



SYLLABUS

2015-2016



PT. RAVISHANKAR SHUKLA
UNIVERSITY RAIPUR
CHHATTISGARH

एम.ए.पूर्व इतिहास (M.A. Pre. History)
प्रथम एवं द्वितीय सेमेस्टर (I & II Semester)
सत्र – 2015–16 (Session 2015-16)

टीप :- तीन अनिवार्य प्रश्न पत्रों के अतिरिक्त परीक्षार्थियों को कोई एक वैकल्पिक प्रश्न पत्र का चयन करना होगा। प्रत्येक प्रश्न पत्र 100–100 अंकों का होगा। 100 अंकों में 80 अंक सैद्धांतिक एवं 20 अंक आंतरिक मूल्यांकन के होंगे।

प्रथम सेमेस्टर (First semester)

प्रश्न पत्र	प्रश्न पत्र का नाम	कोड संख्या	पूर्णांक	सैद्धांतिक	आंतरिक
प्रथम I	इतिहास पद्धति (अनिवार्य) Historiography (Compulsory)	0370–I	100	80	20
द्वितीय II	आधुनिक विश्व (अनिवार्य) Modern world (Compulsory)	0371–I	100	80	20
तृतीय III	प्राचीन एवं मध्यकालीन छत्तीसगढ़ (अनिवार्य) Ancient and Medieval Chhattisgarh (Compulsory)	0372–I	100	80	20
चतुर्थ (अ) IV (A)	ग्रेट ब्रिटेन का इतिहास 1815–1885 (वैकल्पिक–अ) History of Great Britain 1815-1885	0373–I	100	80	20

	(Optional-A)				
चतुर्थ (स) IV (C)	चीन और जापान का इतिहास 1800—1911 (वैकल्पिक—स) History of China & Japan 1800-1911 (Optional-C)	0375—I	100	80	20
चतुर्थ (द) IV (D)	भारतीय इतिहास में नारी—प्राचीन एवं मध्यकालीन (वैकल्पिक—द) Women in Indian History in Ancient &Medieval Period (Optional-D)	0377—I	100	80	20

द्वितीय सेमेस्टर (Second semester)

प्रश्न पत्र	प्रश्न पत्र का नाम	कोड संख्या	पूर्णांक	सैद्धांतिक	आंतरिक
पंचम V	इतिहास लेखन (अनिवार्य) Historiography (Compulsory)	0370—II	100	80	20
षष्ठम VI	समकालीन विश्व (अनिवार्य) Contemporary world (Compulsory)	0371—II	100	80	20
सप्तम VII	आधुनिक छत्तीसगढ़ (अनिवार्य) Modern Chhattisgarh (Compulsory)	0372—II	100	80	20
अष्टम (अ) VIII (A)	आधुनिक इंग्लैण्ड 1885—1956 (वैकल्पिक—अ) Modern England 1885-1956 (Optional-A)	0373—II	100	80	20
अष्टम (स) VIII (C)	चीन और जापान का इतिहास 1911—1950 (वैकल्पिक—स) History of China & Japan 1911-1950 (Optional-C)	0375—II	100	80	20
अष्टम (द)	आधुनिक भारत में नारी (वैकल्पिक—द)	0377—II	100	80	20

VIII (D)	Women in Modern India (Optional-D)				
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(एम.ए.पूर्व) प्रथम सेमेस्टर इतिहास (M.A. Pre. 1st Sem. History)
प्रथम-प्रश्न पत्र (अनिवार्य) (I Paper Compulsory)
इतिहास पद्धति (Historiography)
(पेपर कोड-0370 – I) (Paper Code - 0370 - I)

इकाई – 1

1. इतिहास का अर्थ एवं परिभाषा
2. इतिहास का स्वरूप
3. इतिहास विज्ञान एवं कला के रूप में
4. इतिहास के प्रकार

इकाई – 2

5. इतिहास का अन्य सभी सामाजिक विज्ञान विषयों के साथ संबंध
6. इतिहास का साहित्य के साथ संबंध
7. इतिहास में तथ्य
8. तथ्यों की व्याख्या

इकाई – 3

9. इतिहास में उपकरण
10. इतिहास में कारण एवं नियतिवाद
11. इतिहास में वस्तुनिष्ठता
12. इतिहास में पूर्वाग्रह

इकाई – 4

13. इतिहास का चक्रवादी सिद्धांत
14. इतिहास का समाज शास्त्रीय सिद्धांत
15. इतिहास का आदर्शवादी सिद्धांत
16. इतिहास का तुलनात्मक सिद्धांत

इकाई – 5

17. इतिहास का आलोचनात्मक सिद्धांत
18. इतिहास का भौतिकवादी सिद्धांत
19. इतिहास का सापेक्षवादी सिद्धांत
20. इतिहासवाद

संदर्भ ग्रंथ :

- (1) झारखण्ड चौबे — इतिहास दर्शन
- (2) के.एल.खुराना एवं आर.के.बंसल — इतिहास लेखन, धारणाएं तथा पद्धतियां
- (3) परमानन्द सिंह — इतिहास दर्शन
- (4) प्रो.राधेशरण — इतिहास पद्धति, इतिहास लेखन
- (5) गोविन्द चन्द्रपांडे — इतिहास स्वरूप एवं सिद्धांत
- (6) ब्रजेश कुमार श्रीवास्तव — इतिहास लेखन : अवधारणा, विधाएं एवं साधन
- (7) E.H.Car - What is History
- (8) R.G. Collingwood - The Idea of History
- (9) बुद्ध प्रकाश — इतिहास दर्शन
- (10) बुद्ध प्रकाश — इतिहास दर्शन उद्देश्य एवं विधि
- (11) मानिक लाल गुप्ता — इतिहास—स्वरूप, अवधारणाएं एवं उपयोगिता
- (12) रामकुमार बेहार, ऋषिराज पांडेय — इतिहास पद्धति एवं इतिहास लेखन
- (13) कौलेश्वर राय — इतिहास दर्शन
- (14) Erich Kahler - The Meaning of History
- (15) H.S. Commager - History purpose and Methods
- (16) सत्यनारायण दुबे शरतेन्दु — इतिहास दर्शन (चिंतन) एवं लेखन

(एम.ए.पूर्व) प्रथम सेमेस्टर इतिहास (M.A. Pre. 1st Sem. History)
द्वितीय-प्रश्न पत्र (अनिवार्य) (II Paper Compulsory)
आधुनिक विश्व (Modern World)
(पेपर कोड-0371-I) (Paper Code - 0371 - I)

इकाई – 1

1. विश्व में पूंजीवाद का विकास
2. साम्राज्यवाद का विकास-इंग्लैंड और फ्रांस में
3. साम्राज्यवाद का विकास-जर्मनी और जापान में
4. इंग्लैंड में उदारवाद का विकास

इकाई – 2

5. बिस्मार्क की आंतरिक एवं विदेश नीति
6. कैसर विलियम द्वितीय की विश्व राजनीति
7. 1900-1910 तक अंतर्राष्ट्रीय संधियां
8. 1912 तक पूर्वी समस्या

इकाई – 3

9. प्रथम एवं द्वितीय बाल्कन युद्ध एवं प्रभाव
10. प्रथम विश्वयुद्ध कारण एवं परिणाम
11. पेरिस की शांति सम्मेलन एवं वर्साय की संधि
12. विश्व में समाजवाद का विकास

इकाई – 4

13. 1917 की रूसी क्रांति
14. बोलेशेविक क्रांति एवं लेनिन
15. राष्ट्रसंघ संगठन
16. राष्ट्रसंघ की उपलब्धियां एवं असफलताएं

इकाई – 5

17. प्रथम विश्वयुद्ध के पश्चात् विश्व आर्थिक मंदी का उदय
18. न्यूडील
19. इटली में फांसीवाद-उदय के कारण
20. मुसोलिनी-गृह एवं विदेश नीति

संदर्भ ग्रंथ :

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|--------------------------------------|--|
| (1) दीनानाथ वर्मा | — आधुनिक विश्व का इतिहास |
| (2) के.एल.खुराना एवं शर्मा | — विश्व का इतिहास |
| (3) बिनाके | — सुदूरपूर्व का इतिहास |
| (4) H.G.Wells | - World History |
| (5) Moon & Parker | - Imperialism & world politieces |
| (6) मथुरालाल शर्मा | — आधुनिक यूरोप |
| (7) कालूराम शर्मा | — आधुनिक विश्व का इतिहास |
| (8) केटेलबी | — आधुनिक यूरोप (1815 से 1919) |
| (9) देवेन्द्र सिंह चौहान | — आधुनिक यूरोप (1815 से 1919) |
| (10) सत्यकेतु विद्यालंकार | — एशिया का इतिहास |
| (11) जार्ज बर्नाड्सकी | — रूस का इतिहास |
| (12) B.V. Rao | - History of Modern world |
| (13) D.N.Ghosh | - The History of Europe |
| (14) B.R.Gokhale | - Modern Europe |
| (15) डॉ.मथुरालाल शर्मा | — आधुनिक विश्व |
| (16) विपिन बिहारी सिन्हा | — आधुनिक विश्व |
| (17) दीनानाथ वर्मा एवं शिवकुमार सिंह | — विश्व इतिहास का सर्वेक्षण |
| (18) जैन एवं माथुर | — आधुनिक विश्व |
| (19) डॉ.एस.आर. वर्मा | — आधुनिक विश्व का इतिहास |
| (20) मानिक लाल गुप्ता | — विश्व का इतिहास |
| (21) इंदिरा अर्जुन देव | — समकालीन विश्व का इतिहास (1890—2008) |
| (22) बी.एन. लुणिया | — आधुनिक पाश्चात्य इतिहास की प्रमुख धाराएं |
| (भाग-2) | |
| (23) कौलेश्वर राय | — आधुनिक एशिया (1839—1949) |
| (24) कौलेश्वर राय | — आधुनिक यूरोप (1789—1945) |

(एम.ए.पूर्व) प्रथम सेमेस्टर इतिहास (M.A. Pre. 1st Sem. History)
तृतीय-प्रश्न पत्र (अनिवार्य) (III Paper Compulsory)
प्राचीन एवं मध्यकालीन छत्तीसगढ़ (Ancient & Midieval Chhattisgarh)
(पेपर कोड-0372-I) (Paper Code - 0372 - I)

इकाई – 1

1. छत्तीसगढ़ का परिचय एवं भौगोलिक स्थिति
2. छत्तीसगढ़ का नामकरण
3. छत्तीसगढ़ का जनजीवन
4. प्राचीन छत्तीसगढ़-मौर्य वंश के पूर्व तक

इकाई – 2

5. छत्तीसगढ़ में मौर्यकालीन एवं गुप्तकालीन छत्तीसगढ़
6. छत्तीसगढ़ में सातवाहनों का प्रभाव
7. क्षेत्रीय राजवंश-नलवंश, राजर्षितुल्य कुल वंश, शरभपुरीय वंश
8. पाण्डु वंश, छिन्दकनाग वंश, फणिनाग वंश

इकाई – 3

9. छत्तीसगढ़ में कलचुरियों का आगमन
10. छत्तीसगढ़ में कलचुरि वंश रत्नदेव से मोहन सिंह तक
11. कलचुरि कालीन शासन व्यवस्था
12. कलचुरि कालीन आर्थिक दशा

इकाई – 4

13. कलचुरि कालीन सामाजिक एवं सांस्कृतिक दशा
14. कलचुरि स्थापत्य
15. छत्तीसगढ़ में मराठा शासन – बिंबाजी एवं उनका प्रशासन
16. छत्तीसगढ़ में मराठों की सूबा शासन व्यवस्था

इकाई – 5

17. रघुजी तृतीय
18. मराठा कालीन छत्तीसगढ़ की आर्थिक दशा
19. मराठा कालीन छत्तीसगढ़ की सामाजिक एवं सांस्कृतिक दशा
20. ब्रिटिश नियंत्रण काल

संदर्भ ग्रंथ :

- (1) प्यारेलाल गुप्त — प्राचीन छत्तीसगढ़
- (2) पी.एल. मिश्र — दक्षिण कोशल का प्राचीन इतिहास
- (3) पी.एल. मिश्र — मराठाकालीन छत्तीसगढ़
- (4) भगवान सिंह वर्मा — छत्तीसगढ़ का इतिहास
- (5) राम कुमार बेहार — छत्तीसगढ़ का इतिहास
- (6) एल.एस. निगम — दक्षिण कोशल का इतिहास
- (7) मदनलाल गुप्ता — छत्तीसगढ़ दिग्दर्शन भाग 1, भाग 2
- (8) जे.आर. वालर्यानी एवं वासुदेव साहसी
— छत्तीसगढ़ का राजनीतिक एवं सांस्कृतिक इतिहास
- (9) सुरेश चंद्र शुक्ल — छत्तीसगढ़ का समग्र अध्ययन
- (10) ऋषिराज पांडेय — छत्तीसगढ़ (दक्षिण कोशल के कल्युरि)
- (11) व्ही.व्ही. मिराशी — कल्युरि नरेश और उनका काल
- (12) श्रीमती शांता शुक्ला — छत्तीसगढ़ की सामाजिक एवं आर्थिक स्थिति

(एम.ए.पूर्व) प्रथम सेमेस्टर इतिहास (M.A. Pre. 1st Sem. History)
चतुर्थ-प्रश्न पत्र (वैकल्पिक – अ) (IV Paper Optional - A)
ग्रेट ब्रिटेन का इतिहास (1815 से 1885) (History of Great Britain
1815-1885)

(पेपर कोड-0373-I) (Paper Code - 0373 - I)

इकाई – 1

1. 1815 से 1822 तक आंतरिक समस्याएं
2. 1822 से 1830 तक इंग्लैंड की आंतरिक स्थिति
3. कैसलरे की विदेश नीति
4. कैनिंग की विदेश नीति

इकाई – 2

5. ब्रिटेन में उदारवाद का उदय
6. ब्रिटेन में उदारवाद के विकास का कारण
7. 1832 का सुधार अधिनियम
8. 1830 से 1841 तक अन्य सुधार

इकाई – 3

9. चार्टिस्ट आंदोलन
10. ग्रेट ब्रिटेन की विदेश नीति (1830-1841)
11. सर राबर्ट पील
12. लार्ड जॉन रसेल

इकाई – 4

13. लार्ड पामस्टन
14. 1867 का सुधार अधिनियम
15. बेंजामिन डिजरेली – विदेश नीति
16. नवीन टोरीवाद

इकाई – 5

17. ग्रेट ब्रिटेन और मुक्त व्यापार
18. ग्रेट ब्रिटेन और पूर्वी समस्या (1828-1878)
19. ब्रिटिश साम्राज्यवाद (1880 तक)
20. 1884 तथा 1885 के संसदीय सुधार

संदर्भ ग्रंथ :

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|-------------------------|-------------------------------------|
| (1) एल.पी. शर्मा | — इंग्लैंड का इतिहास |
| (2) विद्याधर महाजन | — इंग्लैंड का इतिहास |
| (3) J.A.R.Marriott | - Modern England |
| (4) G.M.Trevelyan | - Social History of England |
| (5) Ramsay Muir | - History of England |
| (6) बिपीन बिहारी सिन्हा | — आधुनिक ग्रेट ब्रिटेन |
| (7) मेरियट | — आधुनिक इंग्लैंड का इतिहास |
| (8) रामकिशोर पाण्डेय | — आधुनिक इंग्लैंड का इतिहास |
| (9) Maitland | - Constitutional History of England |

(एम.ए.पूर्व) प्रथम सेमेस्टर इतिहास (M.A. Pre. 1st Sem. History)
चतुर्थ-प्रश्न पत्र (वैकल्पिक- स) (IV Paper Optional - C)
चीन और जापान का इतिहास (1800 से 1911 तक)
(History of China & Japan 1800 - 1911)
(पेपर कोड-0375-I) (Paper Code - 0375 - I)

इकाई – 1

1. चीन में यूरोपियों का प्रवेश
2. प्रथम अफीम युद्ध – कारण एवं परिणाम
3. द्वितीय अफीम युद्ध – कारण एवं परिणाम
4. ताइपिंग विद्रोह

इकाई – 2

5. जापान में यूरोपियों का प्रवेश
6. जापान में शोगुन व्यवस्था
7. शोगुन व्यवस्था का अंत और मेईजी पुर्नस्थापना के कारण
8. मेईजी काल में जापान का आधुनिकीकरण

इकाई – 3

9. चीन में विदेशी साम्राज्य का प्रसार एवं चीन की लूट-खसोट
10. जापान का औद्योगिकीकरण
11. चीन-जापान युद्ध-कारण एवं परिणाम
12. चीन में बॉक्सर विद्रोह कारण, घटनाएं एवं परिणाम

इकाई – 4

13. आंग्ल-जापान संधि 1902, कारण एवं परिणाम
14. रूस जापान युद्ध – कारण एवं परिणाम
15. देशोत्तर अधिकार, खुलेद्वार की नीति
16. ईवाकुरा मिशन, फारमोसा अभियान

इकाई – 5

17. 1895 से 1911 तक चीन में राजनीतिक सुधार आंदोलन
18. चीन में 1911 की क्रांति – कारण, प्रसार, परिणाम एवं महत्व
19. डॉ. सनयात् सेन
20. मंचूवंश के पतन के कारण

संदर्भ ग्रंथ :

- | | |
|--------------------------|-------------------------------|
| (1) बिनाके | — सुदूरपूर्व का इतिहास |
| (2) सत्यकेतु विद्यालंकार | — एशिया का इतिहास |
| (3) दीनानाथ वर्मा | — एशिया का इतिहास |
| (4) क्लाउड | — सुदूर पूर्व का इतिहास |
| (5) कै.एल.खुराना | — एशिया का आधुनिक इतिहास |
| (6) बूस | — द फार ईस्ट |
| (7) A.C. Gupta | - A History of China |
| (8) F.H.B. Clyde | - The Far East |
| (9) Goodridge | - A Short History of Far East |

(एम.ए.पूर्व) प्रथम सेमेस्टर इतिहास (M.A. Pre. 1st Sem. History)
चतुर्थ-प्रश्न पत्र (वैकल्पिक- द) (IV Paper Optional - D)
भारतीय इतिहास में नारी-प्राचीन एवं मध्यकालीन
(Women in Indian History - Ancient & Medieval Period)
(पेपर कोड-0377-I) (Paper Code - 0377 - I)

इकाई – 1

1. नारी अध्ययन की विचार धारा, उदारवादी, समाजवादी, मार्क्सवादी, मनोवैज्ञानिक
2. नारी अध्ययन संबंधी स्रोत-ऐतिहासिक स्रोत
3. नारी अध्ययन की स्रोत गैर अभिलेखागारीय
4. नारी अध्ययन का महत्व एवं उपयोगिता

इकाई – 2

5. वैदिक साहित्य एवं महाकाव्य में नारी चित्रण
6. मौर्य एवं मौर्योत्तर काल में नारी की स्थिति
7. गुप्त एवं गुप्तोत्तर काल में नारी की स्थिति
8. राजपूत काल में नारी की स्थिति

इकाई – 3

9. बौद्ध धर्म में महिलाओं की स्थिति
10. जैन धर्म में महिलाओं की स्थिति
11. ईस्लाम में महिलाओं की स्थिति
12. सिक्ख धर्म में महिलाओं की स्थिति

इकाई – 4

13. प्राचीन भारत में महिला शिक्षा
14. मध्यकालीन भारत में महिला शिक्षा
15. प्राचीन भारत में महिलाओं की वैधानिक स्थिति
16. मध्यकालीन भारत में महिलाओं की वैधानिक स्थिति

इकाई – 5

17. प्राचीन कालीन दक्षिण भारत में महिलाओं की दशा
18. भक्ति आंदोलन और महिलाएं
19. मध्यकालीन राजनीति और महिलाएं
20. मध्यकालीन मराठा राजनीति एवं महिलाएं

संदर्भ ग्रंथ :

- | | |
|------------------------|--|
| (1) कमलेश्वर प्रसाद | — भारत का इतिहास खंड 1, 2, 3 |
| (2) सुगम आनंद | — भारतीय इतिहास में नारी |
| (3) के.सी.श्रीवास्तव | — प्राचीन भारत का इतिहास तथा संस्कृति |
| (4) सुरेश चंद्र शुक्ला | — भारतीय इतिहास में नारी |
| (5) रामधारी सिंह दिनकर | — संस्कृति के चार अध्याय |
| (6) पुरी, दास, चोपड़ा | — भारत का सामाजिक, आर्थिक, सांस्कृतिक इतिहास |

(भाग 1 एवं 2)

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|---------------------|--|
| (7) प्रताप सिंह | — आधुनिक भारत का सामाजिक, आर्थिक इतिहास |
| (8) राम शरण शर्मा | — प्राचीन भारत |
| (9) सुधा गोस्वामी | — भारत की चर्चित महिलाएं |
| (10) डॉ.एम.के. गिरि | — द रोल एंड स्टेट्स ऑफ वीमन इन सिक्विज्म |
| (11) राजपाल | — वीमेन इन अरली मिडिवल नार्थ इंडिया |

(एम.ए.पूर्व) द्वितीय सेमेस्टर इतिहास (M.A. Pre. 2nd Sem. History)
पंचम-प्रश्न पत्र अनिवार्य (V Paper Compulsory)
इतिहास लेखन (Historiography)
(पेपर कोड-0370-II) (Paper Code - 0370 - II)

इकाई – 1

1. यूनानी एवं रोमन इतिहास लेखन
2. चीनी इतिहास लेखन
3. मध्यकालीन यूरोपीय इतिहास लेखन
4. प्रबुद्धतावादी इतिहास लेखन

इकाई – 2

5. अरबी तथा परशियन (फारसी) इतिहास लेखन
6. प्राचीन भारत में इतिहास लेखन की परम्परा
7. मध्यकालीन भारतीय इतिहास लेखन—सल्तनत काल
8. मध्यकालीन भारतीय इतिहास लेखन—मुगल कालीन

इकाई – 3

9. भारतीय इतिहास की साम्राज्यवादी व्याख्या
10. भारतीय इतिहास की राष्ट्रवादी व्याख्या
11. भारतीय इतिहास की मार्क्सवादी व्याख्या
12. भारतीय इतिहास की सवालटर्न अथवा जनवादी व्याख्या

इकाई – 4

13. भारतीय इतिहास की विषय वस्तु—आर्थिक इतिहास
14. भारतीय इतिहास की विषय वस्तु—सामाजिक—सांस्कृतिक इतिहास
15. जातीय एवं जनजातीय इतिहास
16. क्षेत्रीय इतिहास लेखन

इकाई – 5

17. भारतीय इतिहास की विषय वस्तु—कृषक एवं श्रमिक
18. भारतीय इतिहास की विषय वस्तु—विज्ञान एवं प्रौद्योगिकी
19. भारतीय इतिहास की विषय वस्तु—नारी
20. भारतीय इतिहास लेखन में वामपंथी, दक्षिण पंथी वाद—विवाद

संदर्भ ग्रंथ :

- | | |
|---------------------------------------|--|
| (1) गोविन्द चन्द्र पांडे | — इतिहास स्वरूप एवं सिद्धांत |
| (2) के.एल.खुराना, आर.के.बंसल | — इतिहास—लेखन, धारणाएं तथा पद्धतियां |
| (3) प्रो. राधेशरण | — इतिहास पद्धतियां इतिहास लेखन |
| (4) कौलेश्वर राय | — इतिहास दर्शन |
| (5) कंवर बहादुर कौशिक
लेखन | — इतिहास दर्शन एवं भारतीय—इतिहास |
| (6) Gyanendra Pandey | — Subaltern Studies |
| (7) ई. श्रीधरन
से 2000 तक | — इतिहास लेख एक पाठ्य पुस्तक 500 ई.पू. |
| (8) S.P.Sen
Modern India | - History & Historiography in |
| (9) Ranjit Guha | - Subaltern Studies (All Volumes) |
| (10) बी.के. श्रीवास्तव
इतिहास लेखन | — इतिहास के सिद्धांत स्वरूप एवं |
| (11) हेरम्ब चतुर्वेदी | — मध्यकालीन इतिहासकार |
| (12) R.C.Majumdar | - Historiography of Modern India |
| (13) बी. शेख अली | — हिस्ट्री इट्स थ्योरी एंड मेथड |
| (14) ए.आर. देसाई | — Peasant struggles in India |
| (15) D.N. Dhangra | - Peasant struggles in India |

(एम.ए.पूर्व) द्वितीय सेमेस्टर इतिहास (M.A. Pre. 2nd Sem. History)
षष्ठम-प्रश्न पत्र (अनिवार्य) (VI Paper Compulsory)
समकालीन विश्व (Contemporary World)
(पेपर कोड-0371-II) (Paper Code - 0371 - II)

इकाई – 1

1. जर्मनी में नाजीवाद का उदय-कारण
2. हिटलर की गृह नीति
3. हिटलर की विदेश नीति
4. जापान में सैन्यवाद

इकाई – 2

5. द्वितीय विश्व युद्ध – कारण एवं परिणाम
6. संयुक्त राष्ट्रसंघ – उद्देश्य एवं संगठन
7. संयुक्त राष्ट्रसंघ – उपलब्धियां एवं योगदान
8. निशस्त्रीकरण की समस्याएं

इकाई – 3

9. चीनी क्रांति 1911
10. चीन में गृहयुद्ध एवं राष्ट्रवादी सरकार की स्थापना।
11. चीन में साम्यवादी सरकार का अभ्युदय।
12. हिन्द चीन एवं इंडोनेशिया में राष्ट्रीय आंदोलन

इकाई – 4

13. शीत युद्ध – परिभाषा एवं स्वरूप
14. शीत युद्ध – अंतर्राष्ट्रीय संधियां एवं तनाव
15. साम्यवादी रूस का विघटन – कारण एवं परिणाम
16. एक ध्रुवीय विश्व

इकाई – 5

17. गुटनिरपेक्ष आंदोलन एवं भारत, पंचशील
18. अरब राष्ट्रवाद
19. आधुनिक तुर्की
20. अंतर्राष्ट्रीय समस्या – फिलीस्तीन, कोरिया एवं वियतनाम

संदर्भ ग्रंथ :

- (1) दीनानाथ वर्मा – आधुनिक विश्व का इतिहास
- (2) सत्यकेतु विद्यालंकार – एशिया का इतिहास
- (3) के.एल.खुराना एवं शर्मा – विश्व का इतिहास
- (4) देवेन्द्र सिंह चौहान – समकालीन यूरोप
- (5) S.P. Nanda - History of Modern World
- (6) सुरेश चंद्र एवं शिवकुमार – आधुनिक विश्व का इतिहास
- (7) कालू राम शर्मा – आधुनिक विश्व
- (8) ई.एच.कार – दो विश्व युद्ध के बीच
- (9) जैन एवं माथुर – विश्व का इतिहास
- (10) D.G.E. Hall - Soul Eorl Asia
- (11) B.V.E. Rao - History of World
- (12) Leyender - The Mieldle East
- (13) A.C.Ray - Contemporary World since 1919
- (14) P.K. Chhatterjee - Modern World
- (15) D.C.Bhattacharya - International relation in the 20th century
- (16) अजय चंद्र बनर्जी – माडर्न वर्ल्ड
- (17) अर्जुन देव, इंदिरा अर्जुन देव – समकालीन विश्व का इतिहास
(1890–2008)
- (18) बी.एन.लुणिया – आधुनिक पाश्चात्य इतिहास की प्रमुख धाराएं
(भाग–2)
- (19) कौलेश्वर राय – आधुनिक यूरोप (1789–1945)

(एम.ए.पूर्व) द्वितीय सेमेस्टर इतिहास (M.A. Pre. 2nd Sem. History)
सप्तम-प्रश्न पत्र (अनिवार्य) (VII Paper Compulsory)
आधुनिक छत्तीसगढ़ (Modern Chhattisgarh)
(पेपर कोड-0372-II) (Paper Code - 0372 - II)

इकाई – 1

1. ब्रिटिश सत्ता की स्थापना
2. ब्रिटिश कालीन प्रशासनिक व्यवस्था
3. ब्रिटिश कालीन छत्तीसगढ़ की सामाजिक, सांस्कृतिक दशा
4. छत्तीसगढ़ के रियासतों के प्रति ब्रिटिश नीति

इकाई – 2

5. 1857 का विप्लव – छत्तीसगढ़ में सिपाही विद्रोह
6. जमींदारी विद्रोह – वीरनारायण सिंह
7. बस्तर में आदिवासी विद्रोह – 1876 एवं 1910
8. छत्तीसगढ़ में राष्ट्रीय आंदोलन 1920 तक

इकाई – 3

9. छत्तीसगढ़ में असहयोग आंदोलन
10. छत्तीसगढ़ में सविनय अवज्ञा आंदोलन
11. छत्तीसगढ़ में जंगल सत्याग्रह
12. छत्तीसगढ़ में व्यक्तिगत सत्याग्रह

इकाई – 4

13. छत्तीसगढ़ में भारत छोड़ो आंदोलन
14. छत्तीसगढ़ में किसान आंदोलन
15. छत्तीसगढ़ में श्रमिक आंदोलन
16. छत्तीसगढ़ में रियासतों का विलीनीकरण

इकाई – 5

17. छत्तीसगढ़ में धार्मिक आस्थाएँ, शैव, वैष्णव, शाक्त, जैन एवं बौद्ध धर्म
18. छत्तीसगढ़ में कबीर एवं सतनाम पंथ
19. छत्तीसगढ़ की लोक संस्कृति
20. छत्तीसगढ़ राज्य निर्माण की पृष्ठभूमि

संदर्भ ग्रंथ :

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|--|---|
| (1) किशोर अग्रवाल | — बीसवीं शताब्दी का छत्तीसगढ़ |
| (2) किशोर अग्रवाल | — स्वातंत्र्योत्तर छत्तीसगढ़ |
| (3) अरविंद शर्मा | — छत्तीसगढ़ का इतिहास |
| (4) तृषा शर्मा | — छत्तीसगढ़ इतिहास, संस्कृति एवं परंपरा |
| (5) अशोक शुक्ला | — छत्तीसगढ़ का राजनीतिक इतिहास |
| (6) भगवान सिंह वर्मा | — छत्तीसगढ़ का इतिहास |
| (7) सुरेश चंद्र | — छत्तीसगढ़ का समग्र इतिहास |
| (8) हीरालाल शुक्ला | — छत्तीसगढ़ का इतिहास |
| (9) दिनेश कुमार राठौर | — कांकेर का इतिहास |
| (10) ऋषिराज पांडेय | — सारंगढ़ रियासत |
| (11) देवेश शर्मा | — मध्यप्रांत में छत्तीसगढ़ |
| (12) रश्मि चौबे | — राष्ट्रीय चेतना के विकास में छत्तीसगढ़ के |
| साहित्यकारों का | योगदान "पंडित सुंदरलाल |
| शर्मा के विशेष में" | |
| (13) सुरेश चंद्र शुक्ला, एवं अर्चना शुक्ला | — छत्तीसगढ़ की रियासतों का |
| विलीनीकरण | |
| (14) शैलेन्द्र सिंह | — भारत के आदिवासी क्षेत्रों के सामन्तीय |
| रियासतों एवं | जमींदारियों में जनजागृति |

(एम.ए.पूर्व) द्वितीय सेमेस्टर इतिहास (M.A. Pre. 2nd Sem. History)
अष्टम-प्रश्न पत्र (वैकल्पिक- अ) (VIII Paper Optional - A)
आधुनिक इंग्लैंड (1885 से 1956 तक) (Modern England 1885 -
1956)

(पेपर कोड-0373-II) (Paper Code - 0373 - II)

इकाई – 1

1. ग्लैंडस्टन – आयरिश नीति
2. ग्लैंडस्टन – गृह नीति
3. सेलिसबरी – गृह नीति

इकाई – 2

4. सेलिसबरी – विदेश नीति
5. चेम्बरलेन का साम्राज्यवाद
6. 1911 का सुधार अधिनियम
7. इंग्लैंड की गृह नीति (1902-1914)

इकाई – 3

8. इंग्लैंड की विदेश नीति (1902-1914)
9. इंग्लैंड और पूर्वी समस्या (1878-1914)
10. प्रथम विश्व युद्ध में इंग्लैंड की भूमिका
11. दो विश्व युद्धों के बीच इंग्लैंड

इकाई – 4

12. विश्व आर्थिक मंदी और इंग्लैंड
13. अफ्रीका के विभाजन में इंग्लैंड की भूमिका
14. ग्रेट ब्रिटेन की गृह नीति (1919-1939)
15. ग्रेट ब्रिटेन की विदेश नीति (1919-1935)

इकाई – 5

16. चेम्बरलेन की तुष्टीकरण की नीति (1936-1939)
17. द्वितीय विश्व युद्ध में इंग्लैंड की भूमिका
18. द्वितीय विश्व युद्ध के पश्चात् इंग्लैंड की स्थिति
19. इंग्लैंड और शीत युद्ध

संदर्भ ग्रंथ :

- | | |
|-----------------------|-----------------------------|
| (1) एल.पी.शर्मा | — इंग्लैंड का इतिहास |
| (2) विद्याधर महाजन | — इंग्लैंड का इतिहास |
| (3) J.A.R. Marriott | - Modern England |
| (4) G.M. Trevelyan | - Social History of England |
| (5) अरुण कुमार मित्तल | — इंग्लैंड का इतिहास |
| (6) रमेश चंद्र सिन्हा | — इंग्लैंड का इतिहास |
| (7) Ramsay Muir | - History of England |

(एम.ए.पूर्व) द्वितीय सेमेस्टर इतिहास (M.A. Pre. 2nd Sem. History)
अष्टम-प्रश्न पत्र (वैकल्पिक – स) (VIII Paper Optional - C)
चीन और जापान का इतिहास (1911 से 1950 तक)
(History of China & Japan 1911-1950)
(पेपर कोड-0375-II) (Paper Code - 0375 - II)

इकाई – 1

1. चीनी गणराज्य
2. युवान-शिह-काई का शासन
3. चीन एवं प्रथम विश्व युद्ध
4. चीन में राष्ट्रवादी सरकार की स्थापना

इकाई – 2

5. नानकिंग की गणतंत्र (कुओमिंगतांग सरकार)
6. जापान एवं प्रथम विश्व युद्ध
7. जापान का आधुनिकीकरण – कारण एवं प्रगति
8. जापान में सैन्यवाद

इकाई – 3

9. जापान में साम्राज्यवाद 1932-1939
10. चीन में गृह युद्ध
11. चीन में राष्ट्रवादियों की पराजय
12. मंचूरिया संकट

इकाई – 4

13. चीन में साम्यवाद का उत्कर्ष
14. चीन में औद्योगिकीकरण
15. जापान एवं एंटिकोमिंटर्न पैक्ट
16. चीन-जापान में द्वितीय युद्ध

इकाई – 5

17. चीन एवं द्वितीय विश्व युद्ध
18. द्वितीय विश्व युद्ध में जापान का प्रवेश
19. चीन में साम्यवादी सरकार
20. द्वितीय विश्व युद्ध में जापान के पराजय का कारण

संदर्भ ग्रंथ :

- | | |
|--------------------------|-------------------------------|
| (1) बिनाके | — सुदूरपूर्व का इतिहास |
| (2) सत्यकेतु विद्यालंकार | — एशिया का इतिहास |
| (3) दीनानाथ वर्मा | — एशिया का इतिहास |
| (4) क्लाउड | — सुदूरपूर्व का इतिहास |
| (5) कै.एल.खुराना | — एशिया का आधुनिक इतिहास |
| (6) बूस | — द फार ईस्ट |
| (7) A.C. Gupta | - A History of China |
| (8) F.H.B. Clyde | - The Far East |
| (9) Goodridge | - A Short History of Far East |

(एम.ए.पूर्व) द्वितीय सेमेस्टर इतिहास (M.A. Pre. 2nd Sem. History)
अष्टम-प्रश्न पत्र (वैकल्पिक – द) (VIII Paper Optional - D)
आधुनिक भारत में नारी (Women in Modern India)
(पेपर कोड-0377-II) (Paper Code - 0377 - II)

इकाई – 1

1. औपनिवेशिक काल में नारी शिक्षा
2. पुनर्जागरण आंदोलन और महिलाएं
3. उन्नीसवीं शताब्दी के नारी संगठन
4. बीसवीं शताब्दी के नारी संगठन

इकाई – 2

5. भारतीय स्वतंत्रता आंदोलन और महिलाएं, 1857 की क्रांति
6. भारतीय स्वतंत्रता आंदोलन और महिलाएं, गांधीवादी आंदोलन
7. भारतीय स्वतंत्रता आंदोलन और महिलाएं, क्रांतिकारी आंदोलन
8. भारतीय स्वतंत्रता आंदोलन और महिलाएं, आजाद हिंद फौज

इकाई – 3

9. स्वतंत्रता के पश्चात् राजनीति और महिलाएं – पंचायत
10. स्वतंत्रता के पश्चात् राजनीति और महिलाएं – विधानसभा से संसद तक
11. मताधिकार और महिलाएं
12. पंचवर्षीय योजनाएं और महिलाएं

इकाई – 4

13. भारतीय संविधान में महिलाओं की स्थिति
14. स्वतंत्रोत्तर भारत में महिलाओं की वैधानिक स्थिति
15. जनजातीय समाज में महिलाओं की स्थिति
16. महिलाओं के प्रति हिंसा एवं अपराध

इकाई – 5

17. महिलाएं – कला एवं साहित्य के क्षेत्र में
18. मानवाधिकार एवं महिलाएं
19. स्वतंत्रोत्तर भारत में महिला शिक्षा
20. काम काजी महिलाएं – स्वावलंबन एवं सशक्तिकरण

संदर्भ ग्रंथ :

- (1) कमलेश्वर प्रसाद — भारत का इतिहास खंड 1, 2, 3
- (2) सुगम आनंद — भारतीय इतिहास में नारी
- (3) विपिन चंद्र — आजादी के बाद का भारत
- (4) पुरी, दास, चोपड़ा — भारत का सामाजिक, आर्थिक, सांस्कृतिक इतिहास (खंड तीन)
- (5) प्रताप सिंह — आधुनिक भारत का सामाजिक, आर्थिक इतिहास
- (6) आनंद मूर्ति — भारतीय इतिहास में नारी
- (7) गोपा जोशी — भारत में स्त्री असमानता
- (8) नीतू केंग — इंडियन वीमेन एक्टीविस्ट
- (9) सी.एन.मंगल, यशोदा भट्ट — बीयांड द थ्रेस होल्ड—इंडियन वीमेन ऑन द मूव
- (10) सुधा गोस्वामी — भारत की चर्चित महिलाएं
- (11) कौरोलिय एम बायर्ली और कारेन रास — महिलायें और संचार माध्यम
- (12) साधना आर्य, नवोदिता मेनन आदि (संपादक) — नारीवादी राजनीति संघर्ष एवं मुद्दे
- (13) यशोदा भट्ट — वीमेन इन इंडिया इन फिफ्टी इयर्स ऑफ इंडिपेंडेंस
- (14) वृंदा करात — भारतीय नारी संघर्ष और मुक्ति

एम.ए.अंतिम इतिहास (M.A. Final. History)
तृतीय एवं चतुर्थ सेमेस्टर (III & IV Semester)
सत्र – 2015–16 (Session 2015-16)

टीप :- परीक्षार्थियों को निम्नलिखित खण्ड अ ब स में से किसी एक खण्ड का चयन कर उसके दोनों प्रश्न पत्रों को हल करना होगा। उपरोक्त वैकल्पिक प्रश्न पत्रों में से परीक्षार्थियों को सरल क्रमांक 1, 3 में से कोई एक एवं 2, 4 में से कोई एक वैकल्पिक प्रश्न पत्रों का चयन करना होगा। सभी प्रश्न पत्रों में 100–100 अंक होंगे। 100 अंकों में 80 अंक सैद्धांतिक एवं 20 अंक आंतरिक मूल्यांकन के होंगे।

तृतीय सेमेस्टर (Third Semester)

प्रश्न पत्र	प्रश्न पत्र का नाम	कोड संख्या	पूर्णांक	सैद्धांतिक	आंतरिक मूल्यांकन
प्रथम I	खण्ड ब : मध्यकालीन भारत Setion B : Medieval India सल्तनतकालीन भारतीय राजनय एवं अर्थव्यवस्था (1200 से 1526 ई. तक) Indian polity and economy in sultanate period (1200-1526 A.D.)	0380—I	100	80	20
द्वितीय II	सल्तनत कालीन समाज एवं संस्कृति (1200 से 1526 ई.) Society and culture in Sultanate period (1200-1526 A.D.)	0381—I	100	80	20
प्रथम I	खण्ड स : आधुनिक भारत Setion C : Modern India आधुनिक भारत 1757 ई. से 1857 ई. तक (राजनीतिक, प्रशासनिक) Modern India 1757 A.D. to 1857 A.D. (Political, Administrative)	0382—I	100	80	20
द्वितीय	आधुनिक भारत 1757 ई. से 1857 ई. तक (आर्थिक, सामाजिक, सांस्कृतिक)	0383—I	100	80	20

II	Modern India 1757 A.D. to 1857 A.D. (Economic, Social, Cultural)				
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वैकल्पिक प्रश्न पत्र (Optional Paper)					
वैक. प्रथम Op. - I	भारतीय राष्ट्रीय आंदोलन का इतिहास (1857 से 1922 ई. तक) History of National Movement (1857 to 1922 A.D.)	0384—I	100	80	20
वैक. द्वितीय Op. - II	भारत का सांस्कृतिक इतिहास (प्रारंभ से 1526 ई. तक) Cultural History of India (Begining to 1526 A.D.)	0385—I	100	80	20
वैक. तृतीय Op. - III	भारतीय संविधान और शासन व्यवस्था Indian Constitution and Administrative System	0386 — A-I	100	80	20
वैक. चतुर्थ Op. - IV	पर्यटन सिद्धांत Tourism Theory	0387—I	100	80	20

चतुर्थ सेमेस्टर (Fourth Semester)

प्रश्न पत्र	प्रश्न पत्र का नाम	कोड संख्या	पूर्णांक	सैद्धांतिक	आंतरिक मूल्यांकन
प्रथम I	खण्ड ब : मध्यकालीन भारत Setion B : Medieval India मुगलकालीन भारतीय राजनय एवं अर्थव्यवस्था (1526 से 1750 ई. तक) Indian Politiy and Economy in Mughal Period (1526-1750 A.D.)	0380—II	100	80	20
द्वितीय II	मुगलकालीन समाज एवं संस्कृति (1526 से 1750 ई.) Society and Culture in Mughal Period (1526-1750 A.D.)	0381—II	100	80	20
प्रथम I	खण्ड स : आधुनिक भारत Setion C : Modern India आधुनिक भारत 1858 ई. से 1964 ई. तक (राजनीतिक, प्रशासनिक) Modern India 1858 A.D. to 1964 A.D. (Political, Administrative)	0382—II	100	80	20
द्वितीय II	आधुनिक भारत 1858 ई. से 1964 ई. तक (आर्थिक, सामाजिक, सांस्कृतिक) Modern India 1858 A.D. to 1964 A.D. (Economic, Social, Cultural)	0383—II	100	80	20
वैकल्पिक प्रश्न पत्र (Optional Paper)					
वैक. प्रथम Op. - I	भारतीय राष्ट्रीय आंदोलन का इतिहास (1922 से 1947 ई. तक) History of Indian National Movement (1922 to 1947 A.D.)	0384—II	100	80	20
वैक. द्वितीय Op. - II	भारत का सांस्कृतिक इतिहास (1526 ई. से 1950 ई. तक) Cultural History of India (1526 A.D.	0385—II	100	80	20

	to 1950 A.D.)				
वैक. तृतीय Op. - III	भारत की केन्द्रीय तथा प्रांतीय शासन व्यवस्था Central and State Administrative System of India	0386—A -II	100	80	20
वैक. चतुर्थ Op. - IV	पर्यटन सिद्धांत एवं व्यवहार—इतिहास के संदर्भ में Tourism Theory and Principles In Reference of History	0387—II	100	80	20

(एम.ए.अंतिम) तृतीय सेमेस्टर इतिहास (M.A. Final. III Sem. History)
प्रथम—प्रश्न पत्र (Paper - I)

(खण्ड—ब) मध्यकालीन भारत (Section -B Medieval India)
सल्तनतकालीन भारतीय राजनय एवं अर्थव्यवस्था (1200 से 1526 ई.)
Indian Polity and Economy in Sultanate Period (1200-1526
A.D.)

(पेपर कोड—0380—I) (Paper Code-0380-I)

इकाई — 1

1. सल्तनत कालीन इतिहास के स्रोत
2. दिल्ली सल्तनत की स्थापना एवं प्रसार
3. सल्तनत कालीन इतिहास लेखन — विभिन्न विचारधाराएं
4. सल्तनत कालीन राज्य का स्वरूप एवं सिद्धांत

इकाई — 2

5. सल्तनतकालीन केन्द्रीय प्रशासन
6. सल्तनत कालीन प्रांतीय व्यवस्था—इक्ता
7. अलाउद्दीन खिलजी की आर्थिक नीति—बाजार नियंत्रण
8. अलाउद्दीन खिलजी की विजयें—उत्तर भारत, दक्षिण भारत

इकाई — 3

9. मुहम्मद बिन तुगलक की योजनाएं
10. फिरोजशाह तुगलक का प्रशासन
11. सल्तनतकालीन क्षेत्रीय राज्य — उत्तर भारत
12. सल्तनतकालीन क्षेत्रीय राज्य — दक्षिण भारत

इकाई — 4

13. सल्तनतकालीन भूराजस्व व्यवस्था
14. सल्तनतकालीन शिल्प व उद्योग
15. सल्तनतकालीन आंतरिक व्यापार
16. सल्तनतकालीन विदेशी व्यापार

इकाई — 5

17. तैमूर का आक्रमण एवं प्रभाव
18. सल्तनत काल में नगरों का उदय
19. सल्तनत कालीन मुद्राएं एवं बैंकिंग

20. सल्लनत कालीन – कृषि एवं उद्योग

संदर्भ ग्रंथ :

- | | |
|----------------------------------|---|
| (1) हरिशचंद्र वर्मा | – मध्यकालीन भारत भाग – 1 |
| (2) ए.एल. श्रीवास्तव | – सल्लनतकालीन भारत |
| (3) विपिन बिहारी सिन्हा | – मध्यकालीन भारत |
| (4) बी.एन. लूणिया | – पूर्व मध्यकालीन भारत |
| (5) इरफान हबीब | – सल्लनतकालीन भारत |
| (6) एल.पी. शर्मा | – मध्यकालीन भारत |
| (7) हेरम्ब चतुर्वेदी | – मध्यकालीन इतिहासकार |
| (8) सतीश चंद्र
संस्कृति–आठवीं | – मध्यकालीन भारत–राजनीति, समाज और
से सत्रहवीं सदी तक |

(एम.ए.अंतिम) तृतीय सेमेस्टर इतिहास (M.A. Final. III Sem. History)
द्वितीय-प्रश्न पत्र (Paper - II)
(खण्ड-ब) मध्यकालीन भारत (Section -B Medieval India)
सल्तनतकालीन समाज एवं संस्कृति (1200 से 1526 ई. तक)
Society and Culture in Sultanate Period (1200-1526 A.D.)
(पेपर कोड-0381-I) (Paper Code-0381-I)

इकाई – 1

1. सल्तनत कालीन समाज – संरचना एवं परिवर्तन
2. सल्तनत कालीन नगरीय समाज – नये सामाजिक वर्गों का उदय
3. सल्तनत कालीन हिन्दू समाज
4. सल्तनत कालीन मुस्लिम समाज

इकाई – 2

5. भक्ति आंदोलन – उदय के लिए उत्तरदायी तत्व
6. सगुण भक्ति की विशेषताएं
7. कृष्ण भक्ति शाखा
8. राम भक्ति शाखा

इकाई – 3

9. निर्गुण भक्ति सम्प्रदाय – कबीर और नानक
10. भक्ति आंदोलन की क्षेत्रीय विशेषताएं
11. भक्ति आंदोलन की भारतीय समाज एवं संस्कृति पर प्रभाव
12. भक्ति आंदोलन का साहित्य पर प्रभाव

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13. सूफीवाद
14. प्रमुख सूफी सिलसिलें और उनकी विशेषताएं
15. इण्डो-इस्लामिक संस्कृति का उदय एवं विकास
16. सल्तनत कालीन विज्ञान एवं तकनीकी

इकाई – 5

17. सल्तनत कालीन स्थापत्य कला
18. सल्तनत कालीन क्षेत्रीय स्थापत्य कला
19. सल्तनत काल में साहित्य का विकास

संदर्भ ग्रंथ :

- (1) बी.के. पंजाबी — मध्यकालीन भारतीय इतिहास
- (2) हरिश्चंद्र वर्मा — मध्यकालीन भारत भाग-1
- (3) रामधारी सिंह दिनकर — संस्कृति के चार अध्याय
- (4) बी.एन. लूणिया — पूर्व मध्यकालीन भारत
- (5) विपिन बिहारी सिन्हा — मध्यकालीन भारत
- (6) प्रताप सिंह — मध्यकालीन संस्कृति
- (7) राजबली सिंह — सूफीवाद
- (8) एल.पी. शर्मा — मध्यकालीन भारत
- (9) ए.एल. श्रीवास्तव — मध्यकालीन संस्कृति
- (10) पुरी, दास, चोपड़ा — भारत का सामाजिक, आर्थिक एवं सांस्कृतिक इतिहास (भाग-2)

(एम.ए.अंतिम) तृतीय सेमेस्टर इतिहास (M.A. Final. III Sem. History)
प्रथम-प्रश्न पत्र (Paper - I)
(खण्ड-स) आधुनिक भारत (Section -C Modern India)
आधुनिक भारत (1757 ई. से 1857 ई. तक) राजनीतिक, प्रशासनिक
(Modern India 1757 A.D. to 1857A.D.) Political, Administrative
(पेपर कोड-0382-I) (Paper Code-0382-I)

इकाई – 1

1. आधुनिक भारतीय इतिहास के स्रोत
2. आधुनिक भारतीय इतिहास लेखन की विचारधाराएं—साम्राज्यवादी राष्ट्रवादी
3. आधुनिक भारतीय इतिहास लेखन की विचारधाराएं—मार्क्सवादी, जनवादी
4. पूर्व औपनिवेशिक भारत की राजनीतिक व्यवस्था

इकाई – 2

5. भारत में यूरोपियों का आगमन
6. कर्नाटक में आंग्ल-फ्रांसीसी प्रतिष्पर्द्धा
7. बंगाल में अंग्रेजी शक्ति का उदय
8. ब्रिटिश साम्राज्य का विस्तार—नीतियां तथा कार्यक्रम

इकाई – 3

9. आंग्ल – मैसूर संबंध
10. आंग्ल – मराठा संबंध
11. आंग्ल-अफगान संबंध
12. आंग्ल – सिक्ख संबंध

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13. आंग्ल – अवध संबंध
14. भारत की औपनिवेशिक संरचना—प्रशासनिक स्वरूप
15. संवैधानिक विकास – 1773-1784
16. संवैधानिक विकास – 1784-1854

इकाई – 5

17. कंपनी एवं रियासतों के संबंध
18. कंपनी प्रशासन के अंतर्गत पुलिस, लोकसेवा एवं न्याय व्यवस्था
19. उपनिवेशवाद का प्रतिरोध—जनजातीय व कृषक आंदोलन

20. 1857 की क्रांति—विचारधाराएं, कारण, स्वरूप एवं महत्व

संदर्भ ग्रंथ :

- | | |
|---------------------------|--|
| (1) एल.पी. शर्मा | — आधुनिक भारत |
| (2) रजनीपाम दत्त | — इंडिया टुडे |
| (3) प्रताप सिंह | — आधुनिक भारत का इतिहास |
| (4) एम.एस. जैन | — आधुनिक भारत |
| (5) सुमित सरकार | — आधुनिक भारत का इतिहास |
| (6) बी.एल. गोवर एवं यशपाल | — आधुनिक भारत का इतिहास |
| (7) एग्नेस ठाकुर | — भारत का इतिहास 1757—1857 |
| (8) वीरकेश्वर प्रसाद सिंह | — भारतीय राष्ट्रीय आंदोलन एवं संवैधानिक विकास |
| (9) एस.आर. शर्मा | — मेकिंग आफ मॉडर्न इंडिया |
| (10) बी.बी. मिश्र | — सेंट्रल एडमिनिस्ट्रेशन आफ ईस्ट इंडिया कंपनी |
| (11) शेखर बंधोपाध्याय | — प्लासी से विभाजन तक |
| (12) विपिन चंद्रा | — आधुनिक भारत का इतिहास |
| (13) वी.डी. महाजन | — मॉडर्न इंडियन हिस्ट्री फ्रॉम 1707 टू प्रजेन्ट डे |
| (14) के.सी. चौधरी | — हिस्ट्री आफ मॉडर्न इंडिया |
| (15) कौलेश्वर राय | — आधुनिक भारत 1757—1950 |

(एम.ए.अंतिम) तृतीय सेमेस्टर इतिहास (M.A. Final. III Sem. History)
द्वितीय-प्रश्न पत्र (Paper - II)
(खण्ड-स) आधुनिक भारत (Section -C Modern India)
आर्थिक, सामाजिक, सांस्कृतिक (1757 ई. से 1857ई. तक)
(Economic, Social, Cultural 1757 A.D to 1857 A.D.)
(पेपर कोड-0383-I) (Paper Code-0383-I)

इकाई – 1

1. पूर्व औपनिवेशिक भारत की आर्थिक व्यवस्था
2. यूरोपीय वाणिज्यवाद का उदय
3. अंग्रेजों की व्यापारिक, वाणिज्यिक नीति
4. कृषि का वाणिज्यीकरण

इकाई – 2

5. ग्रामीण अर्थव्यवस्था – कृषि की स्थिति एवं समस्याएं
6. नवीन भूराजस्व व्यवस्था – स्थाई बंदोबस्त तक
7. नवीन भूराजस्व व्यवस्था – रैयतवाड़ी, महालवाड़ी
8. ग्रामीण ऋण ग्रस्तता, अकाल नीति

इकाई – 3

9. शहरी अर्थव्यवस्था – हस्तशिल्प, उद्योगोंकी स्थिति
10. औद्योगीकरण 1757-1857
11. आंतरिक बाजार और शहरी केन्द्र, विदेश व्यापार
12. धन का निष्कासन

इकाई – 4

13. पूर्व औपनिवेशिक भारत की सामाजिक एवं सांस्कृतिक व्यवस्था
14. भारतीय पुनर्जागरण
15. समन्वयवादी समाज सुधार आंदोलन-बंगाल एवं महाराष्ट्र के संदर्भ

में

16. सामाजिक सुधार शासन द्वारा किये गए सुधार कार्य

इकाई – 5

17. प्रतिक्रियावाद – बहावी आंदोलन
18. नवीन सामाजिक वर्गों का उदय
19. शिक्षा का विकास

20. भारतीय प्रेस (1857 तक)

संदर्भ ग्रंथ :

- (1) एल.पी. शर्मा — आधुनिक भारत
- (2) ए.आर. देसाई — आधुनिक राष्ट्रवाद की सामाजिक पृष्ठभूमि
- (3) रजनी पामदत्त — इंडिया टुडे
- (4) ग्रोवर एवं यशपाल — आधुनिक भारत का इतिहास एवं नवीन मूल्यांकन (1707–1969)
- (5) एस.आर. शर्मा — मेकिंग आफ मॉडर्न इंडिया
- (6) प्रताप सिंह — आधुनिक भारत-1, खंड-3
- (7) एम.एस. जैन — आधुनिक भारत का इतिहास
- (8) एस.पी. नायर — सोशल एंड इकॉनामिक हिस्ट्री आफ मॉडर्न इंडिया
- (9) S.P. Nanda - Economic and Social History of Modern India
- (10) V.A. Narain - Social History of Modern India
- (11) एग्नेस ठाकुर — भारत का आर्थिक इतिहास (1757–1950)
- (12) पुरी, दास, चोपड़ा — भारत का सामाजिक आर्थिक एवं सांस्कृतिक इतिहास
- (13) अरूण भट्टाचार्य — हिस्ट्री आफ मॉडर्न इंडिया (1757–1947)
- (14) नीलकंठ शास्त्री — एडवांस हिस्ट्री ऑफ इंडिया
- (15) आर.सी. मजुमदार एवं एच.सी. राय — ऐन एडवांस हिस्ट्री ऑफ इंडिया
- (16) कौलेश्वर राय — आधुनिक भारत 1757–1950

(एम.ए.अंतिम) तृतीय सेमेस्टर इतिहास (M.A. Final. III Sem. History)
प्रथम-प्रश्न पत्र (वैकल्पिक-01) (Paper - I Optional - 01)
भारतीय राष्ट्रीय आंदोलन का इतिहास (1857ई. से 1922ई. तक)
History of National Movement (1857 to 1922 A.D.)
(पेपर कोड-0384-I) (Paper Code-0384-I)

इकाई – 1

1. 1857 के विप्लव के कारण
2. 1857 के विप्लव का स्वरूप एवं परिणाम
3. भारत में राष्ट्रवाद की वैचारिक पृष्ठभूमि
4. कांग्रेस की स्थापना के पूर्व राजनीतिक संगठन

इकाई – 2

5. भारतीय राष्ट्रीय कांग्रेस की स्थापना – अवधारणाएं एवं उद्देश्य
6. कांग्रेस का नरमपंथी युग – विचारधारा एवं कार्यक्रम
7. कांग्रेस में उग्रवाद का उदय – विचारधारा एवं कार्यक्रम
8. नरमपंथी – उग्रवाद संघर्ष

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9. बंग-भंग एवं स्वदेशी आंदोलन
10. साम्प्रदायिक राजनीति का उदय, मुस्लिम लीग
11. लखनऊ समझौता
12. होमरूल आंदोलन

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13. गांधीजी का भारतीय राजनीति में प्रवेश एवं उनके नेतृत्व में प्रारंभिक आंदोलन
14. रोलेक्ट एक्ट
15. जलियावाला बाग हत्याकांड और उसका प्रभाव
16. हण्टर कमीशन रिपोर्ट

इकाई – 5

17. 1919 के अधिनियम
18. क्रांतिकारी आंदोलन-प्रथम चरण-महाराष्ट्र, बंगाल, पंजाब एवं अन्य

क्षेत्र

19. असहयोग आंदोलन

20. असहयोग आंदोलन का भारतीय राजनीति पर प्रभाव

संदर्भ ग्रंथ :

- (1) ताराचंद — भारतीय स्वाधीनता आंदोलन का इतिहास भाग 1 व 2
- (2) सुमित सरकार — आधुनिक भारत
- (3) पं.सुंदरलाल शर्मा — भारत में अंग्रेजी राज
- (4) डॉ. आभा सक्सेना— इंडियन नेशनल मूवमेंट एंड द लिबरलस
- (5) ए.आर. देसाई — भारतीय राष्ट्रवाद की सामाजिक पृष्ठभूमि
- (6) शर्मा एवं शर्मा — भारतीय राष्ट्रीय आंदोलन एवं राजनैतिक विकास
- (7) कौलेश्वर राय — फ्रीडम स्ट्रगल
- (8) विपिन चन्द्र — भारतीय स्वतंत्रता संग्राम का इतिहास
- (9) बीरकेश्वर प्रसाद सिंह — भारतीय राष्ट्रीय आंदोलन एवं संवैधानिक विकास
- (10) रामलखन शुक्ला — आधुनिक भारत का इतिहास
- (11) विनोद कुमार सक्सेना — द पार्टीशन ऑफ बंगाल
- (12) के.पी. बहादुर — हिस्ट्री ऑफ फ्रीडम मूवमेंट इन इंडिया
- (13) योगेन्द्र श्रीवास्तव — हिस्ट्री ऑफ फ्रीडम मूवमेंट 1857–1947
- (14) यशपाल एवं ग्रोवर — आधुनिक भारत का इतिहास
- (15) कौलेश्वर राय — आधुनिक भारत 1757–1950

(एम.ए.अंतिम) तृतीय सेमेस्टर इतिहास (M.A. Final. III Sem. History)
द्वितीय-प्रश्न पत्र (वैकल्पिक-02) (Paper - II Optional - 02)
भारत का सांस्कृतिक इतिहास (प्रारंभ से 1526 ई. तक)
Cultural History of India (Beginning to 1526 A.D.)
(पेपर कोड-0385-I) (Paper Code-0385-I)

इकाई – 1

1. हड़प्पाकालीन सामाजिक एवं आर्थिक जीवन
2. हड़प्पाकालीन कला एवं स्थापत्य कला
3. आर्यों का मूल निवास संबंधी अवधारणाएं
4. आर्यों का भारत में प्रसार

इकाई – 2

5. ऋग्वेद कालीन समाज एवं संस्कृति
6. उत्तरवैदिक कालीन समाज एवं संस्कृति
7. वेद, उपनिषद, सूत्र, स्मृतिग्रंथ
8. महाकाव्य युगीन संस्कृति

इकाई – 3

9. महाजनपद कालीन समाज एवं संस्कृति
10. जैन धर्म, बौद्ध धर्म
11. मौर्यकालीन समाज एवं संस्कृति
12. भारतीय संस्कृति में अशोक का योगदान

इकाई – 4

13. गुप्तकालीन समाज एवं धर्म
14. गुप्तकालीन कला विज्ञान एवं साहित्य
15. राजपूत कालीन समाज
16. राजपूत कालीन कला एवं स्थापत्य

इकाई – 5

17. सल्तनत कालीन समाज
18. सल्तनतकालीन संस्कृति की विशेषताएं
19. भक्ति आंदोलन
20. सूफी आंदोलन

संदर्भ ग्रंथ :

- | | |
|--------------------------|---|
| (1) रामशरण शर्मा | — प्राचीन भारत |
| (2) विमल चन्द्र पाण्डेय | — प्राचीन भारत का राजनीतिक, सांस्कृतिक इतिहास |
| (3) रोमिला थापर | — अशोक तथा मौर्य साम्राज्य का पतन |
| (4) के.एन. शास्त्री | — दक्षिण भारत का इतिहास |
| (5) ए.एल. बाशम | — अद्भुत भारत |
| (6) भारद्वाज | — मध्यकालीन भारतीय संस्कृति |
| (7) जयनारायण पांडे | — सिंधु सभ्यता |
| (8) के.सी. श्रीवास्तव | — प्राचीन भारत का इतिहास तथा संस्कृति |
| (9) शिवशंकर शर्मा | — भारतीय संस्कृति |
| (10) नीरज श्रीवास्तव | — मध्यकालीन भारत—प्रशासन, समाज एवं संस्कृति |
| (11) रामशरण शर्मा | — प्रारंभिक भारत का परिचय |
| (12) कृष्ण मोहन श्रीमाली | — धर्म, समाज एवं संस्कृति |
| (13) रमेन्द्र नाथ नंदी | — प्राचीन भारत में धर्म के सामाजिक आधार |
| (14) राधाकुमुद मुखर्जी | — हिन्दू सभ्यता |
| (15) बी.एन. लूणिया | — प्राचीन भारतीय संस्कृति |
| (16) राजबली | — सूफीवाद |

(एम.ए.अंतिम) तृतीय सेमेस्टर इतिहास (M.A. Final. III Sem. History)
तृतीय-प्रश्न पत्र (वैकल्पिक-03) (Paper - III Optional - 03)
भारतीय संविधान और शासन व्यवस्था
Indian Constitution and Administrative System
(पेपर कोड-0386-A-I) (Paper Code-0386-A-I)

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1. भारत की संविधान सभा का गठन
2. भारत का संविधान सभा की विभिन्न समितियाँ
3. भारतीय संविधान की प्रस्तावना
4. भारतीय संविधान की प्रमुख विशेषताएं

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5. भारतीय संविधान के स्रोत
6. मौलिक अधिकार एवं संवैधानिक उपचार
7. नीति निर्देशक तत्व
8. मौलिक कर्तव्य

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9. राष्ट्रपति-निर्वाचन शक्तियाँ एवं कर्तव्य
10. उपराष्ट्रपति-निर्वाचन शक्तियाँ एवं कर्तव्य
11. प्रधानमंत्री एवं मंत्रि परिषद तथा उनके कार्य
12. संसद का गठन – राज्य सभा एवं लोक सभा

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13. संविधान संशोधन प्रक्रिया एवं प्रमुख संशोधन
14. आपात कालीन उपबंध
15. महान्यायवादी
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17. सर्वोच्च न्यायालय
18. संघ लोक सेवा आयोग, निर्वाचन आयोग
19. योजना आयोग एवं राष्ट्रीय विकास परिषद
20. वित्त आयोग

संदर्भ ग्रंथ :

- (1) डी.डी. बसु — भारत का संविधान एक परिचय
- (2) हिर मोहन जैन — भारतीय शासन और राजनीति
- (3) सुशीला कौशिक — भारतीय शासन और राजनीति
- (4) सुभाष कश्यप — हमारा संविधान
- (5) R.C Agrawal - Indian Political System
- (6) A.G. Noorani - Constitutional Question in India
- (7) A. S. Narang - Indian Government and Politics
- (8) G. Austin - The Indian Constitution
- (9) M.V. Paylee - An Introduction to the constitution of India

(एम.ए.अंतिम) तृतीय सेमेस्टर इतिहास (M.A. Final. III Sem. History)

चतुर्थ-प्रश्न पत्र (वैकल्पिक-04) (Paper - IV Optional - 04)

पर्यटन सिद्धान्त

Tourism Theory

(पेपर कोड-0387-I) (Paper Code-0387-I)

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1. पर्यटन का अर्थ एवं परिभाषा
2. पर्यटन की अवधारणा
3. पर्यटन का उद्देश्य एवं महत्व
4. पर्यटन के सिद्धान्त एवं व्यवहार

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5. पर्यटन संगठन
6. भारतीय पर्यटन संगठन केन्द्रीय
7. प्रान्तीय पर्यटन विभाग

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8. ट्रेवल एजेंसी – गठन
9. ट्रेवल एजेंसी – कार्य
10. पर्यटन एवं यातायात
11. टिकट एवं आरक्षण कार्य

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12. पर्यटन एवं आवास तथा होटल उद्योग मुद्रा विनिमय
13. अंतर्राष्ट्रीय पर्यटन – पासपोर्ट, वीसा विदेशी संबंधी नियम
14. अंतर्राष्ट्रीय पर्यटन सुविधाएं एवं समस्याएं

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15. पर्यटन एवं हस्तशिल्प उद्योग
16. पर्यटन एवं कला
17. पर्यटन एवं लोक संस्कृति
18. पर्यटन एवं मेले त्यौहार

संदर्भ ग्रंथ :

- (1) जगमोहन नेगी – पर्यटन एवं यात्रा के सिद्धांत
- (2) जगमोहन नेगी – पर्यटन एवं मार्केटिंग तथा विकास
- (3) के.के. दीक्षित – पर्यटन के विविध आयाम
- (4) ताज राव – पर्यटन विकास के विविध आयाम
- (5) ताज राव – पर्यटन का प्रभाव एवं प्रबंधन
- (6) ए.के. भाटिया – टूरिज्म डेवलेपमेंट प्रिंसिपल एंड प्रैक्टिसेज
- (7) राम आचार्य – टूरिज्म इन इंडिया

(एम.ए.अंतिम) चतुर्थ सेमेस्टर इतिहास (M.A. Final. IV Sem. History)
पंचम प्रश्न पत्र (खंड ब मध्यकालीन भारत) (Paper - V Section - B Medieval
India)

मुगलकालीन भारतीय राजनय एवं अर्थव्यवस्था (1526 से 1750 ई. तक)

Indian Politiy and Economy in Mughal Period (1526-1750 A.D.)

(पेपर कोड-0380-II) (Paper Code-0380-II)

इकाई – 1

1. मुगलकालीन इतिहास के स्रोत
2. मुगलकालीन इतिहास लेखन – विभिन्न विचारधाराएं
3. मुगलकालीन राजनय – दैवीय अधिकार का सिद्धांत
4. मुगल शासकों की राजत्व नीति

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5. मुगलकालीन केन्द्रीय प्रशासन
6. मुगलकालीन प्रांतीय प्रशासन विशेषताएं
7. मनसब एवं जागीर
8. शेरशाह का प्रशासन

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9. मुगलकालीन दरबारी राजनीति एवं संघर्ष
10. मराठा इतिहास के स्रोत
11. मराठा राज्य की स्थापना एवं विकास
12. शिवाजी का प्रशासन

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13. मुगलकालीन कृषि अर्थव्यवस्था एवं भू-राजस्व
14. मुगलकाल में शिल्प उद्योग
15. मुगलकालीन आंतरिक व्यापार
16. मुगलकालीन विदेशी व्यापार

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17. मुगलकाल में नगरों का उदय-नगरीय प्रशासन
18. मुगलकालीन मुद्रा एवं बैंकिंग
19. नए व्यापारिक वर्गों का उदय
20. मुगल काल में कृषि एवं उद्योग में तकनीकी परिवर्तन

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1. हरिश्चन्द्र – मध्यकालीन भारत – भाग 2
2. सर जदुनाथ सरकार – शिवाजी एंड हिज टाईम्स
3. ए.एल. श्रीवास्तव – मुगलकालीन भारत
4. बी.एन. लुनिया – मुगल साम्राज्य का उत्कर्ष
5. बी.के. पंजाबी – मध्यकालीन भारत का इतिहास
6. हेरम्ब चतुर्वेदी – मुगलकालीन इतिहासकार
7. हेरम्ब चतुर्वेदी – मुगलकालीन राजनय एवं अर्थव्यवस्था

8. पी.पी. सिन्हा – मध्यकालीन भारत

(एम.ए.अंतिम) चतुर्थ सेमेस्टर इतिहास (M.A. Final. IV Sem. History)
षष्ठम प्रश्न पत्र (खंड ब मध्यकालीन भारत) (Paper - VI Section - B Medieval India)
मुगलकालीन भारतीय समाज एवं संस्कृति (1526 से 1750 ई. तक)
Society and Culture in Mughal Period (1526-1750 A.D.)
(पेपर कोड-0381-II) (Paper Code-0381-II)

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1. मुगलकालीन हिन्दू समाज
2. मुगलकालीन मुस्लिम समाज
3. मुगलकालीन समाज में शासक वर्ग की भूमिका
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5. मुगलकालीन स्थापत्यकला
6. मुगलकालीन क्षेत्रीय स्थापत्य कला
7. मुगलकालीन चित्रकला
8. क्षेत्रीय चित्रकला का विकास

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9. फारसी भाषा एवं साहित्य का विकास
10. हिन्दी साहित्य का विकास
11. संस्कृत साहित्य का विकास
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13. मुगलकाल में समन्वयवादी संस्कृति का विकास
14. मुगलकाल में संस्कृति के विकास में अकबर का योगदान
15. समन्वयवादी संस्कृति का विघटन और औरंगजेब
16. मुगलकाल में नृत्य एवं संगीतकला का विकास

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17. मुगलकाल में धार्मिक आंदोलन
18. सामंती व्यवस्था का समाज पर प्रभाव
19. मराठा संस्कृति की विशेषताएं
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1. आर्शीवादी लाल श्रीवास्तव – मध्यकालीन भारत
2. हरिश्चन्द्र वर्मा – मध्यकालीन भारत – 2
3. बी.एन. लुनिया – मुगल साम्राज्य का उत्कर्ष
4. ए.एल. श्रीवास्तव – मध्यकालीन संस्कृति
5. दिनेश चन्द्र भारद्वाज – मध्यकालीन संस्कृति
6. पुरीदास एवं चोपड़ा – भारत का सामाजिक, सांस्कृतिक एवं आर्थिक इतिहास भाग –

7. एल.पी. शर्मा – मध्यकालीन भारत

(एम.ए.अंतिम) चतुर्थ सेमेस्टर इतिहास (M.A. Final. IV Sem. History)
पंचम प्रश्न पत्र (खंड स आधुनिक भारत) (Paper - V Section - C Modern India)
आधुनिक भारत (1858 से 1964 ई. तक) राजनीतिक, प्रशासनिक
Modern India 1858 A.D. to 1964 A.D. (Political, Administrative)
(पेपर कोड-0382-II) (Paper Code-0382-II)

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1. प्रशासनिक परिवर्तन – संवैधानिक सुधारों के संदर्भ में (1858–1892)
2. प्रशासनिक परिवर्तन – संवैधानिक सुधारों के संदर्भ में (1909–1919)
3. प्रशासनिक परिवर्तन – संवैधानिक सुधारों के संदर्भ में (1935–1947)
4. भारतीय गणतंत्र का संविधान

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5. प्रशासनिक ढांचा – स्थानीय स्वाशासन के संदर्भ में
6. प्रशासनिक ढांचा – लोकसेवा के संदर्भ में
7. प्रशासनिक ढांचा – न्याय व्यवस्था के संदर्भ में
8. प्रशासनिक ढांचा – पुलिस प्रशासन के संदर्भ में

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9. पड़ोसी राज्यों से संबंध – अफगानिस्तान एवं फारस के संदर्भ में
10. पड़ोसी राज्यों से संबंध – नेपाल एवं बर्मा के संदर्भ में
11. देशी रियासतों के साथ संबंध – नीतिगत विस्तार
12. रियासतों का भारतीय संघ में विलीनीकरण

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13. भारतीय राष्ट्रवाद का उदय – अवधारणाएं एवं गतिविधियां
14. 1919 तक संगठित राष्ट्रवाद की प्रवृत्तियां
15. कृषक, श्रमिक एवं क्रांतिकारी आंदोलन
16. गांधीवादी आंदोलन – विचारधारा, स्वरूप एवं कार्यक्रम

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17. साम्प्रदायिकता का उदय एवं विकास – मुस्लिम लीग की स्थापना तक
18. साम्प्रदायिकता का विकास – भारत विभाजन तक
19. स्वाधीनता की प्राप्ति
20. भारत की विदेश नीति – गुटनिरपेक्षता

संदर्भ ग्रंथ :

1. एल.पी.शर्मा – आधुनिक भारत
2. रजमी पाम दत्त – इंडिया टुडे
3. प्रताप सिंह – आधुनिक भारत का इतिहास
4. एम.एस. जैन – आधुनिक भारत
5. सुमित सरकार – आधुनिक भारत का इतिहास
6. बी.एल.ग्रोवर एवं यशपाल – आधुनिक भारत का इतिहास
7. एग्नेस ठाकुर – भारत का इतिहास 1757–1857
8. वीरकेश्वर प्रसाद सिंह – भारतीय राष्ट्रीय आंदोलन एवं संवैधानिक विकास
9. एस.आर. शर्मा – मेकिंग ऑफ मॉडर्न इंडिया
10. बी.बी. मिश्र – सेंट्रल एडमिनिस्ट्रेशन ऑफ ईस्ट इंडिया कंपनी
11. शेखर बंधोपाध्याय – प्लासी से विभाजन तक
12. विपन चन्द्र – आधुनिक भारत का इतिहास
13. बी.डी. महाजन – मॉडर्न इंडियन हिस्ट्री 1707 टू प्रजेन्ट डे
14. के.सी. चौधरी – हिस्ट्री ऑफ मॉडर्न इंडिया
15. कौलेश्वर राय – आधुनिक भारत 1757–1950

(एम.ए.अंतिम) चतुर्थ सेमेस्टर इतिहास (M.A. Final. IV Sem. History)
षष्ठम प्रश्न पत्र (खंड स आधुनिक भारत) (Paper - VI Section - C Modern India)
आधुनिक भारत (1858 से 1964 ई. तक) आर्थिक, सामाजिक, सांस्कृतिक
Modern India 1858 A.D. to 1964 A.D. (Economic, Social, Cultural)
(पेपर कोड-0383-II) (Paper Code-0383-II)

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1. ग्रामीण अर्थव्यवस्था – कृषि की स्थिति
2. अकाल नीति
3. शहरी अर्थव्यवस्था – औद्योगिकीकरण का विकास 1858–1947
4. वृहद पैमाने के उद्योग

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5. औद्योगिक श्रम, श्रम संघों का विकास व आंदोलन
6. जनसंख्या
7. रेल्वे का विकास एवं भारतीय अर्थव्यवस्था
8. रेलपथ के सामाजिक, आर्थिक प्रभाव

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9. भूमि सुधार – 1964 तक
10. नियोजित अर्थव्यवस्था-पंचवर्षीय योजनाएं
11. योजनाओं के आर्थिक परिणाम

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12. आर्य समाज, प्रार्थना समाज
13. थियोसोफिकल सोसाइटी, रामकृष्ण मिशन
14. अलीगढ़ आंदोलन
15. निम्न जातीय आंदोलन, सिक्ख सुधार आंदोलन

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16. ब्रिटिश शासन काल में नारी उत्थान के प्रयास
17. आधुनिक शिक्षा का विकास
18. समाचार पत्रों का विकास
19. स्वास्थ्य एवं विज्ञान – तकनीकी विकास

संदर्भ ग्रंथ :

1. बी.एल.गोवर एवं यशपाल – आधुनिक भारत का इतिहास एक नवीन मूल्यांकन (1707–1969)
2. एल.पी.शर्मा – आधुनिक भारत
3. एस.आर.शर्मा – मेकिंग ऑफ मॉडर्न इंडिया
4. ए.आर.देसाई – भारतीय राष्ट्रवाद की सामाजिक पृष्ठभूमि
5. आर.सी. दत्त – इकोनामिक हिस्ट्री ऑफ इंडिया
6. विपिन चंद्र – भारतीय स्वतंत्रता संग्राम का इतिहास 1857–1947
7. विपिन चंद्र – आजादी के बाद भारत (1947–2000)
8. सुमित सरकार – आधुनिक भारत
9. एम.ए. जैन – आधुनिक भारत का इतिहास
10. प्रताप सिंह – आधुनिक भारत का सामाजिक आर्थिक इतिहास
11. प्रताप सिंह – आधुनिक भारत, 3 खंड
12. एग्नेस ठाकुर – भारत का आर्थिक इतिहास 1757–1950
13. पुरी दास ठाकुर – भारत का सामाजिक, आर्थिक एवं सांस्कृतिक इतिहास
14. अरुण भट्टाचार्य – हिस्ट्री ऑफ मॉडर्न इंडिया

(एम.ए.अंतिम) चतुर्थ सेमेस्टर इतिहास (M.A. Final. IV Sem. History)
प्रश्न पत्र (वैकल्पिक – 01) (Paper Optional - 01)
भारतीय राष्ट्रीय आंदोलन का इतिहास (1922 से 1947 ई. तक)
History of Indian National Movement (1922 to 1947 A.D.)
(पेपर कोड-0384-II) (Paper Code-0384-II)

इकाई – 1

1. स्वराज्य दल
2. साइमन कमीशन का विरोध एवं नेहरू रिपोर्ट
3. सविनय अवज्ञा के समय भारत की राजनीतिक स्थिति
4. सविनय अवज्ञा आंदोलन

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5. गोलमेज सम्मेलन
6. पूना समझौता एवं श्वेत पत्र
7. प्रांतीय स्वायत्तता का क्रियान्वयन
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9. क्रांतिकारी आंदोलन द्वितीय चरण
10. भारतीय राजनीति में वामपंथी विचारधारा
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12. श्रमिक आंदोलन

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15. भारत छोड़ो आंदोलन
16. भारतीय राजनीति में गांधीजी का योगदान

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17. भारत विभाजन की योजनाएं
18. कैबिनेट मिशन एवं अंतरिम सरकार
19. आजाद हिन्द फौज एवं सुभाष चंद्र बोस
20. सांप्रदायिक राजनीति का विकास एवं भारत विभाजन

संदर्भ ग्रंथ :

1. बी.एल. ग्रोवर – आधुनिक भारत का नवीन मूल्यांकन
2. कौलेश्वर राय – आधुनिक भारत
3. सुमित सरकार – आधुनिक भारत
4. बिरकेश्वर प्रसाद सिंह – भारतीय राष्ट्रीय आंदोलन एवं संवैधानिक विकास
5. पुखराज जैन – भारत का स्वतंत्रता संग्राम एवं राजनैतिक विकास
6. डी.सी. गुप्ता – भारत का राष्ट्रीय आंदोलन
7. विपन श्रीवास्तव – भारतीय स्वतंत्रता संग्राम का इतिहास
8. योगेन्द्रा चंद्रा – हिस्ट्री ऑफ फ्रीडम मूवमेंट इन इंडिया
9. यशपाल एवं ग्रोवर – आधुनिक भारत
10. रामलखन शुक्ला – आधुनिक भारत का इतिहास

(एम.ए.अंतिम) चतुर्थ सेमेस्टर इतिहास (M.A. Final. IV Sem. History)
प्रश्न पत्र (वैकल्पिक – 02) (Paper Optional - 02)
भारत का सांस्कृतिक इतिहास (1526 से 1950 ई. तक)
Cultural History of India (1526 A.D. to 1950 A.D.)
(पेपर कोड-0385-II) (Paper Code-0385-II)

इकाई – 1

1. भारतीय संस्कृति में अकबर का योगदान
2. मुगलकालीन समाज
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5. मुगलकालीन संगीतकला
6. दक्षिण भारतीय सांस्कृतिक जीवन
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8. यूरोपियों के आगमन का आर्थिक प्रभाव
9. भारतीय संस्कृति पर पाश्चात्य प्रभाव
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13. आर्य समाज तथा थियोसोफिकल सोसाइटी
14. रामकृष्ण मिशन एवं विवेकानंद
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16. ब्रिटिश भारत में नारी की स्थिति – सामाजिक कुरीतियां
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18. कंपनी शासन काल में शिक्षा का विकास 1857 तक
19. ब्रिटिश शासन काल में शिक्षा का विकास 1858 से 1947

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1. ए.एल. श्रीवास्तव – सल्तनतकालीन भारत
2. हरिशचन्द्र वर्मा – मध्यकालीन भारत – भाग – 1 एवं 2
3. राजबली पांडे – सूफीज्म
4. पं. सुन्दर लाल शर्मा – भारत में अंग्रेजी राज
5. डाडवेल – कैम्ब्रिज हिस्ट्री ऑफ इंडिया
6. रोमिला थापर – आधुनिक भारत का इतिहास
7. बी.एन. लुणिया – मुगल साम्राज्य का उत्कर्ष
8. शिवशंकर शर्मा – भारतीय संस्कृति
9. बी.एन. लुणिया – भारतीय संस्कृति
10. पुरी, दास, चोपड़ा – भारत का सामाजिक, आर्थिक सांस्कृतिक इतिहास, खंड 2, 3।

(एम.ए.अंतिम) चतुर्थ सेमेस्टर इतिहास (M.A. Final. IV Sem. History)
प्रश्न पत्र (वैकल्पिक – 03) (Paper Optional - 03)
भारत की केन्द्रीय तथा प्रान्तीय शासन व्यवस्था
Central and State Administrative System of India
(पेपर कोड-0386-A-II) (Paper Code-0386-A-II)

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1. लोकपाल
2. भाषाएं एवं राजभाषा आयोग
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4. सूचना आयोग एवं सूचना का अधिकार

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6. मुख्यमंत्री एवं मंत्रिपरिषद तथा उनके कार्य
7. विधान परिषद एवं विधान सभा
8. संघ राज्य क्षेत्र

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10. अधीनस्थ न्यायालय
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18. राज्य में कानून व्यवस्था एवं पुलिस प्रशासन
19. संभाग एवं संभागायुक्त, उनके कार्य तथा शक्तियां
20. जिला एवं जिला दंडाधिकारी, उनके कार्य तथा शक्तियां

संदर्भ ग्रंथ :

- (1) डी.डी. बसु — भारत का संविधान एक परिचय
- (2) हिर मोहन जैन — भारतीय शासन और राजनीति
- (3) सुशीला कौशिक — भारतीय शासन और राजनीति
- (4) सुभाष कश्यप — हमारा संविधान
- (5) R.C Agrawal - Indian Political System
- (6) A.G. Noorani - Constitutional Question in India
- (7) A. S. Narang - Indian Government and Politics
- (8) G. Austin - The Indian Constitution
- (9) M.V. Paylee - An Introduction to the constitution of India

(एम.ए.अंतिम) चतुर्थ सेमेस्टर इतिहास (M.A. Final. IV Sem. History)
प्रश्न पत्र (वैकल्पिक – 04) (Paper Optional - 04)
पर्यटन सिद्धान्त एवं व्यवहार इतिहास के संदर्भ में
Tourism Theory and Principles In Reference of History
(पेपर कोड-0387-II) (Paper Code-0387-II)

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1. पर्यटन का इतिहास से संबंध
2. पर्यटन का संस्कृति से संबंध
3. पर्यटन विकास के कारक

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4. पर्यटन उद्योग
5. पर्यटन विपणन
6. पर्यटन और पर्यावरण

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7. पर्यटन में राष्ट्रीय उद्यानों का महत्व
8. भारत में प्रमुख राष्ट्रीय उद्यान
9. छत्तीसगढ़ के प्रमुख राष्ट्रीय उद्यान

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10. उत्तर भारत के प्रमुख ऐतिहासिक पर्यटन स्थल
11. दक्षिण भारत के प्रमुख ऐतिहासिक पर्यटन स्थल
12. पूर्वी भारत के प्रमुख ऐतिहासिक पर्यटन स्थल
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16. छत्तीसगढ़ के प्रमुख प्राकृतिक पर्यटन स्थल
17. छत्तीसगढ़ में पर्यटन की सुविधाएं एवं समस्याएं

संदर्भ ग्रंथ :

1. जगमोहन नेगी – राष्ट्रीय संस्कृति, संपदा, सांस्कृतिक पर्यटन एवं पर्यावरण
2. रामआचार्य – टूरिज्म एंड कल्चरल हेरीटेज ऑफ इंडिया
3. ताज रावत – पर्यटन का प्रभाव एवं प्रबंधन
4. शिवाकांत बाजपेयी – सिरपुर – पुरातत्व एवं पर्यटन
5. पर्यटन विभाग – भारत शासन एवं छत्तीसगढ़ शासन द्वारा प्रकाशित सामग्री

एम.ए.पूर्व (इतिहास)

नोट : तीन अनिवार्य प्रश्न पत्रों के अतिरिक्त परीक्षार्थियों को कोई एक वैकल्पिक प्रश्न पत्र का चयन करना होगा । प्रत्येक प्रश्न-पत्र 100-100 अंकों के होंगे ।

प्रथम प्रश्न पत्र (अनिवार्य)

इतिहास पद्धति एवं इतिहास लेखन

(पेपर कोड - 0370)

- इकाई-1** 1. इतिहास का अर्थ, परिभाषा एवं विस्तार सामग्री संकलन तथा तथ्यों की व्याख्या
2. इतिहास में कार्य कारण संबंध
3. इतिहास में वस्तुनिष्ठता
4. इतिहास का अन्य विषयों से संबंध
- इकाई-2** 5. इतिहास के प्रमुख सिद्धान्त - चक्रवादी, तुलनात्मक, आधुनिकोत्तर
6. इतिहास के प्रमुख सिद्धान्त - ऐतिहासिक भौतिकवाद, समाजशास्त्रीय, सापेक्षवाद
7. इतिहास लेखन की परम्पराएं - ग्रीक - रोमन, चीनी, अरबी तथा पश्चिम
8. इतिहास लेखन की परम्पराएं - प्राचीन भारतीय, मध्यकालीन तथा आधुनिक
- इकाई-3** 9. इतिहास की धार्मिक व्याख्या
10. इतिहास की आदर्शवादी व्याख्या
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12. इतिहास की राष्ट्रवादी व्याख्या
- इकाई-4** 13. इतिहास की मार्क्सवादी व्याख्या
14. सबालर्टन अथवा जनवादी इतिहास
15. भारतीय इतिहास की विषयवस्तु - आर्थिक इतिहास
16. भारतीय इतिहास की विषयवस्तु - कृषक एवं श्रमिक इतिहास
- इकाई-5** 17. जातीय एवं जनजातीय इतिहास
18. सामाजिक - सांस्कृतिक इतिहास
19. विज्ञान एवं प्रौद्योगिकी इतिहास
20. भारतीय इतिहास लेखन में वामपंथी - दक्षिणपंथी वाद - विवाद

अनुशासित ग्रन्थ सूची :

- | | | |
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| 1. E.H. Carr | : | What is History |
| 2. R.G. Collingwood | : | The idea of History |
| 3. S.P. Sen | : | History and Historiography in Modern India |
| 4. R.C. Majumdar | : | Historiography in Modern India |
| 5. A.R. Desai (ed.) | : | Peasant Struggle in India |
| 6. Bipan Chandra | : | Rise and Growth of Economic Nationalism in India |
| 7. Romila Thapar, Harbans Mukhiya
Bipan Chandra | : | Communalism in Indian History |
| 8. डॉ. रमेन्द्रनाथ एवं डॉ. सचिन मंदिलवार | : | इतिहास चिन्तन, पद्धति एवं इतिहास लेखन |
| 9. राधेशरण | : | इतिहास और इतिहास लेखन |
| 10. रामकुमार बेहार एवं ऋषिराज पांडेय | : | इतिहास पद्धति एवं इतिहास लेखन |

11. बी.के. श्रीवास्तव	: इतिहास लेखन : अवधारणा, विधाएं एवं साधन
12. के.एल. खुराना एवं डॉ. आर.के. बंसल	: इतिहास लेखन : धारणाएं तथा पद्धतियां
13. झारखंड चौबे	: इतिहास दर्शन
14. परमानन्द सिंह	: इतिहास दर्शन
15. गोविन्द चन्द्र पांडे	: इतिहास स्वरूप एवं सिद्धान्त
16. रामविलास शर्मा	: इतिहास दर्शन
17. साजिदहुसैन	: भौगोलिक विचारधारा का इतिहास
18. मानिक लाल गुप्ता	: इतिहास स्वरूप, अवधारणाएं एवं उपयोगिता
19. श्यामाचरण दुबे	: परम्परा, इतिहास बोध और संस्कृति
20. S.R. Goyal	: Philosophy of History
21. इब्नखलदून	: मुकद्दमा
22. Karl Marx	: Das Capital
23. D.N. Dhangare	: Peasant Struggle in India
24. Ranjit Guha	: Subaltern studies (vol. I & VI)
25. Gyanendra Pandey	: Subaltern Studies (Vol. 7 & 8)
26. हेरम्ब चतुर्वेदी	: मध्यकालीन इतिहासकार

द्वितीय प्रश्नपत्र (अनिवार्य)

बीसवीं शताब्दी का विश्व

(पेपर कोड - 0371)

- इकाई-1**
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 2. उदारवाद एवं समाजवाद
 3. पूर्वी समस्या (1900-1914)
 4. कैसर विलियम की विश्व राजनीति
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5. प्रथम विश्वयुद्ध- कारण, घटनाएं, परिणाम
 6. पेरिस शांति संधियां
 7. रूसी क्रांति (1917)
 8. राष्ट्रसंघ - उपलब्धियां एवं असफलताएं
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9. विश्व आर्थिक मंदी - न्यू डील
 10. इटली में फासीवाद
 11. जर्मनी में नाजीवाद
 12. जापान में सैन्यवाद
- इकाई-4**
13. अरब राष्ट्रवाद
 14. द्वितीय विश्वयुद्ध - कारण, घटनाएं, परिणाम
 15. चीनी क्रांतियां (1911 से 1949 तक)
 16. हिन्दचीन एवं हिन्देशिया में राष्ट्रीय आंदोलन
- इकाई-5**
17. शीत युद्ध - संधियां, तनाव, शत्रुता तथा प्रभाव
 18. गुटनिरपेक्ष आंदोलन तथा तृतीय विश्व

19. संयुक्त राष्ट्र संघ

20. अंतर्राष्ट्रीय समस्याएं - फिलिस्तीन, क्यूबा, कोरिया, वियतनाम

अनुशासित ग्रन्थ सूचि :

- | | | | |
|-----|--------------------|---|------------------------------|
| 1. | दीनानाथ वर्मा | : | आधुनिक विश्व का इतिहास |
| 2. | बी.पी.गूच | : | हमारे युग का इतिहास |
| 3. | जगदीश चन्द्र झा | : | हमारे युग का इतिहास |
| 4. | एम.एल.शर्मा | : | आधुनिक यूरोप का इतिहास |
| 5. | आर्य बर्नादसकी | : | रूस का इतिहास |
| 6. | Leydner | : | The Middle East |
| 7. | Moon & Partner | : | Imperialism & World Politics |
| 8. | सत्यकेतु विधालंकार | : | एशिया का इतिहास |
| 9. | एम.एल.शर्मा | : | अमेरिका का इतिहास |
| 10. | S.F. Morison | : | The History of United States |
| 11. | बी. पी.शर्मा | : | अमेरिका का इतिहास |
| 12. | विनाके | : | सुदूर पूर्व का इतिहास |
| 13. | क्लाइड | : | सुदूर पूर्व का इतिहास |
| 14. | के. एल. खुराना | : | विश्व का इतिहास |
| 15. | D.G.E. Hall | : | South East Asia |
| 16. | J.L. Nehru | : | Glimpses of World History |
| 17. | H.G. Wells | : | World History |
| 18. | B.V. Rao | : | History of World |
| 19. | के.एल.खुराना | : | एशिया का आधुनिक इतिहास |

तृतीय प्रश्न पत्र (अनिवार्य)

छत्तीसगढ़ का इतिहास

(पेपर कोड - 0372)

- इकाई-1**
- क्षेत्र का परिचय, सीमाएं, नामकरण
 - प्राचीन काल में छत्तीसगढ़ में - मौर्य गुप्त - बाकाटक
 - क्षेत्रीय राजवंश - नलवंश, राजर्षितुल्य कुल, शरभ पुरीय, पांडु वंशीय, छिंदकनाग, नागवंश सोमवंश
 - मध्यप्रदेश के कल्चुरी
- इकाई-2**
- छत्तीसगढ़ के कल्चुरी
 - कल्चुरी युगीन छत्तीसगढ़ की सामाजिक,आर्थिक, सांस्कृतिक दशा
 - छत्तीसगढ़ में भोंसले शासन
 - मराठा कालीन, छत्तीसगढ़ की सामाजिक, आर्थिक, सांस्कृतिक दशा
- इकाई-3**
- छत्तीसगढ़ में ब्रिटिश शासन
 - ब्रिटिश कालीन छत्तीसगढ़ का सामाजिक ,आर्थिक,सांस्कृतिक विकास
 - छत्तीसगढ़ की जमीदारियां एवं करद राज्य
 - 1857 का विप्लव (छत्तीसगढ़,उड़ीसा,सागर नर्मदा क्षेत्र,नागपुर)

- इकाई-4** 13. छत्तीसगढ़ में राजनीतिक जागरण 1920 तक
 14. छत्तीसगढ़ में राष्ट्रीय आन्दोलन (1920 -1947)
 15. छत्तीसगढ़ में किसान, मजदूर, जनजातीय आन्दोलन
 16. स्वतंत्रता प्राप्ति एवं रियासतों का विलीनीकरण
- इकाई-5** 17. छत्तीसगढ़ में धार्मिक आस्थाएं-वैष्णव, शैव, शाक्त, जैन, बौद्ध, कबीरपंथ, सतनाम पंथ, इस्लाम पंथ, इसाई धर्म
 18. छत्तीसगढ़ की लोक संस्कृति
 19. स्वतंत्रोत्तर छत्तीसगढ़ का आर्थिक विकास
 20. छत्तीसगढ़ राज्य के निर्माण की पृष्ठभूमि

अनुशंसित ग्रन्थ सूची :

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|---|---|
| 1. प्यारे लाल गुप्त | : प्राचीन छत्तीसगढ़ (रविशंकर शुक्ल वि. वि. प्रकाशन) |
| 2. टी. बी. नायक | : छत्तीसगढ़ में गांधी जी |
| 3. भगवान सिंह वर्मा | : छत्तीसगढ़ का इतिहास |
| 4. अशोक शुक्ला | : छत्तीसगढ़ का राजनैतिक इतिहास एवं राष्ट्रीय आन्दोलन |
| 5. शांता शुक्ला | : छत्तीसगढ़ का सामाजिक एवं आर्थिक इतिहास |
| 6. रमेन्द्रनाथ मिश्र | : ब्रिटिश कालीन छत्तीसगढ़ का प्रशासनिक इतिहास |
| 7. रमेन्द्रनाथ मिश्र | : छत्तीसगढ़ का राजनैतिक इतिहास एवं राष्ट्रीय आन्दोलन |
| 8. पी. एल. मिश्रा | : मराठा कालीन छत्तीसगढ़ |
| पी. एल. मिश्रा | : दक्षिण कोशल का प्राचीन इतिहास |
| 9. आर. के. बेहार | : बस्तर एक अध्ययन |
| 10. आर. के. बेहार | : छत्तीसगढ़ इतिहास के प्रमुख प्रकरण |
| 11. एल. एस. निगम | : दक्षिण कोशल का ऐतिहासिक भूगोल |
| 12. आर. के. शर्मा | : मध्यप्रदेश के पुरातत्व का संदर्भ ग्रंथ |
| 13. बी.बी.मिराशी | : कल्चुरी नरेश और उनका काल |
| 14. जे. आर. वर्ल्यानी एवं वासुदेव साहसी | : छत्तीसगढ़ का राजनीतिक एवं सांस्कृतिक इतिहास -प्रारंभ से 1947 तक |
| 15. जे.आर. वर्ल्यानी एवं वासुदेव साहसी | : बस्तर एवं कांकेर का राजनीतिक एवं सांस्कृतिक इतिहास प्रारंभ से 1947 तक |
| 16. ममता गर्ग | : राष्ट्रीय आंदोलन मे कांग्रेस दल की भूमिका |
| 17. केदारनाथ ठाकुर | : बस्तर भूषण |
| 18. श्यामलाल पांडे | : दक्षिण कोशल का इतिहास (म.प्र.हिन्दी ग्रंथ अकादमी प्रकरण) |
| 19. पालेश्वर प्रसाद शर्मा | : छत्तीसगढ़ का इतिहास एवं परम्परा |
| 20. गनपतलाल साव बिलासपुरी | : बस्तर का खूनी इतिहास |
| 21. मदनलाल गुप्ता | : छत्तीसगढ़ दिग्दर्शन |
| 22. M.A. Khan | : History of British Administrative System in India |
| 23. R.M. Sinha | : Bhoslas of Nagpur : The Last Phase |
| 24. P.K. Mishra | : Political History of Chhattisgarh |
| 25. R.K. Sharma | : The Kalchuris and their times |
| 26. Sabeeha Yasmin Khan | : Civil Disobedience Movement in Chhattisgarh |

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|-------------------------------------|--|
| 27. डी.पी. मिश्र | : मध्यप्रदेश में स्वाधीनता आन्दोलन का इतिहास |
| 28. शुक्ल अभिनन्दज ग्रन्थ | : |
| 29. नंदिनी परिहार | : दक्षिण कोसल का इतिहास |
| 30. सुरेश कुमार शुक्ला | : छत्तीसगढ़ का इतिहास |
| 31. के.के. अग्रवाल | : बीसवीं शताब्दी का छत्तीसगढ़ |
| 32. के.के. अग्रवाल | : स्वातंत्र्योत्तर छत्तीसगढ़ |
| 33. ऋषिराज पाण्डेय | : छत्तीसगढ़ : दक्षिण कोसल के कल्चरी |
| 34. ऋषिराज पाण्डेय | : सारंगढ़ रियासत |
| 35. राजेश शुक्ला एवं ऋषिराज पाण्डेय | : छत्तीसगढ़ : समाज एवं संस्कृति |

चतुर्थ प्रश्न पत्र (वैकल्पिक)
(अ) ग्रेट ब्रिटेन का इतिहास (1815-1945)
(पेपर कोड - 0373)

- इकाई-1**
1. 1815 से 1822 तक की आंतरिक समस्याएँ
 2. केसलरे और केनिग की विदेश नीति
 3. 1822 से 1830 तक इंग्लैंड की आंतरिक स्थिती
 4. 1822 का सुधार अधिनियम
- इकाई-2**
5. ब्रिटेन में उदारवाद का उदय और विकास
 6. चार्टिस्ट आंदोलन
 7. ग्रेट ब्रिटेन की विदेश नीति (1830 से 1841)
 8. सर राबर्ट पील
- इकाई-3**
9. ग्रेट ब्रिटेन और पूर्वी समस्या (1828 से 1856)
 10. नवीन टोरीवाद
 11. पामस्टन युग
 12. 1867 एवं 1885 के संसदीय सुधार
- इकाई-4**
13. ग्लेड स्टोन
 14. बेजामिन डिज़रायली
 15. चेम्बरलेन का साम्राज्यवाद
 16. ग्रेट ब्रिटेन की वैदेशिक नीति (1902 -1914)
- इकाई-5**
17. ग्रेट ब्रिटेन और प्रथम विश्वयुद्ध
 18. ग्रेट ब्रिटेन की गृह नीति (1919 -1939)
 19. ग्रेट ब्रिटेन की वैदेशिक नीति (1919 - 1939)
 20. ग्रेट ब्रिटेन और द्वितीय विश्वयुद्ध

अनुशंसित ग्रंथ सूची :

- | | | |
|--------------------|---|--|
| 1. J.A.R. Marriott | : | England since Waterloo |
| 2. J.A.R. Marriott | : | Modern England |
| 3. G.M. Trevelyan | : | Social History of England |
| 4. Maitland | : | Constitutional History of England |
| 5. Eperton | : | Short History of British Colonial Policy |

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|-----|-------------------|---|---|
| 6. | Winston Churchill | : | History of British People |
| 7. | Cecil | : | Queen Victoria & her prime ministers |
| 8. | Ramsay Muir | : | History of British Common Wealth (Vol. 2) |
| 9. | Ramsay Muir | : | History of England |
| 10. | G.M. Trevelyan | : | England in the nineteenth century & after |
| 11. | एल.पी. शर्मा | : | इंग्लैण्ड का इतिहास |
| 12. | विद्याधर महाजन | : | इंग्लैण्ड का इतिहास |

अथवा

(ब) संयुक्त राज्य अमेरिका का इतिहास (1775-1950)

(पेपर कोड - 0374)

- इकाई-1**
1. अमेरिका की खोज और उपनिवेशों की स्थापना
 2. अमेरिका का स्वतंत्रता संग्राम कारण , घटनाएँ और परिणाम
 3. नवोदित राष्ट्र की घटनायें
 4. जार्ज वाशिंगटन की उपलब्धियाँ
- इकाई-2**
5. राष्ट्रपति एडम्स
 6. राष्ट्रपति जेफरसन
 7. जैक्सन युग
 8. राष्ट्रपति लिंकन
- इकाई-3**
9. अमेरिका का गृह युद्ध
 10. औद्योगिक विकास
 11. अमेरिका का पुर्ननिर्माण
 12. अमेरिका और यूरोपीय राजनीति
- इकाई-4**
13. जन और कृषक आन्दोलन
 14. अमेरिका का विश्व शक्ति के रूप में अभ्युदय
 15. अमेरिका और प्रथम विश्वयुद्ध
 16. प्रथम विश्वयुद्ध के पश्चात अमेरिका
- इकाई-5**
17. आर्थिक मन्दी
 18. फ्रैंकलिन रूजवेल्ट और न्यूडील
 19. अमेरिका और द्वितीय विश्वयुद्ध
 20. अमेरिका और शीत युद्ध

अनुशंसित ग्रंथ सूची :

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|----|-----------------|---|----------------------------------|
| 1. | जे. आर. काम्बले | : | अमेरिका का इतिहास |
| 2. | एम. एल. शर्मा | : | अमेरिका का इतिहास |
| 3. | S.F. Morison | : | The History of the united states |
| 4. | W.E. Woodward | : | The New American History |
| 5. | Andre Nevins | : | A History of the united states |
| 6. | J.S. Bassell | : | A short history of U.S.A. |
| 7. | Woodrow Wilson | : | A history of American People |
| 8. | Beard & Beard | : | A History of United States |
| 9. | R. Cassert | : | Amercian History - A Survey |

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|-----|----------------|---|---|
| 10. | D. Julius | : | Diplomatic History of the United States |
| 11. | Gium & Others | : | The National Experience |
| 12. | बी.पी. सक्सेना | : | संयुक्त राज्य अमेरिका का इतिहास |

अथवा

(स) चीन और जापान का इतिहास (1800-1950)

(पेपर कोड - 0375)

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|---------------|-----|--------------------------------------|
| इकाई-1 | 1. | चीन और जापान में यूरोपियनों का आगमन |
| | 2. | अफीम युद्ध |
| | 3. | जापान में शोगून शासन व्यवस्था |
| | 4. | मेज़ी पुनर्स्थापना |
| इकाई-2 | 5. | चीन में विदेशियों का हस्तक्षेप |
| | 6. | जापान का औद्योगिकरण |
| | 7. | चीन जापान युद्ध |
| | 8. | बॉक्सर विद्रोह |
| इकाई-3 | 9. | आंग्ल जापान संधि |
| | 10. | रूस जापान युद्ध |
| | 11. | 1911 की चीनी क्रांति |
| | 12. | प्रथम विश्व युद्ध और जापान |
| इकाई-4 | 13. | चीन में गणराज्य |
| | 14. | कीमिन्तांग और उनकी देन |
| | 15. | जापान में सैनिकवाद का विकास |
| | 16. | मंचुरिया |
| इकाई-5 | 17. | चीन में साम्यवाद |
| | 18. | जापान में साम्राज्यवाद (1932-1939) |
| | 19. | चीन और द्वितीय विश्व युद्ध |
| | 20. | जापान और द्वितीय विश्व युद्ध |

अनुशंसित ग्रंथ सूची :

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|-----|----------------------|---|---|
| 1. | बिनाके | : | सुदूर पूर्व का इतिहास |
| 2. | सत्यकेतु विद्यालंकार | : | एशिया का इतिहास |
| 3. | H.M. Vinacle | : | A History of the far east in Modern Times |
| 4. | F.H.B. Clyde | : | The Far East |
| 5. | Goodridge | : | A Short History of Far East |
| 6. | Lateruette | : | A Short History of Far East |
| 7. | A.C. Gupta | : | A History of China |
| 8. | Buss | : | The Far East |
| 9. | क्लाउड | : | सुदूर पूर्व का इतिहास |
| 10. | दीनानाथ वर्मा | : | एशिया का इतिहास |

एम.ए. अंतिम (इतिहास)

एम.ए. (अंतिम) में निम्नलिखित खण्ड अ, ब, स, में से कोई दो प्रश्नपत्र छात्रों को चयनित करना होगा :-

टीप :- उपरोक्त वैकल्पिक प्रश्नपत्रों में से परीक्षार्थियों को सरल क्रमांक दो वैकल्पिक प्रश्नपत्र का चयन करना होगा ।
प्रत्येक प्रश्नपत्र 100-100 अंकों के होंगे ।

क्रम प्रश्न पत्र	प्रश्नपत्र का नाम	कोड संख्या	पूर्णांक
खण्ड “अ” प्राचीन भारत			
1. प्रथम प्रश्नपत्र	प्राचीन भारत प्रारंभ से 650 ई. तक	(0378)	100
2. द्वितीय प्रश्नपत्र	भारत का इतिहास (650 ई. से 1200 ई. तक)	(0379)	100
खण्ड “ब” मध्यकालीन भारत			
1. प्रथम प्रश्नपत्र	मध्यकालीन भारतीय राजनय एवं अर्थव्यवस्था (1200 से 1750 ई.तक)	(0380)	100
2. द्वितीय प्रश्नपत्र	मध्यकालीन समाज एवं संस्कृति (1200 से 1750 ई. तक)	(0381)	100
खण्ड “स” आधुनिक भारत			
1. प्रथम प्रश्नपत्र	आधुनिक भारत (1757 ई. से 1857 ई.तक)	(0382)	100
2. द्वितीय प्रश्नपत्र	आधुनिक भारत (1857 ई. से 1964 ई. तक)	(0383)	100
वैकल्पिक प्रश्नपत्र			
1. (1)	भारतीय राष्ट्रीय आन्दोलन का इतिहास (1885 ई. से 1947 ई.तक)	(0384)	100
2. (2)	भारत का सांस्कृतिक इतिहास - प्रारंभ से 1950 ई. तक	(0385)	100
3. (3)	भारत में विज्ञान तथा प्रौद्योगिकी का इतिहास - प्रारंभ से 1950 ई. तक	(0386)	100

(खंड-अ) प्राचीन भारत

प्रथम प्रश्न पत्र

(प्राचीन भारत प्रारंभ से 650 ई. तक)

(पेपर कोड - 0378)

- इकाई-1**
1. प्राचीन भारतीय इतिहास से संबंधित स्रोतों की समीक्षा
 2. पाषाण युग-पुरापाषाण, मध्य पाषाण तथा नव पाषाण युग
 3. कांस्ययुग - हड़प्पा एवं हड़पोत्तर सभ्यताएं - प्रथम नगरीकरण
 4. महापाषाण सभ्यता
- इकाई-2**
5. पूर्व वैदिक समाज राजनीति, अर्थ व्यवस्था एवं धर्म
 6. उत्तर वैदिक समाज-राजनीति, अर्थ व्यवस्था एवं धर्म
 7. इतिहास में वेदों की भूमिका
 8. ईसा पूर्व 6वीं शताब्दी के धार्मिक आंदोलन
- इकाई-3**
9. द्वितीय नगरीकरण-नगरीय केंद्र, नवीन सामाजिक वर्ग, आर्थिक विकास
 10. महाजन पद राजतंत्रीय व गणतंत्रीय
 11. मगध साम्राज्य का उदय-हर्यक वंश से नंद वंश तक
 12. संगम युग

- इकाई-4** 13. मौर्यकालीन राजनीति एवं अर्थव्यवस्था
 14. मौर्यकालीन कला एवं स्थापत्य
 15. इन्डोग्रीक, शक, पल्लव, कुषाण व सात बाहन
 16. शक-कुषाण, सात बाहन कालीन संस्कृति
- इकाई-5** 17. गुप्त-वाकाटक कालीन राजनीतिक सुदृढ़ता
 18. प्रशासकीय व्यवस्था, भूमिदान एवं सामंतवादी व्यवस्था
 19. धार्मिक पुनरुत्थान - भागवत धर्म
 20. गुप्त वाकाटक कालीन कला, स्थापत्य, साहित्य व विज्ञान

पुस्तक हेतु संस्तुति -

1. सिंधु सभ्यता - डॉ. जयनारायण पाण्डेय
2. प्राचीन भारत का इतिहास तथा संस्कृति - डॉ. के.सी. श्रीवास्तव
3. प्राचीन भारत - रामशरण शर्मा
4. प्राचीन भारत का इतिहास - झा व श्रीमाली
5. प्राचीन भारत का राजनीतिक सांस्कृतिक इतिहास - बिमल चंद्र पांडे
6. हिस्ट्री ऑफ गुप्तराज्य - आर.एन. दपडेकर
7. गुप्त साम्राज्य - पी.एल. गुप्त
8. भारत का इतिहास - डॉ. कमलेश्वर प्रसाद
9. अशोक तथा मौर्य साम्राज्य का पतन - रोमिला थापर
10. प्राचीन भारत का राजनीतिक सामाजिक एवं सांस्कृतिक इतिहास - आर. एस. शर्मा
11. चोलवंश का इतिहास- नीलकंठ शास्त्री
12. दक्षिण के पल्लव - के.ए. एन. शास्त्री
13. दक्षिण भारत का इतिहास - के.ए.एन. शास्त्री
14. भारतीय सामंतवाद - रामशरण शर्मा
15. अद्भुत भारत - ए.एल. बाशम
16. प्राचीन भारत का राजनैतिक एवं सांस्कृतिक इतिहास - रतिभानु सिंह नाहर

द्वितीय प्रश्न पत्र

भारत का इतिहास (650 ई. से 1200 ई. तक)

(पेपर कोड - 0379)

- इकाई-1** 1. इतिहास जानने के साधन
 2. ऐतिहासिक स्रोतों पर विवाद - सामंतवादी, विखंडित एवं समन्वयवादी दृष्टिकोण
 3. राजनीति, अर्थव्यवस्था एवं समाज में परिवर्तन
 4. क्षेत्रीय राज्यों का उदय - कारण एवं परिस्थितियां
- इकाई-2** 5. पूर्वी भारत के राज्य - पाल, सेन व गंग वंश
 6. पश्चिमी भारत के राज्य - गुर्जर प्रतिहार, चौहान, सोलंकी, परमार एवं चंदेल
 7. दख्खन के राजवंश - कल्चुरी, चालुक्य एवं राष्ट्र कूट
 8. सुदूर दक्षिण के राज्य - पल्लव, चोल एवं पांड्य
- इकाई-3** 9. कृषि अर्थ व्यवस्था - भूमिदान, कृषि तकनीकी का विकास

10. नगरीय अर्थ व्यवस्था - शिल्प व व्यापार
11. आर्थिक क्षेत्र में श्रेणी (गिल्ड) व्यवस्था का योगदान
12. नव-व्यापारिक व नव शिल्पी वर्गों का विकास
- इकाई-4** 13. जाति व्यवस्था का प्रादुर्भाव - अस्पृश्यता
14. स्त्रियों की सामाजिक दशा
15. शिक्षा का विकास एवं शैक्षणिक संस्थाएं
16. क्षेत्रीय भाषाओं एवं साहित्य का विकास
- इकाई-5** 17. भक्ति आंदोलन - दक्षिण भारत के संदर्भ में
18. शैववाद, वैष्णवाद व तांत्रिकवाद
19. वेदांत एवं मीमांसा दर्शन
20. मंदिर स्थापत्य एवं मूर्ति कला का विकास

पुस्तक हेतु संस्तुति-

1. सिंधु सभ्यता - डॉ. जयनारायण पांडेय
2. प्राचीन भारत का इतिहास तथा संस्कृति - डॉ. के.सी. श्रीवास्तव
3. प्राचीन भारत - रामशरण शर्मा
4. प्राचीन भारत का इतिहास - झा व श्रीमाली
5. प्राचीन भारत का राजनीतिक सांस्कृतिक इतिहास
6. हिस्ट्री ऑफ गुप्तराज्य - आर.एन. दपडेकर
7. गुप्त साम्राज्य - पी.एल. गुप्त
8. भारत का इतिहास - डॉ. कमलेश्वर प्रसाद
9. अशोक तथा मौर्य साम्राज्य का पतन - रोमिला थापर
10. चोलवंश का इतिहास- नीलकंठ शास्त्री
11. दक्षिण के पल्लव - के.ए. एन. शास्त्री
12. दक्षिण भारत का इतिहास - के.ए.एन. शास्त्री
13. भारतीय सामंतवाद - रामशरण शर्मा
14. अद्भुत भारत - ए.एल. बाशम
15. भारत का इतिहास भाग 1 - रोमिला थापर
16. प्राचीन भारत का राजनैतिक एवं सांस्कृतिक इतिहास - रतिभानु सिंह नाहर

(खंड - ब) मध्यकालीन भारत

प्रथम प्रश्न पत्र

मध्यकालीन भारतीय राजनय एवं अर्थ व्यवस्था (1200 से 1750)

(पेपर कोड - 0380)

- इकाई-1** 1. सल्तनत कालीन इतिहास के स्रोत
2. मुगल कालीन इतिहास के स्रोत
3. मध्यकालीन स्थापत्य व शिल्पकला
4. मराठा इतिहास के स्रोत
- इकाई-2** 5. सल्तनत कालीन राजनय का स्वरूप - सिद्धांत, दबाव समूह तथा क्षेत्रीय विशेषताएं

6. मुगल कालीन राजनय - दैवीय अधिकार सिद्धांत
7. केन्द्रीय प्रशासन - सल्तनत कालीन, मुगलकालीन
8. प्रांतीय व्यवस्था - इक्ता, अमरम, मनसब व जागीर
- इकाई-3** 9. सल्तनत में सुल्तान एवं अमीरों के बीच संघर्ष
10. सल्तनत कालीन क्षेत्रीय राज्य
11. मुगलकालीन दरबारी राजनीति, संघर्ष, दक्खन के मुस्लिम राज्यों का प्रतिरोध
12. मराठा राज्य की स्थापना एवं विकास
- इकाई-4** 13. कृषि अर्थव्यवस्था एवं भूराजस्व व्यवस्था
14. शिल्प व उद्योग
15. आंतरिक व्यापार
16. विदेशी व्यापार
- इकाई-5** 17. नगरों का उदय - जनानिकी परिवर्तन, नगरीय प्रशासन
18. मध्यकालीन मुद्राएं एवं बैंकिंग
19. नए व्यापारिक वर्गों का उदय
20. कृषि एवं उद्योग में तकनीकी परिवर्तन

पुस्तक हेतु संस्तुति-

1. सल्तनतकालीन भारत - ए.एल. श्रीवास्तव
2. मध्यकालीन भारत - एल.पी. शर्मा
3. मध्यकालीन भारत (भाग एक) - हरिश्चंद्र वर्मा
4. मध्यकालीन भारत (खंड-दो) - हरिश्चंद्र वर्मा
5. मध्यकालीन संस्कृति - ए.एल. श्रीवास्तव
6. संस्कृति के चार अध्याय - रामधारी सिंह दिनकर
7. सुफीज्म - राजबली पांडे
8. मध्यकालीन भारतीय इतिहास - बी.के. पंजाबी
9. भारत का सामाजिक, आर्थिक, मास्वत्व सांस्कृतिक इतिहास (भाग-2) - पुरी, दास, चोपड़ा
10. मध्यकालीन इतिहासकार - हेरम्ब चतुर्वेदी

द्वितीय प्रश्न पत्र

मध्यकालीन समाज एवं संस्कृति (1200-1750 ई. तक)

(पेपर कोड - 0381)

- इकाई-1** 1. मध्यकालीन ग्रामीण समाज - संगठन एवं परिवर्तन
2. मध्यकालीन नगरीय समाज - नए सामाजिक वर्गों का अंतर्साम्राज्यिक संबंध
3. स्त्रियों की दशा
4. मध्यकालीन सामाजिक जीवन
- इकाई-2** 5. भक्ति आंदोलन - निर्गुणवादी सम्प्रदाय कबीर व नानक
6. भक्ति आंदोलन - सगुणवादी कृष्ण भक्ति तथा राम भक्ति शाखाएं
7. भक्ति आंदोलन की क्षेत्रीय विशेषताएं
8. सूफीवाद सिद्धांत व व्यवहार, सूफी सिलसिले

- इकाई-3** 9. सल्तनतकालीन स्थापत्य
 10. मुगलकालीन स्थापत्य
 11. क्षेत्रीय स्थापत्य - विजय नगर, बहमनी, जौनपुर, गुजरात, मालबा, राजपुताना
 12. मध्यकाल में चित्रकला, संगीत व नृत्य
- इकाई-4** 13. फारसी भाषा एवं साहित्य
 14. हिन्दी साहित्य का विकास
 15. संस्कृत साहित्य का विकास
 16. क्षेत्रीय साहित्य का विकास
- इकाई-5** 17. मध्यकालीन भारतीय समाज में शासक वर्गों की भूमिका
 18. धार्मिक एवं साम्प्रदायिक समुदायों का प्रादुर्भाव
 19. भारतीय सभ्यता पर इस्लामिक प्रभाव
 20. समन्वयवादी संस्कृति का विकास

पुस्तक हेतु संस्तुति-

1. सल्तनतकालीन भारत - ए.एल. श्रीवास्तव
2. मध्यकालीन भारत - एल.पी. शर्मा
3. मध्यकालीन भारत (भाग एक) - हरिशचंद्र वर्मा
4. मध्यकालीन भारत (खंड-दो) - हरिशचंद्र वर्मा
5. मध्यकालीन संस्कृति - ए.एल. श्रीवास्तव
6. संस्कृति के चार अध्याय - रामधारी सिंह दिनकर
7. सुफीज्म - राजबली पांडे
8. मध्यकालीन भारतीय इतिहास - बी.के. पंजाबी
9. भारत का सामाजिक, आर्थिक, सांस्कृतिक इतिहास (भाग-2) - पुरी, दास, चोपड़ा

(खंड-स) आधुनिक भारत

प्रथम प्रश्न पत्र

आधुनिक भारत (1757 ई. से 1857 ई.)

(पेपर कोड - 0382)

- इकाई-1** 1. आधुनिक भारतीय इतिहास के स्रोत
 2. आधुनिक भारतीय इतिहास लेखन की विभिन्न विचार धाराएँ
 3. पूर्व उपनिवेशवादी भारत की राजनीतिक एवं आर्थिक व्यवस्था
 4. पूर्व उपनिवेशवादी भारत की सामाजिक एवं सांस्कृतिक व्यवस्था
- इकाई-2** 5. भारत में यूरोपियों का आगमन
 6. यूरोपीय वाणिज्यवाद की विचार धाराएं एवं कार्यक्रम - ब्रिटिश ईस्ट इंडिया कंपनी के संदर्भ में
 7. कंपनी के अधीन ब्रिटिश साम्राज्य का विस्तार - नीतियां
 8. कंपनी के अधीन ब्रिटिश साम्राज्य का विस्तार - युद्ध व कूटनीति
- इकाई-3** 9. प्रशासनिक विचार धाराएं - प्राच्यवादी, आंग्लवादी, उपयोगितावादी
 10. कंपनी के अधीन प्रशासकीय व्यवस्था तथा संवैधानिक विकास
 11. प्रशासन के अंतर्गत लोकसेवा, न्याय व्यवस्था एवं पुलिस

12. शैक्षिक विकास (कम्पनी शासन के अंतर्गत)
- इकाई-4** 13. सामाजिक पुर्नजागरण कारण व परिस्थितियां
14. समन्वयवादी समाज सुधार आंदोलन बंगाल एवं महाराष्ट्र के संदर्भ में
15. प्रतिक्रियावाद - बहावी आंदोलन
16. उपनिवेशवाद का प्रतिरोध - जनजातीय एवं कृषक आंदोलन कृषि एवं भूराजस्व व्यवस्था
- इकाई-5** 17. 1857 के पूर्व भारत की ग्रामीण अर्थ व्यवस्था में परिवर्तन
18. नगरीय अर्थव्यवस्था - हस्तशिल्प उद्योगों की स्थिति
19. आंतरिक एवं विदेशी व्यापार में परिवर्तन
20. 1857 का विद्रोह - विचार धाराएं, कार्यक्रम. नेतृत्व एवं ब्रिटिश प्रतिक्रिया ।

पुस्तक हेतु संस्तुति-

1. ब्रिटिश भारत का आर्थिक इतिहास - रमेश चंद्रदत्त
2. आधुनिक भारत - एल.पी. शर्मा
3. भारत में अंग्रेजीराज - पं. सुन्दरलाल
4. भारतीय स्वतंत्रता संग्राम का इतिहास (1857-1947) - विपिन चंद्र
5. भारतीय राष्ट्रवाद की सामाजिक पृष्ठभूमि - ए.आर. देसाई
6. इंडिया टुडे - रजनी पाम दत्त
7. इंडियन सोसायटी इन दी एट्टीन सेंचुरी - बी.पी. रघुवंशी
8. आधुनिक भारत का इतिहास एंड नवीन मूल्यांकन (1707-1969) - बी.एल. ग्रोवर एवं यशपाल
9. मेकिंग ऑफ माडर्न इंडिया - एस.आर. शर्मा
10. आधुनिक भारत - सुमित सरकार
11. भारत का राष्ट्रीय आंदोलन एवं संवैधानिक विकास - एस.एल. नागोरी
12. आधुनिक भारत का इतिहास - एम.एस. जैन
13. आधुनिक भारत, 3 खंड - प्रतापसिंह
14. आधुनिक भारत का सामाजिक, आर्थिक इतिहास - प्रतापसिंह
15. सोसल एंड इकानॉमिक हिस्ट्री ऑफ माडर्न इंडिया - एस.पी. नायर

द्वितीय प्रश्न पत्र

आधुनिक भारत (1858-1964)

(पेपर कोड - 0383)

- इकाई-1** 1. प्रशासनिक परिवर्तन - संवैधानिक सुधारों के संदर्भ में
2. प्रशासनिक ढांचा - लोकसेवा, न्याय व्यवस्था तथा पुलिस सेवा के संदर्भ में
3. देशी रियासतों के साथ संबंध - नीतिगत विस्तार
4. पड़ोसी राज्यों से संबंध - नीतियां एवं कार्यक्रम - अफगानिस्तान, नेपाल, फारस तथा वर्मा के संदर्भ में
- इकाई-2** 5. आर्य समाज व थियोसोफिकल सोसायटी, प्रार्थना समाज, रामकृष्ण मिशन
6. भारतीय मुसलमानों का ब्रिटिश राज के साथ सहयोग अलीगढ़ आंदोलन
7. ब्रिटिश शासन काल में नारी उत्थान के प्रयास
8. आधुनिक शिक्षा का विकास
- इकाई-3** 9. यातायात एवं संचार के साधनों में विकास

10. आधुनिक उद्योगों का विकास
11. भारतीय कृषि का वाणिज्यीकरण
12. भारत से धन निर्गमन
- इकाई-4** 13. भारतीय राष्ट्रवाद का उदय - अवधारणाएं एवं गतिविधियां
14. 1919 तक संगठित राष्ट्रवाद की प्रवृत्तियां
15. कृषक, श्रमिक एवं क्रांतिकारी आंदोलन
16. गांधीवादी आंदोलन - विचारधारा, स्वरूप, कार्यक्रम
- इकाई-5** 17. भारतीय रियासतों का विलयीकरण
18. नियोजित अर्थ व्यवस्था - पंचवर्षीय योजनाएं
19. भूमिसुधार, स्वास्थ्य एवं विज्ञान एवं तकनीकी विकास
20. भारत की विदेश नीति - गुट निरपेक्षता

पुस्तक हेतु संस्तुति-

1. ब्रिटीश भारत का आर्थिक इतिहास - रमेश चंद्रदत्त
2. आधुनिक भारत का इतिहास (एक नवीन मूल्यांकन) (1707 से 1964 तक) - बी.एल. ग्रोवर तथा यशपाल
3. आधुनिक भारत - एल.पी. शर्मा
4. मेकिंग ऑफ माडर्न इंडिया - एस.आर. शर्मा
5. द सेंट्रल एडमिनिस्ट्रेशन इस्ट इंडिया कंपनी - बी.बी. मिश्रा
6. भारत में अंग्रेजीराज - पं. सुन्दरलाल
7. भारतीय राष्ट्रवाद की सामाजिक पृष्ठभूमि - ए.आर. देसाई
8. इकानोमिक हिस्ट्री ऑफ इंडिया - आर.सी. दत्त
9. भारतीय स्वतंत्रता संग्राम का इतिहास (1857-1947) - विपिन चंद्र
10. आजादी के बाद का भारत (1947-2000) - विपिन चंद्र
11. सोसल कल्चरल एंड इकालोमिक हिस्ट्री ऑफ इंडिया - एच. राय चौधरी
12. कैमब्रिज हिस्ट्री ऑफ इंडिया
13. कैमब्रिज इकानोमिक हिस्ट्री ऑफ इंडिया
14. भारत का सामाजिक, सांस्कृतिक एवं आर्थिक इतिहास (खंड-3) - पुरी, दास, चोपड़ा
15. आधुनिक भारत - सुमित सरकार
16. आधुनिक भारत का इतिहास - एम.एस. जैन
17. आधुनिक भारत, 3 खंड - प्रतापसिंह
18. आधुनिक भारत का सामाजिक, आर्थिक इतिहास - प्रतापसिंह
19. सोसल एंड इकानोमिक हिस्ट्री ऑफ माडर्न इंडिया - एस.पी. नायडू
20. फ्रीडम स्ट्रगल - कमलेश्वर राय

वैकल्पिक - 1

भारतीय राष्ट्रीय आंदोलन का इतिहास (1885-1947) (पेपर कोड - 0384)

- इकाई-1**
1. भारतीय राष्ट्रवाद की वैचारिक पृष्ठभूमि
 2. कांग्रेस के पूर्व राजनीतिक संगठन

3. भारतीय राष्ट्रीय कांग्रेस की स्थापना, स्थापना से संबंधित विभिन्न विचारधाराएं
4. कांग्रेस में उदारवाद - उग्रवाद संघर्ष
- इकाई-2** 5. स्वदेशी आंदोलन
6. क्रांतिकारी आंदोलन - प्रथम चरण - बंगाल, महाराष्ट्र, पंजाब
7. होमरूल आंदोलन
8. क्रांतिकारी आंदोलन - द्वितीय चरण - हिन्दुस्तान रिपब्लिक आर्मी, संयुक्त प्रांत एवं बंगाल
- इकाई-3** 9. गांधीवादी आंदोलन - असहयोग आंदोलन
10. गांधीवादी आंदोलन - सविनय अवज्ञा आंदोलन
11. गांधीवादी आंदोलन - व्यक्तिगत सत्याग्रह
12. गांधीवादी आंदोलन - भारत छोड़ो आंदोलन
- इकाई-4** 13. भारतीय राजनीति में वामपंथी विचारधारा
14. भारतीय राजनीति में साम्प्रदायवाद
15. कृषक, श्रमिक एवं जनजातीय आंदोलन
16. रियासतों में स्वाधीनता आंदोलन
- इकाई-5** 17. प्रांतीय स्वायत्तता का क्रियान्वयन
18. राजनीतिक गतिरोध - 1940-45
19. सुभाष चंद्र बोस एवं आजाद हिन्द फौज
20. अंतरिम सरकार से स्वाधीनता आंदोलन तक

प्रस्तावित पुस्तक-

1. ब्रिटिश भारत का आर्थिक इतिहास - आर.सी. दत्त
2. आधुनिक भारत का नवीन मूल्यांकन - बी.एल. ग्रोवर
3. आधुनिक भारत - एल.पी. शर्मा
4. इंडियन नेशनल मूवमेंट एंड द लिबरल - आभा सक्सेना
5. आधुनिक भारत - विपिन चंद्र
6. आजादी के बाद का भारत - विपिनचंद्र
7. भारत में अंग्रेजी राज - पं. सुन्दरलाल
8. भारतीय स्वतंत्रता संग्राम का इतिहास - विपिन चंद्र
9. फ्रीडम स्ट्रगल - कमलेश्वर राय
10. आधुनिक भारत - सुमित सरकार
11. भारतीय स्वाधीनता आंदोलन का इतिहास - ताराचंद
12. भारतीय राष्ट्रीयता का विकास - बी. एन. लूनिया

वैकल्पिक - 2

भारत का सांस्कृतिक इतिहास - प्रारंभ से 1950 तक

(पेपर कोड - 0385)

- इकाई-1**
1. हड़प्पा कालीन संस्कृति
 2. वैदिक कालीन संस्कृति
 3. मौर्यकालीन संस्कृति

4. भारतीय संस्कृति में अशोक का योगदान
- इकाई-2** 5. भारतीय संस्कृति पर यूनानी, शक, कुषाण प्रभाव
6. गुप्तकालीन संस्कृति
7. राजपूत कालीन संस्कृति
8. पूर्व मध्यकालीन संस्कृति एवं ब्राम्हणवाद
- इकाई-3** 9. इण्डो-इस्लामिक संस्कृति
10. भक्ति-आंदोलन
11. सूफीवाद
12. भारतीय संस्कृति में अकबर का योगदान
- इकाई-4** 13. यूरोपियों का भारत आगमन एवं भारतीय संस्कृति पर उनका प्रभाव
14. भारतीय संस्कृति एवं मिशनरियों का योगदान
15. भारतीय संस्कृति पर पाश्चात्य प्रभाव
16. भारतीय संस्कृति के विकास में प्राच्यवाद की भूमिका
- इकाई-5** 17. राजाराम मोहनराय एवं समन्वयवादी आंदोलन
18. आर्य समाज - धियोसोफिकल सोसायटी
19. मुस्लिम समाज सुधार एवं भारतीय संस्कृति
20. भारतीय संस्कृति एवं गांधीजी

प्रस्तावित पुस्तक-

1. सिंधु सभ्यता - जयनारायण पांडे
2. प्राचीन भारत का इतिहास तथा संस्कृति - डॉ. के. सी. श्रीवास्तव
3. भारत का इतिहास - डॉ. कमलेश्वर प्रसाद
4. मध्यकालीन भारत (खंड-1 व खंड-2) - हरिश्चंद्र वर्मा
5. सल्तनत कालीन भारत - डॉ. ए.एल. श्रीवास्तव
6. आधुनिक भारत का इतिहास - एक नवीन मूल्यांकन - ग्रोवर एवं यशपाल
7. आधुनिक भारत - विपिन चंद्र
8. आधुनिक भारत - एल.पी. शर्मा
9. संस्कृति के चार अध्याय - रामधारी सिंह दिनकर
10. अद्भुत भारत - ए.एल. बाशम
11. भारत का सामाजिक, सांस्कृतिक एवं आर्थिक इतिहास - पुरी, दास, चोपड़ा
12. मध्यकालीन संस्कृति - आशीर्वादी लाल श्रीवास्तव
13. दिल्ली सल्तनत - आर.पी. त्रिपाठी
14. भारतीय संस्कृति का विकास - बी.एन. लूनिया
15. भारतीय सभ्यता एवं संस्कृति - बी.एन. लूनिया

वैकल्पिक -3

भारत में विज्ञान तथा प्रौद्योगिकी का इतिहास (प्रारंभ से 1950)

(पेपर कोड - 0386)

- इकाई-1** 1. विज्ञान तकनीकी का अर्थ एवं समाज के साथ उसका संबंध

एम.ए. इतिहास - वार्षिक परीक्षा

M.A./M. Sc. GEOGRAPHY
SEMESTER I (2015-16)

M. A. /M. Sc. Geography Semester I shall consist the following papers:

S. No.	Paper	Title	M. M.		
			Written	Inte. Asse.	Total
1.	I	Geomorphology	80	20	100
2.	II	Climatology	80	20	100
3.	III	Geographical Thought	80	20	100
4.	IV	Geography of India	80	20	100
5.	V	Practical-I : Advanced Cartography	---	---	100

1. The M. A. /M. Sc. Semester I examination in Geography shall consist of 500 marks.

There shall be four theory papers each of 100 marks and one practical of 100 marks as follows:

Paper I	Geomorphology
Paper II	Climatology
Paper III	Geographical Thought
Paper IV	Geography of India
Paper V	Practical-I: Advanced Cartography

2. The theory papers shall be of three hours duration.

3. Candidates will be required to pass separately in theory and practical examinations.

4. (a) In the practical examination the following shall be the allotment of time and marks.

(i)	Practical record	20%
(ii)	Lab work (up to three hours)	70%
(iii)	Viva on i. ii.	10%

(b) The external and internal examiners shall jointly submit marks.

(c) All the candidates shall present at the time of the practical examination their practical record regularly signed by the teachers concerned.

PAPER –I (2015-16)

GEOMORPHOLOGY

- UNIT – I Nature and scope of Geomorphology; Fundamental concepts; Interior of the earth; Earth movement: epeirogenic and orogenic movements With reference to the evolution of the Himalaya: Forces of Crustal instability, Isostasy, Geosyncline, Plate tectonic, Mountain building, Earthquake and Vulcanicity.
- UNIT – II Exogenic processes: concept of gradation; Agents and processes of gradations: weathering, wasting and erosion, aggradations; Climatic Geomorphology and morphogenetic regions; slope evolution, Arid and Semi-Arid and Karst topography.
- UNIT – III Concept of Geomorphic cycle and its controversy; Dynamic of glacial and periglacial processes and resulting landforms, Complications of fluvial geomorphic cycle and resulting landforms.
- UNIT – IV Geological structure and landform: development of landscape and drainage on uniclinal, folded and domal structures and Erosion surfaces, Applied Geomorphology.

SUGGESTED READINGS:

1. Ahnmed, E.: Coastal Geomorphology of India.
2. Chorley, R. J.: Spatial Analysis in Geomorphology, Methuen, London, 1972.
3. Cooke R.IJ. and Doornkamp, J.C. : Geomorphology in Environmental Management. An Introduction, Clarendon press, Oxford, 1974.
4. Dury, G.H.: The Face of the Earth, Penguin Hormondsworth 1959.
5. Fairbridge, R.W. Encyclopedia of Geomorphology, Reinholdts, New York, 1968.
6. Goudie, A.: The Nature of the Environment Oxford & Blackwell, London, 1993.
7. Garner, H.F. : The Origin of landscape- A Synthesis of Geomorphology, Oxford University Press. London, 1974.
8. Holms, A.: Principles of Physical Geology, Thomas Nelson, London.
9. Mitchell, C.W.: 'l'erra.ii'i Evaluation. Longman, London, 1973.
10. Oilier, C.D. : Weathering, Longman, London, 1979.
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13. Skinner, B.J. & Porter, S.C.: The Dynamic Earth John Wiley. New York, 1995.
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16. Singh, S : Geomorphology, Prayag Publication, Allahabad, 1998.
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18. Thornbury, W.I.). Principles of Geomorphology, John Wiloy, New York, 1960.
19. Strahler, A.N.: Physical Geography, Willey, New York.
20. कौशिक, एस.डी. : भू-आकृति विज्ञान
21. नेगी, बी.एस. : भू-आकृति विज्ञान
22. दयाल परमेश्वर : भू-आकृति विज्ञान
23. यादव तथा रामसुरेश : भू-आकृति विज्ञान, ग्रनयि, कानपुर
24. सिंह, सविन्द्र के. भू-आकृति विज्ञान, शारदा पुस्तक भवन, इलाहाबाद

PAPER - II (2015-16)

CLIMATOLOGY

- UNIT – I Nature and scope of climatology and its relationship with meteorology; composition of atmosphere; Insolation, heat balance of the earth, stability and instability, green house effect, vertical and horizontal distribution of temperature.
- UNIT – II Jet stream; General circulation in the atmosphere; Acid rain; concept of air masses and Front. EL Nino and La Nina. Monsoon winds and cyclones.
- UNIT – III The application of general principles of elementary physical and synoptic meteorology to the study and classification of climate. Climatic classification of Koppen and Thornthwaite. Major climate of the world-tropical, temperate, desert and mountain climate.
- UNIT – IV Climatic changes during geological and historical times, evidences, possible causes, global warming, Applied climatology.

SUGGESTED READINGS:

1. Barry, R.G. and Chorley P..1.; Atmosphere, Weather and Climate, Roulledge, London and New York, 1998.
2. Critchfiedid, J.H. : General Climatology, Prentico Hall, India, New Delhi, 1993.
3. Das, P.K. : Monsoons 'National Book Trust, New Delhi, 1987.
4. Fein, J.S. and Slephens, P.N. : Monsoons. Wiley Interscience, 1987.
5. India Met. Deptt : Climatologically Tables of Observatories in India, Govt. of India 1968.
6. Lal, D.S. : Climatology, Chaitanaya Publications, Allahabad, 1986.
7. Lydolp, P.H. : The Climate of the Earth, Rowiman, 1985.
8. Menon, P.A. : Our Weather, N.B.T., New Delhi, 1989.
9. Pelerson, S. : Introduction to Meteorology, Me G-r-aw Hill Book, London, 1969.
10. Robinson, P.J. and Henderson S. : Contemporary Climatology, Henlow, 1999.
11. Thompson, R.D. and Perry, A (ed.) : Applied Climatology, Principles and Practice. Raoutledge, London. 1997.
12. तिवारी अनिल कुमार : जलवायु विज्ञान, राजस्थान हिन्दी ग्रंथ अकादमी

PAPER – III (2015-16)

GEOGRAPHICAL THOUGHT

- UNIT – I The Field of geography, its place in the classification of science, geography as a social science, and natural science. Definition, scope and functions of geography; Geography as science of relationship, as science of areal differentiation, as spatial science, Spatial Organisation, Geography and environmentalism : forms of man-nature relationship and current view; Dualism in geography; Regional Concept.
- UNIT – II The growth of geographical knowledge from earliest times up to the 15th century. Contributions of Greek and Roman thinkers. Arab Geographers and their contributions. Geographical information in Ancient Indian literature. The dark age in Geography. The Great Age of Maritime Discovery and Exploration.
- Contributions of various schools of thought in modern Geography:
- (i) German School (ii) French School
(in) British School (iv) American and Russian Schools.
- UNIT – III Scientific explanations: routes to scientific explanation (inductive/deductive); Type of explanation: cognitive description, cause and effect, temporal, functional/ecological, systems; Laws, theories and models in geography; Quantitative revolution and philosophy of positivism.
- UNIT – IV Responses to positivism, behaviourism and humanistic, relevance movement and radical geography; Changing paradigms; Status of Indian Geography; Future of Geography.

SUGGESTED READINGS:

1. Abler, Ronald; Adams, John S. Gold, Peter : Spatial Organization : The Geographer's view of the world. Prentice Hall, N.J. 1971.
2. Ali S.M. : The Geography of Puranas, Peoples Publishing House, Delhi, .1968.
3. Amedeo, Douglas : An Introduction to Scientific Reasoning in Geography, John Wiley, U.S.A. 1971.
4. Dikshit, R.D. (ed.): The Art & Science of Geography Rand McNally & Co., 1959.
5. Hartshorne, R.: Perspectives on Nature of Geography Rand McNally & Co., 1959.
6. Husain, M. : Evolution of Geographic Thought, Rawat Pub., Jaipur, 1984.
7. Johnston, R.J.: Philosophy and Human Geography, Edward Arnold, London, 1983.
8. Johnston, R.J.: The Future of Geography, Methuen, London, 1988.
9. Minshull, R.: The Changing Nature of Geography, Hutchinson University Library, London, 1970.
10. Ali, S. M.- Arab Geography.
11. Taylor, G.: Geography in the 20th Century.
12. Dikshit, R.D.: Geographical Thought : A Contextual History of Ideas, Prentice Hall of India, New Delhi.
13. Harvey D. : Explanation in Geography.

14. सिंह उजागर : भौगोलिक चिन्तन का विकास
15. त्रिपाठी एवं बिरले : भौगोलिक चिंतन का विकास एवं विधितंत्र
16. कौशिक , एस.डी. : भौगोलिक विचारधाराओं का इतिहास एवं विधितंत्र
17. सिंह , जगदीश : भौगोलिक चिंतन का मूलाधार.

PAPER – IV (2015-16)

GEOGRAPHY OF INDIA

- UNIT – I** Physical and Biological elements in the Geography of India: Geological structure, relief, climate Drainage, vegetation and soils.
- UNIT – II** Agriculture: Major characteristics and problems, Impact of infrastructural and institutional factors on agriculture. Important crops-wheat, rice, cotton, sugarcane, oil-seeds, tea and coffee, Agricultural regions. Green revolution, Agro-climatic regions.
- UNIT – III** Sources of power: Coal; Petroleum, Natural gas. Hydroelectricity and Atomic energy. Mineral resources with special reference to iron ore, manganese and bauxite. Industrial development with special reference to iron and steel, cement, cotton, jute, sugar and paper industries; Industrial regions.
- UNIT – IV** Regional division of India: Purpose and Methodology. Major schemes of regions of India: O.H.K. Spate and R.L. Singh. Physical and cultural geography of Chhattisgarh State.

SUGGESTED READINGS:

1. Centre for Science & Environment (1988) State of India's Environment, New Delhi.
2. Desphande C.D. India. : a Regional Interpretation ICSSR & Northern Book Centre 1992.
3. Dreza, Jean & AMartya. Sen (ed.) India Economic Development and Social opportunity Oxford University Person, New Delhi. 1996.
4. Kundu A. Raza Moonis : Indian Economy : the Regional Dimension Speclaum Publishers, New Delhi, 1992.
5. Robinson, Francs : The Cambridge Encyclopedia of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan & Maldives Cambridge University Press, London, 1989.
6. Singh R.L. (ed.) : India - A Regional Geography National Geographical Society, India Varanasi, 1971.
7. Spale OHK & ATA Learnont-India & Pakistan Methuen, London. 1967.
8. Tirtha R. & Gopal Krishna, Emerging India Reprinted by Rawat Publications, Jaipur 1996.
9. Sharma T.C. and O. Coutinho : Economic and Commercial Geography of India.
10. अग्रवाल पी.सी. भारत का भौतिक भूगोल, एशिया प्रकाशन कं., रायपुर 2003
11. बंसल सुरेशचंद्र, भारत का भूगोल, मिनाक्षी प्रकाशन, मेरठ.
12. वर्मा रामविलास, भारत : एक भौगोलिक विवेचन, भवदीय प्रकाशन श्रृंगारघाट—अयोध्या, फैजाबाद, पिन –224123, 2007.

PAPER – V (2015-16)

PRACTICAL I - ADVANCED CARTOGRAPHY

Graphs and Diagrams: Triangular graph. Logarithmic and semi logarithmic graphs, scatter graphs; climatograph. Proportional circles, spheres and cubes.

Thematic Maps: Choropleth maps, isolines, Flow maps, isochrones and class intervals. Morphometric Analysis: Profiles, Slope Analysis; Altimetric, and Clinographic curves; Block Diagrams.

SUGGESTED READING:

1. Monk house F.J. & H.R. Wilkinson: Maps and Diagrams, Methuen, London.
2. मॉक हाउस तथा विल्किन्सन (अनु.प्रो.प्रेमचन्द अग्रवाल) : मानचित्र तथा आरेख, म.प्र. हिंदी ग्रंथ अकादमी.
3. हीरालाल : प्रायोगिक भूगोल.

M.A./M. Sc. GEOGRAPHY (2015-16)

SEMESTER – II

M. A. /M. Sc. Geography Semester II shall consist the following papers:

S. No.	Paper	Title	M. M.		
			Written	Inte. Asse.	Total
1.	VI	Economic and Natural Resource Management	80	20	100
2.	VII	Oceanography	80	20	100
3.	VIII	Regional Development and Planning	80	20	100
4.	IX	Social Geography	80	20	100
5.	X	Practical-II : Map Projections, Map Interpretation and Surveying	---	---	100

1. The M. A./M. Sc. Semester II examination in Geography shall consist of 500 marks.

There shall be four theory papers each of 100 marks and one practical of 100 marks as follows:

Paper VI Economic and Natural Resource Management.

Paper VII Oceanography

Paper VIII Regional Development and Planning

Paper IX Social Geography

Paper X Practical-II : Map Projections, Interpretation and Surveying.

2. The theory papers shall be of three hours duration.

3. Candidates will be required to pass separately in theory and practical examinations.

4. (a) In the practical examination the following shall be the allotment of time and marks.

(i) Practical record	20%
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(ii) Lab work (up to three hours) 40%

(iii) Field work (up to three hours)	30%
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(iv) Viva on i, ii & iii above 10%

(b) The external and internal examiners shall jointly submit marks.

(c) Candidates shall be examined in survey individually. They will however be allowed to take the help of a labourer each at their own expense.

(d) All the candidates shall present at the time of the practical examination their

Practical record regularly signed by the teachers concerned.

PAPER- VI (2015-16)

ECONOMIC AND NATURAL RESOURCE MANAGEMENT

- UNIT – I Nature and scope of economic Geography; fundamental concepts in economic geography; classification of economies, sectors of economy (primary, secondary, tertiary). Meaning, nature and classification of resources, Resource appraisal : human want and social objective, technological status and resources. Appraisal of quality and quantity of human resources, relation between population and resource, natural resources and economic development, resource adequacy and scarcity, limits to growth. Resource use, concept of absolute and relative abundance of resources, optimum, under use, misuse and over use of resources.
- UNIT – II World pattern of major natural resources: land and soils, biotic resources, water resources mineral and energy resources, oceanic resources.
- UNIT – III Classification of Industries, Theories of industrial location; case studies of selected industries; Iron and Steel; Aluminium, Chemical, Textile. Means of transport, International trade, trade blocks, globalization and Indian economy.
- UNIT – IV Conservation and management of resources; evolution of the concept, principles, philosophy and approaches to conservation, resource conservation and management methods. Policy making and resource management; sustainable development of resources.

SUGGESTED READING:

- | | | |
|---------------------------------------|---|--|
| Ahemd, Jaleel | - | Natural Resources in Low Income Contries. |
| Bennet, II.II. | - | Elements of Soil Conservation. |
| Ciriacy, Wantrup,S.V.& Persons (eds.) | - | Natural resources: Quality & Quantity |
| Betall,R.C. & R.O.Buehanan | - | Industrial Activity and Economic Geography. |
| Edvard and Rosers | - | Agricultural Resources. |
| Freeman, T.W. | - | Geography and Planning. |
| Fryer, D.M. | - | World Economic Development. |
| Isard, Walter | - | Method of Regional Analysis. |
| Mehta, M.M. | - | Human Resource Development Planning. |
| Owen, O.S. | - | Natural Resource Conservation. |
| Peach, W.N.& James, A. | - | Zimmerman's World Resources Contenting and Conservation. |
| Parkin's,E.A. & J.R. Whitakr | - | Our Natural Resource and their conservation. |
| Renner, G.T. | - | Conservation of National Recourses. |
| Stamp, L.D. | - | Land of Britain Its use and Misue. |
| Smith, G.H.(ed.) | - | Conservation. of Natural Recourses. |
| Symoos, L. | - | Agriculture Geography. |
| Thomas W.L.(et.al.reds.) | - | Man's Role in Changing the face of the Earth. |
| Wales, H.& H.O. Lathrop | - | The Conservation of Natural Recourses. |
| Wheeler, T.O. et al | - | Economic Geography, John Wiler New York 1995. |

PAPER – VII (2015-16)

OCEANOGRAPHY

- UNIT – I Nature and scope of Oceanography; Distribution of land and water; Major features of ocean basins; Marine sediments. Physical and chemical properties of sea water.
- UNIT – II Interlink between atmospheric circulation and circulation pattern in the oceans, surface currents, thermohaline, waves and tides.
- UNIT – III Marine biological environment : Bio geochemical cycle in the ocean. biozones, types of organisms; plankton, nekton and benthos, food and mineral resources of the sea. Major marine environments; coastal : estuary, deltas, barrier island, rocky coasts : Open : reefs, continental shelf, continental slope and deep : Pelagic environment and floor of the ocean basins.
- UNIT – IV Impact of Humans on the marine environment. Law of the sea; exclusive economic zone; marine deposits and formation of coral-reefs.

SUGGESTED READINGS:

1. Davis Richard J.A. : "Oceanography-An Introduction to the Marine Environment". Wm. C. Brown Iowa, 1986.
2. Duxbury, C.A. and Duxbury B. : An Introduction to the world's Oceans-C. Brown. Iowa 2nd ed., 1986.
3. Garrison, T. : "Oceanography - An Introduction to Marine Science" Books/Cole, Pacific Grove, USA, 2001.
4. Gross, M. Grant : Oceanography, a View of the earth, prantice-Hall inc, New Delhi, 1987.
5. King C.A.M. Oceanography for Geographers 1962.
6. Sharma, R. C. "The Oceans" Rajesh N. Delhi, 1985.
7. Urnmerkutty, A.N.P. Science of the Eceans and Human life, NBT, New Delhi, 1985.
8. Ornmany, F.D. : The Ocean.
9. Sharma, R. C. & M. Vital : Oceanography : A Brief Introduction kislaya Pub. New Delhi.
10. Siddartha, K.. : Oceanography : A Brief Introduction, Kislya Pub. New Delhi.
11. नेगी, बी.एस. : जलवायु तथा समुद्र विज्ञान.

PAPER – VIII (2015-16)

REGIONAL DEVELOPMENT AND PLANNING

- UNIT – I Regional Planning: Definition, Scope, evolution and Objectives. Region and Regionalism, Planning Regions: Concept and Delineation. Type of Regions. Spatial organisation: Central Place Theory, Concept of core and

- periphery Friedmann's Model of Spatial Organisation and Economic Growth.
- UNIT – II Regional Development Theories: Development Theories of Myrdal and Hirschman, Economic and Export Base model, Frank's Theory of Under development.
- UNIT – III Approaches and Strategies of Regional Development: Growth Pole Theory Agropolitan Development, Community Development, River Basin Planning, Metropolitan Planning (with reference to India)
- UNIT – IV Regional Planning in India. Regional Imbalances and Inequalities, Indicators of Regional Development; Regional Policies in Five Year Plans, Centre State Relations and Multilevel Planning, Planning for special problem Regions: Hill area, Tribal areas, Drought prone areas, Command areas and River basins. Regional development and planning in India.

SUGGESTED READING:

1. Daysch, C.H.J. & others: Studies in Regional Planning.
2. Deckinsonm R.E. : City Region and Regionalism.
3. Freeman, E.W. : Geography arid Planning.
4. Golksin A. : Regional Planning and Development.
5. Keeble, L. : Principle and Practice of Town and Country Planning.
6. Stamp L.D. : The Land of Britain : Its use and Misure.
7. Sdasyuk. Gatina and Dengupta, P. : Economic Regionalization of India problems and Approaches.
8. Desai, P.B. & others : Regional Perspective of Industrial and Urban Growth the case of Kanpur, Bombay, 1969.
9. Prakash, Rao V.L. & S.P. : Regional Planning.
10. Censuts of India : Economic and Socio Cultural Dimensions of regionalization (An Indo-USSR Collaborative Study)
11. Friedmann J. & Alonsow : Regional Development and Planning, M.I.T. Press.
12. Misra R.P. (ed.) : Regional Planning : Concept; Techniques, Policies and cade studies Mysore 1969.
13. Misra, R.P. & others : Regional Development and Planning in India.
14. Timbergen : Essays on World Regional Planning.
15. Lord, W. : Methods of Regional Analysis, M.I.T., 1960.
16. Zimmerinan, E.W. : World Resources and Industries.
17. Burton & Kates : Reading in Resource Management Conservation.
18. Burton & Kates : Regional Planning in India.
19. Ahamed, Enayet : Regional Planning with particular Reference to India. Vol. I and li New Delhi.
20. Bhatt L.S. and others: Micro level planning - A Case Study of Karnal Area, Hyryana (K.B. Publishing, New Delhi)
21. Bhatt LS : Regional Planning in India, Statistical Publishing Society, Calcutta, 1973.
22. Gosal GS, and G. Krishanan : Regional Disparities in levels of Socio-economic Development in Punjab, Vishal Publications Kurukshetra, 1984.
23. Chandna, R.C. : Regional Planning : A comprehensive 'Text-Kajyani Publishers.
24. Ray Choudhari, Jayasri : An Introduction to Development and Regional Planning Orient Longman.
25. Sundaram, KV (ed) Geography and Plann8ing, Essaya in houour of VLS Prakasa Rao, Concept Publishing Co., New Delhi, 1985.
26. Raza, Meomis (ed) Regional Development, Hefitage Publishiers, Delhi, 1988.

27. Mishra R.P. et al : Multilevel Planning, Heritage Publishers Delhi, 1980
28. श्रीवास्तव व्ही.के. एवं अन्य : प्रादेशिक नियोजन एवं संतुलित विकास.
29. ओझा, रघुनाथ : प्रादेशिक नियोजन का भूगोल.
30. शर्मा, राजीवलोचन : प्रादेशिक एवं नगरीय नियोजन.
31. चन्द्राकर, इन्द्रमण : व्यावहारिक भूगोल, वसुन्धरा प्रकाशन, गोरखपुर, 1998.

PAPER – IX (2015-16)

SOCIAL GEOGRAPHY

- UNIT – I** Definition, meaning and scope of Social geography and it's Nature and relationship with other Social sciences. Development of Social Geography, Approaches to the study of Social Geography.
- UNIT – II** Concept of Society – Social Environment, Geographic bases of Social Formation. Social Geography of India - Social Stratification, Caste and Class. Social organization and groups, Social transformation and change in India, Religion and linguistic group of India. Evolution of Socio-Cultural Regions of India.
- UNIT – III** Social well- being– meaning and indicators of Social well- being. Quality of life, Human Development, Measurement of Human Development with Social, Economical and Environmental indicators, Pattern and bases of rural and urban society. Deprivation and discrimination issues relating to women and under privileged groups. Cultural Realms and Cultural Region of the World.
- UNIT – IV** Social development planning – meaning and importance. Public policy and Social planning in India : Review of Five year Plans strategies to improve Social well being in tribal, hill, drought and flood prone Areas.

SUGGESTED READINGS:

- 1 Ahmad Aijazuddin, Social Geography, Rawat Publication, New Delhi, 1999.
- 2 De Blij. H.D. Human Geography. John Wiley and son, New York.
- 3 Dreze Jean, Amariya Sen, Economic Development and Social opportunity. Oxford University Press. New Delhi. 1996
- 4 Dubey. S.C : Indian Society. National Book Trust, New Delhi, 1991.
- 5 Gregory. D . and J. Larry (Eds.) Social. relations and spatial structures. MCMillan. 1985.
- 6 Haq. Mahbubul : Reflections on Human Development. Oxford University Press, New Delhi.
- 7 Jones, Emrys, Reading in Social Geography, Oxford University Press, Ely House, London, 1977.
- 8 Jones, Emrys and John Eyles, An Introduction to Social Geography, Oxford University Press, London, 1977.
- 9 Maione. Clarence: People of South Asia, Winston, New York, 1974.
- 10 Planning Commission, Government of India: Report on Development of Tribal areas, 1981.

11. Rao, M.S.A.. Urban Sociology in India, Orient Longman, 1970.
12. Schwartzberg Joseph : An Historical Atlas of South Asia, University of Chicago Press, (Chicago, 1978.
13. Sen, Amartya & Dreze Jean. Indian Development : Selected Regional Perspectives. Oxford University Press, 1996
14. Smith, David: Geography : A welfare Approach, Edward Arnold, London, 1977.
15. Sopher, David. An Exploration of India, Cornell University Press, 1980.
16. Subba. Rao. Personality of India : Pre and Proto Historic foundation of India and Pakistan, M.S. University Baroda. Vadodai'a, 1958
17. मौर्य,एस.डी., सामाजिक भूगोल शारदा पुस्तक भवन,11,युनिवर्सिटी रोड, इलाहाबाद-2 , 2004.

PAPER – X (2015-16)

PRACTICAL II- MAP PROJECTIONS, INTERPRETATION AND SURVEYING

Map Projections: Mathematical construction of world projections.

Interpretation of Maps: Geological Maps.

Principles and methods of topographical surveying involving the use of Theodolite and Dumpy level. Solution of problems in Surveying.

Topographical Information – International series, South east Asia Series, Indexing, Classification & Interpretation of topographical sheets.

SUGGESTED READINGS:

1. Davis, R. C. & E. S. Forte : Surveying : Theory and Practical.
2. Kanetkar, T.R. & S.V. Kulkarni: Surveying and leveling part I & II A.V.G. Prakashan, Poona.
3. Monkhouse F.J. & H.R. Wilkinson: Maps and Diagrams, Methuen, London.
4. मॉक हाउस तथा विलकौन्सन (अनु.प्रो.प्रेमचन्द अग्रवाल) : मानचित्र तथा आरेख, म.प्र. हिंदी ग्रंथ अकादमी.
5. हीरालाल : प्रयोगिक भूगोल.

**M.A./M. Sc. GEOGRAPHY
SEMESTER III (2015-16)**

M.A./M. Sc. Geography Semester III shall consist the following papers:

S. No.	Paper	Title	M. M.		
			Written	Inte. Asse.	Total
1.	XI	Population Geography	80	20	100
2.	X II	Settlement Geography	80	20	100
3.	XIII (A)	Remote Sensing Techniques	80	20	100
	OR	OR			
4.	XIII (B)	Biogeography and Ecosystem	80	20	100
5.	IV	Research Methodology	80	20	100
	V	Practical-III : Remote Sensing and Quantitative Techniques	---	---	100

1. The M.A. /M. Sc. Semester III examination in Geography shall consist of 500 marks.

There shall be four theory papers each of 100 marks and one practical of 100 marks as' follows:

Paper XI : Population Geography

Paper XII : Settlement Geography

Paper XIII (A) : Remote Sensing Techniques

OR

Paper XIII (B) : Biogeography and Ecosystem

Paper XIV : Research Methodology

Paper XV : Practical – III: Remote Sensing and Quantitative Techniques

2. The theory papers shall be of three hours duration.
3. Candidates will be required to pass separately in theory and practical examinations.
4. (a) In the practical examination the following shall be the allotment of time and marks.
 - (i) Practical record : 20%
 - (ii) Lab work (up to Four hours) : 70%
 - (iii) Viva on i.& ii. Above : 10%
- (b) The external and internal examiners shall jointly submit marks.
- (c) All the candidates shall present at the time of the practical examination their practical record regularly signed by the teachers concerned.

SEMESTER – III (2015-16)

PAPER - XI

POPULATION GEOGRAPHY

- UNIT – I Definition and scope of Population Geography. Relation of Population Geography with other subjects of social sciences. Historical development of Population Geography in western countries and in India. Sources of population data, Census and its history.
- UNIT – II Distribution of Population: The concept of population density and its types. Factors affecting population distribution. Distribution & Density of population in the world with special reference to Europe, Asia and India. Growth of population: Measure of decennial and annual rates of population growth, prehistoric and modern trends of population growth in the world. Regional aspect of population growth in India. Population theories. Demographic transition.
- UNIT – III Population composition in terms of age and sex, rural, urban residence, educational status and occupational structure. Significance of these elements in population analysis, factors affecting their composition in population, broad world patterns and detailed spatial patterns in India. Fertility and Mortality of population: Significance and factor. Indices and rates. World pattern and pattern in India.
- UNIT – IV Migration of population: Causes, characteristics and types. Methods of estimating value of internal migration. Important international migrations of the world, internal migration in India: Population and Resources: Population-Resource regions. Population Regions: Concept and methods, population regions of India, population policies of India.

SUGGESTED READINGS:

1. Bilasboruw, Richard Li and Daniel Hogan, Population and Deforestation in the Humid Tropics, International Union for the Scientific Study of Population, Belgium 1999.
2. Boglia, D.J. Principles in Demography, John Wiley, New York 1969.
3. Bose, Ashish et al. : Population in India's Development (1947-2000); Vikas Publishing House, New Delhi, 1974.
4. Census of India, India : A State Profile, 1991.
5. Chandna, R. C. Geography of Population, Concept, Determinants and Patterns. Kalyani Publishers, New York, 2000.
6. Clarke, John I. Population Geography, Pergamon Press, Oxford, 1973.
7. Crook, Nigel Principles of Population and Development Pergamon Press. New York 1997.
8. Daugherty, Helen Gin, Kenneth C.W. Kammeyir, An Introduction to Population (Second Edition), The Guilford Press, New York, London, 1998.
9. Garnier, B.J. Geography of population Longman, London. 1970.
10. Koclihar, Ramesh, The Tribal People : Their History and Geography Orient Longman Ltd., New Delhi, 2000.

11. Mamoria, C.B. India's Population Problem, Kitab Mahal New Delhi, 1981.
12. Mjtra, Ashok India's Population : Aspects of Quality and (control Vol I & 11. Abhiman Publications, New Delhi, 1978.
13. Premi, M.K. India's Population : Heading Towards a Billion, B.R., Publishing Corporation 1991.
14. Srinivasan, K. and M. Vlassoff, Population Development Nexus in India :Challenges for the New Millennium Lata Me Graw-Hill, New Delhi, 2001.
15. Srinivasan K. Basic Demographic Techniques and Applications Sage, Publications, New Delhi, 1998.
16. Sunda.ra.m K. V. a.nd Sudesh Nangia., (ed.) Population Geography, Henlage Publications, Delhi, 1986.
17. UNDP : Human Development Report, Oxford University Press, Oxford, 2000.
18. United Nations, Methods for Projections of urban and Rural Population No. VIII, New York, 1974.
19. Woods R.. Population Amalysis' in Geography Longman, London, 1979.
20. Zeiinsky Wilbur, A Prologue to Population Geography, Prentic Hall, 1966.
21. बघेल, अनुसुइया : अनुसूचित जातियों एवं अनुसूचित जनजातियों में प्रजननता प्रतिरूप : छत्तीसगढ़ राज्य के रायपुर संभाग के विशेष संदर्भ में', पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर, 2002.
22. बघेल, अनुसुइया : शिशु मर्त्यता : सिंघई पब्लिशर्स एण्ड डिस्ट्रीब्यूटर, रायपुर, 2004.
23. शर्मा, सरला : औद्योगिक नगरों में जनसंख्या आप्रवास (भिलाई एवं कोरबा नगर के विशेष संदर्भ में), पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर, 2002.
24. शर्मा, सरला : छत्तीसगढ़ बेसिन में ग्रामीण शिशु मर्त्यता प्रतिरूप.
25. पंडा, बी.पी. : जनसंख्या भूगोल.
26. ओझा, रघुनाथ : जनसंख्या भूगोल.
27. हीरालाल : जनसंख्या भूगोल.
28. चन्दना, आर.सी. : जनसंख्या भूगोल.
29. त्रिपाठी, रामदेव : जनसंख्या भूगोल.

SEMESTER – III (2015-16)

PAPER - XII

SETTLEMENT GEOGRAPHY

- UNIT – I Meaning, Objectives and Scope of Settlement Geography; Evolution, Distribution, Types and Patterns of Rural Settlements; Rural House Types; Rural Service Centers.
- UNIT – II Evolution and growth of urban settlements; The Geographical setting of Urban Centers: Site, Situation and Location.
- UNIT – III Rank- size-relationship; Cities as Central Places, Central Place Theory, Growth Centre Theory.
- UNIT – IV City- Country Relationship : Umland, Rural-Urban Fringe.

SUGGESTED READINGS:

1. Abercrombee, Sir P. : Town and Country planning 1961.
2. Alani, Shah Manzoor : Hyderabad Secuidrabad (Twin Cities) A. study in urban geography)
3. Alam, S.M. & V.V. Tokshishevesky : Urbanization in developing countries.

4. Berry Brain .1. L. : Geographic Prospective on Urban .Systems.
5. Bresse, C. & D.F. Whiteman : An approach to Urban Planning
6. Dickinson, R.E. : City, Religion and Regionalism.
7. Gallion and Fisher : The Urban Pattern.
8. Griffith, , J.P. : A study of Urban constructions in India.
9. Gibbs : Urban Research Methods.
10. Mayor, H.M. & (, '.1". Kohn : Readings in Urban Geography.
11. Morgan, F.W. : Ports and Harbours.
12. Mumford L. : Culture of cities.
13. Robson, W.A. : Great cities of world.
14. Robson, B.T. : Urban Growth : An approach, Methuen, London.
15. Carter, Harold : Study of Urban Geography, London, Edward Arnold, 1979.
16. Singh R.I., & K.N. Singh : Readings in Rural Settlement Geography, NGSI Varanasi, 1975.
17. सिंह, उजागिर : नगरीय भूगोल ।

SEMESTER – III (2015-16)

PAPER – XIII (A)

REMOTE SENSING TECHNIQUES

- | | |
|------------|---|
| UNIT – I | Historical development of remote sensing as a technology - Relevance of remote sensing in Geography - Concepts and basics: Energy source, energy and radiation principles, energy interactions in the atmosphere and earth surface features, remote sensing systems: platform sensors and radiation records. Microwave sensing interpretation of SLAR imageries, thermal imageries. |
| UNIT – II | Remote Sensing Satellite: platforms LANDSAT, SPOT, NOAA, RADARSAT, IRS, INSAT: principles and geometry of scanners and CCD arrays, orbital characteristics and data products - MSS, TM, LISS I & II, SPOTPLA & MLA, SLAR. |
| UNIT – III | Image Processing: Types of imagery, techniques of visual interpretation, ground verification transfer of interpreted thematic information to base maps-digital processing: rectification and restoration, image enhancement - contrast manipulation, Classification: Supervised and Unsupervised, post-classification analysis and accuracy assessment. |
| UNIT – IV | Applications : Air photo and image interpretations arid mapping land use and land cover, land evaluation, urban land use, landform and its processes, weather studies and studies of water resources : integration of Remote Sensing and GIS. Remote sensing and hazard management, remote sensing and environmental management. |

SUGGESTED READINGS:

1. American Society of Photogrammetry: Manual of Remote Sensing. ASP, Falls Church V.A., 1983.
2. Barrett E.C. and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation on, Memillan, New York, 1992.
3. Campbell J.: Introduction to Remote Sensing, Guilford, New York, 1989.
4. Curran, Paul J.: Principles of Remote Sensing. Longman, London, 1985.
5. Hord R.M. : Digital Image Processing of Remotely Sensed Data, Academic, New York, 1983.
6. Luder D., Aerial Photography Interpretation: Principles and Application, CcGraw Hill, New York, 1959.
7. Pratt W.K. Digital Image Processing. Wiley, New York, 1978.

8. Rao D. P. (eds.): Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hederabad, 1998.
9. Thomas M. Lollasand and Ralph W. Kefer, Remote Sensing and Image Interpretation, Wiley & sons, New York, 1994.
10. Aronoff S. Geographic Information Systems : A. Management Perspective, Publication Offiawa, 1989.
11. Burrough P.A. Principles of Geographic Information Systems for Land Reson Assessment Oxford University Press, New York, 1986.
12. Fraser Taylor D.R. Geographic information Systems. Pergamor Press, Oxford 1990.
13. Maquire D.J.M.F. Goodchild and D.W. Rhind (eds.). Geographic information System 'Principles arid Application. Taylor & Francis, Washington, 1991.
14. Mark S. Monmonier. Computer - assisted Cartography, Prentice-Hall, Englewood Cliff, Jersey, 1982.
15. Peuquet D. .1. and D.F.- Marble, Introductory Reading in Geographic. Information System Taylor & Francis, Washington, 1990.
16. Star J. and J. Estes, Geographic Information Systems : An Introduction, Prentice Englewood Cliff, New Jersey, 1994.
17. चौनियाल, देवी दत्त : सुदूर संवेदन एवं भौगोलिक सूचना प्रणाली.

PAPER – XIII (B) (2015-16)

BIOGEOGRAPHY AND ECOSYSTEM

- UNIT – I** Definition and scope of Biogeography Environment, Habitat and Plant-animal association, Biome Types.
- UNIT – II** Elements of plant geography, distribution of forests and major communities. Plant successions in newly formed land forms. Zoogeography and its Environmental Relationship. Pale botanical and Palaeo climatological records of environmental change.
- UNIT – III** Ecosystems: concept and components, Ecosystem-form and function: tropic level, ecological pyramids, ecological niche, energy and nutrients in the ecosystem, hydrological cycle, food chains and food webs. Major terrestrial ecosystems of the world : agriculture, forests, grassland and desert. Population growth and environment.
- UNIT – IV** Biodiversity and its Conservation. Preservation and conservation of the ecosystem through resource management, Environment legislation. The Stockholm conference, the Earth summit, Environmental laws in India (the Wild Life Act, Water Act, Forest Act, Environment Protection Act and National Environment Tribunal Act).

SUGGESTED READINGS -

1. Agrawal D.P. : Man and Environment in India through Ages, Book & Books, 1992.
2. Bradshaw, M.J. : Earth and Living Planet, ELBS. London, 1979.
3. Cox, C.D. and Moore, P.D. : Biogeography : An Ecological and Evolutionary Approach 5th edn. Blackwell, 1993.
4. Gaur, R. : Environment and Ecology of Early Man in Northern India R. B. Publication Corporation 1987.
5. Hoyt, J.B. Man and the Earth, Prentice Hall, U.S.A. 1992.
6. Huggett. R.J. : Fundamentals of Biogeography, Routledge, U.S. A. 1998.
7. Illes, J. : Introduction to Zoogeography, Mcmillan, London, 1974.

8. Khoshoo, T. N. and Sharma. M. (eds) : Indian Geosphere-Biosphere Har-Anand Publication, Delhi 1991
9. Lapedes, D.N.(ed) : Encyclopedia of Environmental Science, McGraw Hill, 1974.
10. Mathur H.S. : Essentials of Biogeography, Anuj Printers, Jaipur, 1998.
11. Pears, N. : Basic Biogeography, 2nd edn. Longman, London, 1985.
12. Simmons, I.G. Biogeography, Natural and Cultural, Longman, London, 1974.
13. Tivy J. : Biogeography: A Study of Plants in Ecosphere 3rd edn. Oliver and Boyd, U.S. A., 1992.
14. Ackerman, E.A. : Geography as a Fundamental Research Discipline, University of Chicago Research Papers, 1958
15. Agarwal, A. and Narain, S. : The Citizens Fifth Report. Centre for Science and Environmental, New Delhi, 1999.
16. Bertalanffy, L. : General Systems Theory, George Bragiller, New York, 1958.
17. Bodkin, E. : Environmental studies, Charles E Merrill Pub. Co., Columbus, Ohio, 1982.
18. Chandana, R.C. : Environmental Awareness, Kalyani Publishers, New Delhi, 1958.
19. Chorley, R.J. : Geomorphology and General Systems Theory, U.S.G.S. Professional Paper, 500B, 1962.
20. Eyre, S.R. and Jones, G.R.J. (eds) Geography as Human Ecology, Edward Arnold, London, 1966.
21. Kormondy, E.J. : Concepts of Ecology, Prentice Hall, 1989.
22. Manners, I.R. and Mikesell, M.W. (eds.) Perspectives on Environment, Commission on College Geography, Publ. No. 13 Washington, D.C., 1974.
23. Nobel and Wright : Environmental Science, Prentice Hall, New York, 1996.
24. Odum, E.P.: Fundamentals of Ecology, W.B. Saunders, Philadelphia, 1971.
25. Russwurm, L.H. and Sommerville, E. (eds.) : Man's Natural Environment-A Systems Approach, Duxbury, Massachusetts, 1985.
26. Sharma, H.S. : Ranthambhore Sanctuary – Dilemma of Eco-development, Concept, New Delhi, 2000.
27. Simmons, I.G. : Ecology of Natural Resources, Edward Arnold, London, 1981.
28. Singh S. : Environmental Geography, Prayag Publications, Allahabad, 1991.
29. Smith, R.L. : Man and his Environment : An Ecosystem Approach, Harper & Row, London, 1992.
30. U.N.E.P. : Global Environmental Outlook, U.N. Pub. , New York, 1998.
31. World Resources Institute : World Resources, (Latest Report) Washington.
32. कुलश्रेष्ठ, कामता प्रसाद : जैव भूगोल

SEMESTER – III (2015-16)

PAPER - XIV RESEARCH METHODOLOGY

- | | |
|------------|---|
| UNIT – I | Research Methodology-An Overview; Procedure of scientific Research, Defining Research Problem; Formulating Hypothesis; Research Design. |
| UNIT – II | Methods of Data Collection: Observation, Questionnaire, Schedule and Interview; Sampling: Sampling Methods, Size of Sample; |
| UNIT – III | Processing and Analysis of Data: Processing- Editing, Coding, Classification and Tabulation, Analysis – Measurement of Central Tendency, Dispersion, Correlation. |
| UNIT – IV | Preparation of Research Reports: Steps, Layout and Types of Reports |

SUGGESTED READING:

- | | |
|--|---|
| 1. Selltitz, C.M. Jahoda, M. Deutsch and others. | Research Methods in Social Relations, Holt, . New York, 1961. |
| 2. Goode, W and P.K. Hatt | Methods in Social Research, Mc Graw Hill, |

3. Harvey, David .Tokyo, 1962.
Explanation in Geography, Edward Arnold, London, 1971
4. Chorley, R.J. and P. Haggett (ed) Models in Geography, Methuen, London, 1967.
5. Minshull, R. Introduction to Models in Geography. Longman London, 1975.
6. Sheskin, I.M. Survey Research for Geographers Scientific Publisher, Jodhpur, 1987.
7. Kothari, C. R. Research Methodology : Methods and Techniques, Wishwa Prakashan, 1994.
8. Misra H.N. and V.P. Singh Research Methodology in Geography: Social, Spatial and Policy Dimensions, Rawat Publications New Delhi, 1998.
9. Har Prasad Research Methods and Techniques in Geography, Rawat Publications, New Delhi. 1992.

SEMESTER – III (2015-16)

PAPER - XV

PRACTICAL -III

Remote Sensing, Interpretation of Topographical Sheets and Quantitative Techniques

1. **Principles of Photogrammetry:** - Air Photo- Stereo test, Orientation of stereo model under mirror stereoscope, Preparation of photo/line index and determination of photo scale, Use of parallax bar and determination of heights, Identification of features on aerial photograph, Tracing of details from stereo pair, Interpretation of physical and cultural details, Preparation of Land use map pre field interpretation, Field visit for ground truthing.
2. **Remote Sensing:**– Study of satellite Image – Annotation Identification of features on FCC imageries, Tracing of details from satellite imageries, Basic Principles of Image interpretation, Interpretation of Physical and Cultural details and preparation of land use and land cover map using IRS Images. Pre field visit.
3. **Land use Processing System:-** Familiarization and startup procedure, Visualization of satellite image data, importing data, Creating a subset image, Identification of object on video display, Display of Histogram and image information, Image rectification and registration, Image to image registration, Image Enhancement techniques, Filtering techniques, Band Rationing, Principal component Analysis, Image classification.

Statistical Techniques:

Product moment and Rank Correlation Coefficients, Linear Regression. Hypothesis Testing: Chi-Square test, t-test & F test, Sampling Techniques, Point, Line and Area Sampling.

SUGGESTED READINGS:

1. American Society of Photogrammetry : Manual of Remote Sensing. ASP, Falls Church V.A. 1983.
2. Barren E.C. and I..F. Clirtis : Fundamentals of Remote Sensing and Air Photo Interpretation 'on, Memillan, New York, 1992.
3. Conipbell .1. : Introduction to Remote Sension, Glinford, "New York, 1989.
4. Clirran, Paul J. : Principles of Remote Sensing. Longman, London, 1985.
5. Hord R.M. : Digital Image Processing of Remotely Sensed Date, Academic, New York,1983
6. Luder D., Aerial Photographliy Interpretation : Principles and Application, Cc Graw Hill, New York, 1959.
7. Pratt W.K. Digital Image Processing. Wiley, New York, 1978.
8. Rao D. P.. (eds.) : Remote Sensing for Earth Resources, Association of Exploration Geophysicisi, Hederabad, 1998.
9. Thomas M. Lollesand and Ralph W. Keler, Remote Sensing and Image Interpretation, Wiley & sons. New York, 1994.
10. Aronoff S. Geographic Information Systems: A Management Perspective, Publication Offawa, 1989.
11. Burroligh P..A. Principles of Geographic Information Systems for Land Reson Assessment Oxford University Press, New York, 1986.
12. Fraser Taylor D.R. Geographic information Systems. Pergamor Press, Oxford 1990.
13. Maquire D.J.M.F. Goodchiln and D.W. Rhind (eds.). Geographic information System Principles and Application. Taylor& Francis, Washingron, 1991.
14. Mark S. Monrnonicr. Computer-assisted Cartography, Prentice Hall, Englewood Cliff, Jersey, 1982.
15. Peuquer D.J. and D.F. Marble, Introductory Reading in Geographic Information System Taylor & Francis, Washington, 1990.
16. Star J. and J. Estes, Geographic Information Systems; An Introduction, Prentice Eaglewood Cliff, New Jersey. 1994.

M.A./M. Sc. GEOGRAPHY
SEMESTER IV (2015-16)

M.A./M.Sc. Geography Semester IV shall consist the following papers:

S. No.	Paper	Title	M. M.		
			Written	Int. Ass.	Total
1.	XVI	Urban Geography	80	20	100
2.	XVII	Agricultural Geography	80	20	100
3.	XVIII (A)	Geographical Information System	80	20	100
	OR	OR			
4.	XVIII (B)	Environmental Geography	80	20	100
	XIX	Field Work (Physical and Socio-Economic)	---	---	100
5.	XX	Practical-IV:Geographical Information System and Quantitative Techniques	---	---	100

- The M.A./M.Sc. Semester IV examination in Geography shall consist of 500 marks.

There shall be three theory papers and one Field Work report each of 100 marks and one practical of 100 marks as follows.

S. No.	Paper	Title
1.	XVI	: Urban Geography
2.	XVII	: Agricultural Geography
3.	XVIII (A)	: Geographical Information System
	OR	
	XVIII (B)	: Environmental Geography
4.	XIX	: Field Work (Physical and Socio-Economic)
5.	XX	: Practical-IV: Geographical Information system and Quantitative Techniques

- The theory papers shall be of three hours duration.
- Candidates will be required to pass separately in theory and practical examinations.
- Candidates will be required to submit their Field Report in three copies in hard bound at least one hundred pages for Valuation.
- In the practical examination the following shall be the allotment of time and marks.
 - Practical record 20%
 - Lab work (up to Four hours) 70%
 - Viva on i. & ii. above 10%
 - The external and internal examiners shall jointly submit marks.
 - All the candidates shall present at the time of the practical examination their practical record regularly signed by the teachers concerned.

SEMESTER – IV (2015-16)

PAPER-XVI

URBAN GEOGRAPHY

- UNIT – I Definition, Objective and Scope of urban geography, General Nature of City Structure.
- UNIT – II Internal structure: Morphology and Land use. Theories of Urban Structure: The Concentric Zone Theory, the Sector Theory, the Multiple Nuclei Theory. Commercial Structure of Cities; The Central Business District (CBD),
- UNIT – III Centrifugal and Centripetal forces in Geography, Economic Base of Towns: Basic, Non-basic concept. Urban Functions: Functional Classification of Towns: Webb, Harris, and Nelson.
- UNIT – IV Contemporary Urban Issues: Urban renewal, Urban sprawl, Slums, Environmental Pollution, Urban Planning; Landuse Planning, Urban and Metropolitan Planning in India.

SUGGESTED READINGS:

1. Abercrombee, Sir P. : Town and Country planning 1961.
2. Alam, Shah Manzoor : Hyderabad Securdabad (Twin Cities) A. study in urban geography)
3. Alam, S.M. & V.V.Tokshishevesky : Urbanization in developing countries.
4. Berry Brain .I. L. : Geographic Prospectives on Urban .Systems.
5. Bresse, C. & D.F. Whiteman : An approach to Urban Planning
6. Dickinson, R.E, : City, Religion and Regionalism.
7. Gallion and Fisher : The Urban Pattern.
8. Grifitth, , J.P : A study of Urban constructions in India.
9. Gibbs : Urban Research Methods.
10. Hall P. : Urban and Regional Planning, Rout ledge, London, 1992.
11. Kundu, A. : Urban Development and Urban Research in India, Khanna Publication, 1992.
12. Mayor, H.M. & Kohn : Readings in Urban Geography.
13. Morgan, F.W. : Ports and Harbours.
14. Mumford L. : Culture of cities.
15. Nangia Sudesh : Delhi Metropolitan Region ; A Study in Settlement Geography, Rajesh Publication, 1976.
16. Robson, W.A. : Great cities of world.
17. Robson, B.T.: Urban Growth : An approach, Methuen, London.
18. Smailes, A E : The Geography of Town, Hutchinson, London, 1953.
19. Tewari, Vinod K, Jay A : Indian Cities : Ecological
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23. सिंह, उजागर : नगरीय भूगोल.
24. करन, एम.पी. : नगरीय भूगोल.
25. बंसल सुरेश चन्द्र : नगरीय भूगोल.
26. सिंह, ओमप्रकाश : नगरीय भूगोल.
27. तिवारी आर.सी. : आधिवास भूगोल, प्रयाग पुस्तक भवन, इलाहाबाद, 1997.
28. करण एवं यादव : आधिवास भूगोल.
29. यादव रामसुरेश : अधिवास भूगोल

SEMESTER – IV (2015-16)

PAPER – XVII

AGRICULTURAL GEOGRAPHY

- UNIT – I Nature, scope, significance and development of agricultural geography. Approaches to the study of agricultural geography: Commodity, systematic and regional systems. Origin and dispersal of agriculture. Sources of agricultural data.
- UNIT – II Determinants of agricultural land use - Physical, economic, social, and technological Land holding and land tenure systems, Land reforms, land use Agriculture policy and planning. Selected agricultural concepts and their measurements; cropping pattern, crop concentration, intensity of cropping, degree of commercialization, diversification and specialization, efficiency and productivity, crop combination regions and agricultural development.
- UNIT – III Theories of agricultural location based on several multi-dimensioned factors:-Von Thunen's theory of agricultural location and its recent modifications; Whittlesey's classification of agricultural regions; land use and land capability.
- UNIT – IV Contemporary Issues: Food, nutrition and hunger, food security, drought and food-security, food aid Programmes; role of irrigation, fertilizers, insecticides and pesticides, technological know-how. Employment in the agricultural sector: landless labourers, woman, children: occupational and agricultural activities.

SUGGESTED READINGS:

1. Bayliss Smith, IP.: The Ecology of Agricultural Systems. Cambridge University London, 1987.
2. Berry, B.J.L et. al. : The Geography of economic Systems. Prentice Hall, New York, 1976.
3. Brown, L.R. : The Changing World Food Prospects - The Nineties and Beyond, World Watch Institute, Washington D.C., 1990.
4. Dyson, T. : Population and Food - Global Trends and Future Prospects. Routledge. London, 1996.
5. Gregor, H.P. : Geography of Agriculture. Prentice Hall, New York, 1970.
6. Grigg, D.B. : The Agricultural Systems of the World. Cambridge University Press, New York 1974.
7. Hartshorn, T.N. and Alexander, J.W. : Economic Geography. Prentice Hall, New Delhi, 1988
8. Mannion, A.M. : Agriculture and Environment Change, John Wiley, London, 1995.
9. Morgan W.B. and Norton, R.J.C. : Agricultural Geography. Methuen, London, 1971.
10. Morgan, W.B.:Agriculture in the Third World - A Spatial Analysis. Westview Boulder, 1978.
11. Sauer, C.O. : Agricultural Origins and Dispersals,. M.I.T. Press, Mass, U.S.A., 1988.
12. Singh, J. and Dhillon, S.S. : Agricultural Geography. Tata McGraw Hill' Pub.; Delhi, 1988.
13. Tarrant, J.R. : Agricultural Geography. Wiley, New York, 1974.

SEMESTER – IV (2015-16)

PAPER – XVIII (A)

GEOGRAPHICAL INFORMATION SYSTEM

- UNIT – I Spatial Science : Geography as a spatial science, maps and spatial information dynamics of spatial information, elements of information technology, Geographic objects and their relations definition and development of GIS, computer environment for GIS.
- UNIT – II Spatial Data: Elements of spatial data: data sources: Primary and secondary census and sample data, quality and error variations Raster and vector data structures, data conversion comparison of raster and vector data bases, methods of spatial interpolation – GIS data formats for the computer environment.
- UNIT – III GIS Technology: Coordinate system-basic principles of cartography and computer assisted cartography for GIS – remote sensing data as a data source for GIS integration of GIS and remote Sensing-GPS and GIS: technology, data generation and limitations – visualization in GIS-Digital Elevation Models (DEM and TINS).
- UNIT – IV GIS Application: GIS as a Decision Support System –expert system for GIS-basic flow chart for GIS application – GIS standard legal system and national GIS policy application of GIS in Land Information System, Urban Management, Environmental Management and Emergency Response System.

SUGGESTED READINGS:

1. American Society of Photogrammetry : Manual of Remote Sensing. ASP, Falls Church V.A., 1983.
2. Barrett E.C. and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation on, Memillan, New York, 1992.
3. Compbell J. : Introduction to Remote Sensing, Guilford, New York, 1989.
4. Curran, Paul J. : Principles of Remote Sensing. Longman, London, 1985.
5. Hord R.M.:Digital Image Processing of Remotely Sensed Date, Academic, New York, 1983.
6. Luder D., Aerial Photography Interpretation : Principles and Application, CcGraw Hill, New York, 1959.
7. Pratt W.K. Digital Image Processing. Wiley, New York, 1978.
8. Rao D. P. (eds.) : Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hederabad, 1998.
9. Thomas M. Lollesand and Ralph W. Kefer, Remote Sensing and Image Interpretation, Wiley & sons, New York, 1994.
10. Aronoff S.Geographic Information Systems: A. Management Perspective, Publication Offiawa, 1989.
11. Burrough P.A. Principles of Geographic Information Systems for Land Reson Assessment Oxford University Press, New York, 1986.
12. Fraser Taylor D.R. Geographic information Systems. Pergamor Press, Oxford 1990.
13. Maquire D.J.M.F. Goodchild and D.W. Rhind (eds.). Geographic information System 'Principles arid Application. Taylor & Francis, Washington, 1991.
14. Mark S. Monmonier. Computer-assisted Cartography,Prentice-Hall, Englewood Cliff, Jersey, 1982.
15. Peuquet D. .1. and D.F.- Marble, Introductory Reading in Geographic. Information System Taylor & Francis, Washington, 1990..
16. चौनियाल, देवी दत्त, : सुदूर संवेदन एवं भौगोलिक सूचना प्रणाली.

SEMESTER – IV (2015-16)

PAPER – XVIII (B) ENVIRONMENTAL GEOGRAPHY

- UNIT – I Environment: Meaning, definition, concepts and theories related to environment. Environment and its components: Classification, Characteristics and their interdependent relationship, Development of the environmental studies and their approaches: Development of environmentalism in Geography.
- UNIT – II Environment and development. Ecological concepts; Geography as human ecology; Ecosystem: meaning definition, Concept and components. Main terrestrial ecosystems of the world-forests and agriculture.
- UNIT – III Environmental hazards- natural and human made, environmental pollution : meaning definition, nature and types-air, water, noise and others. Ecological impacts of pollution. Resource use and ecological imbalance with special reference to soil, forests and water resources.
- UNIT – IV Environmental Management : meaning, importance and approaches, need for environmental policy and laws. Preservation and conservation of environment through resource management (Green revolution, Chipko movement, National Parks). Environmental Actions: concept, need and importance Stockholm Conference, Earth Summit, E.I.A. definition and methods and need for EM Environmental education and People's participation.

Suggested Readings :

1. Agrawal, Anil and Sunita Narain. Dying Wisdom : The Fourth citizen Report. Centre for Science and Environment, New Delhi, 1998.
2. Burton I.; R.W. Kates & G.F. Whitey. The Environment as Hazards. O. U.P. New York, 1978, Carledge, Bryen. Population and the Environment, O.U.P., New York, 1995.
3. Chandna, R.C. Environmental Awareness Kalyani Publishers, New Delhi, 1998.
4. Dawson, J. and J.C. Doornkamp, eds.: Evaluating the Human Environment. Edward Arnold, London, 1975
5. Detwyler, J.R.: Man,s impact on Environment. Pelican, 1970.
6. Edington, J.M. & M.A. Edington : Ecology and Environmental Planning. Chapman & Hall, London, 1977.
7. Goudie, Andrew. The Human Impact on the Natural Environment, Blackwell Oxford, U.K. 1994
8. Jain, R. K., L.V. Urban and G.S. Stacy; Environmental Impact Analysis-A New Dimension in Decision-Making. Van Norstrand Reinhold Co. New York, 1977.
9. Khoshoo, T.N. Environmental Concepts and Strategies. Ashish Publishing House, New Delhi.
10. Mohan, M. Ecology and Development. Rawat Publications; Jaipur, 2000.
11. Munn, R.E. Environmental Impact Assessment : Principles and Procedures. John Wiley & Sons, New York, 1979.
12. Narain, Sunita. The Citizen Fifth Report. Centre for Science and Environment, New Delhi 2003.

13. Mukherji, A and V. K. Agnihotri : Environment and Development. Concept Pu. Co. New Delhi, 1993.
14. Rudig Wolfgeng. Environmental Policy Edward Elger Publishing Ltd. UK. 1998.
15. Saxena, H.M. Environmental Geography. Rawat Publications, Jaipur, 1999
16. Saxena, H.M. Environmental Management. Rawat Publications, Jaipur, 2000
17. Sharma, B.L. & Puar P: Global Environmental Challenges. Rohini Books, Publishers & Distributors, Jaipur, 2004.
18. Singh, K.N. and D.N. Singh : Population Growth, Environment and Development Issues, Impacts and Responses. Environment & Development Study Centre, Varanasi, 1991.
19. Singh, R. B. and S. Mishra : Environmental Law in India : Issues and responses, Concept Pub. Co. New Delhi, 1966.
20. Singh, S. Environmental Geography. Prayag Pustak Sadan, Allahabad, 2000.
21. Smith, R.L. : Man and his Environment: An Ecosystem Approach. Harper & Row. London, 1992.
22. U.N.E.P.: Global Environmental Outlook. U.N. Pub. New York.
23. अवस्थी एन. एम. एवं आर.पी. तिवारी पर्यावरण भूगोल, मध्यप्रदेश ग्रंथ अकादमी भोपाल ।
24. नेगी, पी. एस. : परिस्थितिकीय विकास एवं पर्यावरण भूगोल, रस्तोगी एन्ड कम्पनी, मेरठ, 1995 ।
25. रघुवंशी अरुण और चन्द्रलेखा रघुवंशी : पर्यावरण तथा प्रदूषण, मध्यप्रदेश हिन्दी ग्रंथ अकादमी, भोपाल, 1989 ।
26. सविन्द्र सिंह : पर्यावरण भूगोल, प्रयाग पुस्तक सदन इलाहाबाद, 1993 ।
27. शर्मा, बी एल : पर्यावरण : साहित्य भवन, आगरा, 1992 ।
28. तिवारी, विजय कुमार : पर्यावरण और परिस्थितिकी, हिमालय पब्लिशिंग हाउस, दिल्ली 1998 ।
29. तिवारी, विजय कुमार, : पर्यावरण अध्ययन, हिमालय पब्लिशिंग हाउस, दिल्ली, 1998 ।

SEMESTER – IV, (2015-16)

PAPER - XIX

FIELD WORK (PHYSICAL AND SOCIO- ECONOMIC) Physical

- UNIT – I** Trace the prominent features of area to be surveyed. Identify salient landform features of selected area on a topographical sheet. Identify the landforms on the surface, while in the field. Also note the agents of erosion, transportation and deposition associated with the landforms.
- UNIT – II** Identify and classify the Bio-diversity in the area (Flora & fauna). Observe the relationship of various landforms, flora and fauna with land-use, settlement structure and life style of people.

Socio – Economic

- UNIT – III** Procure a cadastral map of the village/town for field mapping of the features of land-use and land quality. Procure/prepare the settlement –site map through rapid survey to map the residential, commercial, recreational (parks, playground), educational, religious and other prominent features. Conduct a socio-economic survey of the households with a structured questionnaire. Supplement the information by personal observations and perceptions.

UNIT – IV Based on observations of the land-use and results of the socio-economic enquiry of the households, prepare a critical field-survey report. Photographs and sketches, in addition to maps and diagrams, may supplement the report.

SEMESTER – IV, (2015-16)

PAPER - XX

PRACTICAL-IV

GEOGRAPHICAL INFORMATION SYSTEM AND QUANTITATIVE TECHNIQUES

Geographical Information System

An overview of GIS software, Elements of GIS: Data capture-verification and preprocessing-data storage and maintenance of databases-Database Management Systems: Spatial data creation, Editing the layers and table creation, Creation of non Spatial data, data manipulation, analysis (integrated analysis of spatial and attribute data, overlay analysis, neighborhood operations and connectivity functions) and spatial modeling-output format and generation. Buffer analysis, Network Analysis, Creation of DEM & TIN Generation of thematic map.

GPS – Demonstration and handling of Hand held GPS receivers, Checking and updating of existing map, Use of GPS to Check/update the existing topographical map, Ground truthing by GPS.

Quantitative Techniques:

Running mean, Mean centre, Nearest Neighbor Analysis; Lorenz Curve, Normal distribution curve, Probability.

SUGGESTED READINGS:

1. Singh, R.L. & P.K. Dutt : Elements of Practical Geography Students trends.
2. Monkhouse, F.J. & H.R. Wilkinson; Maps and Diagrams Mathuen, London.
3. Mahmood, Aslam 1971 : Statistical Methods in Geographical studies Rajesh Pub., New Delhi.
4. Gregory, S. Statistical Methods and The Geographer.
5. Hammond & Mccullah 1977 : Quantitative Techniques in Geography, Clarendon Press,Oxford.
6. Fitz, Gomid, B.P. : Science in Geography, Developments in Geographical Method, Oxford University Press.
7. Yeaters, M. : An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York.
8. मॉक हाउस तथा विल्किन्सन 1976 : मानचित्र तथा आरेख, म.प्र. केदारनाथ , रामनाथ, मेरठ.
9. नेगी, डी.एस. : भूगोल में आधारभूत सांख्यिकी, केदारनाथ , रामनाथ, सेठ.
10. हीरालाल : प्रायोगिक भूगोल, किताबघर, कानपुर.
11. आर.सी. तिवारी एवं सुधाकर त्रिपाठी : अभिनव प्रयोगात्मक भूगोल, प्रयाग पुस्तक भवन, इलाहाबाद.

GEOGRAPHY (Code-021)

M.A./M.Sc. पूर्व भूगोल में निम्नलिखित प्रश्न पत्र होंगे -

क्रमांक	प्रश्न पत्र	प्रश्न पत्र का नाम	कोड संख्या	पूर्णांक
1.	प्रथम	Geomorphology	(0399)	100
2.	द्वितीय	Climatology & Oceanography	(0400)	100
3.	तृतीय	Geographical Thought	(0401)	100
4.	चतुर्थ	Advanced Geography of India	(0402)	100
5.	पंचम	Population Geography	(0403)	100
6.	प्रायोगिक	Advanced cartography and surveying		100

The M.A./M.Sc. Previous examination in Geography shall consist of 600 marks.

There shall be five theory papers and one practical each of 100 marks as follows:

Paper I	Geomorphology
Paper II	Climatology & Oceanography
Paper III	Geographical Thought
Paper IV	Advanced Geography of India
Paper V	Population Geography
Practical	Advanced Cartography and Surveying

The theory papers shall be of three hours duration.

Candidates will be required to pass separately in theory and practical examinations.

Each theory paper in M.A./M.Sc. Previous Geography has been divided into four units.

(a) In the practical examination the following shall be the allotment of time and marks.

(i) Practical record	20%
(ii) Lab work (up to three hours)	50%
(iii) Field work (up to three hours)	25%
(iv) Viva on i, ii, & iii above	5%

(b) The external and internal examiners shall jointly submit marks.

(c) Candidates shall be examined in survey individually. They will however be allowed to take the help of a labourer each at their own expense.

(d) All the candidates shall present at the time of the practical examination their practical record regularly signed by the teachers concerned.

PAPER - I GEOMORPHOLOGY (Paper Code - 0399)

- NIT-1** Nature and Scope of Geomorphology; Fundamental concepts; Interior of the earth; Earth movements: epeirogenic and orogenic movements : Forces of crustal instability, isostasy, plate tectonics, earthquakes, volcanic activities, faulting, mountain building.
- NIT-2** Exogenic processes : concept of gradation; Agents and processes of gradation : weathering, mass wasting and erosion, aggradation; soil formation; Climatic Geomorphology and morphogenetic regions; slope evolution.
- NIT-3** Concept of geomorphic cycle and its controversy; Dynamics of fluvial, glacial, periglacial, aeolian and marine (coastal) processes and resulting landforms; Complications of fluvial geomorphic cycle.

UNIT-4 Geological structure and landforms: development of landscape and drainage on uniclinal, folded and domal structures and in Karst region; Erosion surfaces; Applied geomorphology

SUGGESTED READINGS -

1. Ahmed, E. : Coastal Geomorphology of India.
2. Chorley, R.J. : Spatial Analysis in Geomorphology, Methuen, London, 1972
3. Cooke R.U. and Doornkamp, J.C.: Geomorphology in Environmental Management A introduction, Clarendon Press, Oxford, 1974
4. Dury, G. H. : The Face of the Earth, Penguin Harmondsworth 1959
5. Fairbridge, R.W. Encyclopedia of Geomorphology, Reinholdts, New York, 1968.
6. Goudie, A.: The Nature of the Environment Oxford & Blackwell, London, 1993.
7. Garner, H.F. : The Origin of landscape- A Synthesis of Geomorphology, Oxford University Press, London, 1974.
8. Holms, A. : Principles of Physical Geology, Thomas Nelson, London.
9. Mitchell, C.W.: Terrain Evaluation, Longman, London, 1973.
10. Ollier, C.D.: Weathering, Longman, London, 1979.
11. Pitty, A.F.: Introduction to Geomorphology, Methuen, London, 1971.
12. Stoddart, D.R. (ed.): Process and Form in Geomorphology, Roulledge, New York, 1996.
13. Skinner, B.J. & Porter, S.C.: The Dynamic Earth John Wiley, New York, 1995.
14. Sparks, B.W. Geomorphology, Longman, London, 1960.
15. Sharma, H.S.(ed.): Perspectives in Geomorphology, Concept, New Delhi, 1980
16. Singh, S: Geomorphology, Prayag Publication, Allahabad, 1998.
17. Steers, J.A. : The Unstable Earth Methuen, London.
18. Thornbury, W.D. Principles of Geomorphology, John Wiley, New York, 1960.
19. Strahler, A.N. : Physical Geography, Wiley, New York.
20. कौशिक, एस.डी. : भू - आकृति विज्ञान
21. नेगी, बी.एस. : भू - आकृति विज्ञान
22. दयाल परमेश्वर : भू - आकृति विज्ञान
23. यादव तथा रामसुरेश : भू - आकृति विज्ञान, ग्रन्थ, कानपुर
24. सिंह, सविन्द्र के. : भू - आकृति विज्ञान, शारदा पुस्तक भवन, इलाहाबाद

PAPER - II

CLIMATOLOGY AND OCEANOGRAPHY

(Paper Code - 0400)

(A) CLIMATOLOGY

UNIT-1 Nature and scope of climatology and its relationship with meteorology; composition of the atmosphere; Insolation, heat balance of the earth, stability and instability, green house effect, vertical and horizontal distribution of temperature; Jet stream; General circulation in the atmosphere; Acid rain; concept of air masses and atmospheric disturbances. Ocean atmospheric interaction, EL Nino and La Nino, Monsoon winds and cyclones.

UNIT-2 The application of general principles of elementary physical and synoptic meteorology to the study and classification of climate. Climatic classification of Koppen and Thornthwaite. Major climates of the world- tropical, temperate, desert and mountain

climate. Climatic changes during geological and historical times. evidences. possible causes, global warming, environmental impacts and society's response. Applied climatology.

(B) OCEANOGRAPHY

- T-3** Nature and scope of oceanography; Distribution of land and water; Major features of ocean basins; Marine sediments. Physical and chemical properties of sea water; Interlink between atmospheric circulation and circulation pattern in the oceans, surface currents, thermohaline, waves and tides.
- T-4** Marine biological environment: Bio geochemical cycle in the ocean, biozones, types of organisms; plankton, nekton and benthos, food and mineral resources of the sea. Major marine environments; coastal: estuary, deltas, barrier island, rocky coasts; Open: reefs, continental shelf, continental slope and deep: Pelagic environment and floor of the ocean basins. Impact of Humans on the marine environment. Law of the sea; exclusive economic zone; marine deposits and formation of coral-reefs.

SUGGESTED READINGS :

- Barry, R.G. and Chorley P.J.: Atmosphere, Weather and Climate, Routledge, London and New York, 1998
- Critchfield, J.H.: General Climatology, Prentice Hall, India, New Delhi, 1993.
- Das, P.K.: Monsoons National Book Trust, New Delhi, 1987.
- Fein, J.S. and Stephens, P.N.: Monsoons. Wiley Interscience, 1987.
- India Met. Deptt. : Climatological Tables of Observatories in India, Govt. of India 1968.
- Lal, D.S.: Climatology, Chaitanya Publications, Allahabad, 1986.
- Lydolph, P.E. : The Climate of the Earth, Rowman, 1985.
- Menon, P.A.: Our Weather, N.B.T., New Delhi, 1989.
- pelerson, S.: Introduction to Meteorology, Mc Graw Hill Book, London, 1969.
- Robinson, P.J. and Henderson S.: Contemporary Climatology, Henlow, 1999.
- Thompson, R.D. and Perry, A (ed.): Applied Climatology, Principles and Practice, Routledge, London, 1997.
- Davis Richard J.A.: "Oceanography- An Introduction to the Marine Environment". Wm. C. Brown Iowa. 1986.
- Duxbury, C.A. and Duxbury B.: An Introduction to the world's Oceans-C. Brown. Iowa 2nd ed. 1986.
- Garrison, T.: "Oceanography - An Introduction to Marine Science" Books/Cole, Pacific Grove, USA, 2001
- Gross, M. Grant: Oceanography, a View of the earth, Prentice-Hall inc, New Jersey, 1987.
- King C.A.M. Oceanography for Geographers 1962.
- Sharma, R.C. "The Oceans" Rajesh N. Delhi. 1985.
- Ummerkutty, A.N.P. Science of the Oceans and Human life, NBT, New Delhi 1985.
- Trewartha, G.T. : An Introduction to weather and climates.
- Ommamy, F.D.: The Ocean
- Sharma, R.C. & M. Vatal : Oceanography : A Brief Introduction Kishore Pub. New Delhi.
- Siddhartha, K. : Oceanography : A Brief Introduction, Kishore Pub. New Delhi.
- तिवारी, अनिल कुमार : जलवायु विज्ञान, राजस्थान हिन्दी ग्रंथ अकादमी
- नेगी, बी. एस. : जलवायु तथा समुद्र विज्ञान

PAPER-III
GEOGRAPHICAL THOUGHT
(Paper Code - 0401)

- UNIT-1** The field of geography, its place in the classification of science; geography as a social science, and natural science. Definition, scope and functions of geography; Geography as science of relationship, as science of areal differentiation, as spatial science, Geography and environmentalism; forms of man-nature relationship and current view; Dualism in geography; Regional Concept.
- UNIT-2** The growth of geographical knowledge from earliest times upto the 15th century. Contributions of Greek and Roman thinkers. Arab Geographers and their contributions. Geographical information in Ancient Indian literature. The dark age in Geography. The Great Age of Maritime Discovery and Exploration. Contributions of various schools of thought in Modern Geography:
(i) German School. (ii) French School
(iii) British School (iv) American and Russian Schools.
- UNIT-3** Scientific explanations: routes to scientific explanation (inductive/deductive); Types of explanation: cognitive description, cause and effect, temporal, functional/ ecological, systems; Laws, theories and models in geography; Quantitative revolution and philosophy of positivism.
- UNIT-4** Responses to positivism, behaviouralism and humanistic geography, relevance movement and radical geography; Changing paradigms; Status of Indian Geography; Future of geography.

SUGGESTED READINGS :

1. Abler, Ronald; Adams, John S. Gold, Peter: Spatial Organization: The Geographer's view of the World, Prentice Hall, N.J., 1971.
2. Ali S.M.: The Geography of Puranas, Peoples Publishing House, Delhi, 1968.
3. Amedeo, Douglas: An Introduction to Scientific Reasoning in Geography, John Wiley, U.S.A., 1971.
4. Dikshit, R.D. (ed.): The Art & Science of Geography Rand Mc Nally & Co., 1959.
5. Hartshorne, R.: Perspectives on Nature of Geography Rand Mc Nally & Co., 1959.
6. Husain, M.: Evolution of geographic Thought, Rawat Pub. Jaipur, 1984.
7. Johnston, R.J.: Philosophy and Human Geography, Edward Arnold, London, 1983.
8. Johnston, R.J.: The Future of Geography, Methuen, London, 1988.
9. Minshull, R.: The Changing Nature of Geography, Hutchinson University Library, London, 1970.
10. Ali, S.M. : Arab Geography
11. Taylor, G. : Geography in the 20th Century.
12. Dikshit, R.D. : Geographical Thought : A Contextual History of Ideas, Prentice Hall of India, New Delhi.
13. Harvey D. : Explanation in Geography
14. सिंह उजागर : भौगोलिक चिन्तन का विकास , कल्याणी प्रकाशन एवं डिस्ट्री-
ब्यूटर्स
15. त्रिपाठी एवं बिरले : भौगोलिक चिन्तन का विकास एवं विधितंत्र , सनातनधर्म काग्रेस
केन्द्र
16. कौशिक, एस.डी. : भौगोलिक विचारधाराओं का इतिहास एवं विधितंत्र , एन.एन.टी प्रकाशन, नई
दिल्ली
17. सिंह, बगदीश : भौगोलिक चिन्तन का मूलाधार , एन.एन.टी प्रकाशन एवं डिस्ट्री-
ब्यूटर्स

PAPER-IV
ADVANCED GEOGRAPHY OF INDIA
(Paper Code - 0402)

- UNIT-1** Physical and Biological elements in the Geography of India : Geological structure, relief, climate, water resources, vegetation and soils.
- UNIT-2** (a) Population: distribution, density and growth, problems and policies.
 (b) Irrigation
 (c) Agriculture : Major characteristics and problems, impact of infrastructural and institutional factors on agriculture. Important crops-wheat, rice, cotton, sugarcane, oil-seeds, tea and coffee, Agricultural regions. Green revolution, Agro- climatic regions.
 (d) Sources of power: Coal, Petroleum, Natural gas, Hydroelectricity and Atomic energy.
- UNIT-3** (a) Mineral resources with specific reference to iron ore, manganese and bauxite.
 (b) Industrial development with specific reference to iron and steel, cement, cotton, jute, sugar and paper industries; Industrial regions.
 (c) Transport infrastructure: Road, rail, water and air.
 (d) Trade: Internal and Foreign.
- UNIT-4** (a) Regional division of India: Purpose and Methodology.
 (b) Major schemes of regions of India: O.H.K. Spate and R.L. Singh.
 (c) Detailed regional study of the following: Kashmir valley, Middle Ganga Plain, Narmada Basin, Marusthali and Kerala.
 (d) Physical and cultural geography of Chhattisgarh State.

SUGGESTED READINGS :

1. Centre for Science & Environment (1988) State of India's Environment, New Delhi.
2. Deshpande C.D. India: a Regional Interpretation ICSSR & Northern Book Centre 1992.
3. Dreze, Jean & Amartya Sen (ed.) India Economic Development and Social opportunity Oxford University Press, New Delhi, 1996.
4. Kundu A. Raza Moonis: Indian Economy: the Regional Dimension Spectra Publishers, New Delhi, 1992.
5. Robinson, Francis: The Cambridge Encyclopaedia of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan & Maldives Cambridge University Press, London, 1989.
6. Singh R.L. (ed.): India- A Regional Geography National Geographical Society, India Varanasi, 1971.
7. Spate O.H.K. & ATA Learmont-India & Pakistan Methuen, London, 1967.
8. Tirtha R. & Gopal Krishna, Emerging India Reprinted by Rawat Publications, Jaipur 1996.
9. Sharma T.C. and O. Coutinho : Economic and Commercial Geography of India.
10. अग्रवाल पी.सी. : भारत का भौतिक भूगोल, एशिया प्रकाशन कं., रायपुर 2003.
11. जोशी, यशवन्त गोविंद : नर्मदा बेसिन का कृषि भूगोल
12. देशबंधु प्रकाशन : संदर्भ उत्तीर्ण

PAPER - V
POPULATION GEOGRAPHY
(Paper Code - 0403)

- UNIT-1** Definition and scope of Population Geography. Relation of Population Geography with other subjects of social sciences. Historical development of Population Geography in western countries and in India. Sources of population data, Census and its history.
- UNIT-2** Distribution of Population : The concept of population density and its types, Factors affecting population distribution. Distribution of population in the world with special reference to Europe and Asia. Distribution of population in India.
 Growth of population: Measure of decennial and annual rates of population growth, prehistoric and modern trends of population growth in the world. Regional aspect of population growth in India.
 Population theories. Demographic transition. Future growth of population.
- UNIT-3** Population composition in terms of age and sex, rural-urban residence, educational status and occupational structure. Significance of these elements in population analysis, factors affecting their composition in population, broad world patterns and detailed spatial patterns in India.
 Fertility and Mortality of population : Significance and factor, Indices and rates. World pattern and pattern in India.
- UNIT-4** Migration of population: Causes, characteristics and types. Methods of estimating value of internal migration, Important international migrations of the world, internal migration in India.
 Population and Resources: concept of optimum population, over population and under population, Population-Resource regions.
 Population Regions: Concept and methods, population regions of India, causes and consequences of population growth, population policies of India. Human Development Index and its components.

SUGGESTED READINGS :

1. Bilasborrow, Richard E and Daniel Hogan, Population and Development in the Humid Tropics, International Union for the Scientific Study of Population, Belgium 1999.
2. Bogua, D.J. Principles in Demography, John Wiley, New York 1969.
3. Bose, Ashish et al.: Population in India's Development (1947-2000); Vikas Publishing House, New Delhi 1974.
4. Census of India, India: A State Profile. 1991.
5. Chandna, R.C. Geography of Population; Concept, Determinants and Patterns. Kalyani Publishers, New York 2000.
6. Clarke, John I. Population Geography, Pergamon Press, Oxford 1973.
7. Crook, Nigel Principles of Population and Development, Pergamon Press, New York 1997.
8. Daugherty, Helen Gin, Kenneth C.W. Kammeier, An Introduction to Population (Second Edition) The Guilford Press, New York London 1998.
9. Garnier, B.J. Geography of Population Longman, London 1970.
10. Kochhar, Rajesh, The Vedic People: Their History and Geography Orient Longman Ltd., New Delhi 2000.
11. Mamoria, C.B. India's Population Problem, Kitab Mahal New Delhi 1981.
12. Mitra, Ashok India's Population: Aspects of Quality and Control Vol I & II. Abhiman Publications, New Delhi 1978.

13. Premi, M.K. India's Population: Heading Towards a Billion, B.R., Publishing Corporation 1991.
14. Srinivasan, K. and M. Vlassoff, Population Development Nexus in India: Challenges for the New Millennium Lata Mc Graw- Hill, New Delhi 2001.
15. Srinivasan K. Basic Demographic Techniques and Applications Sage Publications, New Delhi 1998.
16. Sundaram K.V. and sudesh Nangia, (ed) Population Geography, Henlage Publications, Delhi 1986.
17. UNDP: Human Development Report, Oxford University Press, Oxford 2000.
18. United Nations, Methods for Projections of urban and Rural Population No VIII, New York 1974.
19. Woods R. Population Analysis in Geography Longman, London 1979.
20. Zelinsky Wilbur, A Prologue to Population Geography, Preglio Hall, 1966
21. मंडा, बी.पी. : जनसंख्या भूगोल
22. ओझा, रघुनाथ : जनसंख्या भूगोल
23. हीरालाल : जनसंख्या भूगोल
24. चन्दना, आर. सी. : जनसंख्या भूगोल
25. त्रिपाठी रामदेव : जनसंख्या भूगोल

PRACTICAL ADVANCED CARTOGRAPHY AND SURVEYING.

SECTION A

Max. Marks 25

Graphs and Diagrams : Triangular graph, Logarithmic and semi logarithmic graphs, scatter graphs; climatograph, Proportional circles, spheres and cubes.

Thematic Maps: Choropleth maps, isolines, Flow maps, Isochrones and class intervals.

Morphometric Analysis : Profiles, Slope Analysis; Altimetric, and Clinographic curves; Block Diagrams.

SECTION B

Max. Marks 25

Map Projections: Mathematical construction of world projections.

Interpretation of Maps : Geological Maps.

SECTION C

Max. Marks 25

Principles and methods of topographical surveying involving the use of Theodolite and Dumpy level. Solution of Problems in Surveying.

SUGGESTED READING :

1. Davis, R.C. & E.S. Forte : Surveying : Theory and Practical
2. Knetkar, T.R. & S.V. Kulkarni : Surveying and levelling part I & II A.V.G. Prakashan, Poona.
3. Monk house F.J. & H.R. Wilkison : Maps and Diagrams, Methuen, London.
4. Mahmood, Aslam : Statistical Methods in Geographical studies.
5. Gregory, S. : Statistical Methods and the Geographers.
6. Hammond & Mc Gullagh : Quantitative Techniques in Geography.
7. Fitz Gerald, S.P. : Science in Geography & Data Description and Presentation by Petter Davis.
8. मॉक हाऊस तथा विलकौन्सन (अनु. प्रो. प्रेमचन्द अग्रवाल) : मानचित्र तथा आरेख, म.प्र. हिन्दी ग्रन्थ अकादमी
9. नेगी, बी.एस. : भूगोल में आधारभूत सांख्यिकी
10. हीरालाल : प्रायोगिक भूगोल

GEOGRAPHY (Code- 022)

M.A./M.Sc. अंतिम भूगोल में निम्नलिखित प्रश्न पत्र होंगे –

क्रमांक	प्रश्न पत्र	प्रश्न पत्र का नाम	कोड संख्या	पूर्णांक
1	VI	Economic Geography and Natural Resource Management,	(0404)	100
2	VII	Settlement Geography	(0405)	100
3	VIII	Regional Development and Planning	(0406)	100
4	IX (A)	Remote Sensing Techniques and Geographical Information System	(0407)	100
5	IX (B)	Biogeography and Ecosystem	(0408)	100
6	X	Agricultural Geography	(0409)	100
		प्रायोगिक कार्य Quantitative Techniques, Remote Sensing and GIS		100
			कुल योग	600

The M.A./M.Sc. Final examination in Geography shall consist of 600 marks. There shall be five theory papers and one practical, each of 100 marks as follows.

Paper VI Economic Geography and Natural Resource Management,

Paper VII Settlement Geography

Paper VIII Regional Development and Planning

Paper IX (A) Remote Sensing Techniques and Geographical Information System

OR

Paper IX (B) Biogeography and Ecosystem

Paper X Agricultural Geography

Practical: Quantitative Techniques, Remote Sensing and GIS

- The Theory papers shall be of three hours duration.
- Candidates will be required to pass separately in theory and practical exam.
- Each theory paper in M.A./M.Sc. Final Geography has been divided into four units.
- (a) In the Practical examination the following shall be the allotment of time and marks.

(i)	Practical Record	20%
(ii)	Lab. Work (up to 4 hours)	70%
(iii)	Viva on (i) & (ii) above	10%
- (b) the external and internal examiners shall jointly submit marks.
- (c) All the candidates shall present at the time of the practical examination their practical record, regularly signed by the teachers concerned.

PAPER VI
ECONOMIC GEOGRAPHY AND NATURAL RESOURCE MANAGEMENT
(Paper Code - 0404)

- UNIT-I** Nature and scope of Economic Geography ; fundamental concepts in economic geography ; concept and classification of resources ; classification of economies, sectors of economy (primary, secondary and tertiary)
World distribution of population : Appraisal of quality and quantity of human resources, relation between population and resource, population resource regions of the world, natural resources and economic development, resource adequacy and scarcity, limits to growth.
- UNIT-II** World pattern of major natural resources : land and soils, biotic resources, water resources, mineral and energy resources, oceanic resources.
- UNIT-III** Concept and techniques of delimitation of agricultural regions and their features, Von Thunen's model of agricultural location and its modifications.
Classification of Industries, Theories of industrial location ; case studies of selected industries ; Iron & Steel ; Aluminium, Chemical, Textile.
Means of transport, International trade, trade blocks, globalisation and Indian economy.
- UNIT-IV** Conservation and management of resources ; evolution of the concept, principles, philosophy and approaches to conservation, resource conservation and management methods.
Resource appraisal and policy making ; Use of GIS and remote sensing in resource appraisal ; policy making and resource management ; sustainable development of resources.

SUGGESTED READINGS :

1. Berry, J.I., Geography of Market Centres and Retail Distribution, Prentice Hall, New York, 1967.
2. Chatterjee, S.P. : Economic Geography of Asia, Allied Book Agency, Calcutta, 1984.
3. Chorley, R.J. and Haggett, P. (ed.) : Network Analysis in Geography, Arnold, 1969.
4. Dreze, J. and Sen, A. : India : Economic Development and Social Opportunity ; Oxford University Press, New Delhi, 1996.
5. Eckarsley, R. (ed.) : Markets, the state and the environment, McMillan, London, 1995.
6. Garnier, B.J. and Deiobez, A.: Geography of Marketing, Longman, London, 1979.
7. Hamiton, F.E.I. : Spatial Perspectives on Industrial Organisation and Decision Making John Wiley, New York 1974.
8. Hamiton, I. (ed.) : Resources and Industry, Oxford University Press, New York, 1992.
9. Hurst E. : Transport Geography : Comments and Readings : McGraw Hill, New York, 1974.
10. Morgan, WB and Munton R.J.C. : Agricultural Geography, Methuen, London, 1977.
11. Pachuri, R.K. Energy and Economic Development in India, Praeger, New York, 1977.
12. Robertson, D. (ed.) : Globalization and Environment, E. Elgar Co., U.K. 2001.

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14. Singh J. and Dhillon S.S. Agricultural Geography, McGraw Hill, India, New Delhi, 1984.
15. Symons, L. : Agricultural Geography, Bell and Sons, London, 1972.
16. Wheeler, J.O. et.al. : Economic Geography, John Wiley, New York, 1995.
17. Adams, W.M. : Green Development : Environment and Sustainability in the third world, Routledge & Chapman Hall, New York, 1990.
18. Granfelt, T.R. : Managing the globalized environment : J. & L. Composition Ltd., New York, 1999.
19. Holechek, J.L. et.al. : Natural Resources : Eulogy Economics & Policy, Prentice Hall, New Jersey, 2000.
20. Hooja, R. & Roshni, R. : Desert, Drought and Development, studies in Resource Management and sustainability ; Rawat Publication, Jaipur, 1994.
21. Howard, M.C. (ed.) : Asia's environmental crisis, Westview Press, Prouldar, 1993.
22. Kates, R.W. & Burton, I. (eds.) : Geography, Resources and Environment, Vol. I & II, University of Chicago Press, Chicago, 1986.
23. Mc. Laren, D.J. and Skinnnet, B.J. (eds.) : Resources and World Development, John Wiley & Sons, New York, 1986.
24. Newson, M.D. : land, water & development, River, Basin systems & Management, Routledge, London, 1991.
25. Owen, S. & Owens, P.L. : Environment Resources & Conservation, Cambridge University Press, New York, 1991.
26. Peckford, John et.al. (ed.) 1994 : Water, sanitation, environment & development, IT Publication, London, 1994.
27. Rees, J. : Natural Resources : Allocation, Economics and Policy, Methuen, London, 1988.
28. Redclift, M. : Sustainable Development : Exploring the Contradiction : Methuen, London, 1987.
29. Simmons, I.G. : Earth, Air & Water : Resources and Environment in Late 20th Century Edward Arnold, New York, 1991.
30. Thoman, Alan et.al. : Environmental Politics & NGO Influence, Routledge, London 2001.
31. Zimmerman, E.W. : World Resources and Industries.
32. सिंह काशीनाथ एवं जगदीश सिंह : आर्थिक भूगोल के मूल तत्व
33. करन, एम.पी. : संसाधन भूगोल
34. शर्मा, राजीव लोचन : संसाधन संरक्षण
35. सिंह, अमर : संसाधन तथा संरक्षण
36. कुमार प्रमिला एवं श्रीकमल शर्मा : कृषि भूगोल

PAPER - VII
SETTLEMENT GEOGRAPHY
(Paper Code - 0405)

- UNIT-I**
1. Meaning, Objectives and Scope of Settlement Geography
 2. Evolution, Distribution, Types and Patterns of Rural Settlements.
 3. Rural House Types

4. Rural Service Centres
- UNIT-II**
1. Evolution and growth of urban settlements
 2. The Geographical setting of Urban Centres : Site, Situation and Location
 3. Rank-size-relationship
 4. Cities as Central Places, Central Place Theory, Growth Centre Theory.
 5. City-Country Relationship : Umland, Rural-Urban Fringe.
- UNIT-III**
1. General Nature of City Structure :
 - (i) Internal structure : Morphology and landuse.
 - (ii) Theories of Urban Structure : The Concentric Zone Theory, The Sector Theory, The Multiple Nuclei Theory.
 2. The Central Business District (CBD)
 3. Centrifugal and Centripetal forces in Urban Geography.
 4. Economic Base of Towns : Basic/non-basic concept.
- UNIT-IV**
1. Urban Functions
 2. Functional Classification of Towns.
 3. Urban Planning (i) Types and Elements (ii) Urban Problems, Blight and renewal.
 4. Urban Planning in India.

SUGGESTED READINGS :

1. Abercrombee, Sir P. : Town and Country planning 1961.
2. Alam, Shah Manzoor : Hyderabad Secundrabad (Twin Cities) A study in urban geography)
3. Alam, S.M. & V.V. : Urbanization in developing countries Pokshishevesky
4. Berry Brain J.L. : Geographic Prospectives on Urban Systems
5. Bresse, C. & D.F. : An approach to Urban Planning Whiteman
6. Dickinson, R.E. : City, Religion and Regionalism
7. Gallion and Fisher : The Urban Pattern
8. Griffith, J.P. : A study of Urban constructions in India
9. Gibbs : Urban Research Methods
10. Mayor, H.M. & C.F. Kohn : Readings in Urban Geography
11. Morgan, F.W. : Ports and Harbours
12. Mumford L. : Culture of cities
13. Robson, W.A. : Great cities of world
14. Robson, B.T. : Urban Growth : An approach, methuen, London
15. Carter, Harold : Study of Urban Geography, London, Edward Arnold, 1971
16. Singh R.L. & K.N. Singh : Readings in Rural Settlement Geography, NGSI Varana 1975.
17. सिंह, उजागिर : नगरीय भूगोल
18. करन, एम.पी. : नगरीय भूगोल
19. बंसल, सुरेश चन्द्र : नगरीय भूगोल
20. सिंह, ओमप्रकाश : नगरीय भूगोल
21. तिवारी आर.सी. : आधिवास भूगोल, प्रयाग पुस्तक भवन, इलाहाबाद, 1997
22. करण एवं यादव : आधिवास भूगोल

PAPER - VIII
REGIONAL DEVELOPMENT AND PLANNING
(Paper Code - 0406)

- UNIT-I** Regional Planning : Definition, Scope, Evolution and Objectives.
Region and Regionalism, Planning Regions : Concept and Delineation.
Spatial organisation : Central Place Theory, Concept of core and periphery
Friedmann's Model of Spatial Organisation and Economic Growth.
- UNIT-II** Regional Development Theories : Development Theories of Myrdal and Hirschman,
Economic and Export Base model, Frank's Theory of Underdevelopment.
- UNIT-III** Approaches and Strategies of Regional Development. Growth Pole Theory.
Agropolitan Development, Community Development, River Basin Planning, Metropolitan
Planning (with reference to India).
- UNIT-IV** Regional Planning in India. Regional Imbalances and Inequalities, Indicators of
Regional Development ; Regional Policies in Five Year Plans, Centre State
Relations and Multilevel Planning, Planning for special problem Regions : Hill areas,
Tribal areas, Drought prone areas, Command areas and River basins.

RECOMMENDED READING :

1. Daysch, C.H.J. & others : Studies in Regional Planning.
2. Deckinsonm R.E. : City Region and Regionalism
3. Freeman, E.W. : Geography and Planning
4. Golksin A. : Regional Planning and Development
5. Keeble, L. : Principle and Practice of Town and Country Planning.
6. Stamp L.D. : The Land of Britain : Its use and Misure.
7. Sdasyuk. Galina and : Economic Regionalization of India problems and
Dengupta, P. Approches.
8. Desai, P.B. & others : Regional Perspective of Industrial and Urban Growth -
the case of Kanpur, Bombay, 1969.
9. Prakash, Rao V.L., S.P. : Regional Planning
10. Censuts of India : Economic and Socie Cultural Dimensions of regionalisation
(An Indo-USSR Colaborative Study)
11. Friedmann J. & Alonsow : Regional Development and Planning, M.I.T. Press
12. Misra R.P. (Ed.) : Regional Planning : Concept; Techniques, Policies and
cade studies Mysore 1969.
13. Misra, R.P. & others : Regional Development and Planning in India.
14. Timbergen : Essays on World Regional Planning.
15. Isard, W. : Methods of Regional Analysis, M.I.T. 1960.
16. Zimmerman, E.W. : World Resources and Industries.
17. Burton & Kates : Reading in Resource Management Conservation.
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19. Ahamed, Enayet : Regional Planning with particular Reference to India. Vol.
I and II New Delhi.
20. Bhatt L.S. and Others : Micro level planning - A Case Study of Karnal Area,
Haryana (K.B. Publishing, New Delhi)

- | | | |
|------------------------------------|---|--|
| 21. Chandna, R.C. | : | Regional Planning : A Comprehensive Text-Kalyani Publishers. |
| 22. श्रीवास्तव, व्ही. के. एवं अन्य | : | प्रादेशिक नियोजन एवं संतुलित विकास |
| 23. ओझा, रघुनाथ | : | प्रादेशिक नियोजन का भूगोल |
| 24. शर्मा, राजीवलोचन | : | प्रादेशिक एवं नगरीय नियोजन |

PAPER - IX (A)

REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEM

(Paper Code - 0407)

- UNIT-I** Historical development of remote sensing as a technology - Relevance of remote sensing in Geography - Concepts and basics : Energy source, energy and radiation principles, energy interactions in the atmosphere and earth surface features, remote sensing systems : platforms, sensors and radiation records.
Applications : Air photo and image interpretations and mapping land use and land cover, land evaluation, urban land use, landform and its processes, weather studies and studies of water resources : integration of Remote Sensing and GIS, remote sensing and hazard management, remote sensing and environmental management.
- UNIT-II** Image Processing : types of imagery, techniques of visual interpretation, ground verification, transfer of interpreted thematic information to base maps-digital processing : rectification and restoration, image enhancement - contrast manipulation, classification : supervised and unsupervised, post-classification analysis and accuracy assessment, microwave sensing : interpretation of SAR imageries, elements of passive microwave sensing.
- UNIT-III** Spatial Science : Geography as a spatial science, maps and spatial information. dynamics of spatial information, elements of information technology, geographic objects and their relations-definition and development of GIS, computer environment for GIS.
Spatial Data : Elements of spatial data : data sources : primary and secondary, census and sample-data; quality and error variations-raster and vector data structures, data conversion-comparison of raster and vector databases - methods of spatial interpolation-GIS data formats for the computer environment.
- UNIT-IV** GIS Technology : Coordinate system - basic principles of cartography and computer assisted cartography for GIS-remote sensing data as a data source for GIS and integration of GIS and Remote Sensing-GPS and GIS : technology, data generation and limitations - visualization in GIS-Digital Elevation Models (DEM and TINs).
GIS Application : GIS as a Decision Support System-expert system for GIS-basic flow chart for GIS application - GIS standards, legal system and national GIS policy application of GIS in Land Information System, Urban Management, Environment Management and Emergency Response System.

SUGGESTED READINGS :

1. American Society of Photogrammetry : Manual of Remote Sensing. ASP, Falls Church, V.A., 1983.
2. Barrett E.C. and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation, Mcmillan, New York, 1992.

3. Campbell J. : Introduction to Remote Sensing, Guilford, New York, 1989.
4. Curran, Paul J. : Principles of Remote Sensing. Longman, London 1985.
5. Hord R.M. : Digital Image Processing of Remotely Sensed Data, Academic, New York, 1983.
6. Luder D, Aerial Photography Interpretation : Principles and Application, CcGraw Hill, New York, 1959.
7. Pratt W.K. Digital Image Processing. Wiley, New York, 1978.
8. Rao D.P. (eds.) : Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hyderabad, 1998.
9. Thomas M.Lollesand and Ralph w. Kefer, Remote Sensing and Image Intepretation, John Wiley & sons, New York, 1994.
10. Aronoff S, Geographic Information Systems : A Management Perspective, DDL Publication Offawa, 1989.
11. Burrough P.A. Principles of Geographic Information Systems for Land Resource, Assessment Oxford University Press, New York, 1986.
12. Fraser Taylor D.R. Geographic information Systems. Pergamor Press, Oxford 1991.
13. Maquire D.J.M.F. Goodchild and D.W. Rhind (eds.). Geographic information Systems : Principles and Application. Taylor & Francis, Washington. 1991.
14. Mark S. Monmonier. Computer-assisted Cartography. Prentice-Hall, Englewood Cliff, New Jersey, 1982.
15. Peuquet D.J. and D.F. Marble, Introductory Reading in Geographic Information Systems. Taylor & Francis, Washington. 1990.
16. Star J. and J. Estes, Geographic Information Systems : An Introduction, Prentice Hall, Englewood Cliff, New Jersey, 1994.
17. दत्त, नियाल देव : सुदूर संवेदन एवं भौगोलिक सूचना प्रणाली

PAPER - IX (B)
BIOGEOGRAPHY AND ECOSYSTEM
(Paper Code - 0408)

- UNIT-I** Definition and scope of Biogeography. Environment, Habitat and Plant-animal association, Biome types.
- UNIT-II** Elements of plant geography, distribution of forests and major communities. Plant successions in newly formed land forms.
 Zoogeography and its Environmental Relationship.
 Paleobotanical and Palaeo climatological records of environmental change.
- UNIT-III** Ecosystems : concept and components, Ecosystem-form and function : trophic level, ecological pyramids, ecological niche, energy and nutrients in the ecosystem, hydrological cycle, foodchains and foodwebs.
 Major terrestrial ecosystems of the world : agriculture, forests, grassland and desert. Population growth and environment.
- UNIT-IV** Biodiversity and its conservation. Preservation and conservation of the ecosystem through resource management. Environmental legislation.
 The Stockholm conference, the Earth summit, Environmental laws in India (the Wild Life Act, Water Act, Forest Act, Environment Protection Act and National Environment Tribunal Act).

SUGGESTED READINGS :

1. Agrawal D.P. : Man and Environment in India Through Ages, Book & Books, 1992.
2. Bradshaw, M.J. : Earth and Living Planet, ELBS. London, 1979.
3. Cox, C.D. and Moore, P.D. : Biogeography : An Ecological and Evolutionary Approach 5th edn. Blackwell, 1993.
4. Gaur, R. : Environment and Ecology of Early Man in Northern India R.b. Publication Corporation 1987.
5. Hoyt, J.B. : Man and the Earth, Prentice Hall, U.S.A. 1992.
6. Huggett, R.J. : Fundamentals of Biogeography., Routledge, U.S.A. 1998.
7. Illies, J. : Introduction to Zoogeography, Mcmillan, London, 1974.
8. Khoshoo, T.N. and Sharma, M. (eds.) : Indian Geosphere-Biosphere Har-Anand Publication, Delhi 1991.
9. Lapedes, D.N. (ed.) : Encyclopedia of Environmental Science, McGraw Hill, 1974.
10. Mathur H.S. : Essentials of Biogeography, Anuj Printers, Jaipur, 1998.
11. Pears, N. : Basic Biogeography, 2nd edn. Longman, London, 1985.
12. Simmon, I.G. : Biogeography, Natural and Cultural, Longman, London 1974.
13. Tivy J. : Biogeography : A study of Plants in Ecosphere 3rd edn. Oliver and Boyd, U.S.A., 1992.
14. Ackerman, E.A. : Geography as a Fundamental Research Discipline, University of Chicago Research Papers, 1958.
15. Agarwal, A. and Narain, S. : The Citizens Fifth Report. Centre for Science and Environmental New Delhi 1999.
16. Bertalanffy, L. : General Systems Theory, George Bragiller New York, 1958.
17. Bodkin, E. : Environmental Studies, Charles E. Merrill Pub. Co., Columbus, Ohio, 1982.
18. Chandna, R.C. : Environmental Awareness, Kalyani Publishers, New Delhi, 1998.
19. Chorley, R.J. : Geomorphology and General Systems Theory, U.S.G.S. Professional Paper, 500B, 1962.
20. Eyre, S.R. and Jones, G.R.J. (eds.) Geography as Human Ecology, Edward Arnold, London, 1966.
21. Kormondy, E.J. : Concepts of Ecology, Prentice Hall, 1989.
22. Manners, I.R. and Mikesell, M.W. (eds.) Perspectives on Environment, Commission on College Geography, Publ. No. 13, Washington, D.C., 1974.
23. Nobel and Wright : Environmental Science, Prentice Hall, New York 1996.
24. Odum, E.P. : Fundamentals of Ecology, W.B. Saunders, Philadelphia, 1971.
25. Russwurm, L.H. and Sommerville, E. (eds.) : Man's Natural Environment-A systems Approach, Duxbury, Massachusetts, 1985.
26. Sharma, H.S. : Ranthambhore Sanctuary - Dilemma of Eco-development, Concept, New Delhi, 2000.
27. Simmons, I.G. : Ecology of Natural Resources, Edward Arnold, London, 1981.
28. Singh S. : Environmental Geography, Prayag Publications, Allahabad, 1991.
29. Smith, R.L. : Man and his Environment : An Ecosystem Approach, Harper & Row, London, 1992.
30. U.N.E.P. : Global Environmental Outlook, U.N. Pub., New York, 1998.
31. World Resources Institute : World Resources, (Latest Report) Washington.
32. कुल श्रेष्ठ, कामता प्रसाद : जैव भूगोल

PAPER X
AGRICULTURAL GEOGRAPHY
(Paper Code - 0409)

- Unit I: Nature, scope, significance and development of agricultural geography. Approaches to the study of agricultural geography: Commodity, systematic and regional systems. Origin and dispersal of agriculture. Sources of agricultural data.
- Unit II: Determinants of agricultural land use - Physical, economic, social, and technological Land holding and land tenure systems, Land reforms, land use Agriculture policy and planning. Selected agricultural concepts and their measurements; cropping pattern, crop concentration, intensity of cropping, degree of commercialization, diversification and specialization, efficiency and productivity, crop combination regions and agricultural development.
- Unit III: Theories of agricultural location based on several multi-dimensioned factors:- Von Thunen's theory of agricultural location and its recent modifications; Whittlesey's classification of agricultural regions; land use and land capability.
- Unit IV: Agricultural in India- Land use and shifting cropping pattern. Regional pattern of productivity in India. Green Revolution, White Revolution, Food deficit and food surplus regions; nutritional index. Specific problems in Indian agriculture and their management and planning. Agricultural Policy in India. Contemporary Issues: Food, nutrition and hunger, food security, drought and food-security, food aid Programmes; role of irrigation, fertilizers, insecticides and pesticides, technological know-how. Employment in the agricultural sector: landless labourers, woman, children: occupational and agricultural activities.

SUGGESTED READINGS:

1. Bayliss Smith, IP.: The Ecology of Agricultural Systems. Cambridge University London, 1987.
2. Berry, B.J.L et. al. : The Geography of economic Systems. Prentice Hall, New York, 1976.
3. Brown, L.R. : The Changing World Food Prospects - The Nineties and Beyond, World Watch Institute, Washington D.C., 1990.
4. Dyson, T. : Population and Food - Global Trends and Future Prospects. Routledge. London, 1996.
5. Gregor, H.P. : Geography of Agriculture. Prentice Hall, New York, 1970.
6. Grigg, D.B. : The Agricultural Systems of the World. Cambridge University Press, New York 1974.
7. Hartshorn, T.N. and Alexander, J.W. : Economic Geography. Prentice Hall, New Delhi, 1988
8. Mannion, A.M. : Agriculture and Environment Change, John Wiley, London, 1995.
9. Morgan W.B. and Norton , R.J.C. : Agricultural Geography. Mathuen, London, 1971.

10. Morgan, W.B.: Agriculture in the Third World - A Spatial Analysis. Westview Boulder, 1978.
11. Sauer, C.O. : Agricultural Origins and Dispersals,. M.I.T. Press, Mass, U.S.A., 1988.
12. Singh, J. and Dhillon, S.S. : Agricultural Geography. Tata McGraw Hill' Pub.; Delhi, 1988.
13. Tarrant, J.R. : Agricultural Geography. Wiley, New York, 1974.

PRACTICAL

QUANTITATIVE TECHNIQUES, REMOTE SENSING AND GIS

Section (A) : Quantitative Techniques

Marks 35

- (i) Product Moment and Rank Correlation Coefficients, Linear Regression.
- (ii) Hypothesis Testing ; Chi-square and 't' tests, Analysis of variance and test; Sampling
- (iii) Running mean, Mean centre, Nearest Neighbour Analysis ; Lorenz Curve,
- (iv) Normal distribution curve, probability.

Section (B) : Remote Sensing and GIS

Marks 35

- (i) Air Photos and Photogrammetry : Elements of photographic system : types, scales and ground coverage resolution, films, filters, aerial Cameras vertical photographs, relief displacement, airphoto interpretation.
- (ii) Image Processing : types of imagery, techniques of visual interpretation, ground verification, transfer of interpreted thematic information to base maps-digital processing rectification & Restoration image enhancement. Application : Air photo and image interpretations and mapping landuse and studies of water resources.
- (iii) Spatial Data : Elements of spatial data : quality and error variations raster and vector data structures data conversion.
- (iv) Elements of GIS : Data capture-verification and preprocessing-data storage and maintenance of database-Database Management Systems : types and merits and demerits-data manipulation, analysis integrated analysis of spatial and attribute data.

SUGGESTED READINGS:

1. American Society of Photogrammetry : Manual of Remote Sensing. ASP, Falls Church, V.A. 1983.
2. Barrett and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation, Mcmillan, New York, 1992.
3. Campbell J. : Introduction of Remote Sensing, Guilford, New York, 1989.
4. Curran, Paul J. : Principles of Remote Sensing, Longman, London, 1985.
5. Hord R.M. : Digital Image Processing of Remotely Sensed Data, Academic, New York, 198...
6. Luder D. : Aerial Photography Interpretation : Principles and Application, McGraw Hill, New York, 1959.
7. Pratt W.K. Digital Image Processing, Wiley, New York, 1978.
8. Rao D.P. (eds.) : Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hyderabad, 1998.
9. Thomas M. Lillo and Ralph W. Keler, Remote Sensing and Image interpretation, John Wiley & sons, New York, 1994.
10. Aronoff S. Geographic Information Systems : A. Management Perspective, DDI, Publication Ottawa, 1980.
11. Burrough, P.A. : Principles of Geographic Information Systems for Land Resource

- Assessment Oxford University Press, New York, 1986.
12. Fraser Taylor D.R. Geographic Information Systems. Pergamon Press, Oxford 1991.
 13. Maqurie D.J. M.F. Goodchild and D.W. Rhind (eds.) Geographic information Systems : Principles and Application. Taylor & Francis, Washington, 1991.
 14. Mark S. Monmonler : Computer-assisted Cartography, Prentice-Hall, Englewood Cliff, New Jersey, 1982.
 15. Peuquet D.J. and D.F. Marble : Introductory Reading in Geographic Information Systems : Taylor & Francis : Washington 1990.
 16. Star J and J. Estes : Geographic Information Systems : An Introduction, Prentice Hall, Englewood Cliff, New Jersey, 1994.
 17. Singh, R.L. & P.K. Dutt : Elements of Practical Geography Students friends.
 18. Monkhouse, F.J. & H.R. Wilkinson : Maps and Diagrams Mathuen, London.
 19. Mahmood, Aslam 1971 : Statistical Methods in Geographical studies Rajesh Pub., New Delhi.
 20. Gregory, S. : Statistical Methods and The Geographer.
 21. Hammond & Mccullah 1977 : Quantitative Techniques in Geography, Clarendon Press, Oxford.
 22. Fitz, Gomid, B.P. : Science in Geography, Developments in Geographical Method, Oxford University Press.
 23. Yeates, M. : An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York.
 24. माँकहाउस तथा विलकिंसन 1976 - "मानचित्र तथा आरेख" मध्यप्रदेश केदारनाथ रामनाथ, मेरठ
 25. नेगी, डी.एस. - "भूगोल में आधारभूत" साख्यकी केदारनाथ रामनाथ, मेरठ
 26. हीरालाल - "प्रायोगिक भूगोल" किताबघर, कानपुर



SYLLABUS

2018-2019



PT. RAVISHANKAR SHUKLA UNIVERSITY
RAIPUR
CHHATTISGARH

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

SYLLABUS FOR 2018-19

M. Sc. ZOOLOGY

Semester	Paper	Title	External marks	Internal marks	Credit
First JULY-DEC, 2017	I	Biosystematics, Taxonomy and Biodiversity	80	20	4
	II	Structure and Function of Invertebrates	80	20	4
	III	Population Genetics and Evolution	80	20	4
	IV	Tools & Techniques in Biology	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
Second JAN-JUNE, 2018	I	Molecular Cell Biology and Biotechnology	80	20	4
	II	General Physiology and Endocrinology	80	20	4
	III	Development Biology	80	20	4
	IV	Quantitative Biology and Computer Application	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
Third JULY-DEC, 2018	I	Comparative Anatomy of	80	20	4

		Vertebrates			
	II	Animal Behaviour	80	20	4
	III	Environment Physiology and Population Ecology	80	20	4
	IV	Immunology and Parasitism	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
	Compulsory				
Fourth JAN-JUNE, 2019	I	Biochemistry	80	20	4
	II	Neurophysiology	80	20	4
	Optional papers (Group I)*				
	I	Fish (ichthyology) structure and function	80	20	4
	II	Cell biology	80	20	4
	III	Entomology	80	20	4
	IV	Wild life conservation	80	20	4
	V	Biology of Vertebrates immune system	80	20	4
	Optional paper (Group II)*				
	I	Pisciculture and economic importance of fishes (Ichthyology)	80	20	4
	II	Cellular organization and molecular organization	80	20	4
	III	Applied entomology	80	20	4
	IV	Environment and Biodiversity conservation	80	20	4
	V	Molecular endocrinology and reproductive technology	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course I (Based on paper III & IV)	80	20	2
Total			1920	480	80

* Student has choice to opt. for one paper each (special paper) from group I & group II.

**The respective teachers on each paper will ensure the internal evaluation by a class test and a seminar/ poster presentation of 10 marks each and submit the foil and counter foil to the HOD by the end the activity.

M. Sc. ZOOLOGY FIRST SEMESTER (July – December 2018)

PAPER – I BIOSYSTEMATICS, TAXONOMY AND BIODIVERSITY

UNIT-I

- Definition and basic concepts of biosystematics and taxonomy.
 - Historical resume of systematics.
 - Importance and applications of biosystematics in biology
- Trends in biosystematics concepts of different conventional and newer aspects
 - Chemotaxonomy
 - Cytotaxonomy
 - Molecular taxonomy

UNIT-II

- Dimensions of speciation and taxonomic characters
 - Mechanisms of speciation in panmictic and apomictic species
 - Species concepts and species category.
 - Theories of biological classification.
 - Taxonomic characters and different kinds.

UNIT-III

- Procedure keys in taxonomy.
 - Taxonomic procedures-taxonomic collections, preservation, curation
 - Taxonomic keys-different kinds of taxonomic keys, their merits and demerits.
 - Process of typification and different Zoological types.
 - International code of Zoological Nomenclature (ICZN)

UNIT-IV

- Biodiversity
 - Types of Biodiversity
 - Hot spots of Biodiversity
 - Threats to Biodiversity
 - Conservation of Biodiversity
- Evaluation of biodiversity indices
 - Shannon-Weiner index.

SUGGESTED READING MATERIALS - (ALL LATEST EDITION)

- **Biosystematics & Taxonomy,**
Dr.R.C.Tripathi, University Book House JAIPUR.
- **Theory & Practice of Animal Taxonomy**
V.C. Kapoor, 5th Edition Oxford & IBH Publishing Co.
- **Principle of Animal Taxonomy**
G.G. Simpson, Oxford & IBH Publishing Co.
- **Elements of axonomy**
Earnst Mayer
- **Biodiversity**
E.O. Vilson, Acadmic Press Washington
- **The Biology of Biodiversity**
M. Kato, Springer
- **Molecular Markers - Natural History & Evolution J.C. Avise**

M.Sc. ZOOLOGY FIRST SEMESTER (July – December 2018)

PAPER-II: STRUCTURE & FUNCTION OF INVERTEBRATES

UNIT-I

- Organization of coelom

- Acoelomates and Pseudocoelomates
- Coelomates: Protostomia and Deuterostomia.
- Locomotion
 - Flagellar and ciliary movement in Protozoa.
 - Hydrostatic movement in Coelenterata, Annelida and Echinodermata.

UNIT-II

- Nutrition and Digestion
 - Patterns of feeding and digestion in Protozoa
 - Filter feeding in polychaeta.
- Respiration
 - Organs of respiration Gills, lungs and trachea.
 - Respiratory pigments.

UNIT-III

- Excretion
 - Organs of excretion.
 - Excretion and osmoregulation
- Nervous System
 - Primitive nervous system: Coelenterata and Echinodermata.
 - Advanced Nervous system: Annelida, Arthropoda (Crustacea and insecta) and Mollusca (Cephalopoda)

UNIT-IV

- Invertebrate larvae
- Larval forms of free-living and parasitic invertebrates
- Minor Phyla
 - Organization and general characters of (Ctenophore, Rotifera, Ectoprocta, Endoprocta)

SUGGESTED READING MATERIALS (ALL LATEST EDITION)

- **Invertebrate Structure and function:-**
E.J.W. Barrigton English language Book society UK.
- **Invertebrate Zoology:**
Robert Barnes IVth Edition Holt Saunders International Edition Japan.
- **The Cambridge Natural History Vol 1 - 9.**
S F Harmer, A.E. Shipley.

Today's & Tomorrow's Book agency, N Delhi India.

- **A Text book of Zoology Invertebrate:**

Parker Haswell, Marshall & Williams. AITBS
Publishing & Distributors, Delhi

- **The Invertebrates Vol. 1 - 9**

Libbie Henrietta Hyman, McGraw Hill Book Company

M. Sc. ZOOLOGY FIRST SEMESTER (July – December 2018)

PAPER-III: POPULATION GENETICS & EVOLUTION

UNIT-I

- Concepts of evolution and theories of organic evolution: Lamarckism, Darwinism and Synthetic theory of evolution
- Evidences of evolution: anatomical, embryological, palaeontological, physiological and Bio-chemical

Unit-II

- Hardy-Weinberg law of genetic equilibrium
- Detailed account of destabilizing forces.
- Natural selection
 - Mutation
 - Genetic drift
 - Meiotic drive
- Phenotypic variation

UNIT-III

- Patterns and mechanisms of reproductive isolation
- Phylogenetic and biological concepts of species
- Gene Evolution, Evolution of gene families
- Factors affecting human disease frequency

UNIT-IV

- Origin of higher categories
- Micro-and Macro-evolution
- Evolution of horse, elephant, camel, man

SUGGESTED READING MATERIALS - (ALL LATEST EDITION)

- **Gene & Evolution**

- Jha A.P. John Publication, New Delhi
- **Evolution & Genetics**
Merrel D.J. Holt rinchert & Wiston INC.
- **The Genetics & Origin of Species**
Dobzhansky, Columbia University Press.
- **Evolution**
Dobzhansky, Ayala F.J., Stebbins G.L. & Valentine J.M.
Surjeet Publication New Delhi.
- **Species Evolution - The Role of Chromosomal Change**
King M. Cambridge University Press. Cambridge
- **A Primer of Population Genetics**
Hartl D.L. Suinaer Associates INC, Massachusetts
- **Evolutionary Genetics**
Smith J.M. Oxford University Press, NewYork
- **Evolutionary Biology**
- Futuyama D.J. Suinaer Associates INC publishers,
Dunderland
- **Evolution**
Strikberger M.W. Johns & Bartett Publishers, Boston London

M. Sc. ZOOLOGY FIRST SEMESTER (July -December 2018)

PAPER-IV: TOOLS & TECHNIQUES IN BIOLOGY

UNIT-I

- Principles and application of
 - Ultracentrifugation
 - Electrophoresis
 - Chromatography (various types)
 - Lambert-Beers Law and colorimetry and spectrophotometry
 - Flow cytometry.

UNIT-II

- Principles and Application of

- Light Microscopy and micrometry
- Phase Contrast microscopy
- Interference microscopy
- Fluorescence microscopy
- Transmission Electron microscopy.
- Scanning Electron microscopy.

UNIT-III

- Assay
- Chemical assays
- Biological assays-in vivo and in vitro
 - Principles of cytological and cytochemical techniques
 - Fixation: chemical basis of fixation by formaldehyde, glutaraldehyde, chromium salts, mercury salts, osmium salts, alcohol and acetone
 - Chemical basis of staining of carbohydrate, protein lipids and nucleic acids.

UNIT-IV

- Principle and techniques of
 - Nucleic acid hybridization and cot curve
 - Sequencing of proteins and nucleic acids
- Freeze techniques
- Media preparation and sterilization
- Inoculation and growth monitoring

SUGGESTED READING MATERIALS - (ALL LATEST EDITION)

- **Introduction to Instrumental Analysis**
 - **Robert Braun**, McGraw Hill International Edition
- **A biologist guide to principles and techniques of practical biochemistry**
 - **K Wilson and K. H. Goulding** ELBs Edition
- **Instrumentation**
 - **Upadhyay and Nath**, Meerut Publications
- **Instrumentation and Techniques**
 - **R.C. Bajpayee**, Himalayan Publications

M. Sc. ZOOLOGY FIRST SEMESTER (July – December 2018)

LAB COUSE-I: (PRACTICAL BASED ON PAPER I & II)

- **Biosystematics and Taxonomy**

- Study of biodiversity among various invertebrates and vertebrates (Listing of all the animals found in and around your house and also try to find out their Zoological names).
- Collection of various insect species.
- Visits to a local animal park or zoo to identify and study the captive fauna and preparation of report.
- Study of adaptive characteristics of various invertebrates and vertebrates in different climate.
- Taxonomic key formation and conversion.
- Study of biodiversity in grassland and pond water by using Shannon -Weiner index
- Other exercise related to theory paper

- **Structure and function of invertebrates**

- Identification, classification and study of distinguishing features of important representatives from various groups (Protozoa to Hemichordata).
- Study of permanent prepared slides (from Protozoa to Hemichordata).
- Dissection; Reproductive, Excretory, nervous and haemocoelomic systems of leech.
- Dissection Reproductive system of cockroach; general anatomy, nervous and reproductive systems of grasshopper; nervous system of crab; nervous and reproductive systems of scorpion.
- Nervous system of Mytilus, Sepia and Aplysia, general anatomy of Aplysia.
- Study of sections of the arm of a starfish; general anatomy of a Holothurian; Aristotle's lantern of a sea urchin complete as well as disarticulated parts of the Aristotle's lantern.
- Permanent preparations of different materials to be provided for study.
- Wonder invertebrates
- Other exercise related to theory paper.
- * UGC guideline should be followed.

EXAMINATION SCHEME

Based on paper I (Minimum 3 exercise 15+10+10)	35 marks
Based on paper II (Minimum 3 exercise 15+10+10)	35 marks
Viva	10 marks
Sessional (Internal)	20 mark

Total	80+20 (100)
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M. Sc. ZOOLOGY FIRST SEMESTER (July – December 2018)
LAB COUSE-II: (PRACTICAL BASED ON PAPER III & IV)

- **Population genetics and evolution**

- Problems on genetics (complete and incomplete linkage; dominance, sex-linked inheritance) Demonstration of Hardy-Weinberg law
- Preparation of human chromosomes map, demonstration of chromosomal deficiencies.
- Experiments based on population genetics, pedigree analysis.
- Study of evolution of horse by way of models.
- Study of evolution through homologous and analogous organs.
- Other exercises related to theory paper.

- **Tools and techniques in biology**

- Parts study, principles and use of following instruments for different techniques:
 - pH meter: Determination of pH of different soil and water samples.
 - Spectrophotometer: Preparation of absorption spectrum.
 - Chromatography: Paper and thin layer chromatography.
 - Centrifuge: Extraction proteins and carbohydrates from tissues.
 - Electrophoresis: Paper and gel electrophoresis.
 - Microscope: Parts study and principles of various microscopes.
 - Demonstration of cryostat.
 - Other exercise related to theory paper.

EXAMINATION SCHEME

Based on paper III (Minimum 3 exercise 15+10+10)	35 marks
Based on paper IV (Minimum 3 exercise 15+10+10)	35 marks
Viva	10 marks
Sessional (Internal)	20 Mark
Total	80+20 (100)

M. Sc. ZOOLOGY SECOND SEMESTER (January – June, 2019)

PAPER – I: MOLECULAR CELL BIOLOGY AND BIOTECHNOLOGY

UNIT-I

- Biomembranes
 - Molecular composition and arrangement
 - Transport across membrane
- Structure and function
- Mitochondria
- Golgi complex
- Lysosome
- Ribosome

UNIT-II

- DNA replication
- Transcription
- Translation
 - Genetic code
 - Mechanisms of initiation, elongation and termination
 - Regulation of translation

UNIT-III

- Genome organization
 - Chromosomal organization: morphological and structural types.
 - Non-coding DNA
- Molecular mapping of genome
 - Genetic and physical maps
 - Polymerase Chain Reaction (PCR) and blotting techniques
 - Molecular markers in genome analysis.

UNIT-IV

- Transgenic animals and knock-outs
 - Production and applications
 - Embryonic stem cells
- Application of genetic engineering
 - Medicine

- Agriculture
- Industry

SUGGESTED READING MATERIALS - (ALL LATEST EDITION)

- **MOLECULAR CELL BIOLOGY**

Lodish, W.H. Freeman & Co. NewYork

- **Lehninger** PRINCIPLES OF BIOCHEMISTRY,

Fourth Edition - David L [1]. Nelson, Michael M. Cox

- **MOLECULAR CELL BIOLOGY**

Lodish M. Baltimore, Scientific American books

- **ESSENTIALS OF CELL & MOLECULAR BIOLOGY**

Roberties & Roberties, Halt Saunders International Edition.

- **CELL & MOLECULAR CELL BIOLOGY**

Gerald Karp, Willey & Sons Co.

- **MEDICAL CELL BIOLOGY**

Flickinger E.J. Brown J.C. Halt Saunders International Edition.

- **CELL BIOLOGY**

Powar C.B. Himalaya Publishing House

M. Sc. ZOOLOGY SEMESTER – II (January – June, 2019)

PAPER – II: GENERAL PHYSIOLOGY AND ENDOCRINOLOGY

UNIT-I

- Digestion and Metabolism
 - General organization of alimentary canal
 - Mechanism of digestion

- Mechanism of absorption
- Gas Exchange and Acid-base Balance
 - Oxygen and Carbon dioxide transport in blood
 - The role of hemoglobin
 - Regulation of body pH

UNIT-II

- Muscle Function and Movement
 - Anatomy of muscle
 - Mechanism of muscle contraction
 - Regulation of muscle contraction
- Nervous System
 - Neurons and membrane excitation
 - Action potentials
 - Synapses and neurotransmitters

UNIT III

- Sensory Transduction
 - Auditory receptors
 - Chemoreceptor: taste and smell
 - Vision and Photoreception
- Thermoregulation and Cold Tolerance
 - Heat balance and exchange
 - Endotherms Vs Ectotherms
 - Torpor, hibernation and aestivation

UNIT-IV

- Endocrinology
 - Structure and functions of endocrine glands (Pituitary, pineal, pancreas, adrenal, thyroid etc.)
 - Biosynthesis of hormones (thyroid and gonadal)
 - Hormones and Reproduction

SUGGESTED READING MATERIALS - (ALL LATEST EDITION)

- Comparative vertebrate Endocrinology – by **Gorbman & Bern**
- Human Physiology – by **Dr. C. C. Chattergee**
- Comparative Endocrinology – by **Barrington**
- Applied Animal Endocrinology – by **Squires**
- **Endocrinology** – Basic & Clinical principles - by **Melmed & Cohn**

M. Sc. ZOOLOGY SEMESTER - II (January – June, 2019)

PAPER – III: DEVELOPMENT BIOLOGY

UNIT-I

- Oogenesis
 - Differentiation and growth of oocytes.
 - Organization of egg cytoplasm and egg cortex.
 - Vitellogenesis
- Spermatogenesis
 - Differentiation and ultra structure of sperm
 - Capacitation

UNIT-II

- Fertilization
 - Biological role of fertilization.
 - Basic requirements of fertilization.
 - Activation of egg metabolism
 - Biochemistry of fertilization
- Cleavage
 - Characteristics and mechanisms of cleavages

UNIT-III

- Formative movements
- Fate maps

- Utility and comparative topographical relationship of the Presumptive areas in early embryos of
 - Amphioxus
 - Fishes
 - Amphibian
 - Birds
- Differentiation

UNIT-IV

- Cell and tissue interactions in development
 - Primary embryonic induction
 - Competence
 - Concept of organizer
- Metamorphosis
- Teratology

SUGGESTED READINGS MATERIALS

- **Animal Gametes –**
Vishmanath, Asia Publishing House
- **Foundation Of Embrology –**
Bradley M.Patten, McGraw Publication
- **Fertilization In Animals –**
Brain Dale, Arlond Heiniman, Gulab Vazerani Publication
- **Development Biology -**
N.J. Berril, Tata McGraw Hill Publication N. Delhi
- **Embryology Of Vertebrates -**
Nelson

M. Sc. ZOOLOGY SEMESTER – II (January – June, 2019)

PAPER – IV: QUANTITATIVE BIOLOGY AND COMPUTER APPLICATION

UNIT-I

- Introduction to digital computer and application
 - Basic knowledge of hardware and software
 - CPU (Central Processing Unit)
 - Input and Output devices
 - Auxiliary storage system
 - Operating system and Binary number system

UNIT-II

- Computer application
 - Introduction to MS office
 - Word
 - Excel
 - Power point
- Computer application in biostatistics
- Simple computation and elementary knowledge of flow chart

UNIT-III

- Types of biological data
- Representation of data
- Sample and sampling
- Measures of central tendency
- Measures of dispersion
- Hypothesis testing: Null and alternate hypothesis

UNIT-IV

- Tests of significance

- Chi-square test
- Student's t-test
- Analysis of Variance
- Simple linear regression
- Correlation
- Probability distribution: normal and binomial

SUGGESTED READING MATERIALS

- Bataschelet. E. Introduction to mathematics for site scientist springer-verlag, berling
- Lenderen D. Modelling in behavioral ecology. Chapman & Hall London U.K.
- Snedecor, G.W. and W.G. Cochran, statistical methods, Affiliated East, West Press New Delhi (Indian ed.)
 - Muray, J.D. Mathematical Biology, Springer Verlag Berlin
 - Pelon, E.C. The interpretation of ecological data : A primer on classification and ordination.
 - A. Lewis . Biostatistics
 - B.K. Mahajan Methods in Biostatistics
 - J.D. Murray Mathematical Biology
 - Georgs & Wilians Statistical method

M. Sc. ZOOLOGY SEMESTER – II (January – June, 2019) **LAB COURSE – I: (PRACTICAL BASED ON PAPER I & II)**

- **Molecular biology and Biotechnology**
 - Isolation of DNA/RNA
 - Study of mitochondria from buccal epithelium by staining with supravital stains.
 - Culture of amoeba, paramecium, euglena.
 - Study of cell division mitosis/meiosis by squash and smear preparation of root tip and cockroach/grasshopper testis.
 - Study of giant chromosome in the salivary gland of Chironomous larvae or Drosophila. .
 - Study of Barr body and human chromosome.
 - Culture and study of drosophila.
 - Preparation of culture media and culture of bacteria.
 - Other exercise related to theory paper.

- **General physiology and endocrinology**

- Estimation of RBC, hemoglobin, hematocrit/PVC, blood group and Rh factor blood clotting time.
- Determine the blood pressure of man.
- Determination of urea, glucose and ketone bodies in urine.
- Demonstration of osmosis.
- Dissection and exposure of major endocrine glands in an experimental animals.
- Study of histology of endocrine glands in different animal types through permanent slides and microtomy.
- Other exercise related to theory paper.

EXAMINATION SCHEME

Exercise based on paper I (Minimum 3 exercise 15+10+10)	35 marks
Exercise based on paper II (Minimum 3 exercise 15+10+10)	35 marks
Viva	10 marks
Sessional (Internal)	20 Mark
Total	80+20 (100)

M. Sc. ZOOLOGY SEMESTER – II (January – June, 2019)
LAB COURSE-II: (PRACTICAL BASED ON PAPER III & IV)

- **Development biology**

- Study of slides of development of frog.
- Study of development of Hen's egg, by cover glass window method, staining and mounting of blastodisc.
- Study of caudal regeneration in Teleost (Meal time effect).
- Study of embryological slides: spermatogenesis, oogenesis, histology of gonads.
- Study of effect of NaF/urea on growth of fish fingerlings.
- Study of effect of thyroid hormone on metamorphosis of tadpole
- Other exercises related to theory paper

- **Quantitative biology and computer application**

- Preparation of frequency tables and graphs.
- Calculation of standard deviation, variance and standard error of mean.

- Calculation of probability and significance between means using t-test, Chi-square test, ANOVA
- Calculation of correlation, regression and probability distribution.
- Computer software use for computational tasks, data presentation, design task and communication
- Other exercises related to theory paper.

EXAMINATION SCHEME

Exercise based on paper III (Minimum 3 exercise 15+10+10)	35 mark
Exercise based on paper IV (Minimum 3 exercise 15+10+10)	35 mark
Viva	10 mark
Sessional (Internal)	20 Mark
Total	80+20 (100)

M. Sc. ZOOLOGY SEMESTER – III (July – December, 2019)

PAPER-I: COMPARATIVE ANATOMY OF VERTEBRATES

UNIT-I

- Origin of Chordates
- Amphibians, Reptiles, Birds and Mammals.
- Classification of Vertebrates
 - Amphibians
 - Reptiles
 - Birds
 - Mammals.

UNIT-II

- Vertebrate integument and its derivatives.
 - General structure and functions of Integument.
 - Structure and functions of glands, scales, horns, claws, nails, hoof, feather and hair.
- Skeletal system in vertebrates.
 - Comparative account of (i) Jaw suspensorium, (ii) Limbs and Girdles.

UNIT-III

- Respiration in Vertebrates.
 - Comparative account of respiratory organs (structure and functions).

- Circulation in Vertebrates.
 - Structure and function of blood.
 - Evolution of heart.
 - Evolution of aortic arches.

UNIT-IV

- . Nervous System – Central, Peripheral and Autonomic.
 - Sense organs.
 - . Comparative account of Sensory Receptors.
 - Evolution of Urinogenital system in vertebrates.

SUGGESTED READING MATERIALS - (ALL LATEST EDITION)

- **Vertebrate life** :- William N. Ferland, F. Harvey pough, Tom J Gode, John B. Heiser
- Collier MacNille International edition
- **Chordate morphology** :-Malcom Jollie
- Reinhold Publishing Corporation NewYork
- **Chordate –Structure & Function** :- Arnold G. Khage, B.E. Fry Johanson
- Mc Millan Publishing Co. INC. NewYork
- **Comparative Animal Physiology** :- Orosser
- Satish Book Enterprises, Agra
- **The Vertebrate Body** :- Alfred Sherwood Romer
- Vakils, Feffer & Simons Publications Ltd.

M. Sc. ZOOLOGY SEMESTER – III (July – December, 2019)

PAPER-II: ANIMAL BEHAVIOUR

UNIT- I

- . Historical perspectives- Ethology

- Behavioural patterns
- Innate behaviour
- Biological rhythms
 - Types of biological rhythm
 - Biological clock

UNIT- II

- Communications
 - Auditory
 - Visual
 - Chemical
- Learning and Memory
 - Conditioning
 - Habituation
- Reasoning
- Reproductive behaviour.

UNIT-III

Orientation

- Echolocation in bats
- Bird migration and navigation.
- Fish migration.

- Neural and hormonal control of behaviour

UNIT-IV

.Hormonal effect on behavioural patterns.

- Social behaviour
 - Social organization in insects and primates
 - Schooling in fishes and Flocking in birds
 - Homing, territoriality, dispersal
 - Altruism
 - Host–parasite relation

SUGGESTED READING MATERIALS - (ALL LATEST EDITION)

- **ANIMAL BEHAVIOR – Mc Farland** (English Language Book Society)
- **ANIMAL BEHAVIOR – Arora M.P.** (Himalaya Publishing House, Mumbai)
- **ANIMAL BEHAVIOR - Reena Mathur** (Rastogi Publications, Meerut)

M. Sc. ZOOLOGY SEMESTER – III (July – December, 2019)

PAPER – III: ENVIRONMENT PHYSIOLOGY AND POPULATION ECOLOGY

UNIT – I

Population dynamics:

- Demography, life table, reproductive rates, reproductive values
- Population growth, exponential, non overlapping
- Stochastic and time lag models of population growth
- Population density
- Population evolution
- Community dynamics: Characteristics, development and classification

UNIT-II

- Adaptations
 - Levels of adaptation.
 - Mechanisms of adaptation.
- Adaptations to different environments.
 - Marine, shores and estuaries.
 - Freshwater.
- Terrestrial Life.

UNIT-III

- Stress Physiology
 - Basic concepts of environmental stress and strain, Concept of elastic and plastic strain.
 - Stress avoidance, stress tolerance and stress resistance.
 - Acclimatization, acclimation and adaptation.
 - Endothermic and physiological mechanism of regulation of body temperature.

UNIT -IV

- Stress physiology in different conditions
 - Osmoregulation in aqueous and terrestrial habitats.
 - Physiological response to oxygen deficient stress.
 - Physiological response to body exercise.

- Effect of meditation and yoga

SUGGESTED READING MATERIALS - (ALL LATEST EDITION)

ECOLOGY with special reference to animal & man

S. Charles, Kendeigh Prentice hall of India Pvt. Ltd. New Delhi

- **ELEMENTS OF TROPICAL ECOLOGY**

- **Yanney Ewusie** (English language Book Society, Heine mann educational book publication)

- **FUNDAMENTALS OF ECOLOGY**

- **Odum P.**

- **ANIMAL PHYSIOLOGY, MECHANISM AND ADAPTATION -**

Eckert, R., W,H, Freeman and Co.

- **BIOCHEMICAL ADAPTATION -**

Hochachka, P.W, and Somero S.N, Princeton, New Jersey

- **ANIMAL PHYSIOLOGY: ADAPTATION AND ENVIRONMENT.-**

Schiemidt Nielsen, Cambridge

- **GENERAL & COMPARATIVE ANIMAL PHYSIOLOGY**

Hoar W.S. Princeton Hall of India

- **ENVIRONMENTAL PHYSIOLOGY**

Willmer, P.G. Stone & Johansen I, Blackwell Science Oxford

PAPER – IV: IMMUNOLOGY AND PARASITISM

UNIT-I

- Cells of immune system
 - B-Lymphocytes, T-lymphocytes, Null Cells
 - Mononuclear cells
 - Granulocytic cells (Neutrophils, Eosinophils and Basophils)
 - Mast cells
 - Dendritic cells
- Organs of immune system
 - Primary lymphoid organs (Thymus, bone marrow)
 - Secondary lymphoid organs (Lymph nodes, spleen, mucosal associated lymphoid tissue, cutaneous associated lymphoid tissue)

UNIT-II

- Immunoglobulin structure and function
- Molecular structure of Ig, Light chain and Heavy chain
- Immunoglobulin classes
 - IgG
 - IgM
 - IgE
 - IgD

Monoclonal antibodies

UNIT-III

- Antigens

Immunogenicity

- Contribution of the immunogens.
- Contribution of Biological system.
 - Antigen - Antibody Interaction
- Antibody affinity and activity
- Cross reactivity
- Agglutination reactions
- Precipitation Reaction
 - Vaccine
- Active and passive immunization
- Whole organism vaccine
- Recombinant vector vaccines
- DNA vaccines

UNIT-IV

- Immune system in Health disease
- Immune response to infectious disease
- Immune response in cancer
 - Pathophysiology of parasitic infection
 - Viral infections
 - Bacterial infection
 - Helminths infection
- AIDS

SUGGESTED READING MATERIALS

- **Immunology**

- **Kuby, W.H.** Froeman USA
- **Fundamental of Immunology**
 - **W. Paul,**
- **Essential Immunology**
 - **I.M. Roitt,** ELBs Edition
- **Immunology**
 - **Richard M. Hyde, Robert A. Patnode,** A Wiley Medical Publications
- **Reproductive Physiology**
 - **Gayton,**

M. Sc. ZOOLOGY SEMESTER – III (July – December, 2019)

LAB COURSE-I: (PRACTICAL BASED ON PAPER I & II)

- **Comparative anatomy of Vertebrates**
- Identification, classification and study of distinguishing features of important representatives, museum specimens and slides (Protochordates and Chordates)
- Comparative studies of integumentary, skeleton and reproductive system of major vertebrate classes.
- Dissections: fowl/snake cranial nerves
- Wonder vertebrates
- Other exercise related to theory paper.

- **Animal Behaviour**
- To study the phototactic response in earthworm or grain/pulse pest.

- To study the geotaxis behaviour of earthworm.
- To study the food preference and cleaning behaviour of housefly.
- To study the food preference in tribolium or grain/pulse pests.
- To study the web construction and habituation in spider.
- Estimation of body temperature and pulse rate on daily time scale.

- Estimate the time perception among various individuals at two different time points on daily time scale.
- Determination of effect of time on schooling behaviour in fish.
- Toxicological response of fish opercular and surfacing activity.

EXAMINATION SCHEME

Based on paper I (Minimum 3 exercise 15+10+10)	35 mark
Based on paper II (Minimum 3 exercise 15+10+10)	35 mark
Viva	10 mark
Sessional (Internal)	20 Mark
Total	80+20 (100)

M. Sc. ZOOLOGY SEMESTER – III (July – December, 2019)

LAB COURSE-II: (PRACTICAL BASED ON PAPER III & IV)

- **Immunology and Parasitism**
 - Dissection of primary and secondary immune organs from fish/fowl- Preparation and study of cell suspension from spleen (spleenocytes) of Fish / fowl.
 - Total and differential counting of leucocytes.
 - Protein estimation by Lowry's method in normal and infected blood sample.
 - Determination of Blood group.
 - Study of permanent slides (for spotting); thymus, lymph nodes, spleen, bone marrow, types of cells squamous, cuboidal, columnar, epithelial cells, blood cells, nerve cells, muscles cells, connective tissue of various types, adipose tissue, mitotic and meiotic chromosomes and their different phases cancer cells of various types etc.
 - Study of parasites in fish
 - Study of various parasites through slides and specimen.
 - Other exercises related to theory paper.
- **Environmental Biology, Population ecology**
 - Study of biotic community in a pond/grassland ecosystem.
 - Study of population growth rate (curve) in protozoan culture.
 - Population dynamics of *Tribolium* sp.
 - Study of biogeochemical cycles by way of models.

- Visit to some natural habitats and man made habitats to study the human impact on environment.
- Water analysis for fresh and waste water (Dissolve oxygen and chloride).
- Other exercises related to theory paper.

EXAMINATION SCHEME

Based on paper III (Minimum 3 exercise 15+10+10)	35 mark
Based on paper IV (Minimum 3 exercise 15+10+10)	35 mark
Viva	10 mark
Sessional (Internal)	20 Mark
Total	80+20 (100)

M. Sc. ZOOLOGY SEMESTER – IV (January - June, 2020)

PAPER– I (Compulsory) BIOCHEMISTRY

UNIT-I

- Properties of Proteins
 - Structure and properties of amino acids.
 - Classification of proteins.
 - Structure of proteins.
 - Biological Functions of Proteins.
 - Protein Metabolism.

UNIT-II

- Carbohydrates
 - Classification of carbohydrates.
 - Structure and Functions of Carbohydrates.
 - Carbohydrate metabolism.
- Lipid
 - Lipid structure and functions
 - Lipid metabolism.

UNIT-III

- Vitamins
 - Water and Fat soluble vitamins,
 - Chemistry, occurrence and physiological role.

- Enzymes
 - Classification and nomenclature.
 - Mechanism of action
 - Regulation of enzyme activity and functions of Co-enzymes.

UNIT-IV

- Nucleic acid
 - Chemistry of DNA.
 - Chemistry of RNA.
 - Biological importance of nucleic acids.
 - Nucleoproteins.
 - Metabolism of nucleic acids.

Suggested Reading

Lehninger Principles of Biochemistry, Fourth Edition

David L. Nelson, Michael M. Cox
Publisher: W. H. Freeman

- **Biochemistry**

Donald Voet, Hardcover: 1616 pages,
Publisher: Wiley; 3 edition

- **Principles of Biochemistry With a Human Focus**

Reginald H. Garrett, Charles M. Grisham

Publisher: Brooks Cole

- **The Molecular Basis of Cell Cycle and Growth Control**

Gary S. Stein (Editor), Renato Baserga, Antonio Giordano, David T. Denhardt,
Publisher: Wiley-Liss

- **Experiments in Biochemistry: A Hands-On Approach**

Shawn O. Farrell, Ryan T. Ranallo,
Publisher: Brooks Cole

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**PAPER II (Compulsory)
NEUROPHYSIOLOGY**

UNIT - I

- Physiological role of neurosecretory cells
- Histological structure of neurons and neuroglial cells
- Physiological properties of neural fibres
- Synapsis and synaptical transmission
- Myoneural junction and neuromuscular transmission
- Degeneration and regeneration of nerve fibre

UNIT - II

- Nerve fibre, peripheral nerves, receptors and effector endings, dermatomes and muscle activity
- The spinal cord and the ascending and descending tracts
- The cranial and spinal nerves

UNIT - III

- The fore brain, brain stem, the cerebellum
- The meninges and cerebrospinal fluid
- Peripheral nervous system

UNIT - IV

- Autonomic nervous system; sympathetic and para-sympathetic nervous system with special comparison to hormonal mechanism of transmission through autonomic nervous system
- Reflex action; varieties, characteristics, unconditional reflex, electrophysiology of spinal reflexes
- Sensation
- Electro encephalography and its physiological basis.

Suggested Reading

- The Brain: Our Nervous System by Seymour Simon
- Mass Action in the Nervous System by Walter J. Freeman
- Human Anatomy and Physiology with Interactive Physiology 10-System Suite, 8th Edition by Elaine N. Marieb and Katja N. Hoehn (Jan 10, 2010)
- Neuroanatomy by H.G. Snell
- Clinical Neurophysiology-Guide for Authors - Elsevier

- Foundations of Cellular Neurophysiology (Bradford Books): Daniel Johnston,

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Optional papers

- The following optional papers are being suggested as below

• OPTIONAL (SPECIAL PAPER) GROUP 1

- Fish (ichthyology) structure and function

Or

- Cell Biology

Or

- Entomology

Or

- Wild life conservation

Or

- Biology of vertebrates immune system

OPTIONAL (SPECIAL PAPER) GROUP 2

- Pisci culture and economic importance of fishes (Ichthyology)

Or

- Cellular organization and molecular organization

Or

- Applied entomology

Or

- Environment and Biodiversity conservation

Or

- Molecular endocrinology and reproductive technology

** Student has choice to opt for one paper each (special paper) from group 1 and group 2

M.Sc. Zoology Semester-IV (January - June, 2020)

Paper- III A (optional paper)

Ichthyology (Fish) Structure and Function

Unit-1

- Origin and evolution of fishes
- Classification of fishes as proposed by Berg

- Fish integument
- Locomotion
- Alimentary canal and digestion

• Unit-2

- Accessory respiratory organs
- Air bladder and its functions
- Weberian ossicles their homologies and functions
- Excretion and osmoregulation
- Acoustico-lateral line system

Unit-3

- Luminous organs
- Colouration in fishes
- Sound producing organs
- Deep sea adaptations
- Hill stream adaptations

Unit-4

- migration in fishes
- Sexual cycle and fecundity
- parental care in fishes
- Early development and hatching
- Poisonous and venomous fishes.

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Paper- III B (Optional)

Cell Biology

Unit-1

- Molecular organization of eukaryotic chromosomes : structure of nucleosome particles and higher order compaction of mitotic chromosomes, chromatin remodeling
- specialized chromosomes: structural organization and functional significance of polytene chromosomes
- DNA methylation and DNA Aase-1 Hypersensitivity in relation to gene activity and chromatin organization.
- specialized chromosomes II : structural organization and functional significance of lampbrush chromosome.
- Organisation and significance of heterochromatin.

Unit-2

- Structural organization of Eukaryotic genes, interrupted genes and overlapping genes and their evolution
- Gene families: organization, evolution and significance
- Transposable genetic elements of prokaryotes and eukaryotes Gene imitation

and molecular mechanism of occurrence of mutation repair mechanism

- Organisation of eukaryotic transcriptional machinery promoter enhancers transcription factors polymerase activators and repressors.
- DNA binding domains of transcription apparatus zinc finger steroid receptors hemeo domains HILIX-loop, Helix and Leucine Zipper.

Unit-3

- Eukaryotic transcription of Eukaryotic transcriptional control.
- Environmental modulation of gene activity (stress response) stress genes and stress proteins
- Molecular basis of thalasemias muscular dystrophy cystic fibrosis
- DNA rearrangement
- Amplification during development with special response to
- Ciliates
- Chlorine gene
- 58 RNA genes

Unit-4

- Drosophila development
- Cleavage
- Gastrulation

Origin of Anterior –Posterior (Maternal effect genes and segmentation genes

- Drosophila development II origin of dorsal ventral polarity
- Basic idea of homeotic selector genes and homeotic mutation
- Basic idea of organization of homeoboxes
- Evolutionary significance of homeoboxes

Suggested Reading Materials:

- Robertis, De and Robertis Cell and molecular biology Lea and Febiger.
- Watson Hopkins Roberts Steitz Weiner, Molecular Biology of the Gene the Benjamin, Cummings Publishing Company inc.
- Bruce A; berts Bray ewis Raff Roberts Watson Molecular Biology of the Cell, Garland Publishing inc.
- Watson Gilman Witkowski Zoller Recombinant DNA Scientific American Books.
- Karp Gerald Cell Biology.
- Lewin B., Genes VII.
- King Cell Biology.
- Kaniel L. Hartl, Elizabeth W. Jones. Genetics Principles and Analysis, Jones and Bartlett Publishers.

- Kuby, Immunology, W.H. Freeman and Company.
- Roitt Male Snustad Immunology.

M.Sc. Zoology Semester-IV (January - June, 2020)

Paper- III C (Optional) Entomology

Unit-1

- Insect head types and modification as per their habit and habitat
- Modification of mouth parts and feeding behaviour
- Structure types and function of antennae
- Hypothetical wing venation
- Structure of cuticle and pigment

Unit-2

- Sclerotisation and tanning of the cuticle
- Structure of alimentary canal and Physiology of digestion
- Malpighian tubules – anatomical organization , Transport mechanism
- Structure of circulatory system
- Cellular elements in the haemolymph

Unit-3

- Cell mediated and humoral immunity
- Structure of compound eye and Physiology of Vision
- Sound Production in insect
- Structure and function of endocrine glands
- Pheromones

Unit-4

- Embryonic membranous up to the formation of blastoderm
- Metamorphosis
- Insecticide effects on CNS
- Important pest of Soybean Modern concept of pest management

Suggested Reading Materials:

- The Insect: Structure and function by R.F. Chapman
- Comparative Insect physiology, Biochemistry and Pharmacology .Vol :1-13. Edited by G.A. Kerkut and L.I. Gilbert.
- Entomophagous Insect by Clausen
- Entomology by Gilbert
- Principles of Insect Physiology by Wigglesworth.
- Fundamentals of Entomology by Elzinga

- Hand book of economic Entomology for South India by Ayyar.
- Insect cytogenetics by R.E.F.Symposium.
- Insects and plants by Sting, Lawton and southwood.
- Insect and hygiene by Busvine.
- Insect Physiology by Wigglesworth.
- Insect morphology by Mat Calf and Flint
- Applied Agricultural Entomology by Dr. Lalit Kumar Jha

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Paper- III D (Optional)

Wild Life Conservation

Unit-1

- Wild life -
- Values of wild life - positive and negative.
- Our conservation ethics.
- Importance of conservation.
- Causes of depletion.
- World conservation strategies.
- Habitat analysis, Evaluation and management of wild life.
- Physical parameters - Topography, Geology, Soil and water.
- Biological Parameters - food, cover, forage, browse and cover estimation.
- Standard evaluation procedures - remote sensing and GIS.
- Management of habitats -
- Setting back succession.
- Grazing logging.
- Mechanical treatment.
- Advancing the successional process.
- Cover construction.
- Preservation of general genetic diversity.

Unit-2

- Population estimation.
- Population density, Natalty, Birth rate, Mortality, fertility schedules and sex ratio computation.
- Faecal analysis of ungulates and carnivores - Faecal samples, slide preparation, Hair identification, Pug marks and census method.
- National Organization.

- Indian board of wild life.
- Bombay Natural History Society.
- Voluntary organization involved in wild life conservation.
- Wild life Legislation - Wild Protection act - 1972, its amendments and implementation.
- Management planning of wild life in protected areas.
- Estimation of carrying capacity

Unit-3

- Eco tourism / wild life tourism in forests.
- Concept of climax persistence.
- Ecology of perturbation.
- Management of excess population & translocation.
- Bio- telemetry.
- Care of injured and diseased animal.

Unit-4

- Quarantine.
- Common diseases of wild animal.
- Protected areas National parks & sanctuaries, Community reserve.
- Important features of protected areas in India.
- Tiger conservation - Tiger reserve in M.P, in India.
- Management challenges in Tiger reserve.

Suggested Reading Materials:

- Gopal Rajesh : Fundamentals of wild life management
- Agrawal K.C : Wild life India
- Dwivedi A.P (2008) : Management wild life in India
- Asthana D.K : Environment problem and solution
- Rodgers N.A & Panwar H.S : Planning of wild life / Protected area Network in India vol. the report, wild life Institute of India Dehradun.
- Odum E.P : Fundamentals of Ecology
- Saharia V.B : Wild life in India
- Tiwari S.K : Wild life in Central India
- E.P Gee : Wild life of India
- Negi S.S : Wild life conservation (Natraj Publishers)

Paper- III E (Optional)

Biology of vertebrate immune system

Unit-1

- Tissues of Immune system- Primary lymphoid organs, structure and functions (Thymus and Bursa of Fabricius)
- tissues of Immune system- Secondary lymphoid organs, structure and functions (Spleen, lymphnode and Payers patches)
- Antigen processing
- Antigen presentation

Unit-2

- T-cell lineage and receptors
- T-cell activation
- B-cell lineage and receptors
- B-cell activation
- Immunoglobulin structure, Biological and physical properties of immunoglobulin
- Gene model for Immunoglobulin gene structure

Unit-3

- Generation of antibody diversity (Light and heavy chain)
- Immunization
- Immediate type of hypersensitivity reaction of Anaphylectic type-1.
- Antibody dependent cytotoxic type II reaction.
- Complex mediated type III reaction

Unit-4

- Delayed type cell mediated hypersensitivity type IV reaction.
- Enzyme linked immunosorbent assay (ELISA) technique and its applications.
- Immunofluorescence technique (Direct & Indirect and Sandwich antibody labelling techniques .
- Immunodiffusion techniques (Mancini and Ouchterlony immunodiffusion techniques) Monoclonal antibody technology (Hybridoma technology)

M.Sc Zoology Semester-IV (January - June, 2020)

Paper- IV A (Optional)

Pisci Culture and Economic Importance of Fishes (Ichthyology)

Unit-1

- Collection of fish seed from natural resources and transportation of fish seed.
- Breeding in fish, Bundh breeding and Induced breeding.
- Types of ponds required for fresh water fish culture farms.

- Management of fish farm.
- Physiochemical factors of freshwater for fish farming.

Unit-2

- Composite fish culture
- Prawn culture and pearl industries in India.
- Fisheries resources of C.G.
- Riverine fishries.

Unit-3

- Coastal fishries in India
- Offshore and deep sea fishery's in India
- Role of fishries in rural development
- Sewage fed fishries

Unit-4

- Methods of fish preservation
- Marketing of fish in India.
- Economic importance and by product of fishes
- Fish disease.

Suggested Reading Materials:

Paper III A & IV A

- JR. Norman - The History of fishes.
- Nagaraja Rao - An introduction to fisheries.
- Lagler Ichthyology.
- Herclen Jones Fish migration.
- Marshal The life of fishes.
- Thomas - Diseases of fish.
- Greenwood - Inter relationship of fishes.
- Gopalji, Srivastava - Freshwater fishes of U.P. and Bihar.
- Brown -Physiology of fishes Vol. I & II.
- Hoar and Randall -Fish physiology of fishes Vol. 1 & IX.
- Gunther Sterba C.N.H.-Freshwater fishes of the world
- W. Lanham -The Fishes.
- G.V. Nikolsky -The ecology of Fishes,
- Borgstram -Fish as food Vol. I & II.
- Nilsson -Fish physiology -Recent Advances.
- P.B. Myle and J.J. Cech Fishes An Introduction to Ichthyology.
- Carl E. Bond -Biology of fishes.
- M. Jobling -Environmental Biology of fishes.
- Santosh Kumar & Manju Ternbhre -Fish and Fisheries.
- S.K. Gupta -Fish and Fisheries
- K.P. Vishwas -Fish and Fishries.

- Jhingaran -Fish and Fishries.

M.Sc Zoology Semester-IV (January - June, 2020)

Paper- IV B (Optional)

Cellular Organization and Molecular Organization.

Unit-1

- General organization and characterizes of viruses (Examples SV 40 and HIV).
- Yeast : Structure, reproduction and chromosome organization: Basic ideas of its applications as vectors for gene cloning.
- Molecular organization of respiratory chain assemblies, ATP / ADP Translocase and F₀F₁ ATPase.
- Cell cycle: Cell cycle control in mammalian cells and xenopus.
- Cytochemistry of Golgi complex and its role in cell secretion.

Unit-2

- Peroxisomes and targeting of peroxysomal proteins.
- Nucleolus: Structure and Biogenesis and functions of lysosomes.
- Intracellular digestion : Ultra structure and function of lysosomes.
- Synthesis and targeting of mitochondrial proteins.
- Secretory pathways and translocation of secretory proteins across the ER membrane.

Unit-3

- Genome complexity: C- value [paradox and cot value].
- DNA sequences of different complexity.
- Difference between normal cells and cancer cells.
- Biochemical changes.
- Cytoskeleton changes.
- Cell surface changes.
- Genetic basis of human cancer

Unit-4

- Chromosomal abnormalities in human cancer.
- General idea of oncogenes and proto oncogenes.
- Oncogenesis and cancer.
- Transforming Agents.
- Tumor Suppressor genes.

- Receptor – Ligand interaction and signal transduction.
- Cross – talk among various signaling pathways.

Suggested Reading Materials:

- DeRobertis and De Robertis Cell and Molecular Biology. Lea and Febiger.
- We Watson Hopking reberts steits, Weiner molecular biology of the gene, the Benjamin / Cummings Publishin Company Inc.
- Bruce alberts, Bray, Lewis, Raff, Roberts, Watson molecular Biology of the cell garland publishing inc.
- P.K. Gupta, Molecular Cell Biology Rastogi Publication.
- Watson Gilman Witkowski, Zoller Recomdinant D.N.A. scientific American Books.
- Gerald Karp. Cell Biology.
- Lewin B. Genes VII.
- King Cell Biology.
- Baniel L. HArtl Elizabeth W. Jones, Genetics Principles and analysis . Jones and Bartlett Publisher.
- Lodish, Berk Zipursky, Matsudaira Baltimore Dernel Molecular Cell Biology W.H.Freeman and company.
- J. Travers Immunology current Biology limited.
- Kubey Immunology W.H. Freeman and Company.
- Riott, Male snustad Principles of genetics john weley and sons Inc.

M.Sc Zoology Semester-IV (January - June, 2020)

Paper- IV C (Optional)

Applied Entomology

Unit-1

Classification according to imms

- Classification of apterygota upto families.
- Classification of following insect orders
(a) orthoptera (b) hemiptera (c) diptera.
- Classification of following insect order
(a) hymenoptera (b) lepidoptera (c) coleoptera
- Collection and preservation of insects.

Unit-2

- Insect pest-Management strategies and tools
- Biological control, Genetic control, Chemical control
- Pests of Cotton
- Pests of sugarcane

- Pests of paddy
- Pests of stored food grains
- Pests of citrus fruits and mango
- Pests of pulses
- House hold insect pests

Unit-3

- Insects in relation to forensic science
- Insects migration, population fluctuation and factors
 - Insects of medical and veterinary importance
- Ecological factors affecting the population and development of Insects

Unit-4

- Mulberry and non mulberry sericulture
- Apiculture
- Lac culture
- Insects as human food for future.

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Paper- IV D (Optional)

Environment & Biodiversity Conservation

Unit I

- Basic concept of Environmental Biology
- Scope and Environmental Science
- Biosphere and Biogeochemical cycles.
- Environmental monitoring and impact assessment.
- Environmental and sustainable development.
- Water conservation, rain water harvesting, water shed management.

Unit II

- Cause, effects and remedial measure of Air pollution, Water pollution.
- Noise. radioactive and thermal pollution.
- Agriculture pollution
- Basic concepts of Bioaccumulation.
- Solid waste management.

Unit III

Global warming and disaster management

- Cause of global warming
- Impact of global warming – acid rains and ozone depletion, green house effect.
- Control measures of global warming
 - Afforestation (b) reduction in the use of CFCS
 - Disaster management -floods, earthquake, Cyclones landslides.
- Environmental legislation.

Unit IV

Natural Resources:- Forest

-

- Use and over exploitation of forests.
- Timber extraction.

Land

- Land degradation. Landslides.
- Soil-ersion and desertification.

Water

- Use and over utilization of surface and ground

water

- Floods. Drought dams- benefits and problems

Mineral

- Use and exploitation ,
- Environmental effect of extracting and using mineral resources

Food

- World food problem
- Effects of modern agriculture and overgrazing

Energy

- Conventional and nonconventional energy resources.
- Using of alternate energy sources

- Role of an individual in conservation of natural resources

Equitable use of resources for sustainable life

- Biodiversity crisis – habitat degradation poaching of wild life.
- Socio economic and political causes of loss of biodiversity.
- In situ and exsitu conservation of biodiversity
- Value of biodiversity.

Suggested Reading Materials:

Paper III D & IV D

- Arora : Fundamentals of environmental biology
- Anathakrishnan : Bioresources ecology
- Bottain : Environmental studies

- Bouhey : Ecology of populations
- Clark : Elements of ecology
- Dowdoswell : An introduction to animal ecology
- Goldman : Limnology
- Kormondy : Concepts of ecology
- May : Model ecosystems
- Odum : Ecology
- Perkins : Ecology
- Simmons : Ecology of estuaries and costal water
- Pawlosuske : Physico-chemical methods for water
- South Woods : Ecological methods
- Trivedi and Goel : Chemical and biological methods for water pollution studies
- Willington : Fresh water biology
- Wetzel : Limnology
- Welch : Limnology Vols. I-II

M.Sc Zoology Semester-IV (January - June, 2020)

Paper- IV E (Optional)

Molecular Endocrinology and Reproductive Technology

UNIT-1

- Definition and scope of molecular endocrinology.
- Chemical nature of Hormones-
- Protein & polypeptides.
- Amino acid derivative
- Steroids
- Phospholipids derivative
- (tissue hormones)
- Purification and characterization of Hormones.

UNIT-2

- Receptors
- Membrane Receptor.
- Nuclear Receptor.
- Orphan Receptor

- G-Protein
- Nuclear Receptor

UNIT-3

- Hormone – Transduction
- G-Protein & Cyclic Nucleosides.
- Calcium calmoduline & phospholipids.
- Miscellaneous Second Messengers.
- Phosphorylation & other non transcriptional effect of Hormones.
- Genetic control of formation of Hormone.
- Transcription.
- Post transcription.
- Translation.
- Post translation
- Secretion of Hormone.

UNIT-4

- Multiple ovulation and embryo transfer Technology.
- Study of estrous cycle by vaginal smear technology
- Surgical technique-
- Castration
- Ovariectomy
- Vasectomy
- Tubectomy
- Laprotomy.

Suggested Reading Materials:

- Benjamin Lewin – Genes VII/ VIII, oxford University press.
- Lodish et al- Molecular Cell Biology.
- Zarrow, M.X., Yochin J.M. and Machrthy, J.L. – Experimental Endocrinology.
- Chatterji C.C.- Human Physiology (Vol- II).
- Bentley, P.J. – Comparative Vertebrate endocrinology.
- Hadley Mac. E.- Endocrinology.
- Chinoy, N.J. Rao, M.V., Desarai, K.J. and High land, H.N. – Essential techniques in reproductively physiology and Endocrinology.
- Norris, D.O. – Vertebrate Endocrinology.

M.Sc. ZOOLOGY – IV SEMESTER (January - June, 2020)

LAB COURSE-I (COMPULSARY)

PAPER- I BIOCHEMSTRY

1. Estimation of antioxidant enzymes.
2. Estimation of amylase.
3. Estimation of protein by Lowry method.
4. Estimation of Oil in seeds.
5. Estimation of Carbohydrate by anthrone reagent.
6. Other exercise related to theory paper.

PAPER- II NEUROPHYSIOLOGY

1. Study of slides of nervous system.
2. Neck nerve of squirrel.
3. Study of Brain through MODEL.
4. Study of Cranial nerve of Bird, Amphibian, Reptile and Mammals.
5. Other exercise related to theory paper.

EXAMINATION SCHEME

Based on paper I (Minimum 3 exercise 15+10+10)	35 marks
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Based on paper II (Minimum 3 exercise 15+10+10)	35 marks
Viva	10 marks
Sessional (Internal)	20 mark
Total	80+20 (100)

M.Sc. SEMESTER-IV (January - June, 2020)

LAB COURSE-II

OPTIONAL (SPECIAL PAPER) GROUP 1

PAPER-III(A) FISH (ICHTHYOLOGY) STRUCTURE AND FUNCTION

1. Anatomy of various organ systems and mounting of fish materials
2. Cranial nerves of teleost fishes: *Wallago*, *Mystus*, *Labeo* and other fishes
3. Osteology of fish: *Scoliodon*, carps, catfishes, murrels etc.
4. Accessory respiratory organs of air breathing fish
5. Study of histological (permanent) slides
6. Study of museum specimens of the concerned group
7. Other exercise related to theory paper.

PAPER –III(B) CELL BIOLOGY

1. Study of mitosis from onion root tip.
2. Study of meiosis in grasshopper testis.
3. Study of polytene chromosome in Dipteran Larvae.
4. Demonstration of Barr-Body in Human Cheeck cell.
5. Estimation of DNA.
6. Estimation of RNA.
7. Other exercise related to theory paper.

PAPER –III(C) ENTOMOLOGY

1. Anatomy of common grasshopper, cockroach, honey bee, wasp
2. Dissection and mounting of:
 - (i) Sting apparatus of honey bee and wasp.
 - (ii) Tympanal organs of grasshoppers.
 - (iii) Testes of cockroach
 - (iv) Aristae of house fly.

- (v) Different types of mouthparts of insects.
- (vi) Different types of wings and antennae of insects.
- (vii) Tentorium of grasshopper.
- 3. Identification and comment on insects of different orders and families.
- 4. Identification with the help of keys of common insects from different orders and families.
- 9. Other exercise related to theory paper.

PAPER-III(D) WILD LIFE CONSERVATION

1. Anatomy of:
 - (a) Toad / Frog.
 - (b) Lizard / Snake / Turtle.
 - (c) Pigeon / Parrot.
 - (d) Rat / Squirrel.
2. Ecological survey of National Parks and Sanctuaries.
3. Mounting : Permanent preparation of parts of internal organs.
4. Study of slides of different microscopic structure.
5. Identification of wild animal species as objects of museum and zoo and specimens of photographs.
6. Osteology of wild animals.
7. Ecological comments on wild species of different niche and habits. Candidates would be required to keep records of exercise in laboratory, field types, sanctuaries and parks of importance and collections.
8. Other exercise related to theory paper.

PAPER-III(E) BIOLOGY OF VERTEBRATE IMMUNE SYSTEM

1. Dissection of primary and secondary immune organs from mice:
 - a. Preparation of single cell suspension from bone marrow and spleen (spleenocytes) of mice.
 - b. Cell counting and viability testing of the spleenocytes prepared.
2. Preparation and study of phagocytosis by splenic/peritoneal macrophages.
3. Raising polyclonal antibody in mice, serum collection and estimating antibody titre in serum by following methods:
 - a. Ouchterlony (double diffusion) assay for Antigen -antibody specificity and titre.
 - b. ELISA
4. Antibody purification from the serum collected from immunized mice: affinity purification/chromatography.
5. Immunoelectrophoresis.
6. Demonstration of Western blotting:
 - a. Protein estimation by Lowry's method /Bradford's method
 - b. SDS-PAGE.
 - c. Immunoblot analysis.

7. Other exercise related to theory paper

OPTIONAL (SPECIAL PAPER) GROUP 2

PAPER –IV(A) PISCICULTURE AND ECONOMIC IMPORTANCE OF FISH (ICTHYOLOGY)

1. Systematic identification of freshwater fishes with particular reference to C.G.
2. Age determination with the help of scales / otolith
3. Pigmentary behaviour in fish
4. Qualitative zooplankton analysis
5. Nutrient analysis of water
6. Analysis of gut contents
7. Microtomy of fish materials
8. Other exercise related to theory paper

PAPER-IV(B) CELLULAR ORGANIZATION AND MOLECULAR ORGANIZATION

1. Histochemical demonstration of Mitochondria
2. Histochemical demonstration of Golgi complex
3. Histochemical demonstration of Lactate dehydrogenase
4. Histochemical demonstration of Succinate dehydrogenase
5. Isolation and characterization of Nuclei from liver
6. Isolation and characterization of Mitochondria
7. Isolation of DNA from any tissue
8. Separation of lipids using thin layer chromatography
9. Separation of various proteins using column chromatography
10. Study of metaphase chromosomes from rat bone marrow
11. G banding of metaphase chromosomes
12. C- banding of metaphase chromosomes
13. Estimation of Mitotic Index
14. Measurement of cell size using oculometer.
15. Other exercise related to theory paper

PAPER- IV(C) APPLIED ENTOMOLOGY

1. Insect collection and preservation for systematic studies
2. Identification of different insects upto orders
3. Identification of insects upto families of economically important insect orders
4. Identification of insects upto species: Mosquitoes, honeybees, stored grain beetles, aquatic insects, important crop and household pests
5. Analysis of honey and its quality control
6. Field studies of insects to understand their habit, habitat environmental impact, beneficial and harmful activities etc.
7. Study of beneficial insects, benefits derived from them and useful products
8. Study of destructive insects, damage caused by them and damaged products

9. Study of insecticidal formulations and insect control appliances
10. Experiments on insect control like LC-50 /LD-50, knock down and recovery effect, repellency/antifeedance tests, percentage damage tests for leaf eating insects, and stored grain pests
11. Other exercise related to theory paper

PAPER- IV(D) ENVIRONMENT AND BIODIVERSITY CONSERVATION

- (i) Environmental hazards, destruction of habitat and extrication of species causes and preventive measures.
 - (ii) Environmental planning of rural and urban development.
 - (iii) Management of soil resources.
 - (iv) UNESCO's role in ecology, earth summit, SARC, ED trust fund.
 - (v) Biodiversity, its significance and conservation measures.
 - (vi) Role of biodiversity in species development.
- VII. Other exercise related to theory paper

PAPER- IV(E) MOLECULAR ENDOCRINOLOGY AND REPRODUCTIVE TECHNOLOGY

1. Chromatography method (separation of Androgen & Progesterone).
2. Bioassay of α -Ketosteroids.
3. Bioassay of Gnadotropins.
4. Study of slide related to endocrine glands.
5. Estimation of cholesterol.
6. Estimation of catecholamines.
7. Dissection of endocrine glands.
8. Other exercise related to theory paper.

EXAMINATION SCHEME

Based on paper III (Minimum 3 exercise 15+10+10)	35 marks
Based on paper IV (Minimum 3 exercise 15+10+10)	35 marks
Viva	10 marks
Sessional (Internal)	20 mark
Total	80+20 (100)

पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छत्तीसगढ़)

एम.कॉम. सेमेस्टर परीक्षा

पाठ्यक्रम (सत्र 2016-17 से लागू)

M.Com. Ist Semester

प्रश्न पत्र	प्रश्न पत्र का नाम	पूर्णांक	पेपर कोड
प्रश्नपत्र I Paper I	प्रबंधकीय अर्थशास्त्र Managerial Economics	80 + 20	101
प्रश्नपत्र II Paper II	वृहत (उच्चतर) लेखांकन Advanced Accounting	80 + 20	102
प्रश्नपत्र III Paper III	आयकर विधान एवं लेखे (Income Tax Law and Accounts)	80 + 20	103
प्रश्नपत्र IV Paper IV	सांख्यिकीय विश्लेषण Statistical Analysis	80 + 20	104
प्रश्नपत्र V Paper V	निगमित विधि संरचना Corporate Legal Framework	80 + 20	105

M.Com. IInd Semester

प्रश्न पत्र	प्रश्न पत्र का नाम	पूर्णांक	पेपर कोड
प्रश्नपत्र VI Paper VI	व्यवसायिक अर्थशास्त्र Business Economics	80+20	201
प्रश्नपत्र VII Paper VII	विशिष्टकृत लेखांकन Specialized Accounting	80+20	202
प्रश्नपत्र VIII Paper VIII	कर नियोजन एवं प्रबन्ध (Tax Planning and Management)	80+20	203
प्रश्नपत्र IX Paper IX	उच्चतर सांख्यिकी Advanced Statistics	80 + 20	204
प्रश्नपत्र X Paper X	व्यावसायिक सन्नियम Business Laws	80 + 20	205

M.Com. Ist Semester (2013-14)

PAPER-I
MANAGERIAL ECONOMICS

M.M. 80+20

OBJECTIVE:

This course develops managerial, perspective to economic fundamentals as aids to decision making under given environmental constraints.

COURSE INPUTS:

- UNIT-1 Nature and Scope of Managerial, Economics: Objective of a firm; Economics theory and managerial theory; Managerial economist's role and responsibilities.
- UNIT-2 Fundamental economic concepts-incremental principle, opportunity cost principle, discounting principle. equi-marginal principle.
- UNIT-3 Demand Analysis: Individual and Market demand functions Law of demand; determinants of demand; Elasticity of demand-its meaning and importance, Price elasticity; income elasticity and cross elasticity; Using elasticity 'in managerial decisions.
- UNIT-4 Theory of consumer Choice: Cardinal utility approach, indifference approach, revealed preference and theory of consumer choice under risk; Demand estimation for major consumer durable and non-durable products; Demand forecasting tech. technique.
- UNIT-5 Production Theory: Production function-production with one and two variable inputs, Stages of production; Economics of scale; Estimation of production function.

PAPER - II
ADVANCED ACCOUNTING

M.M. 80+20

OBJECTIVE:

The objective of this course is to expose students to accounting issues and practices such as maintenance of company accounts and handling' accounting adjustments.

COURSE INPTS:

- UNIT-1 Accounting for issue, Forfeited and redemption of shares and debentures.
- UNIT-2 Final accounts and financial statements of companies.
- UNIT-3 Accounting issues relative to amalgamation and reconstruction of companies.
- UNIT-4 Accounting for holding and subsidiary companies.
- UNIT-5 Accounts relating to Liquidation of companies.

REFERENCES.

Beams, F.A. : Advanced Accounting, Prentice Hall, ,New Jersey., Dearden, J. and S.K. Bhattacharya: Accounting for Management, Vikas Publishing House, New Delhi.

Engler, C.L.A Bernstein. and K.R. Lambert: Advanced Accounting, with Chicago. Fischer, P.M.,W.J. Taylor and J.A. Leer: Advanced Accounting, South-Western, Ohio. Gupta. R.L.: Advanced Financial Accounting, S.Chand & Co., New Delhi.

Keiso D.E. and J.J. Weygand: Intermediate Accounting, John Wiley and Sons, NY.

Maheshwari, S.N.: Advanced Accountancy- Vol.II Vikash Publishing House, New Delhi

Monga, J.R. : Advanced Financial Accounting, Mayoor Paperbacks, Noida Narayanaswamy, R: Financial Accounting: A Managerial Perspective, Prentice Hall of India, Delhi.

Neigs, R.F. : Financial Accounting. Tata McGraw Hill, New Delhi.

Shukla, M.G. 'and T.S.Grewal : Advanced Accou'ntancy, Sultan Chand & Co. New Delhi.

Warren, C.S. and P.E. Fess: Principles of Financial and Managerial Accounting, South Western, Ohio.

RECOMMENDED BOOKS: .

- 1 Plekles and Duakerley : Accountancy
- 2 Wilson: Company Accounts

- 3 Diskson: Accountancy
- 4 J.R. Batlboi : Advanced Accounting
- 5 R.R.Gupta: Advanced Accounting
- 6 S.M. Shukla : Advanced Accounting
- 7 Shukla and Grewal: Advanced Accounting
- 8 H Chakravarty : Advanced Accounts
- 9 Dr.Shukla Avam Agrawal: Advanced Accountancy
- 10 Dr.S.S. Gupta: Advanced Accounts
- 11 Dr.Karim,Dr.Khanuja & Pro.Mehata : Advanced Accounting
- 12 डॉ. करीम, डॉ. खनूजा एवं प्रो.मेहता : वृहत लेखाकर्म
- 13 जे. के. अग्रवाल तथा आर.के.अग्रवाल : उच्च वित्तीय एवं कम्पनी लेखांकन
- 14 आर.के.गुप्ता : उन्नत लेखांकन
- 15 Basu Das : Advanced Accounting

M. Com - 1st Semester

आयकर विधान एवं लेखे (प्रश्नपत्र – III)

Income Tax Law and Accounts (Paper - Third)

M.M. : 80

OBJECTIVE

The objective of this course is to help student understand and conceptual framework of Income tax.

Unit - I	Law relating to Income tax : Brief study of the main provisions of the Indian Income Tax Act. Important definitions. Income exempted from tax, Residence and Tax liability.
Unit - II	Calculation of taxable income under the head : Salary and House property.
Unit - III	Depreciation and Development allowance, Calculation of taxable Income under the head : Business and Profession, capital gains, income from other sources.
Unit - IV	Set off and carry forward of losses, Deduction from gross total Income Calculation of taxable Income and tax of an individual, and Hindu undivided Families.

Unit - V	Appeals & Revisions Reference of High Court and Supreme court, offences & penalties, Income tax authorities.
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M. Com – 1st Semester

(Compulsory) Paper - IV (Paper Code.....)

STATISTICAL ANALYSIS

M.M.: 80

OBJECTIVE

The Objective of this course is to help student learn the application of statistical tools and techniques for decision making.

- UNIT-1 Statistics - Definitions, Characteristics, Scope and Nature, Functions, limitations, Distrust and misuse importance & Statistical Investigations., Classification & Tabulation,
- UNIT-2 Data Sources: Primary and Secondary, Primary data collection techniques, Schedule, Questionnaire and interview & Sources' of Secondary data.
- UNIT-3 Dispersion, Co-efficient of variance and skewness, correlation - Karl- Pearsons and spearman's ranking method and Regression analysis, Two variables case.
- UNIT-4 Probability Theory: Probability classical, relative and subjective probability, Addition and multiplication probability models - Conditional probability and Baye's Theorem.
- UNIT-5 Probability Distributions - Bionomial, poisson and Normal Distributions, Their characteristics and applications.

M. Com - 1st Semester

UNDER MANAGEMENT BOARD

(Compulsory) Paper - V (Paper Code_____)

OBJECTIVE

CORPORATE LEGAL FRAMEWORK

M.M.: 80

The Objective of this course is provide knowledge of relevant provisions of various laws influencing business operations.

- UNIT-1 The Companies Act, 1956 (Relevant Provisions) : Definition, types of companies

Memorandum of association; Articles of. association; Prospectus; Share capital and membership.
- UNIT-2 Meetings and resolutions - Company management; Managerial remuneration; Winding up and dissolution of companies.
- UNIT-3 The Negotiable Instruments Act, 1881 - Definition, types of negotiable instruments; Negotiation; Holder and holder in due course; payment in due course;
- UNIT-4 Endorsement and crossing of cheque; Presentation of negotiable instruments.
- UNIT-5 Legal Environment for Security Markets: SEBI Act. 1992-organisation and objectives of SEBI

M.Com. IInd Semester

PAPER - VI
BUSINESS ECONOMICS

M.M. 80+20

OBJECTIVE -

This course develops managerial perspective to economic fundamentals' as aids to decision making under given environmental constraints.

- UNIT-1 Cost Theory and Estimation, economic value analysis, Short and long run cost functions- their nature, shape and inter-relationship; Law of variable proportions;-Law of returns to scale.
- UNIT-2 Price Determination under Different Market Conditions: Characteristics of different market structures; Price determination and firm's equilibrium in short-run and long-run under perfect competition, monopolistic competition, oligopoly and monopoly,
- UNIT-3 Pricing Practices: Methods of price determination in practice, pricing of multiple products; price discrimination; International price discrimination and dumping; Transfer pricing.
- UNIT-4 Business Cycles: Nature and phases of the business cycle; Theories of business cycles- psychological, profit, monetary, innovation, cobweb, Samuelson and Hicks theories.
- UNIT-5 Inflation: Definition, Characteristics and types; Inflation in terms of demand- pull and cost-push factors; Effects of inflation.

PAPER - VII
SPECIALISED ACCOUNTING

M.M. 80+20

OBJECTIVE.

The objective of this course -is to expose students to accounting issues and practices such as maintenance of company accounts and handling accounting adjustments.

- UNIT-1 Accounts of General Insurance Companies.
- UNIT-2 Accounts of Banking Companies.
- UNIT-3 Accounts of Public Utility concerns: Double Accounts System.
- UNIT-4 Royalty accounts.
- UNIT-5 Investment accounts.

M. Com – 2nd Semester

कर नियोजन एवं प्रबन्ध (प्रश्नपत्र – VIII)

TAX PLANNING AND MANAGEMENT (Paper – VIII)

M.M. : 80

OBJECTIVE –

This course aims at making students conversant with the concept of corporate tax planning and Indian tax laws, as also their implications for corporate management.

Unit – I	Calculation of taxable Income and tax of Firm and Companies.
Unit – II	Return of Income, Provisional Regular, Expert and emergency assessment, Re opening of assessment.
Unit – III	Concept of tax Planning ; Tax avoidance and tax evasions ; Tax planning with reference of location, nature and form of organization of new
Unit – IV	Tax planning to capital structure, decision dividend policy ; Inter corporate dividends and bonus shares.
Unit – V	Preparation of income tax returns, Computation of Income tax, Tax deduction at source; Advance payment of tax.

(Compulsory) Paper - IX (Paper Code _____)
ADVANCE STATISTICS

M.M. : 80

OBJECTIVE

The Objective of this course is to help student learn the application of statistical tools and techniques for decision making.

- UNIT-1 Statistical Decision Theory: Decision environment, Expected profit under uncertainty and assigning probabilities and utility theory.
- UNIT-2 Statistical Estimations. and Testory: Point and interval estimation of population mean, proportion and variance Statistical Testing - Hypothesis and Errors, Sample size - Large and Small Samplingtest Z tests, T Tests & F Tests.
- UNIT-3 Association of Attributes : Two Attributes, consistency of data, measurement of Association of Attributes - Percentage method, Co-efficient of Association, Comparison of Actual and (you Ie method) Expected frequency's & Issusery Association. .
- UNIT-4 Statistical Quality Control: Causes of Variations in quality characteristics, Quality Control charts-purpose and logic, Process under control and out of control, warning limits, control charts for attributes-fraction defectives and number of defects, Acceptance sampling.
- UNIT-5 Interpolation and Extrapolation - Prabolic Bionomial, Newton and long rages method.

(Compulsory) Paper - X (Paper Code)
Business Laws

M.M. 80

OBJECTIVE

The Objective of this course is provide knowledge of relevant provisions of various laws influencing business operations.

- UNIT-1 SEBI Act-1992: Organisation and objectives of SEBI, Functions and Role of SEBI Rights and Power of SEBI.
- UNIT-2 MRTIP Act 1969: Monopolistic Trade Practice Meaning, essentials, Restrictive Trade Practices - Meaning, Unfair trade practice, MRTIP commission offences and Penalties.
- UNIT-3 Consumer Protection Act 1986: Needs of Act, Rights of consumers, Objectives of Act., Grievance redressal Machinery, District Forum, State Commission, National Commission.
- UNIT-4 FEMA Act 1999: Objectives; Regulation and Management of FEMA, Penalties Appeal.
- UNIT-5 W.T.O.: Brief History of WTO, Objectives and Functions, Organisation, W.T.O. and India, Regional groupings, anti-dumping duties and other NIBs, Doha declaration, Dispute settlement system, TRIP, TRIMS and GATS.

M. Com. IIIrd Semester (Compulsory Papers)

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper - I प्रश्नपत्र — I	प्रबंध की अवधारणा (Management Concept)	80+20	301
Paper - II प्रश्नपत्र — II	संगठनात्मक व्यवहार (Organisational Behaviour)	80+20	302
Paper - III प्रश्नपत्र — III	उच्चतर लागत लेखांकन (Advance Cost Accounting)	80+20	303
Paper - IV प्रश्नपत्र & IV	प्रबंधकीय लेखांकन (Management Accounting)	80+20	304
Paper - V प्रश्नपत्र — V	प्रबंधकीय निर्णय के लिए लेखांकन (Accounting for managerial decision)	80+20	305

M. Com. IVth Semester

Special attention to the Students. Students are required to select any one Specialization out of four suggested below.

Optional - Specialization

Optional Group - (A) Marketing

Optional Group - (B) Management

Optional Group - (C) Banking and Insurance

Optional Group - (D) Taxation and
Accounting

Optional Group - (A) विपणन (Marketing)

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper – A I प्रश्नपत्र – A I	विपणन के सिद्धान्त (Principle of Marketing)	80+20	401
Paper – A II प्रश्नपत्र – A II	विज्ञापन एवं विक्रय प्रबन्ध (Advertising & Sales Management)	80+20	402
Paper – A III प्रश्नपत्र – A III	विपणन अनुसन्धान (Marketing Research)	80+20	403
Paper – A IV प्रश्नपत्र – A IV	अन्तर्राष्ट्रीय विपणन (International Marketing)	80+20	404

Optional Group – (B) प्रबन्ध (Management)

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper – B I प्रश्नपत्र – B I	वित्तीय प्रबन्ध (Financial Management)	80+20	411
Paper – B II प्रश्नपत्र – B II	कार्मिक प्रबन्ध (Personnel Management)	80+20	412
Paper – B III प्रश्नपत्र – B III	उत्पादन प्रबन्ध (Production Management)	80+20	413
Paper – B IV प्रश्नपत्र – B IV	व्यूहरचना प्रबन्ध (Strategic Management)	80+20	414

Optional Group – (C) बैंकिंग एवं बीमा (Banking and Insurance)

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper – C I प्रश्नपत्र – C I	बैंकिंग व्यवहार (Banking Practices)	80+20	421
Paper – C II प्रश्नपत्र – C II	भारत में बैंकिंग संस्थाएँ (Banking Institution in India)	80+20	422
Paper – C III प्रश्नपत्र – C III	जीवन बीमा (Life Insurance)	80+20	423
Paper – C IV प्रश्नपत्र – C IV	सामान्य बीमा (General Insurance)	80+20	425

Optional Group – (D) करारोपण एवं लेखांकन (Taxation and Accounting)

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper – D I प्रश्नपत्र – D I	भारत में प्रत्यक्ष कर (Direct Tax in India)	80+20	431
Paper – D II प्रश्नपत्र – D II	अप्रत्यक्ष कर (Indirect Tax)	80+20	432
Paper – D III प्रश्नपत्र – D III	सेवा के क्षेत्र में लेखांकन (Accounting in Service Sector)	80+20	433
Paper – D IV प्रश्नपत्र – D IV	लेखांकन पद्धतियाँ (Accounting Methods)	80+20	434

महत्वपूर्ण नोट :

1. सत्र 2014–15 से एम. कॉम. प्रथम, द्वितीय एवं तृतीय सेमेस्टर में सभी प्रश्न-पत्र अनिवार्य होंगे। उक्त परीक्षा में वैकल्पिक प्रश्न-पत्र चयन की व्यवस्था नहीं होगी।
2. एम. कॉम. चतुर्थ सेमेस्टर में विशिष्टीकरण समूह (A), (B), (C) या (D) में से किसी भी एक वैकल्पिक समूह का चयन कर उस समूह के सभी चार प्रश्न-पत्र अनिवार्य रूप से लेने होंगे।
3. एम. कॉम. चतुर्थ सेमेस्टर में उपरोक्त विशिष्टीकरण समूह के अतिरिक्त 50 अंक की मौखिक परीक्षा तथा 50 अंक का परियोजना प्रतिवेदन (अधिकतम 50 पृष्ठों का) तैयार करना अनिवार्य होगा। यह प्रतिवेदन वाणिज्य या प्रबन्ध विषय से सम्बन्धित होगा।
4. सभी प्रश्न-पत्रों में लिखित परीक्षा 80 अंकों की तथा 20 अंकों की आन्तरिक मूल्यांकन परीक्षा होगी। आन्तरिक मूल्यांकन के अंक परीक्षार्थियों की उपस्थिति, सेमीनार, शोध एवं शैक्षणिक कार्य में भागिता, इकाईवार मूल्यांकन परीक्षा आदि के आधार पर प्रदान किये जायेंगे।
- 5- आन्तरिक परीक्षा एवं बाह्य परीक्षा में प्रश्नपत्रवार न्यूनतम उत्तीर्णांक 20% होगा। जो अध्यादेश क्रमांक 170 के प्रावधानों के अनुसार बंधनकारी होगा।

M.Com. Third Semester (Compulsory Paper)

एम. कॉम. तृतीय सेमेस्टर – अनिवार्य प्रश्नपत्र

प्रबन्ध की अवधारणा (प्रश्नपत्र प्रथम)

MANAGEMENT CONCEPT (Paper – First)

M.M. : 80

OBJECTIVE -

The Objective of this course is to help student understand and conceptual framework of management and organizational behaviour .

Unit – I	Schools of Management Thought : Scientific, process, human behaviour and social system school; Decision theory school; Quantitative and system school; Contingency theory of management; Functions of a manager.
Unit – II	Managerial Functions : Planning - concept, significance, types; Organizing - concept, principles of authority, theories, types of organizations, authority, responsibility, power, delegation, decentralization;
Unit – III	Staffing; Directing; Coordinating; Control - nature, process, and techniques.
Unit – IV	Motivation : Process of motivation; Theories of motivation - need hierarchy theory, theory X and theory Y, two factor theory, Alderfer's ERG theory, McClelland's learned need theory, Victor Vroom's expectancy theory, Stacy Adams equity theory.
Unit – V	Group Dynamics and Team Development : Group dynamics - Definition and importance, types of groups, group formation, group development, group composition, group performance factors; Principle-centered approach to team development.

संगठनात्मक व्यवहार (प्रश्नपत्र द्वितीय)

ORGANIZATIONAL BEHAVIOUR (Paper – Second)

M.M. : 80

OBJECTIVE -

The Objective of this course is to help student understand and conceptual framework of management and organizational behavior.

Unit – I	Organizational Behaviour : concept and significance ; Relationship between management and organizational behaviour; Emergence and ethical perspective; Attitudes; Perception; Learning; Personality; Transactional analysis.
Unit – II	Leadership : Concept; Leadership styles; Theories - trait theory, behavioural theory, Fielder's contingency theory; Harsey and Blanchard's situational theory; Managerial grid; Likert's four systems of leadership.
Unit – III	Organizational Conflict : Dynamics and management; Sources, patterns, levels, and types of conflict; Traditional and modern approaches to conflict; Functional and difunctional organizational conflicts; Resolution of conflict.
Unit – IV	Interpersonal and Organizational Communication : Concept of two-way communication; Communication process; Barriers to effective communication; Types of organizational communication ; Improving communication; Transactional analysis in communication.
Unit – V	Organizational Development : Concept; Need for change, resistance to change; Theories of planned change; Organizational diagnosis; Organizational Development intervention.

OBJECTIVE -

This course exposes the students to the basic concepts and the tools used in cost accounting.

Unit – I	Introduction – Cost Analysis, concepts and classification, Materials control – Techniques of Materials control.
Unit – II	Labour cost – Computation and control, Overheads – Accounting and Control.
Unit – III	Job, Batch, Contract Costing and operating costing.
Unit – IV	Process Costing, Joint products & By – products costing. Uniform costing and Estimate costing.
Unit – V	Budgetary control – Importance of budgets in accounting. Nature of budgetary control, Organization for budgetary control preparation zero base budgeting, performance budgeting. Cash Budget, Production and sales Budget.

Paper – IV

प्रबंधकीय लेखांकन (Management Accountin)

OBJECTIVE

The objective of this course is to acquaint student with the accounting concepts, tools and techniques for managerial decisions.

COURSE INPUTS-

- UNIT-1 Introduction of Accounting: Management accounting as a area accounting; Objectives, nature and scope of management accounting, techniques of management accounting, difference between financial accounting, cost accounting and management accounting, Management accounting and managerial decisions; Management accountant's position, role and responsibilities.
- UNIT-2 Accounting Plan and Responsibility Centers: Meaning and significance of responsibility accounting; Responsibility centers-cost centre, profit centre and investment centre, Problems in transfer pricing, Objectives and determinates of responsibility centers.
- UNIT-3 Budgeting.: Definition of Budget; Essentials of budgeting; Types of budgets functional, master etc. .Fixed and' flexible budget
- UNIT-4 Standard Costing and Variance Analysis:, Standard costing as a control technique; Setting of standards and their revision; Variance analysis-meaning and importance; ; Kinds of variances and their uses-material, labour and overhead variances; Disposal: of variances; Relevance of variance analysis to budgeting and standard costing.
- UNIT-5 Marginal Costing: Concept of marginal cost; Marginal costing and absorption, costing,

Marginal costing versus direct, costing;

REFERENCE

Anthony, Robert: Management Accounting, Tarapore-wala, Mumbai. Barfield, Jessie, Ceily A. Raiborn and Michael R. Kenney: Cost Accounting: Traditions and Innovations, South-Western College Publishing, Cincinnati, Ohio. Decoster, Don T. and Elden L. Schafe : Management Accounting: A Decision Emphasis, John Wiley and Sons Inc., New York. Garrison, Ray H. and Eric W. Noreen: Management Accounting, Richard D. Irwin, Chicago. Hansen, Don R. and Maryanne M. Moreen: Management Accounting, South-Western College Publishing, Cincinnati, Ohio. Horngren, C.T., Gary L. Sundem and William O. Stratton: Introduction to Management Accounting, Prentice Hall, Delhi.

Horngren, Charles T., George Foster and Srikant M. Dalor : Cost Accounting: A Managerial Emphasis, Prentice Hall, Delhi.
Lall, B.M. and I.C. Jain : Cost Accounting: Principles and Practice, Prentice Hall, Delhi.
Pandey, I.M. : Management Accounting, Vani Publication, Delhi.
Welsch Glenn A., Ronald W. Hilton and Paul N. Gordon: Budgeting, Profit Planning and Control, Prentice Hall, Delhi

BOOKS RECOMMENDED:

1. Anthony Robert N. : Management Accounting
2. Gillet: Management and the account
3. Wills more : Business, Business Budget and Budgetary Control
4. Rose U. Fahri : Higher Management Control
5. Guthmann H.G. : Analysis of financial Statement
6. Smith and Ashburn: Financial and Administrative Accountancy
7. Pinkless and Duakaraley : Accountancy
8. Manmohan A: Goyal: Management Accounting
9. जे.के.अग्रवाल, आर.के.अग्रवाल : प्रबंधकीय लेखांकन
10. ए.पी.गुप्ता : प्रबंधकीय लेखांकन
11. एस.एन.माहेश्वरी : प्रबंध लेखांकन
12. के.जी.गुप्ता : प्रबंधकीय लेखांकन
13. एम.आर.अग्रवाल : प्रबंधकीय लेखांकन
14. पी.मिश्रा : प्रबंध लेखांकन
15. डॉ.बी.पी.अग्रवाल, डॉ.मेहता : प्रबंधकीय लेखाविधि

M. Com – 3rd Semester

Paper – V

प्रबंधकीय निर्णय के लिए लेखांकन (Accounting for managerial decisions)

OBJECTIVE

The objective of this course is to acquaint student with the accounting concepts, tools and techniques for managerial decisions.

COURSE INPUTS-

UNIT-1 Break-even-analysis; Assumptions and practical applications of break- even-analysis; cost volume profit analysis, Decisions regarding sales-mix, make or buy decisions and

discontinuation of a product line etc.

UNIT-2 Analyzing financial Statements: Method, objects and ratio analysis.

UNIT-3 Cash flow analysis and Fund flow analysis.

UNIT-4 Contemporary Issues in Management Accounting: Value chain analysis; Activity bases costing, Quality costing, Target and life cycle costing.

UNIT-5 Reporting to Management : Objectives of reporting, reporting needs at different managerial levels; Types of reports, modes of reporting; reporting at different levels of management.

REFERENCE: .

Anthony, Robert: Management Accounting, Tarapore-wala, Mumbai. Barfield, Jessie,. Ceily A. Raiborn and Michael R. Kenney: Cost Accounting: Traditions and Innovations, South-Western College Publishing, Cincinnati, Ohio. Decoster, Don T. and Elden L. Schafe : Management Accounting: A Decision Emphasis, John Wiley and Sons Inc., New York. Garrison, Ray H. and Eric W. Noreen: Management Accounting, Richard D. Irwin, Chicago. Hansen, Don R. and Maryanne M. Moreen: Management Accounting, South-Western College Publishing, Cincinnati, Ohio.

Horngren, C.T., Gary L. Sundem and William O. Stratton: Introduction to Management Accounting; Prentice Hall, Delhi.

Horngren, Charles T., George Foster and Srikant M. Dalor : Cost Accounting: A Managerial Emphasis, Prentice Hall, Delhi. Lall, B.M. and I.C.Jain : Cost Accounting: Principles and Practice, Prentice Hall, Delhi. Pandey I.M. : 'Management Accounting, Vani Publication, Delhi.

Welsch Glenn A., Ronald W. Hilton and Paul N. Gordon: Budgeting, Profit Planning and Control, Prentice Hall, Delhi:

BOOKS RECOMMENDED:

16. Anthony Robert N. : Management Accounting
17. Gillet: Management and the account
18. Willsmore: Business, Business Budget and Budgetary Control
19. Rose U. Fahri : Higher Management Control
20. Guthmann H.G. : Analysis of financial Statement
21. Smith and Ashburn: Financial and Administrative Accountancy
22. Pinkless and Duakaraley : Accountancy.
23. Manmohan A. Goyal: Management Accounting
24. जे.के.अग्रवाल, आर.के.अग्रवाल : प्रबंधकीय लेखांकन
25. ए.पी.गुप्ता : प्रबंधकीय लेखांकन
26. एस.एन.माहेश्वरी : प्रबंध लेखांकन
27. के.जी.गुप्ता : प्रबंधकीय लेखांकन
28. एम.आर.अग्रवाल : प्रबंधकीय लेखांकन
29. पी.मिश्रा : प्रबंध लेखांकन
30. डॉ.बी.पी.अग्रवाल : डॉ.मेहता : प्रबंधकीय लेखाविधि

एम.कॉम. चतुर्थ सेमेस्टर – (M.Com. Fourth Semester)

विशिष्टीकरण : (A) विपणन

Specialization : (A) Marketing

(1) विपणन के सिद्धान्त (प्रश्नपत्र – : A-प्रथम)

PRINCIPLE OF MARKETING (Paper – : A-First)

M.M. : 80

OBJECTIVE –

The Objective of this course is to facilitate understanding of the conceptual framework of marketing and its applications in decision making under various environmental constraints.

Unit – I	Introduction – Meaning, nature, scope and importance of marketing; Marketing concept and its evolution; Marketing mix; Strategic marketing planning – an overview.
Unit – II	Market Analysis and Selection – Marketing environment – macro and micro components and their impact of marketing decisions ; Market segmentation and positioning ; Buyer behaviour ; Consumer versus organizational buyers ; Consumer decision – making process.
Unit – III	Product Decisions – Concept of a product ; Classification of products ; Major product decisions ; Product line and product mix ; Branding ; Packaging and labeling ; Product lifecycle – strategic implications ; New product development and consumer adoption process.
Unit – IV	Pricing Decisions – Factors affecting price determination ; Pricing policies and strategies ; Discounts and rebates.
Unit – V	Distribution Channels and Physical Distribution Decisions – Nature, functions, and types of distribution channels ; Distribution channel intermediaries ; Channel management decisions ; Retailing and wholesaling. Physical Distribution Management.

(1) विज्ञापन एवं विक्रय प्रबन्ध – (प्रश्नपत्र : A – द्वितीय)

ADVERTISING & SALES MANAGEMENT (Paper : A – Second)

M.M. : 80

Unit – I	Introduction : Concept, Scope, Objectives and Functions of Advertising. Role of Advertising in marketing mix and the advertising process. Legal, ethical and social aspect of advertising.
Unit – II	Pre-launch Advertising Decision : Determination of target audience, Advertising Media and their choice. Advertising messages, Layout of advertisement and Advertising Appeal, Advertising Copy.
Unit – III	Promotional Management : Advertising Department, Role of Advertising Agencies and their Selection, Advertising Budget, Evaluation of Advertising Effectiveness.
Unit – IV	Personal Selling : Meaning and Importance of Personal Selling, - Difference between Personal Selling, Advertising and Sales Promotion. Methods and Procedure of Personal Selling.
Unit – V	Sales Management : Concept of Sales Management, Objectives and Functions of Sales Managements. Sales Organization, Management of Sales force and Sales force objectives, Sales force Recruitment :- Selection, Training, Compensation and Evaluation.

(3) विपणन अनुसंधान (प्रश्नपत्र : A – तृतीय)

MARKETING RESEARCH (Paper : A – Third)

M.M. : 80

Unit – I	Marketing Research : An Introduction ; Marketing Decisions ; Marketing Research and Information System.
Unit – II	Marketing Research Methodology, Research Design.
Unit – III	Organization of Marketing Research. Specialised areas of application of marketing research.
Unit – IV	Specialised Techniques of Marketing Research. Motivation Research.
Unit – V	Advertising Research : Planning and Procedure, New Product Research.

(4) अन्तर्राष्ट्रीय विपणन (प्रश्नपत्र : A – चतुर्थ)

INTERNATIONAL MARKETING (Paper : A – Fourth)

M.M. : 80

Unit – I	International Marketing ; Meaning ; Scope, benefits and difficulties of International Marketing : International marketing and Domestic Marketing, reasons for entering International marketing. International marketing environment ; Identifying and selecting foreign market.
Unit – II	Foreign market entry mode : Product designing, standardisation Vs. Adaptation ; Branding, Packaging and Labelling.
Unit – III	Quality issues and after sales service ; International pricing ; International price quotation ; payment terms and methods of payment.
Unit – IV	Promotion of products and services abroad : International channels of distribution ; Selection and appointment of foreign sales agents. Logistic decision.
Unit – V	Export policy and practices in India, Trends in India's foreign trade, steps in starting export business ; Export finance, documentation and procedure.

विशिष्टीकरण : (B) प्रबन्ध

Specialization : (B) Management

(1) वित्तीय प्रबन्ध (प्रश्नपत्र – : B प्रथम)

FINANCIAL MANAGEMENT (Paper : B - First)

M.M. : 80

OBJECTIVE

The objective of this course is to help students of understand the conceptual framework of financial management, and its applications under various environmental constraints.

COURSE INPUTS

Unit – I	Financial Management : Meaning, nature and scope of finance; Finance functions - investment, financing and dividend decisions. Capital Budgeting : Nature of investment decisions; Investment evaluation criteria - net present value, internal rate of return, profitability index, payback period, accounting rate of return; NPV and IRR comparison; Capital rationing; Risk analysis in capital budgeting.
Unit – II	Cost of Capital : Meaning and significance of cost of capital; Calculation of cost of debt, preference capital, equity capital and retained earnings; Combined cost of capital (weighted); Cost of equity and CAPM.
Unit – III	Operating and Financial Leverage : Measurement of leverages; Effects of operating and financial leverage on profit; Analysing alternate financial plans; Combined financial and operating leverage. Capital structure Theories : Traditional and M.M. hypotheses - without taxes and with taxes; Determining capital structure in practice.
Unit – IV	Dividend Policies : Issues in dividend decisions, Walter's model, Gordon's model, M-M hypothesis, dividend and uncertainty, relevance of dividend; Dividend policy in practice; Forms of dividends; Stability in dividend policy; Corporate dividend behaviour.
Unit – V	Management of Working Capital : Meaning, significance and types of working capital; Calculating operating cycle period and estimation of working capital requirements; Financing of working capital and norms of bank finance; Sources of working capital; Factoring services; Various committee reports on bank finance; Dimensions of working capital management. Management of cash, and inventory.

(2) सेविवर्गीय प्रबन्ध (प्रश्नपत्र : B – द्वितीय)

PERSONNEL MANAGEMENT (Paper : B – Second)

M.M. : 80

Unit – I	Concept, Definition, Importance & Objectives of Personnel Management, Historical Development of Personnel Management, Nature, scope planning, Philosophy and Principles of personnel Management and its relation with behavioural sciences.
Unit – II	Personnel policies, programmes & procedures. Personnel Department; Personnel Functions, Position of personnel Department & Organization of Personnel Management.
Unit – III	Man power planning Recruitment and Selection, Training & Development of Employees & Executives. Promotion, Demotion, Transfers, Absentecism & Turnover.
Unit – IV	Performance Appraisal and Merit Rating, Discipline. Jobevaluation Wage & Salary Administration, plans of Remuneration & Financial Rewards/Incentive payments.
Unit – V	Employees Fringe Benefits & Services - Safety, Health & Security programme and welfare. Motivation and Moral.

(3) उत्पादन प्रबन्ध (प्रश्नपत्र : B – तृतीय)

PRODUCTION MANAGEMNT (Paper : B – Third)

M.M. : 80

Unit – I	Fundamentals of production management, Nature, Scope, Functions ; Problems, Production and Productivity organizing for production. Types of manufacturing systems.
Unit – II	Production planning, Objectives, Factors affecting Production Planning. Planning future activities, forecasting. Qualitative & Quantative forecasting Methods, longrange forecasts, project planning method (P.E.R.T. and C.P.M.) Process planning System. Techniques of process planning : Assembly charts, process charts make or buy analysis.
Unit – III	Process design, Factors affecting design Relation with types of manufacturing plant location and layout : Factors affecting location. Types of plans layout, evaluation of alternative layout.
Unit – IV	Work measurement and work standards Uses of work measurement date, procedure for work measurement. Direct work measurement. Time study, activity sampling, Indirect work measurement : Syntetic timing, Predetermined motion time system, analytical estimating. Methods analysis : Areas of application, Approaches to methods design, Tools for methods analysis, work simplification programme.
Unit – V	Production Control – Control functions : Routing Londing, Scheduling, Despatching, Follow up. Quality control & inspection : place of quality control in modern enterpriss, organisation of qualit control. Statistical quality control, inspection location for inspection, inspection procedure and records, Inspection devices.

(4) व्यूह रचना प्रबन्ध (प्रश्नपत्र : B – चतुर्थ)

STRATEGIC MANAGEMENT (Paper : B – Fourth)

M.M. : 80

Unit – I	<p>Concept of Strategy : Defining strategy, levels at which strategy operates; Approaches to strategic decision making; Mission and purpose, objectives and goals; Strategic business unit (SBU); Functional level strategies.</p> <p>Environmental Analysis and Diagnosis : Concept of environment and its components; Environment scanning and appraisal; Organisational appraisal; Strategic advantage analysis and diagnosis, SWOT analysis.</p>
Unit – II	<p>Strategy Formulation and Choice of Alternatives : Strategies - modernisation, diversification, integration, Merger, take-over and joint strategies; Turnaround, divestment and liquidation strategies; Process of strategic choice-industry, competitor and SWOT analysis; Factors affecting strategic choice; Generic competitive strategies- cost leadership, differentiation focus, value chain analysis, bench marking, service blue printing.</p>
Unit – III	<p>Functional Strategies : Marketing, production / operations and R & D plans and policies.</p> <p>Functional Strategies : Personnel and financial plans and policies.</p>
Unit – IV	<p>Strategy Implementation : Inter-relationship between formulation and implementation; Issues in strategy implementation; Resource allocation.</p> <p>Strategy and Structure : Structural considerations, structures for strategies; Organisational design and change.</p>
Unit – V	<p>Strategy Evaluation : Overview of strategic evaluation; Strategic control; Techniques of strategic evaluation and control.</p> <p>Global Issues in Strategic Management.</p>

विशिष्टीकरण : (C) बैंकिंग एवं बीमा

Specialization : (C) Banking and Insurance

(1) बैंकिंग व्यवहार – (प्रश्नपत्र : C – प्रथम)

BANKING PRACTICES (Paper : C – First)

M.M. : 80

OBJECTIVE –

This course enables the students to know the working of the Indian banking system and fundamentals of insurance.

Unit – I	Bank : Concept, Functions and Services, Prohibited Business, Nature of Banking, Qualities of Banker, Bank and Customer Relationship, Concept of Customer, general Relationship, Bankers, Rights and obligations, Termination of Relationship.
Unit – II	Accounts of Customers : Various Customers' Accounts, Opening an account, Nomination facility, Special Types of Customers Minors, Pardanashin Women, Lunatics, Intoxicated Persons, Joint Hindu Family, Limited Companies and Non Trading Concern.
Unit – III	Employment of Bank Funds, Importance of Liquidity, Cash Reserve, Money at call and short notice, Investments, Statutory provisions regarding liquid Assets, Principles of lending, Types of loan, Interest Tax Act.
Unit – IV	Purchase/Discounting of Bills, Legal Position, Bill Market scheme, Lodgment of bills, Vaghul Working Group Report, Letters of Credit, Concept and types, Crossing and endorsements of cheque.
Unit – V	Securities for Advances : General Principles, Advances against Goods, Stock Exchange Securities, Real Estate, Life Policies, Fixed Deposits, Gold, Silver, Bond and Debenture. Lien and Mortgage, Types of mortgage, Hypothication, pledge.

(2) भारत में बैंकिंग संस्थाएँ – (प्रश्नपत्र : C – द्वितीय)

BANKING INSTITUTION IN INDIA (Paper : C – Second)

M.M. : 80

Unit – I	Indian Banking System : Indigenous Bankers, Money Landers, Nationalization of commercial Bank and their Effects, Classification of Banking Institutions, Commercial Banks, Regional Rural Banks, Cooperative Banks.
Unit – II	Development Banking in India : IFCI, ICICI, SIDBI, Credit Guarantee Institutions; Export Credit Guarantee Corporation of India, Deposit Insurance and Credit Guarantee Corporation of India.
Unit – III	R.B.I. : Organization, function, Central Banking functions, Promotional functions, Control of credit by RBI, NBFC and RBI, Commercial Banks and RBI, Power of RBI.
Unit – IV	Banking Regulation Act 1949 : Important features, Forms of Business of a Bank, Regulation for Capital, Control over Management, Restrictions on loans and advances winding up of a Banking Company, Amalgamation of Banks.
Unit – V	Emerging trends in Banking Sector : Narasimham Committee Report, Committee on Banking Sector Reforms, Bridge Loan and Privatization of Banks and its impact.

(3) जीवन बीमा – (प्रश्नपत्र : C – तृतीय)

LIFE INSURANCE (Paper : C – Third)

M.M. : 80

Unit – I	Life insurance : introduction , History of life insurance, Utility, Object, Characteristics and importance of life insurance, procedure of getting life insurance, non – medical insurance, Insurance of sub – standard lives, insurance of female lives and Minors.
Unit – II	Life insurance policy : Conditions and kinds of Life insurance policies, some important plans of life insurance.
Unit – III	Premium and Annuity : Elements of premium ; methods of premium computation, Natural premium plan, level premium plan, Gross and net premium, Loading mortality table – meaning, characteristics and importance in life insurance ; Kinds of mortality table. Annuity : meaning, objects, advantages and kinds of annuity, annuity Vs Life insurance.
Unit – IV	Life Insurance agent and his working, settlements of Life insurance claims. Guidelines and procedures, Organisation and management of life insurance corporation of India, working and progress.
Unit – V	Privatization of Life insurance in India, Insurance Regulatory & Development Authority Act, 1999, - powers and functions of authority.

(4) सामान्य बीमा – (प्रश्नपत्र : C – चतुर्थ)

GENERAL INSURANCE (Paper : C – Fourth)

M.M. : 80

Unit – I	Introduction : Origin and Development of Insurance : Advantages, Importance and Functions of Insurance, Fundamental principles of Insurance – insurable interest, utmost good faith, other principles – indemnity, subrogation, contribution, mitigating of loss warranties, Proximate cause etc.
Unit – II	Classification and Re-insurance : General Principles, various methods of re-insurance, under insurance, Over-insurance, double insurance Classification and organisation of Insurance.
Unit – III	Marine Insurance : Introduction, Evolution & Development of marine insurance. Necessary elements of marine insurance contract Peril & Scope of marine insurance. Procedure of Taking out Marine Insurance Policy, kinds of Marine insurance Policies, Computation of Marine Insurance Premiums and Returns, Marine Losses – Total loss, Actual and Constructive, Partial Loss – particular average loss and general average loss, Settlements of Claims and Recoveries, Salvage and Particular Charges.
Unit – IV	Fire insurance : Physical and moral hazards, functions of fire insurance, history of fire insurance ; principles of fire insurance, meaning of fire, characteristics of fire insurance, contract rights of insurer under a fire insurance contract, procedure of fire insurance policy, fire policy conditions, settlement of claims.
Unit – V	Miscellaneous Insurance : Personal accident Insurance, Motor, employer's liability fidelity guarantee, burglary, live stock, crop. And workmen's compensation insurance, Cattle Export Risks ; Engineering ; Aircraft insurance.

विशिष्टिकरण : (D) करारोपण एवं लेखांकन

Specialization : (D) Taxation and Accounting

(1) भारत में प्रत्यक्ष कर (प्रश्नपत्र : D – प्रथम)

DIRECT TAX IN INDIA (Paper : D – First)

M.M. : 80

Unit – I	Basic Concepts and Definitions, Residential Status and Tax incidence. Exempted Income, Deemed Income, Clubbing of Income, Deductions under Section – 80.
Unit – II	Computation of Tax Liabilities of Individual. Taxation on Agriculture Income.
Unit – III	Return of Income and Assessment, Various Types of Return, types of Assessment.
Unit – IV	Advance payment of Tax, Tax Deducted at Source, Penalties and Prosecution, Refund of Excess Payment.
Unit – V	Income Tax Authorities, Appeal and Revisions, Settlement of cases.

(2) अप्रत्यक्ष कर (प्रश्नपत्र : D – द्वितीय)

INDIRECT TAX (Paper : D – Second)

M.M. : 80

Unit – I	Concepts of Indirect Taxes, Basic conditions of Excise liability, Concept of goods, Excisable goods, Manufacture, Manufacturer. Principles of Classification.
Unit – II	Valuation of Excisable goods, Definition of Assessable Value, Inclusion and exclusion from Assessable Value, Maximum Retail Price Valuation.
Unit – III	Assessment Procedure, Demand, Refund and Appeal. Central Excise Value Added Tax Credit System (CENVAT). C.G.VAT
Unit – IV	Nature of customs duty, Types of customs duties, valuation for customs, duty, inclusion and exclusion, valuation under customs act, Procedures for import and export under Custom Duty.
Unit – V	Export incentives, Duty drawback, Powers of customs officers, penalties, confiscation of goods.

(3) सेवा के क्षेत्र में लेखांकन (प्रश्नपत्र : D – तृतीय)

Accounting in Service Sector (Paper : D – Third)

M.M. : 80

Unit – I	Accounts of Hotel Companies – Introductions, Sources of Income, Heads of Expenditures, Cash Book, Visitor's ledger, final accounts. Accounting for Transport Undertaking – Introduction – Railways, Trams and Buses, Roadways, Shipping. Preparation of Daily Log book and final accounts (Problems on roadways only)
Unit – II	Accounts for Hospitals – Introduction, preparation of final accounts, capital and revenue expenditure, OPD and IPD register. Accounts of Professional people.
Unit – III	Accounting for educational institutions – General cash book, Collection Ledger, Donors Register, Stock book Register, Salary and wages Register, Types of Govt. Grants and its accounting, Annual statement of accounts.
Unit – IV	Accounts of Co-operative Societies – Accounts of Agricultural Farms.
Unit – V	Government Accounting : Basic principles of government Accounting, Commercial Accounting Vs Government Accounting, Consolidated funds contingency fund and public Accounts.

(4) लेखांकन पद्धतियाँ (प्रश्नपत्र : D – चतुर्थ)

Accounting Methods (Paper : D – Fourth)

M.M. : 80

Unit – I	Preparation of Accounts from incomplete records and single entry system.
Unit – II	Branch Accounts – Independent and foreign branch. Departmental accounts.
Unit – III	Lease Accounts, Social Accounting.
Unit – IV	Accounting for Price level changes. Human Resource Accounting.
Unit – V	Insolvency Accounts. (individual and firm).

SYLLABUS OF ANNUAL EXAM

ORDINANCE No. 24

MASTER OF COMMERCE EXAMINATION

1. The examination for the degree of Master of Commerce shall consist of two parts :
 - a. The Previous Examination and
 - b. The Final Examination
2. A candidate who, after taking his B. Com. Degree of the University or an examination of any Statutory University in India which has been recognized by the University as equivalent to the B. Com. degree of the University and has completed a regular course. of study in the Teaching Department of the University or in a college affiliated to the University in the subject in which he offers himself for examination for an academic year, shall be admitted to the Previous examination for the degree of Master of Commerce.

A candidate after passing a graduate examination under 11+3 scheme or any other examination recognized by the University as equivalent there to shall be eligible for admission to a postgraduate course of studies where graduation is minimum qualification only after passing one year Bridge Course prescribed for the purpose. This shall apply to students graduating in 1991 main examination.

3. A candidate who, after passing the M. Com. Previous examination of the University, has completed a regular course of study for one academic year in a Teaching Department of the University or in a college affiliated to the University shall be admitted to the Final Examination for the degree of Master of Commerce.

A candidate who has passed the Previous examination for the degree of Master of Commerce of another University may also be admitted to the Final examination for the degree of Master of Commerce after obtaining necessary permission from the Kulpati provided that he offered for his Previous examination a course of study of an equivalent standard with almost identical syllabus as is required for the previous examination of this University and has attended a regular course of study for one academic year in a Teaching Department of the University or in a college affiliated to the University.

4. Besides regular student and ex-students and subject to their compliance with this ordinance, Non-collegiate students shall be eligible for admission to the examination as per provisions of Ordinance relating to admission of non-collegiate students to the University examination.

Provided that non-collegiate candidates shall be permitted to offer only such subjects/papers as are taught to the regular students at any of University Teaching Department or College.

A candidate securing 60% or more marks in M.Com. Previous examination will be eligible to offer dissertation in lieu of the optional papers for the Final. A regular candidate can offer dissertation with the permission of the Professor and Head of Department of his

Institution, while a private candidate will have to secure the prior permission in writing of any one of the Professors of the subject working in an Institution within the jurisdiction of the University and will work under supervision of the Professor after obtaining prior permission of the University to that effect.

5. The scope of the examination shall be determined by the Academic Council and given in the detailed course of studies.
6. A candidate who has passed the M.Com Examination of the University, shall be allowed to present himself for the M.Com Examination in any one or more of the optional papers not taken by him at the said examination and if successful will be given a certificate to that effect.

No candidate shall be allowed to offer more than two additional papers in any one year.

7. For both the Previous and Final examination a candidate will be declared successful if he/she obtains at least 36% of the aggregate marks in the subject.

No division will be assigned on the result of the previous examination. The division in which a candidate is placed shall be determined on the basis of aggregate of marks obtained in both the M.Com Previous and M. Com. Final Examination.

8. Successful candidates who obtain 60% or more of the aggregate marks shall be placed in the First Division, those obtaining less than 60% but not less than 48% in the Second Division and all other successful candidates obtaining less than 48% in the Third Division.
9. Candidates who have passed the M.Com. examination of the University in Third or Second Division and desire to appear at the M.Com. Examination for improving division may, without attending a regular course of study in a college affiliated to the University or in a Teaching Department of the University be allowed to appear at the aforesaid examination as non collegiate student on the following conditions.

(i) There shall be only two division for such candidates i.e. First Division and Second Division. The marks required for obtaining these divisions shall be the same as prescribed in the Ordinance i. e. examinees who are successful in final of the examination and have obtained 60% or more of the aggregate of the marks in Previous and Final of the examinations taken together shall be placed in the First Division and examinees who are successful in Final of the examination and have obtained less than 60% but not less than 48% of the aggregate marks in Previous and Final of the Examination taken together shall be placed in the Second Division.

(ii) The results of the candidates obtaining less than 48% of the aggregate marks in Previous and Final of the examination taken together shall not be declared.

(iii) Candidates shall have the option to appear at both the Previous and Final examination in one and the same year and for being successful at the examination, the candidates shall obtain 48% of the aggregate marks.

Provided that such candidates who opt to appear in Previous and Final examinations separately shall have to obtain minimum aggregate required for the Previous exami-

nation but he will have to obtain at least 48% in the aggregate of the Previous and Final examinations taken together or else his result will be cancelled.

- (iv) The syllabus for the examinations shall be the same as prescribed for the year in which the examination is held.
- (v) Not more than two attempts shall be allowed to such candidates. Failure or non-appearance at the examination after permission has been accorded by the University, shall be counted as an attempt.

Provided however such candidates who opt to appear at the Previous and Final examinations separately will be allowed one attempt at the Previous examination and two attempts at the Final examination.

- (vi) Candidates who wish to avail the opportunity given in foregoing para's will have to apply for permission as required in the Ordinance relating to Admission of non-collegiate students to the University examination along with requisite Registration Fees.
- (vii) In case a student improves his division under provision of this para, the fresh degree will be issued after cancelling his first degree.

- 11. Transitory Provision : The repealed Ordinance relating to Master of Commerce Examination shall remain effective till the examination of 1974, and this new Ordinance shall be applicable from the examination of 1975.

USE OF CALCULATOR

The students of Degree P. G. classes will be permitted to use of calculators in the examination hall from annual Academic 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986.

- 1. Student will bring their own Calculator.
- 2. Calculators will not be provided either by the University or examination centres.
- 3. Calculators with memory and following variables be permitted : +, -, x, ÷, square, reciprocal, exponentials log, square root, trigonometric functions viz. sine, cosine, tangent etc. factorial summation, xy, yx and in the light of objective appraisal of merits and demerits of the viva only will be allowed.

वार्षिक परीक्षा (Annual Examination) – 2017

प्रश्न-पत्रों के चयन हेतु स्थून रूप रेखा

OUT LINE OF ELECTIVE PAPERS

एम. कॉम. पूर्व

M.Com. Economics

प्रश्न पत्र	प्रश्न पत्र का नाम	पूर्णांक	पेपर कोड
प्रश्न पत्र – I Paper - I	प्रबन्धकीय अर्थशास्त्र Managerial Economics	100	1171
प्रश्न पत्र – II Paper - II	वृहत (उच्चतर) लेखांकन Advanced Accounting	100	1172
प्रश्न पत्र – III Paper - III	प्रबंधकीय निर्णयों के लिए लेखांकन Accounting for Managerial Decision	100	1173
प्रश्न पत्र – IV Paper - IV	सांख्यिकीय विश्लेषण Statistical Analysis	100	1174
प्रश्न पत्र – V Paper - V	निगमित विधि संरचना Corporate legal frame work	100	1175

एम.कॉम अन्तिम (M. Com. Final)

अनिवार्य प्रश्न-पत्र (Compulsory Paper)

प्रश्न पत्र	प्रश्न पत्र का नाम	पूर्णांक	पेपर कोड
प्रश्न पत्र – I Paper - I	प्रबन्धकीय अवधारणाएं एवं संगठनात्मक व्यवहार Management Concepts and Organisational Behaviour	100	
प्रश्न पत्र – II Paper - II	उच्चतर लागत लेखांकन Advanced Cost Accounting	100	
प्रश्न पत्र – III Paper - III	आयकर विधान एवं कर नियोजन Income Tax Law & Tax Planning	100	

Optional Specialization

And any one Group of the following

Optional Group – (A) विपणन (Marketing)

प्रश्न पत्र	प्रश्न पत्र का नाम	पूर्णांक	पेपर कोड
प्रश्न पत्र – A I Paper – A I	विपणन प्रबन्ध Marketing Management	100	
प्रश्न पत्र – A II Paper - A II	उच्चतर लागत लेखांकन Rural, Agriculture and International Marketing	100	

एम.कॉम पूर्व, वार्षिक परीक्षा - 2014

COMPULSORY GROUP

PAPER - I, (Paper Code - 1171)

MANAGERIAL ECONOMICS

M.M. 100

OBJECTIVE -

This course develops managerial perspective to economic fundamentals as aids to decision making under given environmental constraints.

COURSE INPUTS

- UNIT-1 • Nature and Scope of Managerial Economics : Objective of a firm; Economic theory and managerial theory; Managerial economist's role and responsibilities; Fundamental economic concepts- incremental principle, opportunity cost principle, discounting principle, equi-marginal principle.
- UNIT-2 • Demand Analysis : Individual and market demand functions Law of demand, determinants of demand; Elasticity of demand - its meaning and importance; Price elasticity, income elasticity and cross elasticity; Using elasticity in managerial decisions.
- Theory of consumer Choice : Cardinal utility approach, indifference approach, revealed preference and theory of consumer choice under risk; Demand estimation for major consumer durable and non-durable products; Demand forecasting techniques.
- UNIT-3 • Production Theory : Production function - production with one and two variable inputs; Stages of production; Economies of scale; Estimation of production function; Cost theory and estimation; Economic value analysis; Short and long run cost functions - their nature, shape and inter-relationship; Law of variable proportions; Law of returns to scale.
- UNIT-4 • Price Determination under Different Market Conditions : Characteristics of different market structures; Price determination and firm's equilibrium in short-run and long-run under perfect competition, monopolistic competition, oligopoly and monopoly.
- Pricing Practices : Methods of price determination in practice; Pricing of multiple products; Price discrimination; International price discrimination and dumping; Transfer pricing.
- UNIT-5 • Business Cycles : Nature and phases of a business cycle; Theories of business cycles-psychological, profit, monetary, innovation, cobweb, Samuelson and Hicks theories.
- Inflation : Definition, Characteristics and types; Inflation in terms of demand-pull and cost-push factors; Effects of inflation.

REFERENCES -

- Baumol, William J : Economic Theory and Operations Analysis, Prentice Hall, London.
- Baya, Michael R: Managerial Economics and Business Strategy, McGraw Hill Inc. New York.
- Chopra, O.P : Managerial Economics, Tata McGraw Hill, Delhi.
- Dean, Joel : Managerial Economics, Prentice Hall, Delhi.
- Dholakia, R.H. and A.L. Oza : Micro Economics for Management Students, Oxford University Press, New Delhi.
- Eaton, B.Curtis and Diane Faton: Micro Economics, Prentice Hall, New Jersey.
- Gough, J.and S. Hills : Fundamentals of Managerial Economics, MacMillan London.
- Haynes, W.W., V.L. Mote and S. Paul : Managerial Economic Analysis and Cases, Prentice Hall India, Delhi

Petersen, H.Craig and W.Cris Lewis : Managerial Economics, Prentice Hall, Delhi.
 Salvatore, Dominick : Managerial Economics in a Global Economy, McGraw Hill, New York.
 Virian, H.R: International Microeconomics : A Modern Approach, East West Press, New Delhi.
 Varshney RL and Maheshwari KL : Managerial Economics; Sultan Chand and Sons, New Delhi.
 Dwivedi DN : Managerial Economics, Vikas Publishing House, New Delhi.
 Adhikary M Business Economics, Excel Books, New Delhi.

REFERENCE BOOKS :

- | | | | |
|----|----------------|---|--|
| 1 | Spencer | : | Managerial Economics |
| 2 | Farrar & Meyer | : | Managerial Economics |
| 3 | Nummers | : | Managerial Economics |
| 4 | F. E. Gillis | : | Managerial Economics |
| 5 | Colberg | : | Business Economics |
| 6 | Coppnak | : | Economics of the Business Firm |
| 7 | Macnair Mefiam | : | Problems of Business Economics |
| 8 | Stigler | : | Theory of Prices |
| 9 | Bain | : | Price Theory |
| 10 | Baumol W. U. | : | Economic Theory & Operational Analysis |
| 11 | Cohens Cyert | : | Theory of the Firm |
| 12 | D.S.Watson | : | Price Theory & its Uses. |

RECOMMENDED BOOKS :

- | | | | |
|---|-----------------------|---|--------------------------------------|
| 1 | Savage & Small | : | Introduction to Managerial Economics |
| 2 | Dafty | : | Managerial Economics |
| 3 | Joel Dean | : | Managerial Economics |
| 4 | Haynes & Note | : | Managerial Economics |
| 5 | Varshney & Maheshwari | : | Managerial Economics |
| 6 | H. Rahman | : | Managerial Economics |

PAPER - II, (Paper Code - 1172)

ADVANCED ACCOUNTING

M.M.100

OBJECTIVE :

The objective of this course is to expose students to accounting issues and practices such as maintenance of company accounts, valuation of goodwill and shares, and handling accounting adjustments.

COURSE INPUTS :

- UNIT-1 ● Accounting for issue, forfeited and redemption of shares and debentures.
 ● Final accounts and financial statements of companies
- UNIT-2 ● Amalgamation and Internal REconstruction of companies as per Accounting standard-14.

- UNIT-3 • Accounting for holding and subsidiary companies.
 • Accounts relating to liquidation of companies.
- UNIT-4 • Account of public utility concerns : Double Account system.
 • Accounts of Banking companies.
- UNIT-5 • Royalty accounts, Voyage accounts and Investment accounts.

REFERENCES :

Beams, F.A : Advanced Accounting, Prentice Hall, New Jersey.
 Dearden, J. and S.K. Bhattacharya : Accounting for Management, Vikas Publishing House, New Delhi.
 Engler, C., L.A Bernstein. and K.R Lambert : Advanced Accounting, Irwin, Chicago.
 Fischer, P.M., W.J Taylor and J.A Leer : Advanced Accounting, South-Western, Ohio.
 Gupta, R.L : Advanced Financial Accounting, S.Chand & Co., New Dehli.
 Keiso D.E. and J.J Weygandt : Intermediate Accounting, John Wiley and Sons, NY.
 Maheshwaari, S.N : Advanced Accountancy - Vol.II, Vikas Publishing House, New Delhi.
 Monga, J.R : Advanced Financial Accounting, Mayoor Paperbacks, Noida
 Narayanaswamy, R : Financial Accounting : A Managerial Perspective, Prentice Hall of India, Delhi
 Neigs, R.F : Financial Accounting, Tata McGraw Hill, New Delhi.
 Shukla, M.C. and T.S. Grewal : Advanced Accountancy, Sultan Chand & Co., New Delhi.
 Warren, C.S. and P.E. Fess : Principles of Financial and Managerial Accounting, South-Western, Ohio.

BOOKS RECOMMENDED :

- | | | | |
|-----|------------------------------------|---|--------------------------------|
| 1 | Plekles and Duakerley | : | Accountancy |
| 2 | Wilson | : | Company Accounts |
| 3 | Diskson | : | Accountancy |
| 4 | J.R. Batlboi | : | Advanced Accounting |
| 5 | R.R. Gupta | : | Advanced Accounting |
| 6 | S.M. Shukla | : | Advanced Accounting |
| 7 | Shukla and Grewal | : | Advanced Accounting |
| 8 | H. Chakravarty | : | Advanced Accounts |
| 9 | Dr. Sukla Avam Agrawal | : | Advanced Accountancy |
| 10. | Dr. S.S.Gupta | : | Advanced Accounts |
| 11. | R.L. Gupta | : | Accountancy |
| VW. | जे.के. अग्रवाल | - | वृहद लेखा कर्म |
| VX. | जे. के. अग्रवाल तथा आर. के अग्रवाल | - | उच्च वित्तीय एवं कंपनी लेखांकन |
| VY. | आर. के. गुप्ता | - | उत्तम लेखांकन |
| 15. | Basu Das | : | Advanced Accounting |
| 16. | S.N. Maheshwari | : | Advanced Accounting |
| 17. | Karim, Khanuja and Mehta | : | Advance Accounts |

PAPER - III (Paper Code -.....)

ACCOUNTING FOR MANAGERIAL DECISION

M.M. 100

OBJECTIVE

The objective of this course is to acquaint students with the accounting concepts, tools and techniques for managerial decisions.

COURSE INPUTS -

- UNIT-1 • Introduction of Accounting : Management accounting as a area a accounting; Objectives, nature, and scope of financial accounting, cost accounting, and management accounting; Management accounting and managerial decisions;

- Management accountant's position, role, and responsibilities.
- Accounting Plan and Responsibility Centres : Meaning and significance of responsibility accounting; Responsibility centres-cost centre, profit centre and investment centre; Problems in transfer pricing; Objectives and determinants of responsibility centres.
- UNIT-2
- Budgeting : Definition of budget; Essentials of budgeting; Types of budgets - functional, master, etc.; Fixed and flexible budget; Budgetary control; Zero-base budgeting; Performance budgeting.
 - Standard Costing and Variance Analysis : Standard costing as a control technique; Setting of standards and their revision; Variance analysis - meaning and importance, kinds of variances and their uses - material, labour and overhead variances; Disposal of variances; Relevance of variance analysis to budgeting and standard costing.
- UNIT-3
- Marginal Costing and Break-even Analysis : Concept of marginal cost; Marginal costing and absorption costing; Marginal costing versus direct costing; Cost-volume-profit analysis; Break-even analysis; Assumptions and practical applications of break-even-analysis; Decisions regarding sales-mix, make or buy decisions and discontinuation of a product line etc.
- UNIT-4
- Analysing Financial Statements : Horizontal, vertical and ratio analysis; Cash flow analysis. Fund flow analysis.
- UNIT-5
- Contemporary Issues in Management Accounting : Value chain analysis; Activity-based costing; Quality costing; Target and life cycle costing.
 - Reporting to Management : Objectives of reporting, reporting needs at different managerial levels; Types of reports, modes of reporting, reporting at different levels of management.

REFERENCES :

- Anthony, Robert : Management Accounting, Tarapore-wala, Mumbai.
- Barfield, Jessie, Ceily A.Raiborn and Michael R.Kenney : Cost Accounting : Traditions and Innovations, South - western College Publishing, Cincinnati, Ohio.
- Decoster, Don T. and Elden L. Schafe : Management Accounting : A Decision Emphasis, John Wiley and Sons Inc., New York.
- Garrison, Ray H. and Eric W. Noreen : Management Accounting, Richard D.Irwin, Chicago.
- Hansen, Don R. and Maryanne M. Moreen : Management Accounting, South-Western College Publishing, Cincinnati. Ohio.
- Horngran, C.T., Gary L. Sundem, and William O. Stratton : Introduction to Management Accounting, Prentice Hall, Delhi.
- Horngren, Charles T., George Foster and Srikant M.Dalior : Cost Accounting : A Managerial Emphasis, Prentice Hall, Delhi.
- Lall, B.M., and I.C. Jain : Cost Accounting : Principles and Practice, Prentice Hall, Delhi.
- Pandey, I.M : Management Accounting, Vani Publication, Delhi
- Welsch Glenn A., Ronald W.Hilton and Paul N. Gordon : Budgeting, Profit Planning and Control, Prentice Hall, Delhi.

RECOMMENDED BOOKS :

- | | | | |
|---|-------------------|---|---|
| 1 | Anthony Robert N. | : | Management Accounting |
| 2 | Gillet | : | Management and the account |
| 3 | Willsmore | : | Business, Business Budget and Budgetary Control |
| 4 | Rose U. Fahri | : | Higher Management Control |
| 5 | Guthmann HG | : | Analys of Financial Statement |
| 6 | Smith and Ashburn | : | Financial and Administrative Accountancy |

7	Pinkless and Duakaley	:	Accountancy
8	Mannohan A Goyal	:	Management Accounting
9	जे.के. अग्रवाल, आर.के. अग्रवाल	:	प्रबंधकीय लेखांकन
10	ए.पी. गुप्ता	:	प्रबंधकीय लेखांकन
11	एस.एन. महेश्वरी	:	प्रबंध लेखांकन
12	के.पी. गुप्ता	:	प्रबंधकीय लेखांकन
13	एम.आर. अग्रवाल	:	प्रबंधकीय लेखांकन
14	पी. मिश्रा	:	प्रबंध लेखांकन
15	डी.बी.पी. अग्रवाल, डी. मेहता	:	प्रबंधकीय लेखाविधि

(Compulsory) PAPER - IV, (Paper Code - 1175)

STATISTICAL ANALYSIS

M.M. 100

OBJECTIVE :

The objective of this course is to make the students learn the application of statistical tools and techniques for decision making.

COURSE INPUTS :

- UNIT-1 Statistics - Definitions, Characteristics, Scope & Nature, Functions, limitations, Distrust and misuse, importance & Statistical Investigations.
Classification & Tabulation
Data Sources - Primary and Secondary, Primary data collection techniques, Schedule, Questionnaire and interview & Sources of Secondary data.
- UNIT-2 Dispersion, Co-efficient of variance and skewness, correlation - Karl Pearsons and spearman's ranking method and Regression analysis, Two variables case.
- UNIT-3 Probability Theory - Probability classical, relative and subjective probability, Addition and multiplication probability models - Conditional probability and Baye's Theorem.
Probability Distributions - Bionomial Poisson and Normal Distributions, Their characteristics and applications.
- UNIT-4 Statistical Decision Theory - Decision environment, Expected profit under uncertainty and assigning probabilities and utility theory.
Statistical Estimations and Testory - Point and interval estimation of population mean, proportion and variance Statistical Testing - Hypothesis and Errors, Sample size - Large and Small Sampling; test Z Tests, T Tests & F Tests.
Association of Attributes - Two Attributes, consistency of data, measurement of Association of Attributes - Percentage method, Co-efficient of Association, Comparison of Actual and (youle method) Expected frequencies & Illusery Association.
- UNIT-5 Statistical Quality Control - Causes of Variations in quality characteristics, Quality Control charts-purpose and logic, Process under control and out of control, warning limits, control charts for attributes-fraction defectives and number of defects, Acceptance sampling.
Interpolation and Extrapolation - Prabolic Boinomial, Newton and longrages method.

REFERENCES :

- Hooda, R.P : Statistics for Business and Economics, Macmillan, New Delhi.
Heinz, Kohler : Statistics for Business & Economics, Harper Collins, New York.
Hien, L.W : Quantitative Approach to Managerial Decisions, Prentice Hall, New Jesery.
Lawrence B.Morse : Statistics for Business & Economics, Harper Collins, NY.
Levin, Richard I. and David S Rubin : Statistics for Management, Prentice Hall, Delhi.
Watsnam Terry J. and Keith Parramor; Quantitative Methods in Finance, International Thompson Business Press, London.

Research design, Types of Research, Formulation of Research Proposal Source of Information and writing of reports.

BOOKS RECOMMENDED :

1	D.N.Elhance	: Fundamentals of Statistics
2	E.G.Grant	: Statistical Quality Control
3	Ma.N.Murty	: Sampling theory and methods
4	S.P.Gupta	: Statistical Methods
5	S.C.Gupta & Smt. I.Gupta	: Fundamental of Statistics Himalaya Publishing House Delhi.
6	D.C.Sancheti & V.K.Kapoor	: Statistics theory methods & Application
7	A.N.Sadhu & Amarjeet Singh	: Research Methodology in Social Science
8	V.P. Michael	: Research Methodology in Management
9	Sethana & Groenaveld	: Research Methods in Marketing Management
10	Yule G.V. & Kendall M.G.	: An Introduction to theory of Statistics
11	Yeats	: Sampling Methods in Census and Surveys.
12	Bowley	: Elements of Statistics
13	Singh	: Research Methodology (Hindi)
14	Mukherjee	: Research Methodology
15	डॉ. एस. एम. शुक्ला	: सांख्यिकी
16	एस.डी. सिंह	: शोध प्रविधि
17	रविन्द्रनाथ मुखर्जी	: शोध प्रविधि
18	कैलाशनाथ नागर	: सांख्यिकी के सिद्धांत
19	डॉ. डूगरवाल एवं डॉ. गुप्ता	: उन्नत सांख्यिकी किताब घर ग्वालियर
20	डॉ. बी. एस. गुप्ता	: डॉ. बी.एन. गुप्ता साहित्य भवन, आगरा
21	डॉ. हरिशचंद्र शर्मा	: रिसर्च मेथोडोलॉजी
22	Goudy & Hatt	: Method's in social research
23	Sahu & Singh	: Research Methodology and Social Science
24	पाण्डे एवं बघेल	: सर्वेक्षण एवं अनुसंधान

(Compulsory) PAPER - V, (Paper Code - 1176)

CORPORATE LEGAL FRAMEWORK

M.M.100

OBJECTIVE

The objective of this course is to provide knowledge of relevant provisions of various laws influencing business operations.

COURSE INPUTS

- UNIT-1 • The Companies Act, 1956 (Relevant Provisions) : Definition, types of companies Memorandum of association; Articles of association; Prospectus; Share capital and membership; Meetings and resolutions; Company management; Managerial remuneration; Winding up and dissolution of companies.
- UNIT-2 • The Negotiable Instruments Act, 1881 : Definition, types of negotiable instruments; Negotiation; Holder and holder in due course; Payment in due course; Endorsement and crossing of cheque; Presentation of negotiable instruments.
- UNIT-3 • Legal Environment for Security Markets : SEBI Act, 1992 - organisation and objectives of SEBI; Powers under Securities Contract Regulation Act 1956 transferred to SEBI; Role of SEBI in controlling the security markets.
- UNIT-4 • Restrictive and Unfair Trade Practices : MRTP Act 1969-monopolistic trade practices; Restrictive trade practices; Unfair trade practices. The Consumer Protection Act, 1986 - salient features; Definition of consumer, rights of consumer; Grievance redressal machinery.

एम.कॉम. अन्तिम (M.Com. Final)

अनिवार्य प्रश्नपत्र (Compulsory Paper)

प्रश्नपत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper – I प्रश्नपत्र – I	प्रबन्धकीय अवधारणाएं एवं संगठनात्मक व्यवहार (Management Concepts and Organisational Behaviour)	100	
Paper – II प्रश्नपत्र – II	उच्चतर लागत लेखांकन (Advanced Cost Accounting)	100	
Paper – III प्रश्नपत्र – III	आयकर विधान एवं कर नियोजन (Income Tax Law & Tax Planning)	100	

Optional Specialization :

And any one Group of the following.

Optional Group - (A) विपणन (Marketing)

Paper – A I प्रश्नपत्र – A I	विपणन प्रबन्ध (Marketing Management)		
Paper – A II प्रश्नपत्र – A II	ग्रामीण, कृषि एवं अन्तर्राष्ट्रीय विपणन (Rural, Agricultural and International Marketing)		

Optional Group - (B) प्रबन्ध (Management)

Paper – B I प्रश्नपत्र – B I	वित्तीय प्रबन्ध (Financial Management)	100	
Paper – B II प्रश्नपत्र – B II	मानव संसाधन एवं उत्पादन प्रबंध (Human Resource and Production Management)	100	

Optional Group - (C) बैंकिंग एवं बीमा (Banking and Insurance)

Paper – C I प्रश्नपत्र – C I	बैंकिंग व्यवहार एवं संस्थाएं (Banking Practices and Institutions)	100	
Paper – C II प्रश्नपत्र – C II	बीमा के सिद्धांत एवं व्यवहार (Principles and Practices of Insurance)	100	

Optional Group - (D) करारोपण एवं लेखांकन (Taxation and Accounting)

Paper – D I प्रश्नपत्र – D I	भारत में करारोपण (Taxation in India)	100	
Paper – D II प्रश्नपत्र – D II	लेखांकन पद्धतियाँ (Accounting Method)	100	

महत्वपूर्ण नोट :

- 1) सत्र 2014–15 से एम.कॉम. पूर्व परीक्षा में 100–100 अंकों के पाँच प्रश्नपत्र अनिवार्य होंगे।
- 2) एम.कॉम. अंतिम परीक्षा में 100–100 अंकों के तीन अनिवार्य प्रश्नपत्रों के साथ वैकल्पिक समूह A, B, C अथवा D में से किसी भी एक समूह के दोनों प्रश्नपत्रों का चयन अनिवार्य होगा।
- 3) एम.कॉम. अंतिम की परीक्षा में मौखिक परीक्षा एवं लघुशोध प्रबन्ध नहीं लिया जा सकेगा।

प्रबन्धकीय अवधारणाएं एवं संगठनात्मक व्यवहार

अनिवार्य प्रश्नपत्र – प्रथम

MANAGEMENT CONCEPTS AND ORGANISATIONAL BEHAVIOUR
(Compulsory PAPER - FIRST)

M.M. 100

Unit – I	Schools of Management Thought : Scientific, process, human behavior and social system school; Decision theory school; Quantitative and system school; Contingency theory of management; Functions of a manager. Managerial Functions : Planning - concept, significance, types; Organizing - concept, principles of authority, theories, types of organizations, authority, responsibility, power, delegation, decentralization;
Unit – II	Staffing; Directing; Coordinating; Control - nature, process, and techniques. Organisational Behavior : concept and significance; Relationship between management and organisational behavior; Emergence and ethical perspective; Attitudes; Perception; Learning; Personality; Transactional analysis.
Unit – III	Motivation : Process of motivation; Theories of motivation - need hierarchy theory, theory X and theory Y, two factor theory, Alderfer's ERG theory, McClelland's learned need theory, Victor Vroom's expectancy theory, Stacy Adams equity theory. Group Dynamics and Team Development : Group dynamics - Definition and importance, types of groups, group formation, group development, group composition, group performance factors; Principle-centred approach to team development.
Unit – IV	Leadership : Concept ; Leadership styles; Theories - trait theory, behavioural theory, Fielder's contingency theory; Harsey and Blanchard's situational theory; Managerial grid; Likert's four systems of leadership. Organisational Conflict : Dynamics and management; Sources, patterns, levels, and types of conflict; Traditional and modern approaches to conflict; Functional and difunctional organisational conflicts; Resolution of conflict.
Unit – V	Interpersonal and Organisational Communication : Concept of two-way communication; Communication process; Barriers to effective communication; Types of organisational communication; Improving communication; Transactional analysis in communication. Organisational Development : Concept; Need for change, resistance to change; Theories of planned change; Organisational diagnosis; Organisational Development intervention.

उच्चतर लागत लेखांकन
अनिवार्य प्रश्नपत्र – द्वितीय
ADVANCED COST ACCOUNTING
Compulsory Paper - Second

M.M. 100

Unit – I	Definition and importance of Cost Accounting. Objects and classification of cost accounts Elements of cost and their accounting. Stores - control and record methods of issue of materials Analysis and Accounting for works and sales expenses, Different Methods of allocating indirect expenses.
Unit – II	Record of wages, Methods of remunerating labour and their effect on cost. Output cost accounts and operating costing. Financial and costing, records, their reconciliation, Contract cost accounts profit and loss on incompleted contracts and the valuation of work in progress.
Unit – III	Process cost accounts. Uniform costing & Estimate costing
Unit – IV	Standard costing & Vauiance Analysis (Material, Labour and overheads) Budgetary control Importance of budgets in accounting. Nature of budgetary control Organization for budgetary control preparation of fixed variable budgets. Cash Budget, Prodcution and sales Budget.
Unit – V	Marginal costing - Contribution Marginal analysis Vs. Net Profit analysis cost volume, profit studies and break even charts. Managerlal Decisions Tasted on Marginal and defferential casting.

आयकर विधान एवं कर नियोजन

अनिवार्य प्रश्नपत्र – तृतीय

Income Tax Law and Tax Planning

Compulsory paper - Third

M.M. 100

Unit – I	Law relating to Income tax : Brief study of the main provisions of the Indian Income Tax Act of 1961. Important definitions. Income exempted from tax, Residence and Tax liability, calculation of taxable income under the head salary, House property.
Unit – II	Calculation of taxable income under the head : Business and profession, capital gains, Income from other sources, calculation of taxable income and tax of Individual.
Unit – III	Depreciation and Development allowance, Set off and carry forward of losses, Return of Income, Deduction of tax at source, Advance payment of tax, Provisional Regular, Exparte and emergency assessment, Re opening of assessment, Appeals & Revisions Reference of High court & Supreme court, offences & penaltion, Income tax authourities.
Unit – IV	Assessment of Hindu Undividend; Families; Firms, Association of persons, Companies, Non-residents, Co-operative societies, preparation of income tax returns, Computation of Income Tax.
Unit – V	Concept of tax planning Tax avoidance and tax evasions; Tax Planning with reference of location, nature and form of organisation of new business. Tax planning to Capital Structure, decision dividend policy, Inter corporate dividends and bonus shares.

वैकल्पिक समूह (A) : विपणन

Optional Group (A) : Marketing

विपणन प्रबन्ध (प्रश्नपत्र : A – प्रथम)

MARKETING MANAGEMENT

(Paper : A - First)

M.M. 100

OBJECTIVE :

The objective of this course is to facilitate understanding of the conceptual framework of marketing and its applications in decision making under various environmental constraints.

COURSE INPUTS :

Unit – I	Introduction : Concept, nature, scope and importance of marketing; Marketing concept and its evolution; Marketing mix; Strategic marketing planning-an overview. Market Analysis and Selection : Marketing environment-macro and microcomponents and their impact of marketing decisions; Market segmentation and positioning; Buyer behaviour; Consumer versus organisational buyers; Consumer decision-making process.
Unit – II	Product Decisions : Concept of a product; Classification of products; Major product decisions; Product line and product mix; Branding; Packaging and labeling; Product lifecycle-strategic implications; New product development and consumer adoption process.
Unit – III	Pricing Decisions : Factors affecting price determination; Pricing policies and strategies; Discounts and rebates. Distribution Channels and Physical Distribution Decisions : Nature, functions, and types of distribution channels; Distribution channel intermediaries; Channel management decisions; Retailing and wholesaling.
Unit – IV	Promotion Decisions : Communication process; Promotion mix-advertising, personal selling, sales promotion, publicity and public relations; Determining advertising budget; Copy designing and its testing; Media selection, Advertising effectiveness; Sales promotion-tools and techniques. Marketing Research : Meaning and scope of marketing research; Marketing research process.

Unit – V	<p>Marketing Organisation and Control : Organising and controlling marketing operations.</p> <p>Issues and Developments in Marketing : Social, ethical and legal aspects of marketing; Marketing of services; International marketing; Green marketing; Cyber marketing; Relationship marketing and other developments in marketing.</p>
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ग्रामीण, कृषि एवं अन्तर्राष्ट्रीय विपणन (प्रश्नपत्र A :— द्वितीय)

Rural, Agricultural and International Marketing

(Paper A : - Second)

M.M. 100

Unit – I	<p>Rural Marketing : Image of Indian Rural Marketing and Approach to Rural Markets of India, Rural Consumer and Demand Dimensions and Market Segmentations, Channels of Distribution and Physical Distribution Product Management, Marketing Communication and Sales force Tasks.</p> <p>Agricultural Marketing : Concept, nature, Scope and Subject matter, Classification of agricultural products and their difference with manufactured goods. Agriculture market: Meaning, Components, Dimensions and Classification.</p>
Unit – II	<p>Market Structure : Dynamics of Market Structure, Components of market, Structure and Market forces.</p> <p>Market Management and Channel Strategy : Modern marketing management and agricultural products, "Structured organized markets-commodity exchange and produce exchange, Cash market, Forward Dealing, Exchange Market, Speculative Market, Channels of Distribution for consumer goods, Agricultural Consumer Goods and Agricultural Raw Materials.</p>
Unit – III	<p>Regulation of Markets : Regulated market, Genesis of Regulated Market in India, Limitations in present marketing regulation, Advantages and Limitations of regulated market, Organization of Regulated Market, Future of Regulated Markets in India.</p> <p>Marketing of Farm Products : Packaging - packing and packaging, Packing material, Transportation Advantages, Means of transport and Transportation cost. Grading and Standardization - Meaning, Type, Labeling and specification, Storage and Warehousing.</p>
Unit – IV	<p>International Marketing: Meaning, Scope, Nature and Significance. International Marketing Environment - Internal and External, International Market. Orientation Identification and Selection of foreign market, Functions and qualities of an Export Manager.</p> <p>Export Organization: Meaning, affecting factors and types, Overseas Product Development: Its concept and methods, pricing and its factors, methods, of Pricing, Price quotation.</p>

Unit – V	<p>Direct Trading and Indirect Trading: Meaning and Methods, Methods of Payment in international Marketing.</p> <p>Export Credit: Meaning, Nature, Influencing factors and significance, Methods of Export Credit, Export Credit and Finance in India. Risk in Export Trade, Role of the Export Credit Guarantee, Corporation of India Limited, The Export-Import Bank of India.</p> <p>Export and Import Procedure, Documentation ;in foreign trade, Bilateral and Multilateral Trade Agreements, Its meaning, _ objective, types and significance, SAARC, Role of WTO in Foreign Trade.</p>
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वैकल्पिक समूह (B) : प्रबंध
Optional Group (B) : Management

वित्तीय प्रबन्ध (प्रश्नपत्र : B – प्रथम)

FINANCIAL MANAGEMENT

(Paper : B - First)

M.M. 100

OBJECTIVE

The objective of this course is to help students of understand the conceptual framework of financial management, and its applications under various environmental constraints.

COURSE INPUTS

Unit – I	Financial Management : Meaning, nature and scope of finance; Financial goal-profit Vs. wealth maximisation; Finance functions - investment, financing and dividend decisions. Capital Budgeting : Nature of investment decisions; Investment evaluation criteria - net present value, internal rate of return, profitability index, payback period, accounting rate of return; NPV and IRR comparison; Capital rationing; Risk analysis in capital budgeting.
Unit – II	Cost of Capital : Meaning and significance of cost of capital; Calculation of cost of debt, preference capital, equity capital and retained earnings; Combined cost of capital (weighted); Cost of equity and CAPM.
Unit – III	Operating and Financial Leverage : Measurement of leverages; Effects of operating and financial leverage on profit; Analysing alternate financial plans; Combined financial and operating leverage. Capital structure Theories : Traditional and M.M. hypotheses - without taxes and with taxes; Determining capital structure in practice.
Unit – IV	Dividend Policies : Issues in dividend decisions, Walter's model, Gordon's model, M-M hypothesis, dividend and uncertainty, relevance of dividend; Dividend policy in practice; Forms of dividends; Stability in dividend policy; Corporate dividend behaviour.

Unit – V	Management of Working Capital : Meaning, significance and types of working capital; Calculating operating cycle period and estimation of working capital requirements; Financing of working capital and norms of bank finance; Sources of working capital; Factoring services; Various committee reports on bank finance; Dimensions of working capital management. Management of cash, receivables and inventory.
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मानव संसाधन एवं उत्पादन प्रबन्ध (प्रश्नपत्र : B – द्वितीय)

Human Resource and Production Management

(Paper : B - Second)

M.M. 100

Unit – I	<p>Concept, Definition, Importance & Objectives of Personnel Management, Historical Development of Personnel Management, Nature, scope planning, Philosophy and Principles of personnel Management and its relation with behavioural sciences.</p> <p>Personnel policies, programmes & procedures.</p> <p>Personnel Department; Personnel Functions, Position of personnel Department & Organization of Personnel Management.</p>
Unit – II	<p>Man power planning Recruitment and Selection, Training & Development of Employees & Executives.</p> <p>Promotion, Demotion, Transfers, Absentecism & Turnover.</p> <p>Performance Appraisal and Merit Rating, Discipline.</p>
Unit – III	<p>Job evaluation Wage & Salary Administration, plans of Remuneration & Financial Rewards/Incentive payments.</p> <p>Employees Fringe Benefits & Services - Safety, Health & Security programme and welfare.</p> <p>Motivation and Moral.</p>
Unit – IV	<p>Fundamental of production management - Nature, scope, Functions, Problems. Production and Productivity organising for production. Types of Manufacturing systems.</p> <p>Production Planning objectives and methods, Techniques of process planning, Process design, Factors affecting design Relation with types of manufacturing plant location.</p>
Unit – V	<p>Management of industrial power, work measurement and work standards, Production Control, and inspection.</p>

वैकल्पिक समूह (C) : बैंकिंग एवं बीमा
Optional Group (C) : Banking and Insurance
बैंकिंग व्यवहार एवं संस्थाएं (प्रश्नपत्र : C – प्रथम)

Banking Practices and Institutions

(Paper : C - First)

M.M. 100

Unit – I	<p>Bank - Concept, Functions and Services, Bandand Customer Relationship, Concept of customer general relationship, Rights and obligation Termination of Relationship,</p> <p>Accounts of customers: Various customers account, Opening an account Nomination, Special types of customers - Minors, Pardanshin women, Lunatics, Intoxicated persons, Joint Hindu Family, limited companies and Non-trading concern.</p>
Unit – II	<p>Employment of Bank Funds, Importance of Liquidity, cash Reserve, Money at call and short notice, Investments, Statutory provisions regarding liuid Assets, Principles of lending, Types of Loan, Interest Tax Act.</p> <p>Purchase/Discounting of Bill, legal Position, Cheques - Crossing, collection and Payment system securities for Advances, Lien and Mortgage, Hypothecation, Pledge.</p>
Unit – III	<p>Indian banking system - Structure of Indian banking system in pre-independence and post- independence,</p> <p>Commercial Banks : Meaning functions, management and investment policies of commercial banks; Present structure; E-banking and e-trading; Recent developments in commercial banking.</p> <p>Development Banks : Concept, objectives, and functions of development banks; Operational and promotional activities of development banks; IFCI, ICICI, IDBI, IRBI, SIDBI; State development banks, state financial corporations.</p>
Unit – IV	<p>Non-Banking Financial Institutions : Concept and role of non-banking financial institutions; Sources of finance; Functions of non-banking financial institutions; Investment policies of non banking financial institutions in India.</p>

	<p>Mutual Funds : Concept, performance appraisal, and regulation of mutual funds (with special reference to SEBI guidelines); Designing and marketing of mutual funds schemes; Latest mutual fund schemes in India-an overview.</p> <p>Merchant Banking : Concept, functions and growth; Government policy on merchant banking services; SEBI guidelines; Future of merchant banking in India.</p>
Unit – V	<p>Reserve Bank of India : Organisation, management and functions; Credit creation and credit control; Monetary policy. Banking Regulation Act, 1949, Important features .</p>

बीमा के सिद्धांत एवं व्यवहार (प्रश्नपत्र : C – द्वितीय)

PRINCIPLES AND PRACTICES OF INSURANCE

(Paper : C - Second)

M.M. 100

Unit – I	Origin of Insurance, its development, and organization Utility of Insurance, Fundamental principles of insurance Insurable Interest, almost good faith, other principles, Indemnity, subrogation warranties, mitigation of laws, attachment of risk, cause proxima, contribution, hazards physical and morale. Re-Insurance - General Principles, various methods of reinsurance, under - insurance; over-insurance, double Insurance.
Unit – II	<p>Functions & Benefits of Life Insurance, History of Life Insurance Bussiness, Life Insurance Policies, its kinds, procedure for effecting life Insurance, hazards of life, and basis of rating Annuities Condition of life insurance policies.</p> <p>Premium - Elements of premium Methods of premium computation, Natural Premium plan, Level premium plan, Net & Gross Premium, loading settlement of claims Role of Life insurance Agent and his working.</p> <p>Valuation of surplus, and investment sources of surplus, and use, Role of Life Insurance Corporation. of India and its development.</p>
Unit – III	Marine Insurance - Essentials of Marine Insurance Contract Marine Insurance Act. 1963. Procedure of Taking out Marine Insurance Policy, kinds of Marine Insurance Policies, Computation of Maine Insurance Premiums and Returns, Marine Losses - Total Loss, Actual and Constructive, Partial Loss - Particular average loss and general average loss, Settlements of Claims and Recoveries, Salvage and particular charges.
Unit – IV	Fire Insurance : Physical and moral haxards, functions of fire insurance, history of fire insurance; principles of fire insurance, meaning of fire, characteristics of fire Insurance, Contract rights of insurer under a fire insurance contract, procedure of taking out a fire insurance policy kinds of fire policies, computation of premium under fire insurance policy, fire policy conditions, settlement of claims.
Unit – V	<p>Miscellaneous Insurance Personal accident insurance, Motor, employer's liability fidelity guarantee, burglary, live stock, crop., and workmen's compensation insurance, Cattle Insurance.</p> <p>Privatization of insurance in India. Insurance Regulatory & Development Authority Act, 1999, Power and functions of authority.</p>

वैकल्पिक समूह (D) : करारोपण एवं लेखांकन
Optional Group (D) : Taxation and Accounting

भारत में करारोपण (प्रश्नपत्र : D – प्रथम)

Taxation in India

(Paper : D - First)

M.M. 100

Unit – I	Basic Concepts and Definitions, Residential Status and Tax Incidence, Exempted Income, Deemed Income, Clubbing of Income, Deductions under Section-80. Computation of Tax Liabilities of Individual. Taxation on Agriculture Income.
Unit – II	Return of Income and Assessment, Various Types of Return, Types of Assessment. Advance payment of Tax, Tax Deducted at Source, Penalties and Prosecution, Refund of Excess Payment. Income Tax Authorities, Appeal and Revisions, Settlement of cases.
Unit – III	Concepts of Indirect Taxes, Basic conditions of Excise liability, Concept of goods, Excisable goods, Manufacture, Manufacturer. Principles of Classification. Valuation of Excisable goods, Definition of Assessable Value, Inclusion and exclusion from Assessable Value, Maximum Retail Price Valuation.
Unit – IV	Assessment Procedure, Demand, Refund and Appeal. Central Exise Value Added Tax Credit System (CENVAT), CG.VAT Nature of customs duty, Types of customs duties, valuation for custom, duty, inclusion and exclusion, valuation under customs act,
Unit – V	Procedures for import and export under Custom Duty. Export incentives, Duty drawback, Powers of customs officers, penalties, confiscation of goods.

लेखांकन पद्धतियाँ (प्रश्नपत्र : D – द्वितीय)
ACCOUNTING METHODS

(Paper : D - Second)

Unit – I	Preparation of Accounts from incomplete records and single entry system. Branch Accounts - Independent and foreign branch, Department accounts.
Unit – II	Lease accounts, Accounting for Price level changes, Human Resource Accounting.
Unit – III	Accounts of Hotel Companies, Accounts for Hospitals, Accounts of professional people.
Unit – IV	Accounting for educational institutions Accounts of Co-operative societies. Accounts of Agricultural farms.
Unit – V	Government Accounting. Insolvency accounts (individual and firm).

SCHEME OF TEACHING AND EXAMINATIONS 2019-2020
MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

FIRST SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit $L+((T+P)/2)$	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MSc(IT)101	Object Oriented Programming with C++	3	2	-	4	100	50	-	150	40	30	-	70
MSc(IT)102	RDBMS and SQL	3	2	-	4	100	50	-	150	40	30	-	70
MSc(IT)103	Mathematical Foundations of Computer Science	3	2	-	4	100	50	-	150	40	30	-	70
MSc(IT)104	Computer System Architecture	3	2	-	4	100	50	-	150	40	30	-	70
MSc(IT)105	Internet and Web Technology	3	2	-	4	100	50	-	150	40	30	-	70
MSc(IT)106	Programming Lab C++	-	-	3x2	3	-	25	100	125	-	15	50	65
MSc(IT)107	RDBMS & SQL Lab	-	-	3x2	3	-	25	100	125	-	15	50	65
	TOTAL	15	10	12	26	500	300	200	1000	200	180	100	480

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Object Oriented Programming with 'C++'

MSc(IT)101

Max Marks : 100

Min Marks : 40

UNIT – I: Language Fundamental

Overview of OOP: The Object Oriented paradigm, Basic concepts of OOP, Benefits of OOP, Object oriented languages, Application of OOP. **Overview of C++:** History of C++, **Data Types:** Built-in data types, User-defined data types, Derived data types. **Constants and Variables:** symbolic constants, Dynamic initialization of variable, Reference variable. **Operators in C++:** **Control Structures:** if-else, nested if-else, while, do-while, for, break, continue, switch, goto statement.

UNIT – II: Structure & Function

Structures: A Simple structure, Defining a structure variable, Accessing structures member, Enumeration data type. **Function:** Function Declaration, Calling Function, Function Definition, **Passing Arguments to function:** Passing Constant, Passing Value, Reference Argument, Structure as argument, Default Argument. **Returning values from function:** return statement, Returning structure variable, Return by reference. Overloaded Function, Inline Function, Templates.

UNIT – III: Object Classes and Inheritance

Object and Class, Defining the class and its member, Making an outside function inline, nesting of member function, array as class member, structure and classes. **Memory allocation:** memory allocation for objects, new and delete operator, static data member, static member functions, object as function argument. **Constructor & Destructor:** Null and default constructor. Parameterized constructor, Constructor with default argument, copy constructor, class destructors, **Inheritance:** Introduction to inheritance, Types of inheritance, function overriding, Constructor in Derived class. **Access specifiers:** public, private, protected.

UNIT – IV: Pointers, Virtual Function and Operator Overloading

Pointers: Introduction, & and * operator, pointer to object, this pointer, pointer to derived class. **Dynamic polymorphism:** Virtual function, Pure Virtual Function, Abstract class. **Static Polymorphism:** Operator keyword, overloading unary operator (++(pre increment and post increment),--) using operator function, overloading binary operators (+, -, ==, >, <=, +=, <=, []), Friend function, Friend class, overloading binary operators using friend function.

UNIT – V: File & Stream

File and Stream: C++ Stream class, unformatted I/O operations, formatted console I/O, manipulators, opening and closing a file, detecting eof, file modes, get(), put(), reading and writing a class object, Updating a file random access.

RECOMMENDED BOOKS:

- Object Oriented Programming with C++ : E. Balagurusamy, The McGraw-Hill
- The C++ Programming Language: Bjarne Stroustrup, Addison Wesley.
- Object Oriented Programming in C++: Robert Lafore, Galgotia Publications.
- Introduction to Object Oriented Programming: K V Witt, Galgotia Publications.
- Object Oriented Programming: G Blaschek, Springer Verlag
- Object Data Management: R Cattell, Addison Wesley.

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RDBMS and SQL MSc(IT)102

Max Marks : 100

Min Marks : 40

UNIT – I: Overview of Database Management

Data, Information and knowledge, file oriented approach verses database oriented approach to data management; data independence, database administration roles, DBMS architecture, different kinds of DBMS users, importance of data dictionary, contents of data dictionary, types of database languages. Data models: network, hierarchical, relational. Introduction to distributed databases, Client/Server databases, Object-oriented databases, Object-relational databases.

UNIT – II: Relational Model & Relational Algebra

Entity - Relationship model as a tool for conceptual design-entities, attributes and relationships. ER diagrams; Extended ER features Generalization, specialization and aggregation; Case studies of ER modeling, Concept of keys; Converting an ER model into relational Schema.

Relational Algebra: select, project, cross product different types of joins (inner join, outer joins, self-join); set operations, Tuple relational calculus, Domain relational calculus, Simple and complex queries using relational algebra.

UNIT – III: SQL and Relational Database Design

Introduction to SQL constructs (SELECT...FROM, WHERE... GROUP BY... HAVING...

ORDERBY...), INSERT, DELETE, UPDATE, DROP, VIEW definition and use, Temporary tables, Nested queries, and correlated nested queries, Integrity constraints: Not null, unique, check, primary key, foreign key, references, Triggers. Embedded SQL and Application Programming Interfaces. Normalization concept in logical model; Pitfalls in database design, update anomalies: Functional dependencies, Join dependencies, Normal forms (1NF, 2NF, 3NF). Boyce Codd Normal form, Decomposition, Multi-Valued Dependencies, 4NF, 5NF. Denormalization.

UNIT – IV: PL/SQL

Introduction to PL/SQL variables – literals – data types – advantages of PL/SQL; Control statements : if ; iterative control – loop, while, for , goto ; exit when; Cursors : Types –implicit, explicit – parameterized cursors – cursor attributes; Exceptions: Types – internal , user-defined , handling exceptions – raise statement; PL/SQL tables and records: Declaring PL/SQL tables - referring PL/SQL tables, inserting and fetching rows using PL/SQL table, deleting rows; records - declaration of records - deleting records; Sub programs: Functions -procedures - in, out, inout parameters; purity functions - packages - package specification -advantages of packages - private and public items - cursors in packages.

UNIT – V: Query Processing and Optimization

Query Processing, Protecting Database and Data Organization -Parsing, translation, optimization, evaluation and overview of Query Processing. Protecting the Data Base - Integrity, Security and Recovery. Domain Constraints, Referential Integrity,

Assertion, Triggers, Security & Authorization in SQL. **Data Organization -File Organization:** Issues in physical design,, File organization for relational tables, Fixed length records, variable length records, Organization of records in files, **Indexing:** Concepts of indexes, indexed files -B-tree, B+-tree, and Hashing Techniques.

BOOKS RECOMMENDED:

- **Database System Concept:** A. Silberschatz , H.F. Korth and S. Sudarshan, TMH
- **Fundamentals of Database Systems:** Elmasri & Nawathe, Pearson Education
- **An Introduction to Database Systems:** C. J. Date, AWL Publishing Company
- **SQL, PL/SQL:** Ivan Bayross, BPB Publication
- **An Introduction to database systems:** Bipin Desai, Galgotia Publication.
- **Database Management System:** A. K. Majumdar & P. Bhattacharya, TMH

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Mathematical Foundations of Computer Science MSc(IT)103

Max Marks : 100

Min Marks : 40

UNIT – I: Mathematical Logic, Sets Relations and functions

Mathematical Logic: Notations, Algebra of Propositions & Propositional functions; logical connectives, Truth values & Truth table Tautologies & Contradictions, Normal Forms, Predicate Calculus, Quantifiers. **Set Theory:** Sets, Subsets, Power sets, Complement, Union and Intersection, De-Morgan's law Cardinality. **Relations:** Cartesian Products, relational Matrices, properties of relations. **Equivalence relation functions:** Injection, Surjection, Bijection, Composition, of Functions, Permutations, Cardinality, the characteristic functions recursive definitions, finite induction.

UNIT – II: Lattices & Boolean Algebra

Lattices: Lattices as Algebraic System, Sub lattices, some special Lattices (Complement, Distributive, Modular). **Boolean algebra:** Axiomatic definitions of Boolean algebra as algebraic structures with two Operations, Switching Circuits.

UNIT – III: Groups Fields & Ring

Groups: Groups, axioms, permutation groups, subgroups, co-sets, normal subgroups, free subgroups, grammars, language. **Fields & Rings:** Definition, Structure, Minimal Polynomials, Irreducible Polynomials, Polynomial roots & its Applications.

UNIT – IV: Graphs


Graphs: Simple Graph, Multigraph & Psuedograph, Degree of a Vertex, Types of Graphs, Sub Graphs and Isomorphic Graphs, Operations of Graphs, Path, Cycles and Connectivity, Euler and Hamilton Graph, Shortest Path Problems BFS(Breadth First Search), Dijkstra's Algorithm, Representation of Graphs, Planar Graphs, Applications of Graph Theory.

UNIT – V: Trees


Trees: Trees, Properties of trees, pendant vertices in a tree, center of tree, Spanning tree, Binary tree, Tree Traversal, Applications of trees in computer science.

BOOKS RECOMMENDED:

- A text book of Discrete Mathematics: Swapan Kumar Sarkar, S.Chand & company Ltd.
- Discrete Mathematical structure with applications to computer science: J.P Trembly & R. Manohar, TMH
- Discrete Mathematics: K.A Ross and C.R.B Wriht,
- Discrete Mathematics Structures for computer science: Bernard Kohman & Robert C. Bushy.
- Discrete Mathematics: Seymour Lipschutz Mare Lipson, TMH Edition.


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Computer System Architecture MSc(IT)104

Max Marks : 100

Min Marks : 40

UNIT – I Representation of Information and H/w component

Number system (decimal, BCD, octal, hexadecimal) and conversions, r and $r-1$'s complement, Fixed and Floating point representation, Binary codes: Excess-3, ASCII, EBCDIC, Error detection codes. Boolean Algebra, Map simplification K-Map, Logic Gates, **Combinational Circuit**: Half and Full Adder, Decoder and Multiplexer; **Sequential Circuit**: Flip-Flop (SR, D, JK, Master-Slave,T), 4 bit Register, Register with parallel load, Shift register, Binary ripple Counter, Binary synchronous counter.

UNIT – II Register transfer language and micro operations

Register Transfer Language (RTL), Concepts of bus, Bus and Memory transfers, **Micro-operation**: Arithmetic, Logic and Shift micro operation, Instruction code, Computer registers, Computer instructions, Timing and control, Instruction Cycle and Interrupt Cycle, Memory reference instructions, Input-output and interrupt, Design of basic computer

UNIT – III Programming Computers and CPU

Machine Language, Assembly Language, Assembler, Program Loops, Input /Output, Programming, General register organization, Stack organization, Instruction format, Addressing modes, Data transfer and manipulation language, Micro-programmed and Hardwired control, RISC Vs. CISC, **Pipelining in CPU design**: , Parallel Processing ,Arithmetic and RISC pipelining.

UNIT – IV Computer Arithmetic and I/O Techniques

Addition, Subtraction, Division and Multiplication Algorithm, Input-Output Interface, asynchronous data transfer; **Modes of transfer**: Programmed I/O, Interrupt Mechanism, Direct Memory Access (DMA), I/O Processor.

UNIT – V Memory Organization

Memory hierarchy: Static and Dynamic RAM, ROM; Building large memory using chips, Associative Memory: associative mapping, Direct mapping, set associative mapping; Cache Memory Organization, Virtual Memory.

BOOKS RECOMMENDED:

- Computer System Architecture, *Morris Mano*, PHI, 3rd Edition)
- Computer Organization and Architecture, *William Stallings*, PHI
- Computer organization and Architecture, *J.P.Hayes*, TMH.
- Digital Computer Logic Design, *Morris Mano* ,PHI
- Computer System Architecture and organization, *Dr. M. Usha*, and *T. S. Shrikant*, Wiley publication.
- Digital Computer Electronics, *Malvino*.
- Structured Computer Organization, *Andrew S. Tanenbaum*, PHI
- Modern Digital Electronics, *R.P.Jain*, TMH
- Fundamental of microprocessors, *B. Ram*

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Internet and Web Technology MSc(IT)105

Max Marks : 100

Min Marks : 40

UNIT – I

Introduction to Computer and Hardware: Introduction of Information Technology, History of Computers, Organization of computers, Number Systems, Programming language and types, Public domain software, Applications of Information Technology in business, industry, entertainment, science, engineering and medicine.

UNIT – II

Internet and its Application: Evolution of internet, Internet applications, TCP/IP, Addressing in Internet (IP), Domains, Internet service providers, Connectivity such as dial up, leased line, VSAT. E-mail protocols (X-400, SMTP, UUCP), Description of E-Mail headers, Email routing, e-mail client, POP-3, IMAP- 4.

UNIT – III

FTP and Telnet: Introduction to File Transfer Protocol (FTP), Types of FTP servers (including anonymous), Telnet protocol, Telnet client, Terminal emulation. Usenet and Internet relay chat, Web publishing tool, Website planning, Website Hosting , Multiple sites on one server, Maintaining a web site, WWW servers, HTTP & URLs, Registration of website on search engines , maintenance of website.

UNIT – IV

Dynamic HTML and Web Designing: HTML Basic concepts, Web designing issue, Structure of HTML documents, HTML Elements: Core attributes, Language attributes, Core Events, Block Level Events, Text Level Events, Linking Basics, Linking in HTML, Images and Anchors, Anchor Attributes, Image Maps, Semantic Linking Meta Information, Image Preliminaries, Image Download issues, Images as Buttons, Introduction to Layout: Backgrounds, Colors and Text, Fonts, Layout with Tables, Introduction to CSS.

UNIT – V

Internet Security: Internet security vulnerability and threats, Firewalls, Introduction to AAA, Malwares. **E-Commerce:** Introduction, Concepts & technology, Advantages, Limitations, Various electronics payment system, Payment Gateways, Introduction to EDI.

BOOKS RECOMMENDED:

- **Computers Today**, S.K.Basadra, Galgotia Publication.
- **Internet for Every One**, Alexis Leon and Mathews Leon, Tech World.2008 print.
- **Introduction to Computers**, P.K.Sinha, BPB Publication.
- **Fundamentals of Computers**, V. Rajaraman, Prentice Hall of India.
- **HTML Complete Reference**, Thomas A. Powell, TMH
- **Frontiers of Electronics of Commerce** , Ravi kalakota & Andrew B. Whinston, Addison Wesley

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SCHEME OF TEACHING AND EXAMINATIONS 2019-2020
MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

SECOND SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit $L + ((T + P) / 2)$	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MSc(IT)201	.NET Technology	3	2	-	4	100	25	-	125	40	15	-	55
MSc(IT)202	Data Structures	3	2	-	4	100	25	-	125	40	15	-	55
MSc(IT)203	Computer Networks & Data Communication	3	2	-	4	100	25	-	125	40	15	-	55
MSc(IT)204	Operating System (with Linux as case Study)	3	2	-	4	100	25	-	125	40	15	-	55
MSc(IT)205	AI & Expert Systems	3	2	-	4	100	25	-	125	40	15	-	55
MSc(IT)206	Programming Lab – Based on 201	-	-	3x2	3	-	50	100	150	-	30	50	80
MSc(IT)207	Programming Practice - Based on 202	-	-	2	1	-	50	50	100	-	30	25	55
MSc(IT)208	Common Software - Based on 203/204	-	-	2	1	-	50	50	100	-	30	25	55
MSc(IT)209	Personality Development / Group Discussion	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	12	26	500	300	200	1000	200	180	100	480

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.NET Technology
MSc(IT)201

Max Marks : 100

Min Marks : 40

UNIT – I: Inside the .NET framework:

Overview of .net framework, Managed Execution process, CLR, common language specification, JIT Compilation , MSIL, Namespaces, Assemblies, metadata, Common Type System, cross language, interoperability, Garbage collection.

UNIT – II: Programming with .NET Framework

Windows form: working with Visual Studio IDE, creating a .NET solution, MDI application, components and controls, Data types, variables, Type conversions, Operators, Control **Structures:** conditional statements, loops, arrays, types of methods, method data, Introduction to exception handling-exception statements.

UNIT – III: XML, Windows process and File Handling

Types, structures, Enumerations, classes, Interfaces, Working with files-Files and directories, streams, Readers and writers, Reading and writing XML files, XML serialization, processing Transaction, Monitoring and Managing Windows Process, retrieving information about process.

UNIT – IV: Building .NET Framework Applications

Introduction to ASP .NET, Differentiate classic ASP and ASP .NET, Web application, Web forms, Form validations – Client side, Server side, controls in web forms, Events in Web form.

UNIT – V: Advanced concepts and Database Programming

Delegates, ADO .NET Architecture, .NET data provider, dataset components, creating database applications using Window forms and web forms (Database connectivity through ADO .NET), Introduction to web services, web services for Mobile application, Remote overview.

BOOKS RECOMMENDED:

- **MSDN online** – by Microsoft
- **Visual Basic .NET Complete** - BPB Publications, New Delhi.
- **The Complete Reference VB .NET**, Jeffery R. Shapiro, Tata McGraw Hill.
- **Professional VB .NET 2003**, Bill Evjen & others, Wiley India (P) Ltd.


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Data Structures MSc(IT)202

Max Marks: 100

Min Marks : 40

UNIT – I Array and Linked Lists

Introduction to data structure, Primitive data structure, Introduction to Algorithm analysis for time and space requirement, Rate of growth and Order notation, Basic time and space analysis of an algorithm. Linear Array, Representations of Array in Memory, Traversing, Insertion and Deletion in Linear Array, Multidimensional Array. Linked list, Representation of linked lists in memory, Traversing a linked list, Searching a linked list, Memory Allocation, Insertion into a linked List, Deletion from a Linked List, Header Linked List, Two- Way Linked Lists, Circular Linked List.

UNIT – II Stack and Queues

Stacks Definition, concepts, operation and application of Stacks, Recursion and Polish notations, Quick sort, tower of Hanoi, Queue, Priority Queue: definition concepts, operation and application of Queue, circular queue and Dequeue. Linked representation of stack and queue.

UNIT – III Trees and Its Representation:

Terminologies related to trees, Binary Tree, complete binary tree, almost complete binary tree; Tree Traversals- preorder, in order and post order traversals, their recursive and non-recursive implementations, Expression tree-evaluation, Linked representations of binary tree, operations, header nodes; threads, **Binary Search Tree**: searching, Inserting and deleting in BST, Heap; Path Lengths; Huffman's Algorithms. Basic idea of AVL Tree.

UNIT – IV Graphs:

Related definitions; Graph representations- adjacency matrix, adjacency list, adjacency multi-list; Traversal schemes - depth first search, breadth first search; Minimum spanning tree; Shortest path algorithm; Kruskal and Dijkstra's algorithms.

UNIT – V Searching, Hashing and Sorting:

Searching : Linear Search, Binary Search, Searching and data modification Hashing- Basics, methods, collision, resolution of collision, chaining; Internal Sorting, External sorting - Bubble Sort, Insertion Sort, Selection Sort, Merge sort, Radix sort, heap sort.

BOOKS RECOMMENDED:

- **Fundamental of Data Structures**, Horowitz and Sahani, Galgotia Publishers.
- **Data Structures and Program Design in C**, Kruse R.L, PHI.
- **Data Structures using C and C++**, Tanenbaum, PHI.
- **Data Structures**, Schaum Series.
- **Data Structures**, Bhagat Singh.
- **Data Structures** - Trembley and Sorenson.


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Computer Networks & Data Communication MSc(IT)203

Max Marks : 100

Min Marks : 40

UNIT – I

Introduction to Computer Networking: The Concept of Networking, Data Communication, Required network elements, The role of Standards Organization. Line Configuration, Various Topologies, Transmission Mode, Categories of Networks- LAN, MAN, WAN. The benefits of a Computer Networks. **The OSI and TCP/IP Reference Model:** The Concept of Layered Architecture, Design Issues for the Layers. Interfaces and services, Detailed Functions of the Layers. Comparison between OSI and TCP/IP Reference model.

UNIT – II

Transmission of Digital Data: Shannon's and Nyquist theorems for maximum data rate of a channel. Transmission media- Co-axial, UTP, Fiber optic and wireless. Analog and digital data Transmission- parallel and serial transmission. DTE-DCE interface using RS-232C. Study of modems- 56k and Cable Modem. Modem standards. **Multiplexing and Switching:** The Concept of Multiplexing- FDM, TDM, WDM. The Concept of Switching- Circuiting, Message switching, Packet switching.

UNIT – III

Data Link Layer and Routing Algorithms: Line Discipline, Flow Control- stop and wait, sliding window, Go back N, Error Control- ARQ stop and wait, sliding window ARQ. HDLC, SLIP, PPP. Multiple access protocols- ALOHA, Slotted ALOHA, CSMA/CD. IEEE standards for LAN's and MAN's. The IP protocol, and its header. IP address classes and subnet mask. **The concept of ICMP, ARP, RARP, RSVP, CIDR and Ipv6:** Routing algorithms- shorted path first, Distance Vector, Link State. Congestion Control-The leaky bucket and Token bucket Algorithms.

UNIT – IV

Transport Layer: The Concept of client and Server in terms of Socket addressing in Transport layer. Two way and three-way handshaking. TCP header. Network Performance Issues. The Concept of Domain Name System, Various Resource Records. Architecture and services of E-mail (RFC-822 and MIME). The Concept of World Wide Web- server side and client side. **ATM:** The concept of ATM, ATM Adoption layers- AAL1, AAL2, AAL3/4, AAL5, Comparison of AAL protocols. Cell formats for UNI and NNI. Service Categories, Quality of service, Congestion Control in ATM.

UNIT – V

Comparative study of Networking Technologies: X.25, Frame Relay, ATM, SONET, SMDS, ISDN.

Network Security: The Importance of Security in Networking. Traditional Cryptography, Data Encryption Standards, RSA algorithm.

BOOKS RECOMMENDED:

- Computer Networks - A S Tanenbaum
- Data Communication and Networking - B A Forouzan

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Operating Systems (with Linux as case study) MSc(IT)204

Max Marks : 100

Min Marks : 40

UNIT – I: Introduction

Defining operating system, History and Evolution of operating system, **Basic Concepts**: batch processing, spooling, multiprogramming, multiprocessor system, time sharing, real time systems, Functions and Goals of operating system, Operating system as resource manager, Operating system as an abstract machine.

UNIT – II: Processor Management

Process concept, Process Control Block, **Process State**: State Transition Diagram, **Scheduling Queues**: Queuing Diagram, Types of schedulers-context switching and dispatcher, various types of CPU scheduling algorithms and their evaluation, multilevel queues and multilevel feedback queues, Thread life cycle, multithreading.

UNIT – III: IPC and Dead Locks

Inter Process Communication: competing and co-operating processes, Introduction to concurrent processing, Precedence graphs, Critical section problem, Semaphore concept, Study of classical process synchronization problems: Producer-Consumer, Dining Philosophers. **Deadlocks**: The dead lock problem, dead lock definition, **Deadlock Characterization**: necessary condition, resource allocation graph, **Deadlocks handling**: Deadlock prevention, Deadlock avoidance, Banker's algorithm, Deadlock detection, Recovery from Deadlock.

UNIT – IV: Memory Management

Preliminaries of memory management, Contiguous memory allocation, partitioned allocation MFT, fragmentation, MVT, partition allocation policies, compaction, Non-Contiguous memory allocation, Paging, Structure of page table, Segmentation, **Virtual Memory**: Concepts, demand paging, Swapping, **Page replacement policies**: FIFO, Optimal, LRU, MRU, Thrashing. **Secondary Storage**: Hierarchy, physical characteristics, evaluation of disk access time and data transfer rate, **Scheduling algorithms**: FCFS, SCAN etc.

UNIT – V: File and Device Management

File concept: file types, file directory maintenance, file sharing, basic file system structure, access methods-sequential and direct access, free space management contiguous, linked allocation and indexed allocation and their performances. **Protection and Security**: principle of protection, domain structure, access matrix, access control, the security problems. **Distributed systems**: Introduction & Features, Types of distributed OS.

BOOKS RECOMMENDED:

- **Operating System Concepts**, Abraham Silberschatz, Peter B. Galvin and Greg Gagne (Wiley India Edition)
- **Modern Operating System**, Andrew S. Tanenbaum, (PHI)
- **Operating System Concepts**, James L. Peterson and Abraham Silberschatz (Addison-Wesley)
- **Operating System Concepts & Design**, Milan Milenkovic (MGH)
- **An Introduction to Operating Systems**, Harvey M. Dietel (Addison Wesley)

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Artificial Intelligence & Expert Systems MSc(IT)205

Max Marks : 100

Min Marks : 40

UNIT – I

Introduction to AI: Foundations of AI, Philosophy and History; AI problems, AI technique; The Turing Test. **Intelligent Agents:** Agents and Environments, the Concept of Rationality, the Nature of Environments and the Structure of Agents. **Problem solving & State Space Search:** General problem solving: defining problems as State Space Search, Problem Characteristics; Production Systems & their characteristics.

UNIT – II

Exhaustive Searches: Generate and Test, Breadth First Search, Depth First Search and DFID
Heuristic Search Techniques: Branch and Bound technique; Best first search; A* algorithm; Problem Reduction AND/OR Graphs and AO* algorithm. **Local Searches & Optimizations:** Hill climbing and its variants. **Constraint Satisfaction Problems:** Definition; Constraint Propagation and Backtracking. **Game Playing:** Mini-Max Search Procedure; Alpha-Beta Cutoffs; Additional Refinements.

UNIT – III

Knowledge Representation: Types of Knowledge; Knowledge Representation Issues; **Logic:** First order Predicate Logic; Representation of facts in FOL; Inference in FOL; Resolution Principle, Clausal Form and Unification; **Inference Mechanisms:** Forward and Backward Chaining; **Slot and Filler Structures:** Semantic Networks; Frame Systems and value inheritance; Conceptual Dependency; Scripts;

UNIT – IV

Reasoning under Uncertainty: Non-monotonic Reasoning, Probabilistic Reasoning and Uncertainty; Probability Theory; Bayes Theorem and Bayesian networks; Certainty Factor; Dempster-Shafer Theory. **Planning:** Overview; The Blocks World; Component of a Planning System: Goal Stack Planning; Nonlinear Planning; **Natural Language Processing:** Introduction, Overview of Linguistics, Grammars and Languages; context sensitive and context free grammar; Chomsky Hierarchy, Parsing techniques: Recursive Transition Nets, Augmented Transition Nets, Semantic Analysis: Case, Logic and Semantic grammars;

UNIT – V

Expert Systems: Introduction, Characteristics, History and Applications of expert systems; Expert System Shells; Rule Based Systems Architectures, Non Production System Architectures; Knowledge Acquisition and Validation; Case Studies: MYCIN & DENDRAL. **Learning:** Rote learning; Learning by Taking Advice; Induction; Explanation based learning; Discovery; Analogy.

BOOKS RECOMMENDED:

- **Artificial Intelligence**, Rich E., Knight K. and Nair S. B., McGraw Hill Education
- **Artificial Intelligence: A Modern Approach**, Russell S. J. and Norvig P., Pearson Education
- **Introduction to Artificial Intelligence and Expert Systems**, Patterson D. W., PHI
- **Principles Of Artificial Intelligence**, Nilson N. J., Narosa Publications
- **Artificial Intelligence**, Winston P. H., Pearson Education

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SCHEME OF TEACHING AND EXAMINATIONS 2019-2020
MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

THIRD SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+ ((T+P)/2)	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MSc(IT) 301	Java Programming Language	3	2	-	4	100	25	-	125	40	15	-	55
MSc(IT) 302	Python Programming Language	3	2	-	4	100	25	-	125	40	15	-	55
MSc(IT) 303	Software Engineering	3	2	-	4	100	25	-	125	40	15	-	55
MSc(IT) 304	Electives : 1. Advanced Computer Architecture 2. Data Mining & Warehousing 3. Cloud Computing 4. Digital Image Processing	3	2	-	4	100	25	-	125	40	15	-	55
MSc(IT) 305	Electives : 1. Mobile Communication 2. Theory of Computations 3. Internet of Things 4. Analysis and Design of Algorithms	3	2	-	4	100	25	-	125	40	15	-	55
MSc(IT) 306	Programming Lab - Based on 301	-	-	3x2	3	-	50	100	150	-	30	50	80
MSc(IT) 307	Programming Practice - Based on 302	-	-	2	1	-	50	50	100	-	30	25	55
MSc(IT) 308	Common Software/Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MSc(IT) 309	Managerial Skills / Seminar	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	12	26	500	300	200	1000	200	180	100	480

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Java Programming Language MSc(IT)301

Max Marks : 100

Min Marks : 40

UNIT – I: Introduction to Java Programming

An overview of Java: Object Oriented Programming, Features of Java, Java Virtual Machine, Java Environment: Java Development Kit, Java Standard Library, Data Types, **Variables:** Declaring a variable, Dynamic Initialization, The scope and life time of variable, Type conversion and Casting: Narrowing and Widening Conversions, Numeric Promotions, Type Conversion Contexts; **Operators:** Arithmetic Operators, Relational Operators, Logical Operators, Bit wise Operators, Conditional Operators, new operator, [] and instance of operator. **Control Statements:** Java's Selection statement, Iteration Statement, Jump Statement. **Arrays:** Declaring Array variables, constructing an Array, Initializing an Array, Multidimensional Arrays, Anonymous Arrays.

UNIT – II: Classes and Interface

Introducing Classes: Class Fundamentals, Declaring Object, Assigning Object Reference Variables, Defining **Methods:** method overloading and overriding, Using objects as parameter, Constructors, Garbage collection, finalize () method. **Inheritance:** Inheritance basic, method overloading, object reference this and super, Chaining constructor using this () and super (), Member accessibility modifier: public, protected, default accessibility of member, private protected, private, **Package:** Define package, CLASSPATH, importing package, **Interface:** Define an interface, implementing interface, extending interface, variable in interface, **Overview of Nested Class:** Top level nested class and interface, Non static inner class, Local class, Anonymous class.

UNIT – III: Exception handling and Multithreading

Exception Handling: Exception types, Uncaught Exception, Using try and catch, multiple catch, nested try block, throw, throws, and finally. **Multithreading:** Creating Thread, Thread Priority, Synchronization, Thread Scheduler, Running & Yielding, Sleeping & Waking Up, Waiting & Notifying, Suspending & Resuming; miscellaneous methods in thread class.

UNIT – IV: Fundamental Library Classes of Java and Input / Output

Object class, String class, String Buffer class, Wrapper class, Math class, Collection: Collection interface, List interface, Set interface sorted interface, Array List class, Linked List class, Tree Set, Comparator, Vector, Stack. **I/O Classes and Interfaces:** File, Buffer Stream, Character Stream, and Random Access for files, Object Serialization.

UNIT – V: Events, GUI and JDBC

Event Handling: Overview of Event Handling, Event Hierarchy, The Delegation Event Model, Event Classes, KeyEventClass, Sources of Events, Event Listener Interfaces, Using the Delegation Event Model, Event Adapters. **GUI Programming:** Introduction to Swing, History, Features, Components and Containers, Swing Packages, Painting, Swing Component Classes; **JDBC:** Introduction to JDBC, JDBC Drivers Type, Connection, JDBC URLs, Driver Manager, Statement – Creating, Executing, Closing, Result Set – Data Types and Conversions, Prepared Statement, Callable Statement, Mapping SQL and Java Types.

BOOKS RECOMMENDED:

1. **Java: The Complete Reference**, Herbert Schildt, Oracle Press.
2. **Core Java: Volume-I & Volume 2**, Cay S. Horstmann & Gary Cornell, PEARSON
3. **Programming with Java**, E. Balagurusamy, McGraw Hill Education
4. **Core Java**, R. Nageshwara Rao, Dreamtech Press

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Python Programming Language

MSc(IT)302

Max Marks : 100

Min Marks : 40

UNIT – I

Introduction to Python Programming: What is a Program, Formal and Natural Languages, Why use Python, Uses of python, Strengths & Drawbacks, The Python Interpreter, Running Python, The IDLE User Interface, The Interactive Prompt, Script Mode, Dynamic Typing , Debugging. **Types, Operators, Expressions & Statements:** Values and Types, Assignment Statement, Variable Names, Expressions & Statements, Order of Operations, String Operations, Comments.

UNIT – II

Conditionals: Boolean Expressions, Logical operators, Conditional & Alternative Execution, Chained and Nested Conditions. **Iterations:** Reassignment, Updating Variables, The “for” and “while” statements, break. **Strings:** String is a sequence, len, Traversal with a for loop, String Slices, Searching, Looping and Counting, String Methods, the “in” operator, String Comparison.

UNIT – III

Lists: List is a Sequence, Traversing and other Operations, List Slices, List Methods, Map Filter and Reduce, Deleting Elements, Lists and Strings, Objects and Values, Aliasing, List Arguments. **Dictionaries:** A Mapping and as a Collection of Counters, Looping and Dictionaries, Reverse Lookup, Dictionaries and Lists, Memos, Global Variables. **Tuples:** Tuple Assignments, Tuples as Return Values, Variable Length Argument Tuples, Lists and Tuples, Dictionaries and Tuples, Sequence of Sequences.

UNIT – IV

Functions: Function Calls, Math Functions, Composition, Adding New Functions, Definitions & Uses, Flow of Execution, Parameters and Arguments, Why Functions, Stack Diagrams, Void and Fruitful Functions, Return Values, Incremental Development, Composition, Boolean Functions, Checking Types. **Recursion:** Stack Diagram for Recursive Functions, Infinite Recursion, Taking Input from Keyboard, More Recursion.

UNIT – V

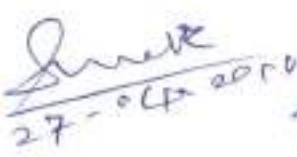
Files: Files & Persistence, Reading and Writing, Format Operator, Filenames and Paths. **Miscellaneous Topics:** Catching Exceptions, Databases, Pickling, Pipes, Modules. **Object-Oriented Programming:** Programmer defined Types, Attributes, Instances as Return Values, Classes and Functions, Classes and Methods, Inheritance and Polymorphism.

BOOKS RECOMMENDED:

1. **Learning Python** 5th Edition, Mark Lutz, O'Reilly Publications
2. **Core Python Programming**, R. Nageshwara Rao, Dreamtech Publications
3. **Think Python** 2nd Edition, Allen B. Downey, O'Reilly Publications
4. **Beginning Python: Using Python 2.6 and Python 3.1**, James Payne, Wiley
5. **Python Essentials Reference**, 4th Edition, David M. Beazley, Addison – Wesley
6. **Practical Programming: An Introduction to Computer Science Using Python 3**, Paul Gries et al., Pragmatic Programmers
7. **Python Complete Reference**, Tata McGraw Hill


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Software Engineering MSc(IT)303

Max Marks : 100

Min Marks : 40

UNIT – I: Software Engineering Fundamentals:

Introduction to Software Engineering; Software Engineering Principles(Layers); Software Process – Process Framework, Umbrella Activities, Process Adaptation; Software Crisis; Process Models-Waterfall Model, Prototype Model, Incremental Model, Spiral Model, RAD Model; Agile Process.

UNIT – II: Software Analysis and Design:

Requirement Engineering; Analysis Model-Data Flow Diagram, Data Dictionary, E-R Diagram, Decision Table; Software Requirements Specification(SRS), Structure of SRS; Pseudo code; Software Design; Design Process; Design Concepts-Abstraction, Partitioning, Modularity, Information Hiding, Refinement, Refactoring; Function Oriented Design; Object Oriented Design; Cohesion and Coupling.

UNIT – III: Software Quality and Case Tools:

Software Metrics, Categories of Metrics, Function Point Metric; Software Quality; McCall's Quality Factors; Software Maturity Model-CMM, CMMI; Software Quality Assurance; ISO Standards-9000, 9001 and 9126; Software Reliability; Case Tools and its Scope; Case Objectives; Architecture of Case Tools; Case Classification.

UNIT – IV: Coding and Testing:

Programming Style; Structured Programming; Coding Standard; Internal Documentation; Software Testing-Verification and Validation; Alpha and Beta Testing; Levels of Testing-Unit, Integration and System Testing; Testing Techniques- White Box, Black Box; Cyclomatic Complexity; Test Plan; Debugging-Debugging Process, Debugging Strategies(Approaches).

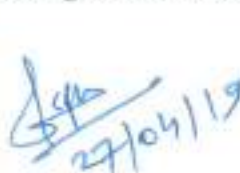
UNIT – V: Software Maintenance and Project Management:

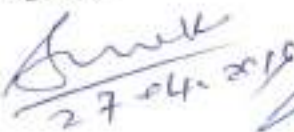
Risk Management – Software Risk, Risk Identification; Introduction to Software Maintenance, Categories of Maintenance; Belady and Lehman Model; Boehm Model; Project Management Concept – People, Product, Process, Project, Software Team; Software Project Planning; Software Project Estimation; Cost Estimation Model(COCOMO, COCOMO II, Putnam-SLIM, Walston and Felix); Software Reengineering.

RECOMENDED BOOKS:

1. **Software Engineering: A Practitioner's Approach**, Roger S. Pressman, TMH
2. **An Integrated approach to Software Engineering**, Pankaj Jalote, Narosa Publications
3. **Software Engineering**, Bharat Bhushan Agarwal.


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Advanced Computer Architecture MSc(IT)304- Elective 1

Max Marks : 100

Min Marks : 40

UNIT – I

Introduction - Feng's and Flynn's classification scheme, Multiprocessor and Multicomputer, UMA, NUMA, COMA, NORMA, memory models, parallel computer and its type. Applications of Parallel Computers.

UNIT – II

System Interconnect Architecture – Static and Dynamic, Hypercube Interconnection network, multistage interconnection networks-architecture and routing, design consideration, throughput delay, blocking and non-blocking properties. Performance Metrics and Benchmarks.

UNIT – III

Principle of pipelining-overlapped parallelism, Linear and non-linear pipelining, reservation table, calculation of MAL, Types of Instruction Pipeline. Arithmetic pipeline designs example –Floating point adder, pipelined multiplier.

UNIT – IV

Advanced processor Technology – RISC, CISC, VLIW architectures, Hazard detection and resolution, functional organization of instruction in IBM 360/91.

UNIT – V

Exploring parallelism in program- multidimensional arrays. Parallel Algorithm-Matrix addition, subtraction, multiplication –block and SIMD. Bitonic sort, sorting on linear array processors. Bernstein's condition, ISO efficiency concept.

BOOKS RECOMMENDED:

- 1 **Computer Architecture & Parallel Processing**, Kai Hwang and F.A. Briggs, McGraw Hill.
- 2 **Advanced Computer Architecture**, Kai Hwang, McGraw Hill.
- 3 **Parallel Computing**, M.R. Bhujade, New Age Publication.
- 4 **Parallel Computing Theory and Practice**, Michael J. Quinn, Tata McGraw Hill


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Data Mining & Warehousing MSc(IT)304- Elective 2

Max Marks : 100

Min Marks : 40

UNIT – I

Introduction: KDD (Knowledge Discovery from Databases), Fundamentals of data mining, Data Mining Functionalities, Major issues in Data Mining, Data Warehouse and OLAP Technology, Multidimensional Data Model, Data Warehouse Architecture, OLAP operations, Warehouse schema.

UNIT – II

Data Preprocessing & Data Mining Languages: Need of Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation, Data Mining Primitives, Data Mining Query Languages, Architectures of Data Mining Systems, Concepts Description: Characterization and Comparison, Analytical Characterization.

UNIT – III

Association Rule Mining, Classification and Prediction: Association Rule Mining, Market Basket Analysis, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Apriori algorithm, FP-Tree growth algorithm, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation.

UNIT – IV

Cluster Analysis: Types of Data in Cluster Analysis, Outlier Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods.

UNIT – V

Mining Complex Types of Data: Web Mining, Text Mining, Multimedia Mining, Temporal and Spatial Data Mining, Trends in Data Mining, Data Mining Applications.

RECOMENDED BOOKS:

1. **Data Mining: Concepts and Techniques**, Jiawei Han and Micheline Kamber
3. **Data Mining Techniques**, Arun K Pujari,
4. **Data Mining Introductory and Advanced Topics**, Margaret H Dunham, Pearson


The bottom section of the page contains several handwritten signatures and dates in blue ink. From left to right, the signatures are: 1. A large signature with the date '27-4-19' below it. 2. A signature with the date '27/04/19' below it. 3. A signature with the date '27-04-2019' below it. 4. A signature with the date '27-04-19' below it. 5. A signature with the date '27/4/19' below it. Below the first signature, there is another signature with the date '27/4/19'. Below the second signature, there is another signature.

Cloud Computing MSc(IT)304- Elective 3

Max Marks : 100

Min Marks : 40

Unit – I

Introduction: Cloud Computing: Vision, Definition, Reference Model, Characteristics, Benefits and Challenges, Historical Developments, Cloud Computing Environments, Cloud Platforms and Technologies; The Evolution of Cloud Computing: Parallel Computing vs. Distributed Computing, Elements of Parallel Computing, Elements of Distributed Computing, Technologies for Distributed Computing, Introduction of Grid Computing.

Unit – II

Virtualization: Introduction, Characteristics, Taxonomy of Virtualization, Levels of Virtualization, Structure and Mechanism of Virtualization, Virtualization and Cloud Computing, Advantages and Disadvantages, Virtualization Technology Examples: Xen, VMware, Microsoft Hyper-V.

Unit – III

Cloud Computing Architecture: Service Oriented Architecture, Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), Data Storage as a Service (DSaaS). Types of Clouds; Economics of the Cloud and Open Challenges; **Security and Organizational aspects:** Host Security and Data Security.

Unit – IV

Migration to the Cloud: Adoption and use of Cloud by Businesses (Small and Enterprise), Pace of Adoption, Benefits and Phases of Adoption, Cloud Service Provider's Capabilities and Liabilities, Success factors and Issues. **Migrating Applications:** Key Aspects, Migration Techniques, Phases of Migration. **Service Level Agreement (SLA):** Aspects and Requirements, Availability and Outages, Credit Calculations, SLA Samples.

Unit – V

Industry Platforms: Amazon Web Services, Google AppEngine, Microsoft Azure; **Cloud Applications:** Scientific Applications, Business and Consumer Applications; Advanced Topics: Energy Efficiency in Clouds, Market Based Management, Federated Clouds / InterCloud, Third Party Cloud Services.

RECOMMENDED BOOKS:

1. **Mastering Cloud Computing**, Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, McGraw Hill Education
2. **Cloud Computing: Black Book**, Kailash Jayaswal et al., Kogent Learning Solutions, Dreamtech Press
3. **Cloud Computing: Principals and Paradigms**, Rajkumar Buyya et al., Wiley India
4. **Cloud Computing: Concepts, Technology & Architecture**, Erl, Pearson Education India
5. **Cloud Computing Bible**, Barrie Sosinsky, O'Reilly Media
6. **Cloud Computing: A Practical Approach**, Toby Velte, Anthony Vote and Robert Elsenpeter, McGraw Hill
7. **Cloud Application Architectures: Building Applications and Infrastructures in the Cloud**, George Reese, O'Reilly Media.
8. **Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance**, Tim Matherm Subra Kumaraswamy and Shahed Latif, O'Reilly Media

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Digital Image Processing MSc(IT)304 - Elective 4

Max Marks : 100

Min Marks : 40

Unit – I

Introduction: Digital Image Fundamentals Origins of Digital Image Processing, examples, Fundamental Steps in Digital Image Processing, Components of an Image Processing System, Image Sensing and acquisition Basic Concepts in Sampling and Quantization, Representing Digital Images, Zooming and Shrinking Digital Images, Some Basic Relationships Between Pixels, Linear and Nonlinear Operations.

Unit – II

Image Enhancement Spatial Domain: Some Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters, Combining Spatial Enhancement Methods, **Frequency Domain:** Background, Image Enhancement in the Frequency Domain, Introduction to the Fourier Transform and the Frequency, Domain, Smoothing Frequency-Domain Filters, Sharpening Frequency Domain Filters, Homomorphic Filtering

Unit – III

Image Restoration A Model of the Image degradation/Restoration process, Noise Models, Restoration in the Presence of Noise Only–Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering.

Unit – IV

Image Compression: Fundamentals, Image Compression Models, Error-Free Compression, Lossy Compression, Image Compression Standards. **Morphological Image Processing:** Dilation and Erosion, Opening and Closing, Hit-or-Miss Transformations, Some Morphological Algorithms.

Unit – V

Segmentation Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation. **Representation and Description:** Representation, Boundary Description and Regional Descriptor.

RECOMMENDED BOOKS:

1. **Digital Image Processing**, Rafael C Gonzalez and Richard E. Woods, Pearson
2. **Fundamentals of DIP**, A.K. Jain, PHI.
3. **Digital Image Processing Using MATLAB**, Gonzalez, Woods and Eddins, McGraw Hill Education

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Mobile Communication MSc(IT)305 - Elective 1

Max Marks : 100

Min Marks : 40

UNIT – I: Introduction.

Introduction to Mobile Communication, Short history of wireless communication, Applications, Vehicles, Emergency, Business, Replacement of wired network, Location dependent services, infotainment, Mobile and Wireless devices, A Simplified reference model, some open research topics in mobile communication.

UNIT – II: Satellite Systems

History of satellite system, Applications of satellite systems, Type of satellite systems, characteristics of satellite systems, satellite system infrastructure, satellite system architecture, Global Positioning system (GPS), Limitations of GPS. Beneficiaries of GPS, Applications of GPS

UNIT – III: Mobile Communication Systems

Introduction, Cellular System Infrastructure,, Registration, Handoff Parameters and Underlying support, Roaming Support Using System Backbone, to Mobile IP, Functions of Mobile IP, Mobile Node, Corresponding Node, Home Network, Foreign Network, Home Agent, Foreign Agent, Care-of Address, IP Packet Delivery, Agent Discovery, Agent Solicitation, Registration, Tunneling, Dynamic host configuration protocol.

UNIT – IV: Wireless LANs and PANs

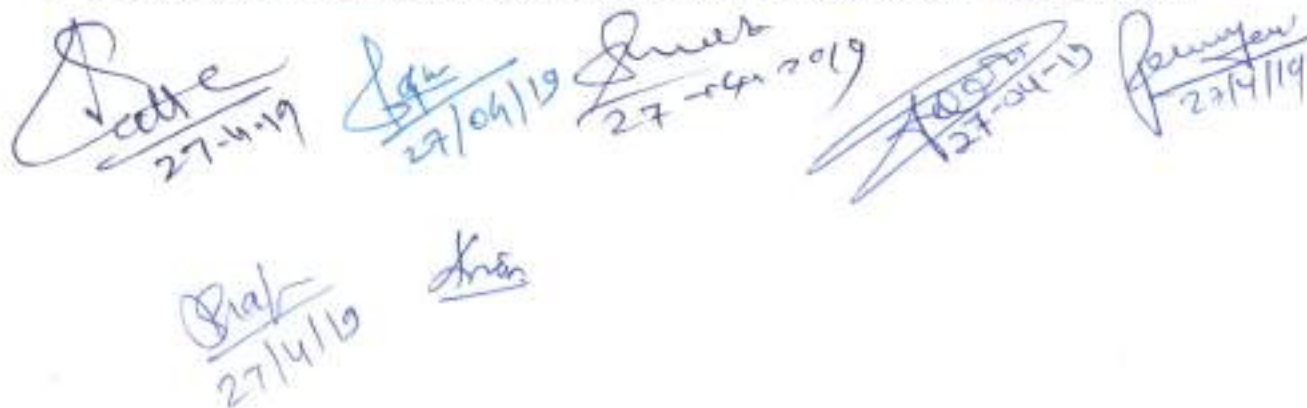
Introduction to IEEE 802.11, Ricochet, Ricochet Wireless Modem, Services Provided by Ricochet , Home RF, Home RF Technology, Hiper LAN, Blue tooth , Advantages and disadvantages of Wireless LAN, Infra red vs radio transmission , introduction to MAC. Technologies influence WLANs / WPANs in future.

UNIT – V: Mobile Adhoc Network

Introduction to Mobile Adhoc Network(MANET), Characteristics of MANET, Applications of MANET, Routing, Need for Routing, Routing Classification, Table-Driven Routing Protocol – Destination Sequenced Distance Vector Routing Protocol, Cluster-Head Gateway Switch Routing, Wireless Routing Protocol. Source initiated On-demand Routing- Adhoc on Demand Distance Vector Routing, Dynamic Source Routing, Temporarily Ordered Routing Algorithms, Hybrid Protocol – Zone Routing Protocol.

RECOMMENDED BOOKS:

1. **Mobile Communication:** Jochen H. Schiller, Pearson Education Publication
2. **Introduction to Wireless and Mobile Systems:** D.P. Agrawal, Qing-An Zeng, Vikas Publishing House


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Theory of Computations MSc(IT)305- Elective 2

Max Marks : 100

Min Marks : 40

UNIT – I

Alphabet, String and language, Finite state Machines, finite automata with ϵ -moves, Conversion of NFA to DFA, Removal of ϵ -transition from NFA, Two way finite automata, finite automata with output, Mealy & Moore machines, Applications of finite automata, minimization of finite automata.

UNIT – II

Chomsky classification of Languages, Regular Expression and Language, Properties of Regular languages, Pumping lemma for regular sets, Closure properties of regular sets, Decision algorithms for Regular sets, Myhill-Nerode theorem.

UNIT – III

Context free grammars and their properties, derivation tree, simplifying CFG, ambiguity in CFG, Chomsky Normal form, Greibach Normal form, Pumping lemma for CFL, Closure properties of CFL.

UNIT – IV

Pushdown automata: Informal description, Definition, Determinism and Non determinism in PDA, Equivalence of PDA's and CFL's. Two way PDA, Concept of Linear Bounded Automata, context sensitive grammars and their equivalence, Turning machine construction, determinism and non-determinism in TM, Multi tape, multi-track TM.

UNIT – V

Decidability, Universal turning machine and decidable problem, recursive function theory, Recursively enumerable sets, recursive sets, partial recursive sets, Church's hypothesis, post correspondence problem, Russell's paradox.

RECOMMENDED BOOKS:

1. **Theory of Computer Science, Automata Languages & computation**, K.L.P. Mishra, N. Chandrashekharan, PHI.
2. **Introduction to Automata Theory Language and Computation**, John E. Hopcraft and Jeffery D. Ullman, Narosa.
3. **Introduction to Formal Languages, Automata Theory and Computation**, Kamala Krithivasan and Rama. R. Pearson.
4. **Theory of Computation**, Lewish Papadimitra, PHI
5. **Introduction to Automata Theory Languages and Computation**, John E. Hopcraft/Jeffary, D. Ullman and Rajeev Motwani.
6. **Introduction to languages and theory of computation**, Martin, J.C, McGraw-Hill
7. **Theory of Computation**, Rajesh .K. Shukla, Cenage Learning

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Internet of Things MSc(IT)305 - Elective 3

Max Marks : 100

Min Marks : 40

Unit – I OVERVIEW:

IoT-An Architectural Overview- Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations, M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management

Unit – II REFERENCE ARCHITECTURE:

IoT Architecture – State of the Art – Introduction, State of the art, Reference Model and architecture, **IoT reference Model** – IoT Reference Architecture Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. **Real-World Design Constraints** – Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control.

Unit – III IOT DATA LINK LAYER & NETWORK LAYER PROTOCOLS:

PHY/MAC Layer(3GPP MTC, IEEE 802.11, IEEE 802.15), Wireless HART, Z-Wave, Bluetooth Low Energy, Zigbee Smart Energy, DASH7 - Network Layer-IPv4, IPv6, 6LoWPAN, 6TiSCH,ND, DHCP, ICMP, RPL, CORPL, CARP

Unit – IV TRANSPORT & SESSION LAYER PROTOCOLS:

Transport Layer Transmission Control Protocol (TCP), Multipath Transmission Control Protocol (MPTCP), User Datagram Protocol (UDP), Datagram Congestion Control Protocol (DCCP) , Stream Control Transmission Protocol (SCTP), Transport Layer Security (TLS), Datagram Transport Layer Security (DTLS))
Session Layer- Hyper Text Transfer Protocol (HTTP), Constrained Application Protocol (CoAP), Extensible Messaging and Presence Protocol (XMPP), Advanced Message Queuing Protocol (AMQP), Message Queue Telemetry Transport (MQTT)

Unit – V SERVICE LAYER PROTOCOLS & SECURITY:

Service Layer – oneM2M, European Telecommunications Standards Institute (ETSI) M2M (Machine-to-Machine), OMA, BBF – Security in IoT Protocols – MAC 802.15.4, 6LoWPAN, Routing Protocol for Low-Power and Lossy Networks (RPL), Application Layer

RECOMMENDED BOOKS:

1. **From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence**, Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, Academic Press, 2014
2. **Learning Internet of Things**, Peter Waher, PACKT publishing
3. **Architecting the Internet of Things**, Bernd Scholz-Reiter, Florian Michahelles, Springer
4. **Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications**, Daniel Minoli, Willy Publications
5. **Internet of Things (A Hands-onApproach)**, Vijay Madiseti and ArshdeepBahga, VPT, 2014.

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Analysis and Design of Algorithms

MSc(IT)305 - Elective 4

Max Marks : 100

Min Marks : 40

UNIT – I INTRODUCTION & ANALYSIS:

Analyzing algorithms, Algorithm types, Recurrence Equations, Growth function: Asymptotic notation, Standard notation & common functions, Recurrence relation, different methods of solution of recurrence equations with examples.

UNIT – II DYNAMIC PROGRAMMING & GREEDY PARADIGM:

The basic dynamic programming paradigm, Dynamic programming solution to the optimal matrix chain multiplication and the longest common subsequence problems, Top down recursive algorithms, Greedy Paradigm: The basic greedy strategy & computing minimum spanning trees, Algorithms of Kruskal and Prim, Union to Find Algorithm & their applications, Disjoint Set, The relationship in Dijkstra's and Prim's algorithms, Use of greedy strategy in algorithms for the Knapsack problem and Huffman trees.

UNIT – III DIVIDE AND CONQUER & BACKTRACKING PARADIGM:

Introduction to Divide and Conquer paradigm, Quick and merge sorting techniques, Linear time selection algorithm, the basic divide and conquer algorithm for matrix multiplication, Backtracking & Recursive backtracking, Applications of backtracking paradigm. heaps, Representation of heaps, Red Black tree, Binary Search tree, heap sort, shell & bucket sort, Amortized Analysis.

UNIT – IV GRAPH ALGORITHMS & STRING MATCHING ALGORITHMS:

Representational issues in graphs, Depth first search & Breadth first search on graphs, Computation of biconnected components and strongly connected components using DFS, Topological sorting of nodes of an acyclic graph & applications, Shortest Path Algorithms on Graphs: Bellman-Ford algorithm, Dijkstra's algorithm & Analysis of Dijkstra's algorithm using heaps, Floyd-Warshall's all pairs shortest path algorithm and its refinement for computing the transitive closure of a graph.

UNIT – V NP-COMPLETE PROBLEMS:

Solvable problems, Types of problems, The notion of a non-deterministic algorithm and its basic relationship to backtracking. Polynomial time non deterministic algorithms for problems like satisfiability, clique problem, Hamiltonian path problems, The definition of NP-hardness and NP-completeness, The notion of polynomial transformation and reductions, Reductions to show that the clique problem, vertex cover, subset sum and Hamiltonian cycle problems are NP-complete.

RECOMENDED BOOKS:

1. **Introduction to Algorithms;** *Cormen, Leiserson, Rivest, Stein*, PHI.
2. **Fundamentals of Algorithms,** Horowitz and Sahni; Galgotia.
3. **The Design & Analysis of Computer Algorithms,** Hopcroft – Aho – Ullman, AWL.
4. **Handbook of Algorithms & Data Structures,** G.H.Gonnet, AWL.
5. **Introduction to Design & Analysis of Algorithms,** Levitin, PE-LPE.

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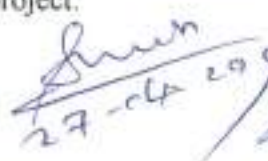




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SCHEME OF TEACHING AND EXAMINATIONS 2019-2020
MASTER OF SCIENCE IN INFORMATION TECHNOLOGY
FOURTH SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+ ((T+P) / 2)	Examination Marks							
		L	T	P		Max. Marks				Min. Marks			
						Th	Ses	Pr	Total	Th	Ses	Pr	Total
MSc(IT) 401	Cyber Security	3	2	-	4	100	50	-	150	40	30	-	70
MSc(IT) 402	Soft Computing	3	2	-	4	100	50	-	150	40	30	-	70
MSc(IT) 403	Big Data Analytics	3	2	-	4	100	50	-	150	40	30	-	70
MSc(IT) 404	Project Based Seminar	-	-	1x2	1	-	50	-	50	-	30	-	30
MSc(IT) 405	Major Project	-	-	5x2	5	-	100	200	300	-	60	100	160
Total					18	300	300	200	800	120	180	100	400

Note:

- Major Project may be a Research Project also.
- Participating in Workshops, Conferences and Seminars or publishing Research Papers will be given weightage in the research project.

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Cyber Security MSc(IT)401

Max Marks : 100

Min Marks : 40

UNIT – I: INTRODUCTION

Computer Security Concepts, The Challenges of Computer Security, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanism, A model for network Security, **Symmetric Encryption**
Principal: Cryptography, Crypt analysis, Feistel Cipher Structure, DES, Random and Pseudorandom Numbers, Symmetric Block Modes of Operation (ECB, CBC, CFB, CTR).

UNIT – II PUBLIC KEY CRYPTOGRAPHY

Approaches to Message Authentication, **Hash Functions:** Hash Functions Requirement, Security of Hash Functions, The SHA Secure Hash Function, **Public Key Cryptography:** Public –Key Encryption Structure, Applications for Public Key Cryptosystem, RSA, Attacks on RSA, OAEP.

UNIT – III MESSAGE INTEGRITY AND MESSAGE AUTHENTICATION

Message Integrity: Document and Finger Printing, Message and Message Digest, Cryptographic Hash Function Criteria Random Oracle Model, Birthday Problems and Summary of solutions, **Message Authentication:** Modification Detection Code, Message Authentication Code, Introduction of HMAC & CMAC, **Digital Signature:** Comparison, Process, Services, Attacks on Digital Signature.

UNIT – IV MALICIOUS SOFTWARE

Intruders: Intruder Behavior Patterns, Intrusion Techniques, Intrusion Detection by Audit Records, Statistical Intrusion Detection, Distributed Intrusion Detection, Honeypots. Types of Malicious Software, Nature of Viruses, Virus Classification, Antivirus Approaches, Worms and its Propagation model, DDoS Attack.

UNIT – V FIREWALL & SECURITY TOOLS

Firewall: Need & Characteristics of Firewall, Types of Firewall, Firewall Basing, Firewall Location and Configuration, Introduction to Kali Linux ,Tools Available in Kali Linux and Its Usage. Wireshark Packet Analyzer and Its Features. Cyber Security Policy, Domain of Cyber Security Policies.

RECOMMENDED BOOKS:

1. **Network Security Essentials**, William Stallings, PEARSON
2. **Cryptography and Network Security**, William Stallings, PHI,
3. **Cryptography and Network Security**, Atul Kahate, Tata McGraw Hill
4. **Cryptography and Network Security**, B.A. FOROUZAN, TMH
5. **Cyber Security policy Guidebook**, Jennifer Jason Paul, Marcus Jeffery Joseph. Wiley Publication, 2012.
6. **Network Security: The Complete Reference**, Robert Bragg, Tata McGraw Hill.
7. **Cyber Security Essentials**, James Graham, Richard Ryan, CRC press

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Soft Computing
MSc(IT)402

Max Marks : 100

Min Marks : 40

UNIT – I: Introduction to Fuzzy Logic System

Fuzzy Sets Operation Of Fuzzy Sets, Properties Of Fuzzy Sets, Fuzzy Relations, Fuzzy Arithmetic, Membership Functions, Fuzzy To Crisp Conversion. Fuzzy Logic, Fuzzy Rule Based Systems, Fuzzy Decision Making, Fuzzy Database, Fuzzy Intelligent System.

UNIT – II: Introduction to Artificial Neural Networks

Introduction to Artificial Neural Network, Artificial Neuron, Classification of Artificial Neural Network, Architecture of a Artificial Neural Network, Activation Function, Training an Artificial Neural Network, Application of Artificial Neural Network.

UNIT – III: Perceptron and Associative Memories

Amari General Learning Rule, HEBB Learning Rule, ADLINE, Perceptron Layer Network, Associative memory: Auto associative Memory, Bi-directional memory, Back-propagation Network: Architecture, Training Algorithm Application of Back-propagation algorithm

UNIT – IV: Evolutionary Computing

Introduction, overview of evolutionary computing, Genetic algorithms and optimization, The schema theorem: the fundamental theorem of genetic algorithms, Genetic algorithm operators, Integration of genetic algorithms with neural networks, Integration of genetic algorithms with fuzzy logic, Known issues in GAs.

UNIT – V: Soft Computing Tools

Introduction to MATLAB, Features, Matrix Operations, Curve Plotting, Toolbox Introduction, Introduction to Simulink.

RECOMMENDED BOOKS:

1. **Fuzzy systems and Fuzzy Logic**, *Klir and Uuno*, PHI Publications.
2. **Introduction to Artificial Neural Networks**, *S. N. Sivanandam and M. Paulraj*, Vikas publication.
3. **Soft Computing and Intelligent systems Design**, *Fakhreddine O. Karry and Clarence de Silva*
4. **Neural Network Design**, *Hagan & Demuth*, Vikas Pub. Comp.
5. **Fundamentals of Artificial Neural Networks**, *M.A.Hassoun*.
6. **Fuzzy sets, uncertainty and information** *George J. Kir, & TA Folger*.
7. **Fuzzy sets, Decision making and Expert system**, *HJ Zimmerman*, Kluwer, Boston.
8. **Fuzzy set theory and its applications**, *H. J. Zimmerman*, Kluwer, Boston.

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Big Data Analytics
MSc(IT)403

Max Marks : 100

Min Marks : 40

UNIT – I: Introduction to Data Warehousing and OLAP Technology for Data Mining

What is Data Mining?, KDD(Knowledge Discovery from Databases) Process, What Kinds of Data Can Be Mined?, Data Mining Functionality, Are all the patterns interesting?, Attribute Types, What is Data Warehouse?, Data Warehouse Architecture, Data Cube: A multi-dimensional data model, Schemas for Multidimensional Data Models, OLAP Operations, Data Warehouse Usage(Applications) , Data Mining Primitive, Architecture of Data Mining System.

UNIT – II: Introduction Concept of Big Data

Big Data- Define Data, Web Data, Classification of Data- Structured, Semi-Structured, and Unstructured. Big Data Definitions, Challenges of Conventional system, Why We Need Big Data, Difference between Big Data and Small Data, Importance of Big Data. Big Data Characteristics (4V's Volume, Velocity, Variety, and Veracity), Big Data Types, Big Data Handling Techniques. Complexity of Big Data, Big Data Processing Architectures, Big Data Technologies, Big Data Business Value. Big Data Analytics Application. Big Data Challenges and Future Scope.

UNIT – III: INTRODUCTION TO HADOOP AND HADOOP ARCHITECTURE

Big Data – Apache Hadoop & Hadoop EcoSystem: Hadoop Core Component, Features of Hadoop, The Hadoop Distributed File System: HDFS data Storage, Hadoop Physical Organization, HDFS Commands, MapReduce Framework, MapReduce Programming Model, MapReduce Map task, Reduce Task and MapReduce Execution, Hadoop YARN, Hadoop2 Execution Model, Hadoop Ecosystem Tools, Hadoop Ecosystem.

UNIT – IV: NoSQL Big Data Management, Mongo DB

NoSQL: What is it?, Where It is Used Types of NoSQL databases, Why NoSQL?, Advantages of NoSQL, Use of NoSQL in Industry, SQL vs NoSQL, NoSQL DataStore, NoSQL Data Architecture pattern, NOSQL to Manage Big Data. **Data Base for the Modern Web:** Introduction to MongoDB, features of MongoDB, Data Types, Mongo DB Query Language and Database Command.

UNIT – V: Hive and Pig:

Pig: Apache Pig, Application of Apache Pig, Feature, Pig Architecture, Pig- Grunt Shell, Installing Pig, Pig Latin Data Model, Pig Latin and Developing Pig Latin Scripts: Apache Pig Execution, Commands. **HIVE AND HIVEQL.** Hive: Introduction, Characteristics, limitation, Hive Architecture and Installation, Comparison with Traditional Database (RDBMS), Hive Datatype and File Formats, Hive Data Model, Hive Integration and Workflow Steps, Hive Built-in Functions, HiveQL.

RECOMMENDED BOOKS:

1. **Big Data Analytics**, Raj Kamal and Preeti Saxena, McGraw Hill Education
2. **Big Data: Black Book**, DT Educational Services, Dreamtech Press
3. **Big Data Analytics**, Seema Acharya & Shubhashini Chellappan, Wiley India
4. **Big Data Analytics**, M. Vijayalakshmi & Radha Shankarmani, Wiley India

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Pt. Ravishankar Shukla University, Raipur

Scheme of Examination

M.A./M.Sc. (MATHEMATICS) (Semester-I)

2019 - 20 (Examination – Dec. 2019) onwards

There shall be five papers. Each paper shall have 100 marks. **Overall tally of marks will be 500.**

Paper	Description	Theory	Sessional	Practical	Total Marks
I	Advanced Abstract Algebra (I)	80	20	-	100
II	Real Analysis (I)	80	20	--	100
III	Topology	80	20	--	100
IV	Advanced Complex Analysis (I)	80	20	--	100
V	Advanced Discrete Mathematics (I)	80	20	--	100

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M.Sc./M.A. Course (First Semester)
PAPER -I

Advanced Abstract Algebra (I)

Max. Marks 80

- Unit-I** Groups - Normal and Subnormal series. Composition series. Jordan-Holder theorem. Solvable groups. Nilpotent groups.
- Unit-II** Field theory- Extension fields. Algebraic and transcendental extensions. Separable and inseparable extensions. Normal extensions.
- Unit-III** Perfect fields. Finite fields. Primitive elements. Algebraically closed fields.
- Unit-IV** Automorphisms of extensions. Galois extensions. Fundamental theorem of Galois theory.
- Unit-V** Solution of polynomial equations by radicals. Insolvability of the general equation of degree 5 by radicals.

Books Recommended:

1. P.B.Bhattacharya, S.K.Jain, S.R.Nagpaul: Basic Abstract Algebra, Cambridge University press
2. I.N.Herstein: Topics in Algebra, Wiley Eastern Ltd.
3. Quazi Zameeruddin and Surjeet Singh : Modern Algebra

References

1. M.Artin, Algebra, Prentice -Hall of India, 1991.
2. P.M. Cohn, Algebra, Vols. I, II & III, John Wiley & Sons, 1982, 1989, 1991.
3. N.Jacobson, Basic Algebra, Vols. I, W.H. Freeman, 1980 (also published by Hindustan Publishing Company).
4. S.Lang, Algebra, 3rd edition, Addison-Wesley, 1993.
5. I.S. Luther and I.B.S. Passi, Algebra, Vol. I-Groups, Vol.II-Rings, Narosa Publishing House (Vol.I-1996, Vol. II-1999)
6. D.S.Malik, J.N.Mordeson, and M.K.Sen, Fundamentals of Abstract Algebra, Mc Graw-Hill, International Edition, 1997.
7. Vivek Sahai and Vikas Bist: Algebra, Narosa Publishing House, 1999.
8. I. Stewart, Galois theory, 2nd edition, Chapman and Hall, 1989.
9. J.P. Escofier, Galois theory, GTM Vol.204, Springer, 2001.
10. Fraleigh, A first course in Algebra, Narosa, 1982.

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M.Sc./M.A. Course (First Semester)
PAPER-II

Real Analysis (I)

Max. Marks 80

- Unit-I** Sequences and series of functions, pointwise and uniform convergence, Cauchy criterion for uniform convergence, Weierstrass M-test, Abel's and Dirichlet's tests for uniform convergence, uniform convergence and continuity, uniform convergence and differentiation, Weierstrass approximation theorem.
- Unit-II** Power series, uniqueness theorem for power series, Abel's and Tauber's theorems. Rearrangements of terms of a series, Riemann's theorem.
- Unit-III** Functions of several variables, linear transformations, Derivatives in an open subset of \mathbb{R}^n , Chain rule, Partial derivatives, interchange of the order of differentiation, Derivatives of higher orders, Taylor's theorem, Inverse function theorem, Implicit function theorem.
- Unit-IV** Jacobians, extremum problems with constraints, Lagrange's multiplier method, Differentiation of integrals.
- Unit-V** Partitions of unity, Differential forms, Stoke's theorem.

Recommended Books:

1. Principle of Mathematical Analysis By Walter Rudin (3rd edition) McGraw-Hill, Kogakusha, 1976, International student edition.
2. Real Analysis By H.L.Roydon, Macmillan Pub.Co.Inc.4th Edition, New York .1962.

References

1. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi,1985.
2. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar,Inc. New York,1975.
3. A.J. White, Real Analysis; an introduction, Addison-Wesley Publishing Co.,Inc.,1968.

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4. G.de Barra, Measure Theory and Integration, Wiley Eastern Limited, 1981.
5. E. Hewitt and K. Stromberg, Real and Abstract Analysis, Berlin, Springer, 1969.
6. P.K. Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age International (P) Limited Published, New Delhi, 1986 Reprint 2000).
7. I.P. Natanson, Theory of Functions of a Real Variable. Vol. I, Frederick Ungar Publishing Co., 1961.
8. Richard L. Wheeden and Antoni Zygmund, Measure and Integral: An Introduction to Real Analysis, Marcel Dekker Inc. 1977.
9. J.H. Williamson, Lebesgue Integration, Holt Rinehart and Winston, Inc. New York. 1962.
10. A. Friedman, Foundations of Modern Analysis, Holt, Rinehart and Winston, Inc., New York, 1970.
11. P.R. Halmos, Measure Theory, Van Nostrand, Princeton, 1950.
12. T.G. Hawkins, Lebesgue's Theory, of Integration: Its Origins and Development, Chelsea, New York, 1979.
13. K.R. Parthasarathy, Introduction to Probability and Measure, Macmillan Company of India Ltd., Delhi, 1977.
14. R.G. Bartle, The Elements of Integration, John Wiley & Sons, Inc. New York, 1966.
15. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1969.
16. Inder K. Rana, An Introduction to Measure and Integration, Norosa Publishing House, Delhi, 1997.
17. Walter Rudin, Real & Complex Analysis, Tata McGraw-Hill Publishing Co.Ltd. New Delhi, 1966.

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M.Sc./M.A. Course (First Semester)

PAPER-III

Topology

Max. Marks 80

- Unit-I** Countable and uncountable sets. Infinite sets and the Axiom of Choice. Cardinal numbers and its arithmetic. Schroeder-Bernstein theorem. Cantor's theorem and the continuum hypothesis. Zorn's lemma, well-ordering theorem.
- Unit-II** Definition and examples of topological spaces. Bases and sub-bases. Subspaces and relative topology. Alternate methods of defining a topology in terms of Kuratowski Closure Operator and Neighbourhood Systems. Continuous functions and homeomorphism.
- Unit-III** First and Second Countable spaces. Lindelof's theorems. Separable spaces. Second countability and separability. Separation axioms; their Characterizations and basic properties. Urysohn's lemma, Tietze extension theorem.
- Unit-IV** Compactness. Continuous functions and compact sets. Basic properties of Compactness. Compactness and finite intersection property. Sequentially and countably compact sets. Local compactness and one point compactification. Stone-Cech compactification.
- Unit-V** Compactness in metric spaces. Equivalence of compactness, countable compactness and sequential compactness in metric space. Connected spaces. Connectedness on the real line. Components. Locally connected spaces.

Recommended Books:

1. James R. Munkres, Topology, A First Course, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
2. K.D. Joshi, Introduction to General Topology, Wiley Eastern Ltd., 1983.

References

1. J. Dugundji, Topology, Allyn and Bacon, 1966 (reprinted in India by Prentice Hall of India Pvt. Ltd.).
2. George F. Simmons, Introduction to Topology and modern Analysis, McGraw-Hill Book Company, 1963.
3. J. Hocking and G. Young, Topology, Addison-Wiley Reading, 1961.


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4. J.L. Kelley, General Topology, Van Nostrand, Reinhold Co., New York, 1955.
5. L. Steen and J. Seebach, Counter examples in Topology, Holt, Rinehart and Winston, New York, 1970.
6. W. Thron, Topologically Structures, Holt, Rinehart and Winston, New York, 1966.
7. N. Bourbaki, General Topology Part I (Transl.), Addison Wesley, Reading, 1966.
8. R. Engelking, General Topology, Polish Scientific Publishers, Warszawa, 1977.
9. W. J. Pervin, Foundations of General Topology, Academic Press Inc. New York, 1964.
10. E.H. Spanier, Algebraic Topology, McGraw-Hill, New York, 1966.
11. S. Willard, General Topology, Addison-Wesley, Reading, 1970.
12. Crump W. Baker, Introduction to Topology, Wm C. Brown Publisher, 1991.
13. Sze-Tsen Hu, Elements of General Topology, Holden-Day, Inc. 1965.
14. D. Bushaw, Elements of General Topology, John Wiley & Sons, New York, 1963.
15. M.J. Mansfield, Introduction to Topology, D. Van Nostrand Co. Inc. Princeton, N.J., 1963.
16. B. Mendelson, Introduction to Topology, Allyn & Bacon, Inc., Boston, 1962.
17. C. Berge, Topological Spaces, Macmillan Company, New York, 1963.
18. S.S. Coirns, Introductory Topology, Ronald Press, New York, 1961.
19. Z.P. Mamuzic, Introduction to General Topology, P. Noordhoff Ltd., Groningen, 1963.
20. K. K. Jha, Advanced General Topology, Nav Bharat Prakashan, Delhi.

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M.Sc./M.A. Course (First Semester)
PAPER-IV

Complex Analysis (I)

Max. Marks 80

- Unit-I** Complex integration, Cauchy-Goursat. Theorem. Cauchy's integral formula. Higher order derivatives. Morera's Theorem. Cauchy's inequality and Liouville's theorem. The fundamental theorem of algebra. Taylor's theorem. Laurent's series. Isolated singularities. Meromorphic functions.
- Unit-II** Maximum modulus principle. Schwarz lemma. The argument principle. Rouché's theorem. Inverse function theorem.
- Unit-III** Residues. Cauchy's residue theorem. Evaluation of integrals. Branches of many valued functions with special reference to $\arg z$, $\log z$ and z^a .
- Unit-IV** Bilinear transformations, their properties and classifications. Definitions and examples of Conformal mappings.
- Unit-V** Spaces of analytic functions. Hurwitz's theorem. Montel's theorem. Riemann mapping theorem.

Recommended Books:

1. Complex Analysis By L.V.Ahlfors, McGraw - Hill, 1979.
2. J.B. Conway, Functions of one Complex variable, Springer-Verlag, International student-Edition, Narosa Publishing House, 1980.

References

1. H.A. Priestly, Introduction to Complex Analysis, Clarendon Press, Oxford 1990.
2. Complex Function Theory By D.Sarason
3. Liang-shin Hahn & Bernard Epstein, Classical Complex Analysis, Jones and Bartlett Publishers International, London, 1996.
4. S. Lang, Complex Analysis, Addison Wesley, 1977.
5. D. Sarason, Complex Function Theory, Hindustan Book Agency, Delhi, 1994.
6. Mark J.Ablowitz and A.S. Fokas, Complex Variables: Introduction and Applications, Cambridge University press, South Asian Edition, 1998.
7. E. Hille, Analytic Function Theory (2 Vols.) Gonn & Co., 1959.
8. W.H.J. Fuchs, Topics in the Theory of Functions of one Complex Variable, D.Van Nostrand Co., 1967.

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9. C. Caratheodory, Theory of Functions (2 Vols.) Chelsea Publishing Company, 1964.
10. M. Heins, Complex Function Theory, Academic Press, 1968.
11. Walter Rudin, Real and Complex Analysis, McGraw-Hill Book Co., 1966.
12. S. Saks and A. Zygmund, Analytic Functions, Monografic Matematyczne, 1952.
13. E. C. Titchmarsh, The Theory of Functions, Oxford University Press, London.
14. W. A. Veech, A Second Course in Complex Analysis, W. A. Benjamin, 1967.
15. S. Ponnusamy, Foundations of Complex Analysis, Narosa Publishing House, 1997.

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M.Sc./M.A. Course (First Semester)
PAPER-V

Advanced Discrete Mathematics (I)

Max. Marks 80

- Unit-I** Formal Logic-Statements. Symbolic Representation and Tautologies. Quantifiers, Predicates and Validity. Propositional Logic. Semigroups & Monoids-Definitions and Examples of Semigroups and monoids (including those pertaining to concatenation operation).
- Unit-II** Homomorphism of semigroups and monoids. Congruence relation and Quotient Semigroups. Subsemigroup and submonoids. Direct Products. Basic Homomorphism Theorem.
- Unit-III** Lattices-Lattices as partially ordered sets. Their properties. Lattices as Algebraic Systems. Sublattices, Direct products, and Homomorphisms. Some Special Lattices e.g., Complete, Complemented and Distributive Lattices. Boolean Algebras-Boolean Algebras as Lattices. Various Boolean Identities. The Switching Algebra example. Subalgebras,
- Unit-IV** Direct Products and Homomorphisms. Join-Irreducible elements, Atoms and Minterms. Boolean Forms and Their Equivalence. Minterm Boolean Forms, Sum of Products Canonical Forms. Minimization of Boolean Functions. Applications of Boolean Algebra to Switching Theory (using AND, OR & NOT gates). The Karnaugh Map Method.
- Unit-V** Grammars and Languages-Phrase-Structure Grammars. Rewriting Rules. Derivations. Sentential Forms. Language generated by a Grammar. Regular, Context-Free, and Context Sensitive Grammars and Languages. Regular sets, Regular Expressions and the Pumping Lemma. Kleene's Theorem. Notions of Syntax Analysis, Polish Notations. Conversion of Infix Expressions to Polish Notations. The Reverse Polish Notation.

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Recommended Books:

1. Elements of Discrete Mathematics By C.L.Liu
2. J.P. Tremblay & R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill Book Co., 1997.

References

1. J.L. Gersting, Mathematical Structures for Computer Science, (3rd edition), Computer Science Press, New York.
2. Seymour Lipschutz, Finite Mathematics (International) edition (1983), McGraw-Hill Book Company, New York.
3. S.Wiitala, Discrete Mathematics-A Unified Approach, McGraw-Hill Book Co.
4. J.E. Hopcroft and J.D Ullman, Introduction to Automata Theory, Languages & Computation, Narosa Publishing House.
5. C.L Liu, Elements of Discrete Mathematics, McGraw-Hill Book Co.
6. N. Deo. Graph Theory with Application to Engineering and Computer Sciences. Prentice Hall of India
7. K.L.P.Mishra and N.Chandrashekar, Theory of Computer Science PHI(2002)

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Scheme of Examination

M.A./M.Sc. (MATHEMATICS) (Semester-II)

2019 - 20 (Examination – Dec. 2019) onwards

There shall be five theory papers. Each paper shall have 100 marks.

Overall tally of marks will be 500.

Paper	Description	Theory	Sessional	Practical	Total Marks
I	Advanced Abstract Algebra (II)	80	20	-	100
II	Real Analysis (II)	80	20	--	100
III	General and Algebraic Topology	80	20	--	100
IV	Advanced Complex Analysis (II)	80	20	--	100
V	Advanced Discrete Mathematics (II)	80	20	--	100


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M.Sc./M.A. Course (Second Semester)

PAPER-I

Advanced Abstract Algebra (II)

Max. Marks 80

- Unit-I** Modules - Cyclic modules. Simple modules. Semi-simple modules. Schuler's Lemma. Free modules. Noetherian and artinian modules and rings-Hilbert basis theorem. Wedderburn Artin theorem. Uniform modules, primary modules, and Noether-Lasker theorem.
- Unit-II** Linear Transformations - Algebra of linear transformation, characteristic roots, matrices and linear transformations.
- Unit-III** Canonical Forms - Similarity of linear transformations. Invariant subspaces. Reduction to triangular forms. Nilpotent transformations. Index of nilpotency. Invariants of a nilpotent transformation. The primary decomposition theorem. Jordan blocks and Jordan forms.
- Unit-IV** Smith normal form over a principal ideal domain and rank. Fundamental structure theorem for finitely generated modules over a Principal ideal domain and its applications to finitely generated abelian groups.
- Unit-V** Rational canonical form. Generalised Jordan form over any field.

Books Recommended:

1. P.B.Bhattacharya, S.K.Jain, S.R.Nagpaul : Basic Abstract Algebra, Cambridge University press
2. I.N.Herstein : Topics in Algebra, Wiley Eastern Ltd.
3. Quazi Zameeruddin and Surjeet Singh : Modern Algebra

References

1. M.Artin, Algebra, Prentice -Hall of India, 1991.
2. P.M. Cohn, Algebra, Vols. I, II & III, John Wiley & Sons, 1982, 1989, 1991.
3. N.Jacobson, Basic Algebra, Vols. I & II, W.H. Freeman, 1980 (also published by Hindustan Publishing Company).
4. S.Lang, Algebra, 3rd edition, Addison-Wesley, 1993.

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5. I.S. Luther and I.B.S. Passi, Algebra, Vol. I-Groups, Vol.II-Rings, Narosa Publishing House (Vol.I-1996, Vol. II-1999)
6. D.S.Malik, J.N.Mordeson, and M.K.Sen, Fundamentals of Abstract Algebra, Mc Graw-Hill, International Edition, 1997.
7. K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
8. S.K.Jain, A. Gunawardena and P.B Bhattacharya, Basic Linear Algebra with MATLAB, Key College Publishing (Springer-Verlag), 2001.
9. S.Kumaresan, Linear Algebra, A Geometric Approach, Prentice-Hall of India, 2000.
10. Vivek Sahai and Vikas Bist, Algebra, Narosa Publishing House, 1999.
11. I. Stewart, Galois theory, 2nd edition, Chapman and Hall, 1989.
12. J.P. Escofier, Galois theory, GTM Vol.204, Springer, 2001.
13. T.Y. Lam, lectures on Modules and Rings, GTM Vol. 189, Springer-Verlag, 1999.
14. D.S. Passman, A Course in Ring Theory, Wadsworth and Brooks/Cole Advanced Books and Softwares, Pacific groves. California, 1991.
15. Fraleigh, A first course in Algebra Algebra, Narosa, 1982.

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M.Sc./M.A. Course (Second Semester)
PAPER-II

Real Analysis (II)

Max. Marks 80

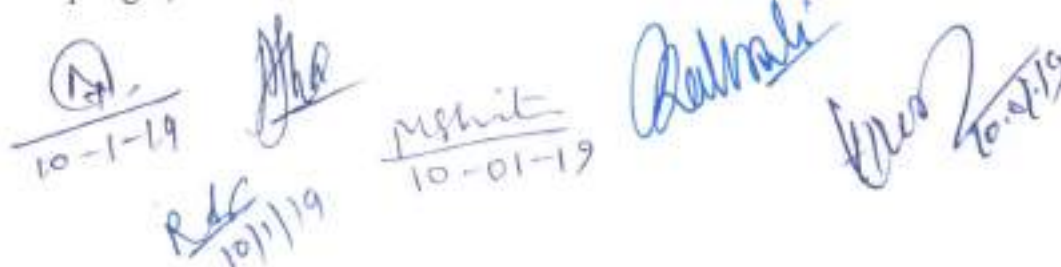
- Unit-I** Definition and existence of Riemann-Stieltjes integral, Properties of the Integral, integration and differentiation, the fundamental theorem of Calculus, integration of vector-valued functions, Uniform convergence and Riemann-Stieltjes integration, Rectifiable curves.
- Unit-II** Lebesgue outer measure. Measurable sets. Regularity. Measurable functions. Borel and Lebesgue measurability. Non-measurable sets. Integration of Non-negative functions. The General integral. Integration of Series.
- Unit-III** Measures and outer measures, Extension of a measure. Uniqueness of Extension. Completion of a measure. Measure spaces. Integration with respect to a measure. Riemann and Lebesgue Integrals.
- Unit-IV** The Four derivatives. Lebesgue Differentiation Theorem. Differentiation and Integration. Functions of Bounded variation.
- Unit-V** The L^p -spaces. Convex functions. Jensen's inequality. Holder and Minkowski inequalities. Completeness of L^p , Convergence in Measure, Almost uniform convergence

Recommended Books:

1. Principle of Mathematical Analysis by W. Rudin
2. Real Analysis by H. L. Roydon

References

1. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
2. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
3. A.J. White, Real Analysis; an introduction, Addison-Wesley Publishing Co., Inc., 1968.
4. G.de Barra, Measure Theory and Integration, Wiley Eastern Limited, 1981.
5. E. Hewitt and K. Stromberg. Real and Abstract Analysis, Berlin, Springer, 1969.


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6. P.K. Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age International (P) Limited Published, New Delhi, 1986 Reprint 2000).
7. I.P. Natanson, Theory of Functions of a Real Variable. Vol. I, Frederick Ungar Publishing Co., 1961.
9. Richard L. Wheeden and Antoni Zygmund, Measure and Integral: An Introduction to Real Analysis, Marcel Dekker Inc. 1977.
10. J.H. Williamson, Lebesgue Integration, Holt Rinehart and Winston, Inc. New York. 1962.
11. A. Friedman, Foundations of Modern Analysis, Holt, Rinehart and Winston, Inc., New York, 1970.
12. P.R. Halmos, Measure Theory, Van Nostrand, Princeton, 1950.
13. T.G. Hawkins, Lebesgue's Theory, of Integration: Its Origins and Development, Chelsea, New York, 1979.
14. K.R. Parthasarathy, Introduction to Probability and Measure, Macmillan Company of India Ltd., Delhi, 1977.
15. R.G. Bartle, The Elements of Integration, John Wiley & Sons, Inc. New York, 1966.
16. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1969.
17. Inder K. Rana, An Introduction to Measure and Integration, Norosa Publishing House, Delhi, 1997.

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M.Sc./M.A. Course (Second Semester)
PAPER-III

General and Algebraic Topology

Max. Marks 80

- Unit-I** Tychonoff product topology in terms of standard sub-base and its characterizations. Projection maps. Separation axioms and product spaces.
- Unit-II** Product spaces. Connectedness and product spaces. Compactness and product spaces (Tychonoff's theorem). Countability and product spaces.
- Unit-III** Embedding and metrization. Embedding lemma and Tychonoff embedding. The Urysohn metrization theorem. Metrization theorems and Paracompactness-Local finiteness. The Nagata-Smirnov metrization theorem. Paracompactness. The Smirnov metrization theorem.
- Unit-IV** Nets and filter. Topology and convergence of nets. Hausdorffness and nets. Compactness and nets. Filters and their convergence. Canonical way of converting nets to filters and vice-versa. Ultra-filters and Compactness.
- Unit-V** The fundamental group and covering spaces-Homotopy of paths. The fundamental group. Covering spaces. The fundamental group of the circle and the fundamental theorem of algebra

Recommended Books:

1. James R. Munkres, Topology, A First Course, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
2. K.D. Joshi, Introduction to General Topology, Wiley Eastern Ltd., 1983.

References

1. J. Dugundji, Topology, Allyn and Bacon, 1966 (reprinted in India by Prentice Hall of India Pvt. Ltd.).
2. George F. Simmons, Introduction to Topology and modern Analysis, McGraw-Hill Book Company, 1963.
3. J. Hocking and G. Young, Topology, Addison-Wiley Reading, 1961.
4. J.L. Kelley, General Topology, Van Nostrand, Reinhold Co., New York, 1955.
5. L. Steen and J. Seebach, Counter examples in Topology, Holt, Rinehart and Winston, New York, 1970.

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6. W.Thron, Topologically Structures, Holt, Rinehart and Winston, New York,1966.
7. N. Bourbaki, General Topology Part I (Transl.),Addison Wesley, Reading, 1966.
8. R. Engelking, General Topology, Polish Scientific Publishers, Warszawa, 1977.
9. W. J. Pervin, Foundations of General Topology, Academic Press Inc. New York,1964.
10. E.H.Spanier, Algebraic Topology, McGraw-Hill, New York,1966.
11. S. Willard, General Topology, Addison-Wesley, Reading, 1970.
12. Crump W.Baker, Introduction to Topology, Wm C. Brown Publisher, 1991.
13. Sze-Tsen Hu, Elements of General Topology, Holden-Day,Inc.1965.
14. D. Bushaw, Elements of General Topology, John Wiley & Sons, New York, 1963.
15. M.J. Mansfield, Introduction to Topology, D.Van Nostrand Co. Inc.Princeton,N.J.,1963.
16. B. Mendelson, Introduction to Topology, Allyn & Bacon, Inc., Boston,1962.
17. C. Berge, Topological Spaces, Macmillan Company, New York,1963.
18. S.S. Coirns, Introductory Topology, Ronald Press, New York, 1961.
19. Z.P. Mamuzic, Introduction to General Topology, P. Noordhoff Ltd.,Groningen, 1963.
20. K.K.Jha, Advanced General Topology, Nav Bharat Prakashan, Delhi.

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M.Sc./M.A. Course (Second Semester)
PAPER-IV

Advanced Complex Analysis (II)

Max. Marks 80

- Unit-I** Weierstrass' factorisation theorem. Gamma function and its properties. Riemann Zeta function. Riemann's functional equation. Runge's theorem. Mittag-Leffler's theorem.
- Unit-II** Analytic Continuation. Uniqueness of direct analytic continuation. Uniqueness of analytic continuation along a curve. Power series method of analytic continuation Schwarz Reflection Principle. Monodromy theorem and its consequences.
- Unit-III** Harmonic functions on a disk. Harnack's inequality and theorem. Dirichlet Problem. Green's function.
- Unit-IV** Canonical products. Jensen's formula. Poisson-Jensen formula. Hadamard's three circles theorem. Order of an entire function. Exponent of Convergence. Borel's theorem. Hadamard's factorization theorem.
- Unit-V** The range of an analytic function. Bloch's theorem. The Little Picard theorem. Schottky's theorem. Montel Caratheodory and the Great picard theorem. Univalent functions. Bieberbach's conjecture (Statement only) and the " $1/4$ -theorem.

Recommended Books:

1. L.V. Ahlfors, Complex Analysis, McGraw - Hill, 1979.
3. J.B. Conway, Functions of one Complex variable, Springer-Verlag, International student-Edition, Narosa Publishing House, 1980.

References

1. H.A. Priestly, Introduction to Complex Analysis, Clarendon Press, Oxford 1990.
2. Liang-shin Hahn & Bernard Epstein, Classical Complex Analysis, Jones and Bartlett Publishers International, London, 1996.
3. S. Lang, Complex Analysis, Addison Wesley, 1977.
4. Mark J. Ablowitz and A.S. Fokas, Complex Variables: Introduction and Applications, Cambridge University press, South Asian Edition, 1998.

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5. E. Hille, Analytic Function Theory (2 Vols.) Gonn & Co., 1959.
6. W.H.J. Fuchs, Topics in the Theory of Functions of one Complex Variable, D. Van Nostrand Co., 1967.
7. C. Caratheodory, Theory of Functions (2 Vols.) Chelsea Publishing Company, 1964.
8. M. Heins, Complex Function Theory, Academic Press, 1968.
9. Walter Rudin, Real and Complex Analysis, McGraw-Hill Book Co., 1966.
10. S. Saks and A. Zygmund, Analytic Functions, Monografie Matematyczne, 1952.
11. E.C. Titchmarsh, The Theory of Functions, Oxford University Press, London.
12. W.A. Veech, A Second Course in Complex Analysis, W.A. Benjamin, 1967.
13. S. Ponnusamy, Foundations of Complex Analysis, Narosa Publishing House, 1997.
14. D. Sarason, Complex Function Theory, Hindustan Book Agency, Delhi, 1994.


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M.Sc./M.A. Course (Second Semester)
PAPER-V

Advanced Discrete Mathematics (II)

Max. Marks 80

Unit-I Graph Theory-Definition of (Undirected) Graphs, Paths, Circuits, Cycles, & Subgraphs. Induced Subgraphs. Degree of a vertex. Connectivity. Planar Graphs and their properties. Trees. Euler's Formula for connected planar Graphs. Complete & Complete Bipartite Graphs. Kuratowski's Theorem (statement only) and its use.

Unit-II Spanning Trees, Cut-sets, Fundamental Cut -sets, and Cycle. Minimal Spanning Trees and Kruskal's Algorithm. Matrix Representations of Graphs. Euler's Theorem on the Existence of Eulerian Paths and Circuits. Directed

Unit-III Graphs. In degree and Out degree of a Vertex. Weighted undirected Graphs. Dijkstra's Algorithm.. strong Connectivity & Warshall's Algorithm. Directed Trees. Search Trees. Tree Traversals.

Unit-IV Introductory Computability Theory-Finite State Machines and their Transition Table Diagrams. Equivalence of finite State Machines. Reduced Machines. Homomorphism.

Unit-V Finite Automata. Acceptors. Non-deterministic Finite Automata and equivalence of its power to that of Deterministic Finite Automata. Moore and mealy Machines. Turing Machine and Partial Recursive Functions.

Recommended Books:

1. Elements of Discrete Mathematics By C.L.Liu
2. Graph Theory and its application By N.Deo
3. Theory of Computer Science By K.L.P.Mishra and N.Chandrashekar

References

1. J.P. Tremblay & R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill Book Co., 1997.
2. J.L. Gersting, Mathematical Structures for Computer Science, (3rd edition), Computer Science Press, New York.
3. Seymour Lipschutz, Finite Mathematics (International) edition 1983), McGraw-Hill Book Company, New York.

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4. S.Wiitala, Discrete Mathematics-A Unified Approach, McGraw-Hill Book Co.
5. J.E. Hopcroft and J.D Ullman, Introduction to Automata Theory, Languages & Computation, Narosa Publishing House.
6. C.L Liu, Elements of Discrete Mathematics, McGraw-Hill Book Co.
7. N. Deo. Graph Theory with Application to Engineering and Computer Sciences. Prentice Hall of India.

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Pt. Ravishankar Shukla University, Raipur

Scheme of Examination

M.A./M.Sc. (MATHEMATICS) (Semester-III)

2019 - 20 (Examination - Dec. 2019) onwards

There shall be five theory papers. Two compulsory and three optional. Each paper shall have 100 marks. Out of these five papers, the paper which has theory and practical both, the theory part shall have 70 marks and practical part shall have 30 marks. **Overall tally of marks in theory and practical will be 500.**

Paper	Description	Theory	Sessi- onal	Practi- cal	Remark
Compulsory Papers					
I	Integration Theory and Functional Analysis (I)	80	20	--	--
II	Partial Differential Equations & Mechanics (I)	80	20	--	--
Optional Papers					
III	A Fundamentals of Computer Science (Object Oriented Programming and Data Structure)	70	--	30	For regular students only
	B Fuzzy Set Theory & Its Applications (I)	80	20	--	--
	C Mathematical Biology (I)	80	20	--	--
IV	A Operations Research (I)	80	20	--	--
	B Wavelets (I)	80	20	--	--
V	A Programming in C (with ANSI Features) (I)	70	--	30	For regular students only
	B Graph Theory (I)	80	20	--	--

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M.Sc./M.A. Course (Third Semester)
PAPER -I
Integration Theory and Functional Analysis (I)

Max. Marks 80

Integration Theory:

- Unit-I** Signed measure. Hahn decomposition theorem, mutually singular measures. Radon-Nikodym theorem. Lebesgue decomposition. Riesz representation theorem. Extension theorem (Caratheodory).
- Unit-II** Lebesgue-Stieltjes integral, product measures, Fubini's theorem. Differentiation and Integration. Decomposition into absolutely continuous and singular parts.
- Unit-III** Baire sets. Baire measure, continuous functions with compact support. Regularity of measures on locally compact spaces. Integration of continuous functions with compact support, Riesz-Markoff theorem.

Functional Analysis :

- Unit-IV** Normed linear spaces. Banach spaces and examples. Quotient space of normed linear spaces and its completeness, equivalent norms. Riesz Lemma, basic properties of finite dimensional normed linear spaces and compactness.
- Unit-V** Weak convergence and bounded linear transformations, normed linear spaces of bounded linear transformations, dual spaces with examples.

Books Recommended :

1. P.R. Halmos, Measure Theory, Van Nostrand, Princeton, 1950.
2. B.Choudhary and S.Nanda, Functional Analysis with Applications. Wiley Eastern Ltd. 1989.
3. H.L. Royden, Real Analysis, Macmillan Publishing Co. Inc., New York, 4th Edition, 1993.

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1. S.K. Berberian, Measure and integration, Chelsea Publishing Company, New York, 1965.
2. G. de Barra, Measure Theory and Integration, Wiley Eastern Limited, 1981.
3. P.K. Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age International (P) Limited, New Delhi, 2000.
4. Richard L. Wheeden and Antoni Zygmund, Measure and Integral : An Introduction to Real Analysis, Marcel Dekker Inc. 1977.
5. J.H. Williamson, Lebesgue Integration, Holt Rinehart and Winston, Inc. New York. 1962.
6. T.G. Hawkins, Lebesgue's Theory of Integration: Its Origins and Development, Chelsea, New York, 1979.
7. K.R. Parthasarathy, Introduction to Probability and Measure, Macmillan Company of India Ltd., Delhi, 1977.
8. R.G. Bartle, The Elements of Integration, John Wiley & Sons, Inc. New York, 1966.
9. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1967.
10. Inder K. Rana, An Introduction to Measure and Integration, Narosa Publishing House, Delhi, 1997.
11. Walter Rudin, Real & Complex Analysis, Tata McGraw-Hill Publishing.
12. Edwin Hewitt and Karl Stromberg, Real and Abstract Analysis, Springer-Verlag, New York.
13. Edwin Hewitt and Kenneth A. Ross, Abstract Harmonic Analysis, Vol. 1, Springer-Verlag, 1993.
14. G. Bachman and L. Narici, Functional Analysis, Academic Press, 1966.
15. N. Dunford and J.T. Schwartz, Linear Operators, Part I, Interscience, New York, 1958.
16. R.E. Edwards, Functional Analysis, Holt Rinehart and Winston, New York, 1965.
17. C. Goffman and G. Pedrick, First Course in Functional Analysis, Prentice Hall of India, New Delhi, 1987.
18. P.K. Jain, O.P. Ahuja and Khalil Ahmad, Functional Analysis, New Age International (P) Ltd. & Wiley Eastern Ltd., New Delhi, 1997.
19. R.B. Holmes, Geometric Functional Analysis and its Applications, Springer-Verlag, 1975.
20. K.K. Jha, Functional Analysis, Students' Friends, 1986.
21. L.V. Kantorovich and G.P. Akilov, Functional Analysis, Pergamon Press, 1982.
22. E. Kreyszig, Introductory Functional Analysis with Applications, John Wiley & Sons, New York, 1978.
23. B.K. Lahiri, Elements of Functional Analysis, The World Press Pvt. Ltd., Calcutta, 1994.
24. A.H. Siddiqui, Functional Analysis with Applications, Tata McGraw-Hill Publishing Company Ltd. New Delhi

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25. B.V. Limaye, Functional Analysis, Wiley Eastern Ltd.
26. L.A. Lustenik and V.J. Sobolev, Elements of Functional Analysis, Hindustan Publishing Corporation, New Delhi, 1971.
27. G.F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill Book Company, New York, 1963.
28. A.E. Taylor, Introduction to Functional Analysis, John Wiley and Sons, New York, 1958.
29. K.Yosida, Functional Analysis, 3rd edition Springer-Verlag, New York, 1971.
30. J.B. Conway, A Course in Functional Analysis, Springer-Verlag, New York, 1990.
31. Walter Rudin, Functional Analysis, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1973.
32. A. Wilansky, Functional Analysis, Blaisdell Publishing Co., 1964.
33. J. Tinsley Oden & Leszek F. Dernkiewicz, Applied Functional Analysis, CRC Press Inc., 1996.

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M.Sc./M.A. Course (Third Semester)
PAPER -II
Partial Differential Equations and Mechanics (I)

Max. Marks 80

Partial Differential Equations

- Unit-I** Examples of PDE. Classification. Transport Equation-Initial value Problem. Non-homogeneous Equation. Laplace's Equation-Fundamental Solution, Mean Value Formulas, Properties of Harmonic Functions, Green's Function, Energy Methods.
- Unit-II** Heat Equation-Fundamental Solution, Mean Value Formula, Properties of Solutions, Energy Methods. Wave Equation-Solution by Spherical Means, Non-homogeneous Equations, Energy Methods.

Analytical Dynamics:

- Unit-III** Generalized coordinates. Holonomic and Non-holonomic systems. Scleronomic and Rheonomic systems. Generalized potential. Lagrange's equations of first kind. Lagrange's equations of second kind. Uniqueness of solution. Energy equation for conservative fields. Hamilton's variables. Donkin's theorem. Hamilton canonical equations. Cyclic coordinates. Routh's equations.
- Unit-IV** Poisson's Bracket. Poisson's Identity. Jacobi-Poisson Theorem. Motivating problems of calculus of variations, Shortest distance. Minimum surface of revolution. Brachistochrone problem. Isoperimetric problem. Geodesic. Fundamental lemma of calculus of variations. Euler's equation for one dependent function and its generalization to (i) 'n' dependent functions, (ii) higher order derivatives. Conditional extremum under geometric constraints and under integral constraints.

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Gravitation:

Unit-V Attraction and potential of rod, disc, spherical shells and sphere. Surface integral of normal attraction (application & Gauss' theorem). Laplace and Poisson equations. Work done by selfattracting systems. Distributions for a given potential. Equipotential surfaces. Surface and solid harmonics. Surface density in terms of surface harmonics.

Books Recommended :

1. L.C. Evans, Partial Differential Equations, Graduate Studies in Mathematics, Volume 19, AMS, 1998.
2. F. Gantmacher, Lectures in Analytic Mechanics, MIR Publishers, Moscow, 1975.
3. R.C.Mondal, Classical Mechanics, Prentice Hall of India
4. S.L. Loney, An Elementary Treatise on Statics, Kalyani Publishers, New Delhi, 1979.

References

1. Books on Partial differential equation by I.N. Sneddon, F. John, P. Prasad and R. Ravindran, Amarnath etc.
2. A.S. Ramsey, Dynamics Part II, The English Language Book Society and Cambridge University Press, 1972.
3. H. Goldstein, Classical Mechanics (2nd edition), Narosa Publishing House, New Delhi.
4. I.M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice Hall.
5. Narayan Chandra Rana & Pramod Sharad Chandra Joag, Classical Mechanics, Tata McGraw Hill, 1991.
6. Louis N. Hand and Janet D. Finch, Analytical Mechanics, Cambridge University Press, 1998.
7. A.S. Ramsey, Newtonian Gravitation, The English Language Book Society and the Cambridge University Press.

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M.Sc./M.A. Course (Third Semester)
PAPER-III (A)
Fundamentals of Computer Science-Theory and Practical
(Object Oriented Programming and Data Structure)

Max. Marks. 100
(Theory-70 +Practical-30)

- Unit-I** Object Oriented Programming-Classes and Scope, nested classes, pointer class members; Class initialization, assignment and destruction.
- Unit-II** Overloaded functions and operators; Templates including class templates; class inheritance and virtual functions.
- Unit-III** Data Structures-Analysis of algorithms, q, W, O, o, w notations ; Sequential and linked representations, Lists, Stacks, and queues;
- Unit-IV** Trees: Binary tree- search tree implementation, B-tree (concept only);
- Unit-V** Sorting: Insertion sort, shell sort, quick-sort, heap sort and their analysis; Hashing-open and closed.

Books Recommended :

1. S.B. Lipman, J. Lajoi: C++ Primer, Addison Wesley.
2. B. Stroustrup; The C++ Programming Language, Addison Wesley.
3. C.J. Date : Introduction to Database Systems, Addison Wesley.
4. C. Ritchie: Operating Systems-Incorporating UNIX and Windows, BPB Publications.
5. M.A. Weiss, Data Structures and Algorithm Analysis in C++, Addison Wesley.

Practical Examination Scheme

Max. Marks - 30

Practical (two)

Viva

Sessional

Time Duration - 3 Hrs.

20 Marks(10 marks each)

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M.Sc./M.A. Course (Third Semester)

PAPER-III (B)

Fuzzy Set Theory and Its Applications (I)

Max Marks – 80

UNIT-I Fuzzy sets-Basic definitions, α -level sets. Convex fuzzy sets. Basic operations on fuzzy sets. Types of fuzzy sets. Cartesian products, Algebraic products. Bounded sum and difference, t-norms and t-conorms.

UNIT-II The Extension Principle- The Zadeh's extension principle. Image and inverse image of fuzzy sets. Fuzzy numbers. Elements of fuzzy arithmetic.

UNIT-III Fuzzy Relations on Fuzzy sets, Composition of Fuzzy relations. Min-Max composition and its properties.

UNIT-IV Fuzzy equivalence relations. Fuzzy compatibility relations. Fuzzy relation equations. Fuzzy graphs, Similarity relation.

UNIT-V Possibility Theory-Fuzzy measures. Evidence theory. Necessity measure. Possibility measure. Possibility distribution. Possibility theory and fuzzy sets. Possibility theory versus probability theory.

REFERENCES :

1. H.J. Zmmemann, Fuzzy set theory and its Applications, Allied Publishers Ltd. New Delhi, 1991.
2. G.J. Klir and B. Yuan- Fuzzy sets and fuzzy logic, Prentice-Hall of India, New Delhi, 1995.

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M.Sc./M.A. Course (Third Semester)
PAPER-III (C)
Mathematical Biology (I)

Max. Marks - 80

Part-A: Simple Single Species Models

UNIT-I

Continuous Population Models: Phase plane analysis of ODE. Exponential Growth model, the Logistic Population Model, qualitative analysis, Harvesting in Population Models, Constant-yield harvesting, constant-effort harvesting, a case study of eutrophication of a lake.

UNIT-II

Discrete Population Models: Linear Models, graphical solution of difference equations, equilibrium analysis, period-doubling and chaotic behavior, discrete-time metered models, two-age group model and delayed recruitment, a case study of oscillation in flour beetle populations.

Part-B : Models for interacting species

UNIT-III

Introduction and Mathematical preliminaries: The Lotka-Volterra equations, the chemostat, equilibria and linearization, qualitative solutions of linear systems, periodic solutions and limit cycles, models for giving up smoking and retaining of workers by their peers.

UNIT-IV

Continuous Models for Two Interacting Populations: Species in competitions, Predator-Prey system, Kolmogorov Models, Mutualism, The community matrix, the nature of interactions between species, invading species and coexistence, a predator and two competing prey, two predators competing for prey.

UNIT-V

Harvesting in Two-Species Models: Harvesting of species in competition, Harvesting of predator-prey systems, some economic aspects of harvesting, optimization of harvesting returns.

Text Book:

1. Fred Brauer, Carlos Castillo-Chavez, Mathematical Models in Population Biology and Epidemiology, Biology, Springer (2010)

Reference Books:

1. Nicholas F. Britton, Essential Mathematical Biology, Springer-Verlag (2003)
2. J.D.Murray, Mathematical Biology I. An Introduction, Springer-Verlag (2002) 3rd Edition.
3. J.D.Murray, Mathematical Biology II. Spatial Models and Biomedical Application, Springer-Verlag (2003) 3rd Edition.

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M.Sc./M.A. Course (Third Semester)

PAPER -IV (A)

Operations Research (I)

Max. Marks 80

- Unit-I** Operations Research and its Scope. Necessity of Operations Research in Industry. Linear Programming-Simplex Method. Theory of the Simplex Method.
- Unit-II** Duality and Sensitivity Analysis. Other Algorithms for Linear Programming-Dual Simplex Method.
- Unit-III** Parametric Linear Programming. Upper Bound Technique. Interior Point Algorithm. Linear Goal Programming.
- Unit-IV** Transportation and Assignment Problems.
- Unit-V** Network Analysis-Shortest Path Problem. Minimum Spanning Tree Problem. Maximum Flow I Problem. Minimum Cost Flow Problem. Network Simplex Method. Project Planning and Control I with PERT-CPM.

Books Recommended :

1. F.S. Hillier and G.J. Ueberman. Introduction to Operations ResBareft (Sixth Edition), McGraw Hill International Edition, Industrial Engineering Series, 1995. (This book comes with a CD containing tutorial software).
2. G. Hadley, Linear Programming, Narosa Publishing House, 1995.
3. G. Hadly, Nonlinear and Dynamic Programming, Addison-Wesley, Reading Mass.
4. H.A. Taha, Operations Research -An introduction, Macmillan Publishing Co., Inc., New York.
5. Kanti Swarup, P.K. Gupta and Man Mohan, Operations Research, Sultan Chand & Sons, New Delhi
6. Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali, Linear Programming and Network flows, John Wiley & Sons, New York, 1990.

References

1. S.S. Rao, Optimization Theory and Applications, Wiley Eastern Ltd., New Delhi.

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2. Prem Kumar Gupta and D.S. Hira, Operations Research-An Introduction. S. Chand & Company Ltd., New Delhi.
3. N.S. Kambo, Mathematical Programming Techniques, Affiliated East-West Press Pvt. Ltd., New Delhi, Madras
4. R.K. Rathy, An Introduction to Fluid Dynamics, Oxford and IBH Publishing Company, New Delhi, 1976.
5. A.D. Young, Boundary Layers, AIAA Education Series, Washington DC, 1989.
6. S.W. Yuan, Foundations of Fluid Mechanics, Prentice Hall of India Private Limited, New Delhi, 1976.
7. UNDO Systems Products (Visit website <http://www.Hndo.com/productsf.html>)
 - (i) UNDO (the linear programming solver)
 - (ii) UNDO Callable Library (the premier optimisation engine)
 - (iii) LINGO (the linear, non-linear, and integer programming solver with mathematical modelling language)
 - (i) What's Best I (the spreadsheet add-in that solves linear, non-linear, and integer problems).

All the above four products are bundled into one package to form the Solver Suite. For more details about any of the four products one has to click on its name.

- (i) Optimisation Modelling with UNDO (8" edition) by Linus Schrage.
- (ii) Optimisation Modelling with LINGO by Unus Schrage.

More details available on the Related Book page York, 1979.

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M.Sc./M.A. Course (Third Semester)

PAPER-IV (B)

Wavelets (I)

Max Marks - 80

Unit-I. Preliminaries-Different ways of constructing wavelets- Orthonormal bases generated by a single function: the Balian-Low theorem. Smooth projections on $L^2(\mathbb{R})$.

Unit-II. Local sine and cosine bases and the construction of some wavelets. The unitary folding operators and the smooth projections.

Unit-III. Multiresolution analysis and construction of wavelets. Construction of compactly supported wavelets and estimates for its smoothness. Band limited wavelets.

Unit-IV. Orthonormality. Completeness. Characterization of Lemarie-Meyer wavelets and some other characterizations. Franklin wavelets and Spline wavelets on the real line.

Unit-V. Orthonormal bases of piecewise linear continuous functions for $L^2(\mathbb{T})$. Orthonormal bases of periodic splines. Periodization of wavelets defined on the real line.

REFERENCES:

1. Eugenic Hernandez and Guido Weiss, A First Course on Wavelets, CRC Press, New York, 1996.
2. C.K. Chui, An Introduction to Wavelets, Academic Press, 1992.
3. I.Daubechies, Ten Lectures on Wavelets, CBS-NSF Regional Conferences in Applied Mathematics, 61, SIAM, 1992.
4. Y.Meyer, Wavelets, algorithms and applications (Trans. by R.D. Ryan, SIAM, 1993.
5. M.V. Wickerhauser, Adapted wavelet analysis from theory to software, Wellesley, MA, A.K. Peters, 1994.

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M.Sc./M.A. Course (Third Semester)
PAPER -V (A)
Programming in C (with ANSI features) Theory and Practical (I)

Max. Marks. 100
(Theory-70 +Practical-30)

- Unit-I** An overview of programming. Programming language, Classification. C Essentials-Program Development. Functions. Anatomy of a C Function. Variables and Constants. Expressions. Assignment Statements. Formatting Source Files. Continuation Character. The Preprocessor.
- Unit-II** Scalar Data Types-Declarations, Different Types of Integers. Different kinds of Integer Constants. Floating-Point Types. Initialization. Mixing Types. Explicit Conversions-Casts. Enumeration Types. The Void Data Type. Typedefs. Finding the Address of an object. Pointers.
- Unit-III** Control Flow-Conditional Branching. The Switch Statement. Looping. Nested Loops. The break and continue Statements. The goto statement. Infinite Loops.
- Unit-IV** Operators and Expressions-Precedence and Associativity. Unary Plus and Minus operators. Binary Arithmetic Operators. Arithmetic Assignment Operators. Increment and Decrement Operators. Comma Operator. Relational Operators. Logical Operators. Bit - Manipulation Operators. Bitwise Assignment Operators. Cast Operator. Size of Operators. Conditional Operator. Memory Operators.
- Unit-V** Arrays -Declaring an Array. Arrays and Memory. Initializing Arrays. Encryption and Decryption.

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Books Recommended :

1. Peter A. Darnell and Philip E. Margolis, C: A Software Engineering Approach, Narosa Publishing House (Springer International Student Edition) 1993.
2. Samuel P. Harkison and Gly L. Steele Jr., C : A Reference Manual, 2nd Edition, Prentice Hall, 1984.
3. Brian W. Kernighan & Dennis M. Ritchie, The C Programme Language, 2nd Edition (ANSI Features), Prentice Hall 1989.

Practical Examination Scheme

Max. Marks - 30

Practical (two)

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Sessional

Time Duration - 3 Hrs.

20 Marks(10 marks each)

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M.Sc./M.A. Course (Third Semester)

PAPER-V (B)

Graph theory (I)

Max. Marks - 80

- Unit-I: Operations on graphs, matrices and vector spaces: Topological operations, Homeomorphism, homomorphism, contractions, derived graphs, Binary operations.
- Unit-II: Matrices and vector spaces: Matrices and vector spaces : The adjacency matrix, The determinant and the spectrum, Spectrum properties, The incidence matrix, cycle space and Bond space, Cycle bases and cycle graphs.
- Unit-III: Colouring packing and covering: Vertex coverings, critical graphs, Girth and chromatic number, uniquely colourable graphs, edge-colourings, Face colourings and Beyond, The achromatic and the Adjoint Numbers.
- Unit-IV: Combinational formulations: Setting up of combinational formulations, the classic pair of duals, Gallai, Norman-Rabin Theorems, Clique parameters, The Rosenfeld Numbers.
- Unit-V: Perfect Graphs: Introduction to the "SPGC", Triangulated (Chordal) graphs, Comparability graphs, Interval graphs, permutation graphs, circular arc graphs, split graphs, weakly triangulated graphs.

REFERENCES :

1. K.R.Parthasarathy, Basic graph theory, Tata Mc graw Hill publishing company limited , 1994.
2. R.J.Wilson, Introduction to graph theory, Longman Harlow, 1985.
3. John Clark, Derek Allon Holton, A first look at graph Theory, World Scientific Singapore, 1991.
4. Frank Hararary, Graph Theory Narosa, New Delhi, 1995.
5. Ronald Gould and Benjamin Cummins, Graph Theory, California.
6. Narsingh Deo, Graph Theory with applications to Engineering and Computer Science, Prentice-Hall of India Private Limited, New Delhi, 2002.

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Scheme of Examination

M.A./M.Sc. (MATHEMATICS) (Semester-IV)

2019 - 20 (Examination - Dec. 2019) onwards

There shall be six papers. Two compulsory and three optional papers. Each paper shall have 100 marks. The paper which has theory and practical both, the theory part shall have 70 marks and practical part shall have 30 marks. **Overall tally of marks in theory and practical will be 500.**

Paper	Description	Theory	Sessional	Practical	Remark
Compulsory Papers					
I	Functional Analysis (II)	80	20	--	--
II	Partial Differential Equations & Mechanics (II)	80	20	--	--
Optional Papers					
III	A Operating System and Database Management System	70	--	30	For regular students only
	B Fuzzy Set Theory & Its Applications (II)	80	20	--	--
	C Mathematical Biology(II)	80	20	--	--
IV	A Operations Research (II)	80	20	-	--
	B Wavelets (II)	80	20	-	--
V	A Programming in C (with ANSI Features) (II)	70	--	30	For regular students only
	B Graph Theory (II)	80	20	--	--

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M.Sc./M.A. Course (Fourth Semester)

PAPER -I

Functional Analysis (II)

Max. Marks 80

- Unit-I** Uniform boundedness theorem and some of its consequences. Open mapping and closed graph theorems.
- Unit-II** Hahn-Banach theorem for real linear spaces, complex linear spaces and normed linear spaces. Reflexive spaces. Weak Sequential Compactness. Compact Operators. Solvability of linear equations in Banach spaces. The closed Range Theorem.
- Unit-III** Inner product spaces. Hilbert spaces. Orthonormal Sets. Bessel's inequality. Complete orthonormal sets and Parseval's identity.
- Unit-IV** Structure of Hilbert spaces. Projection theorem. Riesz representation theorem. Adjoint of an operator on a Hilbert space. Reflexivity of Hilbert spaces.
- Unit-V** Self-adjoint operators, Positive, projection, normal and unitary operators. Abstract variational boundary-value problem. The generalized Lax-Milgram theorem.

Books Recommended :

1. B.Choudhary and S.Nanda, Functional Analysis with Applications. Wiley Eastern Ltd. 1989.
2. H.L. Royden, Real Analysis, Macmillan Publishing Co. Inc., New York, 4th Edition, 1993.

References

1. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1967.
2. Walter Rudin, Real & Complex Analysis, Tata McGraw-Hill Publishing.
3. Edwin Hewitt and Karl Stromberg, Real and Abstract Analysis, Springer-Verlag, New York.
4. Edwin Hewitt and Kenneth A. Ross, Abstract Harmonic Analysis, Vol. 1, Springer-Verlag, 1993.

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5. G. Bachman and L. Narici, Functional Analysis, Academic Press, 1966.
6. N. Dunford and J.T. Schwartz, Linear Operators, Part I, Interscience, New York, 1958.
7. R.E. Edwards, Functional Analysis, Holt Rinehart and Winston, New York, 1965.
8. C. Goffman and G. Pedrick, First Course in Functional Analysis, Prentice Hall of India, New Delhi, 1987.
9. P.K. Jain, O.P. Ahuja and Khalil Ahmad, Functional Analysis, New Age International (P) Ltd. & Wiley Eastern Ltd., New Delhi, 1997.
10. R.B. Holmes, Geometric Functional Analysis and its Applications, Springer-Verlag, 1975.
11. K.K. Jha, Functional Analysis, Students' Friends, 1986.
12. L.V. Kantorovich and G.P. Akilov, Functional Analysis, Pergamon Press, 1982.
13. E. Kreyszig, Introductory Functional Analysis with Applications, John Wiley & Sons, New York, 1978.
14. B.K. Lahiri, Elements of Functional Analysis, The World Press Pvt. Ltd., Calcutta, 1994.
15. A.H. Siddiqui, Functional Analysis with Applications, Tata McGraw-Hill Publishing Company Ltd. New Delhi
16. B.V. Limaye, Functional Analysis, Wiley Eastern Ltd.
17. L.A. Lustenik and V.J. Sobolev, Elements of Functional Analysis, Hindustan Publishing Corporation, New Delhi, 1971.
18. G.F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill Book Company, New York, 1963.
19. A.E. Taylor, Introduction to Functional Analysis, John Wiley and Sons, New York, 1958.
20. K. Yosida, Functional Analysis, 3rd edition Springer-Verlag, New York, 1971.
21. J.B. Conway, A Course in Functional Analysis, Springer-Verlag, New York, 1990.
22. Walter Rudin, Functional Analysis, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1973.
23. A. Wilansky, Functional Analysis, Blaisdell Publishing Co., 1964.
24. J. Tinsley Oden & Leszek F. Dernkiewicz, Applied Functional Analysis, CRC Press Inc., 1996.

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M.Sc./M.A. Course (Fourth Semester)
PAPER -II
Partial Differential Equations and Mechanics (II)

Max. Marks 80

Partial Differential Equations

- Unit-I** Nonlinear First Order PDE-Complete Integrals, Envelopes, Characteristics, Hamilton-Jacobi Equations (Calculus of Variations, Hamilton's ODE, Legendre Transform, Hopf-Lax Formula, Weak Solutions, Uniqueness), Conservation Laws (Shocks, Entropy Condition, Lax-Oleinik formula, Weak Solutions, Uniqueness, Riemann's Problem, Long Time Behaviour)
- Unit-II** Representation of Solutions-Separation of Variables, Similarity Solutions (Plane and Travelling Waves, Solitons, Similarity under Scaling), Fourier and Laplace Transform, Hopf-Cole Transform, Hodograph and Legendre Transforms, Potential Functions.
- Unit-III** Asymptotics (Singular Perturbations, Laplace's Method, Geometric Optics, Stationary Phase, Homogenization), Power Series (Non-characteristic Surfaces, Real Analytic Functions, Cauchy-Kovalevskaya Theorem).

Analytical Dynamics:

- Unit-IV** Hamilton's Principle. Principle of least action. Poincare Cartan Integral invariant. Whittaker's equations. Jacobi's equations. Lee Hwa Chung's theorem, canonical transformations and properties of generating functions.
- Unit-V** Hamilton-Jacobi equation. Jacobi theorem. Method of separation of variables. Lagrange Brackets. Condition of canonical character of a transformation in terms of Lagrange brackets and Poisson brackets,

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invariance of Lagrange brackets and Poisson brackets under canonical transformations.

Books Recommended :

1. L.C. Evans, Partial Differential Equations, Graduate Studies in Mathematics, Volume 19, AMS, 1998.
2. F. Gantmacher, Lectures in Analytic Mechanics, MIR Publishers, Moscow, 1975.
3. R.C.Mondal, Classical Mechanics, Prentice Hall of India

References

1. Books on Partial differential equation by I.N. Sneddon, F. John, P. Prasad and R. Ravindran, Amarnath etc.
2. A.S. Ramsey, Dynamics Part II, The English Language Book Society and Cambridge University Press, 1972.
3. H. Goldstein, Classical Mechanics (2nd edition), Narosa Publishing House, New Delhi.
4. I.M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice Hall.
5. Narayan Chandra Rana & Pramod Sharad Chandra Joag, Classical Mechanics, Tata McGraw Hill, 1991.
6. Louis N. Hand and Janet D. Finch, Analytical Mechanics, Cambridge University Press, 1998.

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M.Sc./M.A. Course (Fourth Semester)
PAPER-III (A)
Operating System and Database Management System
- Theory and Practical

Max. Marks. 100

(Theory-70 +Practical-30)

- Unit-I** Database Systems-Role of database systems, database system architecture and data modeling.
- Unit-II** Introduction to relational algebra and relational calculus.
- Unit-III** Introduction to SQL: Basic features including views; Integrity constraints; Database design-normalization up to BCNF.
- Unit-IV** Operating Systems- Overview of operating system, user interface, processor management, memory management.
- Unit-V** I/O management, concurrency and Security, network and distributed systems.

Books Recommended :

1. S.B. Lipman, J. Lajoi: C++ Primer, Addison Wesley.
2. B. Stroustrup; The C++ Programming Language, Addison Wesley.
3. C.J. Date : Introduction to Database Systems, Addison Wesley.
4. C. Ritchie: Operating Systems-Incorporating UNIX and Windows, BPB Publications.
5. M.A. Weiss, Data Structures and Algorithm Analysis in C++, Addison Wesley.

Practical Examination Scheme

Max. Marks – 30

Practical (two)

Viva

Sessional

Time Duration – 3 Hrs.

20 Marks(10 marks each)

05 Marks

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M.Sc./M.A. Course (Fourth Semester)
PAPER-III (B)
Fuzzy Set Theory & Its Applications (II)

Max Marks – 80

- Unit-I** Fuzzy Logic-An overview of classical logic, Multivalued logics, Fuzzy propositions. Fuzzy quantifiers. Linguistic variables and hedges. Inference from conditional fuzzy propositions, the compositional rule of inference.
- Unit-II** Approximate Reasoning-An overview of Fuzzy expert system. Fuzzy implications and their selection. Multiconditional approximate reasoning. The role of fuzzy relation equation.
- Unit-III** An introduction to Fuzzy Control-Fuzzy controllers. Fuzzy rule base. Fuzzy inference engine. Fuzzification.
- Unit-IV** Defuzzification and the various defuzzitication methods (the centre of area, the centre of maxima, and the mean of maxima methods).
- Unit-V** Decision Making in Fuzzy Environment-Individual decision making. Multiperson decision making. Multicriteria decision making. Multistage decision making, Fuzzy ranking methods. Fuzzy linear programming.

REFERENCES :

1. H.J. Zmmemann, Fuzzy set theory and its Applications, Allied Publishers Ltd. New Delhi, 1991.
2. G.J. Klir and B. Yuan- Fuzzy sets and fuzzy logic, Prentice-Hall ol India, New Delhi, 1995.

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M.Sc./M.A. Course (Fourth Semester)
PAPER-III (C)
Mathematical Biology (II)

Max. Marks - 80

Part-A: Population Models

UNIT-I

Models for population with age structure: Linear discrete models, linear continuous models, the method of characteristics, nonlinear continuous models.

UNIT-II

Models for population with spatial structure: A general metapopulation model, a metapopulation model with residence and travel, the diffusion equation, solution by separation of variables. Linear reaction-diffusion equations, nonlinear reaction-diffusion equations, two-species interactions, diffusion in two dimensions.

Part-B: Disease Transmission Models

UNIT-III

Epidemic models: Introduction to epidemic models, The logistic equation in epidemiology (1.3), simple Kermack-McKendrick epidemic model, network and compartmental epidemic models.

UNIT-IV

More complicated epidemic models: models with exposed period, treatments models, an influenza model, quarantine-isolation models.

An SIR model with a general infectious period, the age of infection epidemic model, models with disease deaths, a vaccination model, the next generation matrix.

UNIT-V

Models for endemic diseases: A model for diseases with no immunity, the SIR model with births and deaths, some applications: Herd immunity, age of infection, the inter-epidemic period, epidemic approach to endemic equilibrium, the SIS model with births and deaths, temporary immunity, diseases population control.

Text Book:

1. Fred Brauer, Carlos Castillo-Chavez, Mathematical Models in Population Biology and Epidemiology, Biology, Springer (2010)

Reference Books:

1. Nicholas F. Britton, Essential Mathematical Biology, Springer-Verlag (2003)
2. J.D.Murray, Mathematical Biology I. An Introduction, Springer-Verlag (2002) 3rd Edition.
3. J.D.Murray, Mathematical Biology II. Spatial Models and Biomedical Application, Springer-Verlag (2003) 3rd Edition.

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M.Sc./M.A. Course (Fourth Semester)

PAPER -IV (A)

Operations Research (II)

Max. Marks 80

- Unit-I** Dynamic Programming-Deterministic and Probabilistic Dynamic programming.
- Unit-II** Game Theory-Two-Person, Zero-Sum Games. Games with Mixed Strategies. Graphical . Solution. Solution by Linear Programming.
- Unit-III** Integer Programming-Pure and Mixed Integer Programming Problem, Gomory's All-I P.P. Method, Construction of Gomory's Constraints, Fractional Cut Method-All Integer LPP, Fractional Cut Method- Mixed Integer LPP, Branch and Bound Technique.
- Unit-IV** Queueing system: Deterministic Queueing system, probability distribution in Queueing, classification of Queueing models, Poission Queueing system.
- Unit-V** Nonlinear Programming-One/and Multi-Variable Unconstrained Optimization. Kuhn-Tucker Conditions for Constrained Optimization. Quadratic Programming. Separable Programming. I Convex Programming. Non-convex Programming.

Books Recommended :

1. F.S. Hillier and G.J. Ueberman. Introduction to Operations ResBareft (Sixth Edition), McGraw Hill International Edition, Industrial Engineering Series, 1995. (This book comes with a CD containing tutorial software).
2. G. Hadley, Linear Programming, Narosa Publishing House, 1995.
3. G. Hadly, Nonlinear and Dynamic Programming, Addison-Wesley, Reading Mass.
4. H.A. Taha, Operations Research -An introduction, Macmillan Publishing Co., Inc., New York.
5. Kanti Swarup, P.K. Gupta and Man Mohan, Operations Research, Sultan Chand & Sons, New Delhi
6. Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali, Linear Programming and Network flows, John Wiley & Sons, New York, 1990.

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References

1. S.S. Rao, Optimization Theory and Applications, Wiley Eastern Ltd., New Delhi.
2. Prem Kumar Gupta and D.S. Hira, Operations Research-An Introduction. S. Chand & Company Ltd., New Delhi.
3. N.S. Kambo, Mathematical Programming Techniques, Affiliated East-West Press Pvt. Ltd., New Delhi, Madras
4. R.K. Rathy, An Introduction to Fluid Dynamics, Oxford and IBH Publishing Company, New Delhi, 1976.
5. A.D. Young, Boundary Layers, AIAA Education Series, Washington DC, 1989.
6. S.W. Yuan, Foundations of Fluid Mechanics, Prentice Hall of India Private Limited, New Delhi, 1976.
7. UNDO Systems Products (Visit website <http://www.Hndo.com/productsf.html>)
 - (i) UNDO (the linear programming solver)
 - (ii) UNDO Callable Library (the premier optimisation engine)
 - (iii) LINGO (the linear, non-linear, and integer programming solver with mathematical modelling language)
 - (i) What's Best I (the spreadsheet add-in that solves linear, non-linear, and integer problems).

All the above four products are bundled into one package to form the Solver Suite. For more details about any of the four products one has to click on its name.

- (i) Optimisation Modelling with UNDO (8th edition) by Linus Schrage.
- (ii) Optimisation Modelling with LINGO by Unus Schrage.

More details available on the Related Book page York, 1979.

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M.Sc./M.A. Course (Fourth Semester)

PAPER-IV (B)

Wavelets (II)

Max Marks – 80

Unit-I Characterizations in the theory of wavelets-The basic equations and some of its applications.

Unit-II Characterizations of MRA wavelets, low-pass filters and scaling functions. Non-existence of smooth wavelets in $H^2(\mathbb{R})$.

Unit-III Frames - The reconstruction formula and the Balian-Low theorem for frames. Frames from translations and dilations. Smooth frames for $H^2(\mathbb{R})$.

Unit-IV Discrete transforms and algorithms-The discrete and the fast Fourier transforms. The discrete and the fast cosine transforms.

Unit-IV The discrete version of the local sine and cosine bases. Decomposition and reconstruction algorithms for wavelets.

REFERENCES:

1. Eugenic Hernandez and Guido Weiss, A First Course on Wavelets, CRC Press, New York, 1996.
2. C.K. Chui, An Introduction to Wavelets, Academic Press, 1992.
3. I. Daubechies, Ten Lectures on Wavelets, CBS-NSF Regional Conferences in Applied Mathematics, 61, SIAM, 1992.
4. Y. Meyer, Wavelets, algorithms and applications (Trans. by R.D. Ryan, SIAM, 1993).
5. M.V. Wickerhauser, Adapted wavelet analysis from theory to software, Wellesley, MA, A.K. Peters, 1994.

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M.Sc./M.A. Course (Fourth Semester)
PAPER -V (A)
Programming in C (with ANSI features) (II)
Theory and Practical

Max. Marks. 100
(Theory-70 +Practical-30)

- Unit-I** Storage Classes-Fixed vs. Automatic Duration. Scope. Global variables. The register Specifier. ANSI rules for the syntax and Semantics of the storage-class keywords.
- Unit-II** Pointers Pointer Arithmetic. Passing Pointers as Function Arguments. Accessing Array Elements through Pointers. Passing Arrays as Function Arguments. Sorting Algorithms. Strings. Multidimensional Arrays. Arrays of Pointers. Pointers to Pointers.
- Unit-III** Functions-Passing Arguments. Declarations and Calls. Pointers to Functions. Recursion. The main Function. Complex Declarations. The C Preprocessor-Macro Substitution. Conditional Compilation. Include Facility. Line Control.
- Unit-IV** Structures and Unions-Structures. Dynamic Memory Allocation. Linked Lists. Unions, enum Declarations.
- Unit-V** Input and Output-Streams, Buffering. The <Stdio.h> Header File. Error Handling. Opening and Closing a File. Reading and Writing Data. Selecting an I/O Method. Unbuffered I/O Random Access. The standard library for Input/Output.

Books Recommended :

1. Peter A. Darnell and Philip E. Margolis, C: A Software Engineering Approach, Narosa Publishing House (Springer International Student Edition) 1993.
2. Samuel P. Harkison and Gly L. Steele Jr., C : A Reference Manual, 2nd Edition, Prentice Hall, 1984.
3. Brian W. Kernighan & Dennis M. Ritchie, The C Programme Language, 2nd Edition (ANSI Features), Prentice Hall 1989.

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Practical Examination Scheme

Max. Marks - 30

Practical (two)

Viva

Sessional

Time Duration - 3 Hrs.

20 Marks(10 marks each)

05 Marks

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M.Sc./M.A. Course (Fourth Semester)

PAPER-V (B)

Graph theory-II

Max. Marks - 80

Unit-I: Ramsey Theory: Perceptness-preserving operations, Forbidden Subgraph orientations, Ramsey numbers and Ramsey graphs.

Unit-II: Groups: Permutation groups, The automorphism group, graphs with given group, symmetry concepts, pseudo-similarity and stability, spectral studies of the Automorphism group.

Unit-III: Polynomials and Graph Enumeration: The colour polynomials, The chromatic polynomial, The bivariate colouring polynomials.

Unit-IV: Graph Enumeration: Co-chromatic (co-dichromatic) graphs and chromatically unique graphs, Graph Enumeration.

Unit-V: Digraphs & Networks: Digraphs, Types of connectedness, Flows in Networks, Menger's and Konig's Theorem, Degree sequences.

REFERENCES :

1. K.R.Parthasarathy, Basic graph theory, Tata Mc graw Hill publishing company limited, 1994.
2. R.J.Wilson, Introduction to graph theory, Longman Harlow, 1985.
3. John Clark, Derek Allon Holton, A first look at graph Theory, World Scientific Singapore, 1991.
4. Frank Harary, Graph Theory Narosa, New Delhi, 1995.
5. Ronald Gould and Benjamin Cummins, Graph Theory, California.
6. Narsingh Deo, Graph Theory with applications to Engineering and Computer Science, Prentice-Hall of India Private Limited, New Delhi, 2002.

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**SCHEME OF EXAMINATION
&
SYLLABUS
of
M.Sc. (PHYSICS)
UNDER
FACULTY OF SCIENCE**

**Approved by Board of Studies in Physics
EFFECTIVE FROM JULY 2019**



**School of Studies in Physics & Astrophysics
Pt. Ravishankar Shukla University
Raipur (C.G.) 492010
PH: - 0771-2262864
WEBSITE: -www.prsu.ac.in**

**Approved by Board of Studies in Physics on 18, January 2019
PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR**

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M. Sc. - PHYSICS

M.Sc. in Physics is a full time 2-year (4-semesters course). There will be four theory papers, and two laboratory courses/project in each semester. In each semester, there will be two internal examinations/assessments. Semester-wise course structure along with distribution of marks is given below:

Semester I

Name of the Paper	Marks					Credits
	Theory		Internal		Total	
	Max	Min	Max	Min		
1. Mathematical Physics	80	16	20	04	100	4
2. Classical Mechanics	80	16	20	04	100	4
3. Electrodynamics & Plasma Physics	80	16	20	04	100	4
4. Electronics	80	16	20	04	100	4
A : General & Optics	-		-		100	2
Laboratory Course I-B : Electronics	-		-		100	2
Total Marks	600					20

Total Marks for Semester I = 600 & Credit = 20

Semester II

Name of the Paper	Marks					Credits
	Theory		Internal		Total	
	Max	Min	Max	Min		
1. Quantum Mechanics-I	80	16	20	04	100	4
2. Statistical Mechanics	80	16	20	04	100	4
3. Electronic & Photonic Devices and Optical Modulators	80	16	20	04	100	4
4. Computational Physics & Computer Programming	80	16	20	04	100	4
Laboratory Course II-A : Numerical Analysis & Computer Programming	-		-		100	2
Laboratory Course II-B : Digital Electronics & Microprocessor	-		-		100	2
Total Marks	600					20

Total Marks for Semester II = 600 & Credit = 20

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Semester III

Name of the Paper	Marks					Credits
	Theory		Internal		Total	
	Max	Min	Max	Min		
1. Quantum Mechanics-II	80	16	20	04	100	4
2. Atomic & Molecular Physics	80	16	20	04	100	4
3. Solid State Physics-I	80	16	20	04	100	4
4. (A) Astronomy & Astrophysics-I (B) Electronics (Communication)-I (C) Physics of Nano-material-I (D) Space Physics-I	80	16	20	04	100	4
Laboratory Course III-A Materials Science & General	-	-	-	-	100	2
Laboratory Course III-B : Astronomy & Astrophysics OR : Electronics (Communication) OR : Physics of Nano-material OR : Space Physics	-	-	-	-	100	2
Total Marks	600					20

Total Marks for Semester III = 600 & Credit = 20

Semester IV

Name of the Paper	Marks					Credits
	Theory		Internal		Total	
	Max	Min	Max	Min		
1. Nuclear & Particle Physics	80	16	20	04	100	4
2. Laser Physics and Applications	80	16	20	04	100	4
3. Solid State Physics -II	80	16	20	04	100	4
4. (A) Astronomy & Astrophysics-II (B) Electronics (Communication)-II (C) Physics of Nano-material-II (D) Space Physics-II	80	16	20	04	100	4
Project Work	-	-	-	-	200	4
Total Marks	600					20

Total Marks for Semester IV = 600 & Credit = 20

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In Each Semester

MAXIMUM MARKS TOTAL	PASS PER	
	TH.	PR.
600	36	36

In semester IV, Project work in Solid State Physics/ Astronomy & Astrophysics/ Electronics/ Physics of Nano-materials/ Space Physics will lead to specialization in the respective area. It will be primarily based on research oriented topics. On completion of the project, student will submit project report in the form of dissertation which will be examined by an external examiner. The examination of project work shall consist of (a) Presentation and (b) comprehensive viva-voce.

Marks-distribution for Laboratory Courses and Project Work:

(a) Laboratory courses (Semesters I-III):

Sessional	: 20 Marks
Viva	: 20 Marks
Experiment	: 60 Marks

(b) Project Work (Semester IV) :

Report – Dissertation	: 60 Marks
Presentation	: 100 Marks
Comprehensive viva-voce	: 20 Marks
Internal assessment	: 20 Marks

Note: Paper IV of both Semesters III and IV is a major elective course. Student has to opt for any one of the courses: (A) or (B) or (C) or (D). The commencement of any one of the major elective paper is subjected to the availability of basic infrastructural facilities viz. expert faculty, laboratory etc.

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Detailed Course Content

Semester - I

PAPER-I: MATHEMATICAL PHYSICS

- Unit-I:** Vector space and Matrices, Linear independence, Bases, dimensionality, Inner product, Linear transformation, matrices, Inverse, Orthogonal and Unitary matrices, Independent element of a matrix, Eigen values and eigen Vectors, Diagonalization, Complete orthonormal sets of functions.
- Unit-II:** Complex Variables: Cauchy- Riemann condition, analytic functions, Cauchy's theorem, Cauchy integral formula, Laurent series, singularities, residue theorem, contour integration, evaluation of definite integrals, problems.
- Unit-III:** Differential equations, first order differential equation, second order differential equation with constant coefficients, second order linear ODEs with variable coefficients, Solution by series expansion, nonhomogenous differential equations and solution by the method of Green's functions.
- Unit-IV:** Special functions, Legendre, Bessel, Hermite and Laguerre functions with their physical applications, generating functions, orthogonality conditions, recursion relations,
- Unit-V:** Integral transforms, Fourier integral and transforms, inversion theorem, Fourier transform of derivatives, convolution theorem, Laplace Transform(LT), LT of Derivatives, Inverse LT, Fourier series; properties and applications, discrete Fourier transform.

TEXT AND REFERENCE BOOKS

1. Mathematical Methods for Physics, by G. Arfken.
2. Matrices and Tensors for Physicist, by A. W. Joshi.
3. Advanced Engineering Mathematics, by E. Kroyazig.
4. Special Functions, by E. B. Rainville.
5. Special Functions, by W.W. Bell.
6. Mathematical Method for Physicist and Engineers, by K. F. Relly, M. P. Hobson and S. J. Bence
7. Mathematics for Physicists, By Marry L. Boas.

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Paper - II: CLASSICAL MECHANICS

- Unit-I** Preliminaries, Newtonian mechanics of one and many particle systems, Conservation laws, Constraints & their classification, Principle of virtual work, Generalized coordinates, D'Alembert's principle and Lagrange's equations, Velocity-dependent potentials and dissipation function, Simple applications of the Lagrangian formulation, Hamilton's principle, Lagrange's equations from Hamilton's principle, Conservation theorems and Symmetry properties, Energy function and the conservation of energy.
- Unit-II** The Hamiltonian formulation of mechanics, Legendre transformations and the Hamilton's equations of motion, Cyclic coordinates and Conservation Theorems, Hamilton's equations from Hamilton's principle, The principle of least action, Simple applications of the Hamiltonian formulation.
- Unit-III** Canonical transformations with examples, The harmonic oscillator, Poisson's brackets, Equations of motion and conservation theorems in the Poisson Bracket formulation, Hamilton-Jacobi (HJ) theory: The HJ equation for Hamilton's principal function, Harmonic oscillator as an example of the HJ method, The HJ equation for Hamilton's characteristic function, The action-angle variables
- Unit-IV** The Central force: Two-body central force problem and its reduction to the equivalent one-body problem, The equations of motion and first integrals, The equivalent one-dimensional problem and classification of orbits, The differential equation of the orbit, Closure and stability of orbits, The Kepler problem, Scattering in a central force field: Rutherford scattering.
- Unit - V** Rigid body dynamics, The Euler angles, Euler's theorem on the motion of a rigid body, Rate of change of a vector, The Coriolis force, Angular momentum and Kinetic energy of motion about a point, The Euler equations of motion of rigid bodies. Formulation of the problem of small oscillations, The eigen-value equation and the principal axis transformation, Frequencies of free vibration and normal coordinates, Free vibration of linear triatomic molecule.

TEXT AND REFERENCE BOOKS

1. Classical Mechanics, By N.C. Rana and P.S. Joag (Tata McGraw-Hill, 1991)
2. Classical Mechanics, by H. Goldstein (Addison Wesley, 1980)
3. Classical Mechanics, by H. Goldstein, C Poole & J Fafko (Pearson Education, Inc, 2002)
4. Mechanics, by A. Sommerfeld, (Academic press, 1952)
5. Introduction to Dynamics by Perceival and D. Richaeds (Cambridge University, press, 1982).

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Paper-III: ELECTRODYNAMICS & PLASMA PHYSICS

- Unit-I** Maxwell's equations, vector and scalar potentials and the wave equation, Gauge transformations, Lorenz gauge, Coulomb gauge, Green function for the wave equation, four-vectors, mathematical properties of the space-time in special relativity, matrix representation of Lorentz transformation, covariance of electrodynamics, transformation of electromagnetic fields.
- Unit-II** Radiation by moving charges, Lienard-Wiechert potential and fields for a point charge, total power radiated by an accelerated charge- Larmor's formula and its relativistic generalization, angular distribution of radiation emitted by an accelerated charge, radiation emitted by a charge in arbitrary extremely relativistic motion, distribution in frequency and angle of energy radiated by accelerated charge.
- Unit-III** Bremsstrahlung: emission from single-speed electrons, thermal Bremsstrahlung emission and absorption, Synchrotron radiation: spectrum of synchrotron radiation, spectral index for power law electron distribution, transition from Cyclotron to Synchrotron emission, Cherenkov radiation
- Unit-IV** Plasma: definition, Debye shielding phenomenon and criteria for plasma, motion of charged particles in electromagnetic field; Uniform E & B fields, Electric field drift, Non-uniform magnetostatic field, Gradient B drift, Parallel acceleration and magnetic mirror effect, Curvature drift, adiabatic invariants.
- Unit-V** Elementary concepts of plasma kinetic theory, the Boltzmann equation, the basic plasma phenomena, plasma oscillations, Fundamental equations of magneto-hydrodynamics (MHD), Hydrodynamics Waves; Magneto sonic and Alfvén waves, Magnetic viscosity and magnetic pressure, plasma confinement schemes.

REFERENCE BOOK:

1. Jackson, classical electrodynamics.
2. Rybicki & Lightman: Radiative Processes in Astrophysics
2. Panofsky and Phillips: Classical electricity and magnetism.
3. Bittencourt, Plasma physics.
4. Chen: Plasma physics.

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Paper - IV: ELECTRONICS

- Unit-I** Operational Amplifier- Basic Op.Amp. Differential amplifier, the emitter coupled Difference Ampl., Transfer characteristics of a Diff. Ampl., an example of an IC Op.-Amp., off set error voltage and currents, measurement of Op.-Amp. Parameters, frequency response of Op-amp.Linear analog systems: Basic Op.-Amp. Applications, Analog integration and differentiation, Electronic analog computation, Non-linear analog systems: Comparators, Waveform generators.
- Unit-II** Combinational Logic –Basic logic gates: OR, AND and NOT gates, NOR and NAND gates, Boolean algebra, DeMorgan's theorems, exclusive OR gate, characteristics of logic families, saturated logic families: RTL, DCTL, non-saturated logic families: TTL and ECL, Unipolar logic families.
- Unit -III** Sequential Logic, Flip-flops: RS Flip-flop, level clocking, Edge triggered Flip Flops, D Flip flops, JK Flip-flops, J.K.master slave Flip-flops, Registers: buffer, shift and control shift registers, counters: ripple synchronous & ring counters, tri-state registers, Buffer: controlled buffer Register, Bus organized structure, Latch, multiplexer, Demultiplexer, decoder, ALU Memories: RAM, ROM, PROM, EPROM, A/D and D/A converters.
- Unit-IV** Microprocessors – Building concept of microprocessors, developing inside of microprocessor , Instruction codes ,Instruction Register ,Introducing RESET Pin, Introducing on chip oscillator, Interfacing I/O devices, Introducing Interrupt lines :Stack,Push,Pop operation ,delay in servicing interrupts, multiply interrupts, location for interrupts .Introducing slow and fast data transfer, Status of microprocessor, interrupt pins, General purpose Register, flag Register, Increment/decrement register. Features of 8085 microprocessor. Pin diagram of 8085, block diagram of 8085. CPU of a microprocessor, timing and control, system timings and interrupt timings of 8085, registers in 8085, interfacing memory and I/O devices- a preliminary ideas.Number system, Floating Point notation.
- Unit – V** Instructions set of 8085, types of instructions- Data transfer group, Arithmetic logic, branch group, stack I/O machine control group, addressing mode of Intel 8085, examples of Assembly language programs of 8085, summing of two 8-bit numbers to result a 16-bit number, summing two 16-bit number, multiplying two 8-bit number to result a 16-bit product, block transfer of data from one memory block to other, BCD to hexadecimal data, finding the largest number in a series.

Text and reference books

1. Integrated Electronics: J.Millman R.C.C.Halkias.
2. Electronics devices and circuit theory, by Robert Boylested and Louis Nashdaky PHI, New Delhi-110001, 1991.
3. Operational amplifier linear integrated circuits, by Romakanth A. Gayakwad PHI, second edition 1991.
4. Digital computer electronics- An introduction to microcomputers-A.P.Malvino.
5. Digital finances and applications, by A.P. Malvino and Donald P.Leach, Tata

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- McGraw Hill company, New Delhi 1993.
6. Microprocessor architecture, programming applications with 8085/8086 by Ramesh S. Gaonkar, Willey-Eastern limited 1987.
 7. Introduction to microprocessors – A.P. Mathur (Tata McGraw).
 8. Microprocessors-Theory and applications- M. Hafiquzzaman (Prentice hall).
 9. Microprocessors fundamentals- Schanmi Outling Service Author Pocer L. Tokheim.
 10. Integrated circuits : K K Botkar(Khanna publications)
 11. Digital Electronics : R P Jain (Tata McGraw Hill)
 12. Microprocesss : B Ram
 13. 8-bit microprocessor : V.J. Vibhute & P.B. Borole(Tecn-Max Publication, Pune)

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Laboratory Course

Lab I-A: General & Optics (Any ten)

1. Determination of band gap of semiconductor by four prob method.
2. Measurement of Hall Coefficient of given semiconductor; identification of type of semiconductor and estimation of charge carrier concentration.
3. Determination of wavelength of mercury light by constant deviation spectrometer using Hartmann formula.
4. Ultrasonic velocity in a liquid as a function of temperature using ultrasonic interferometer.
5. Experiment on transmission line (A) Determination of characteristics impedance, (B) Study of voltage distribution.
6. Determination of the Curie temperature of ferromagnetic material.
7. Determination of forbidden gap of a diode by plotting reverse saturation current as a function of temperature.
8. Determination of operating voltage and study the characteristics of a GM tube.
9. Determination of operating voltage of a GM tube and determine the linear absorption coefficient.
10. Determination of operating voltage of a GM tube and verify inverse-square law.
11. Determination of short half life of a given source which can be obtained from a mini generator or produced with a neutron source by activation.
12. X-ray diffraction by Telexometer.
13. Determination of ionization potential of Lithium/Mercury.
14. Determination of e/m of electron by Normal Zeeman Effect using Fe γ -Perot Etalon.
15. Determination of Dissociation energy of iodine (I_2) Molecule by photography, the absorption bands of I_2 in the visible region.
16. Measurement of wavelength of He-Ne Laser light using a ruler and thickness of thin wire by the laser.
17. To study Faraday Effect using He-Ne Laser.

Lab I-B: Electronics (Any ten)

1. Design & Study of Regulated Power supply.
2. Study of Transistor Amplifiers in CE, CB, and CC modes.
3. Study of Transistor Bias Stability.
4. Study of Astable, Monostable and Bistable Multivibrator.
5. Study of Silicon Controlled Rectifier.
6. Experiment of Uni - Junction Transistor and its application.
7. Experiment of FET and MOSFET characterization and application as an amplifier.
8. Study of Differential Amplifier.
9. Basic Logic gates and verification of their Truth- Tables.
10. Combinational logic gates and verification of De-Morgan's Theorem.
11. Study of Basic Operational Amplifier (741).
12. Study of Opto- Electronics Devices.

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Semester – II

PAPER - I : QUANTUM MECHANICS-I

- Unit - I** Inadequacy of classical mechanics, Plank quantum hypothesis and radiation law, Photoelectric effect, de-broglie's theory, Schrödinger equation, continuity equation, Ehrenfest theorem, admissible wave functions, general formalism of wave mechanics, representation of states and dynamical variables, stationary states, one-dimensional problems; walls and barriers, Schrödinger equation for harmonic oscillator and its solution.
- Unit -II** Superposition principle, uncertainty relations, states with minimum uncertainty product, commutation relationship, completeness and normalization of eigen functions, Dirac-delta function, Bra & Ket notation, matrix representation of an operator, harmonic oscillator and its solution by matrix method, Heisenberg equation of motion.
- Unit -III** Angular momentum in quantum mechanics, commutation relationships, eigen values, Spin angular momentum, Pauli's matrices, addition of angular momentum, Clebsch-Gordon coefficients.
- Unit -IV** Central force problem, spherically symmetric potentials in three dimensions, separation of wave equation, parity, three-dimensional square-well potential and energy levels, the hydrogen atom; solution of the radial equation, energy levels and stationary state wave functions, discussion of bound states, degeneracy.
- Unit -V** Time- independent perturbation theory, non-degenerate case, first order and second perturbations with the example of an oscillator, degenerate cases, removal of degeneracy in second order, Zeeman effect without electron spin, first-order Stark effect in hydrogen, perturbed energy levels, correct eigen function, occurrence of permanent electric dipole moments.

TEXT AND REFERENCE BOOKS:

1. L.I. Schiff: quantum mechanics (McGraw-Hill).
2. S.Gasiorowicz, Quantum Physics (Wiley).
3. Landau and Lifshitz : Non-relativistic quantum mechanics.
4. B.Craseman and Z.D.Powell: quantum mechanics (Addison Wesley)
5. A.P. Messiah: Quantum Mechanics.
6. J.J. Sakurai : Modern Quantum Mechanics.
7. Mathews and Venkatesan : Quantum Mechanics.

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PAPER – II: STATISTICAL MECHANICS

- Unit-I** Foundation of statistical mechanics : macroscopic and microscopic states, contact between statistics and thermodynamics, physical significance of $\Omega(N, V, E)$, the classical gas, entropy of mixing and Gibb's paradox, phase space of classical system, Liouville's theorem and its consequences, quantum states and phase space.
- Unit- II** Elements of ensemble theory – A system in microcanonical, canonical, and grand canonical ensembles, partition functions, physical significance of statistical quantities, example of classical system, energy and energy-density fluctuations and mutual correspondence of various ensembles.
- Unit -III** Formulation of quantum statistics – Quantum mechanical ensemble theory, density matrix, statistics of various quantum mechanical ensembles, system composed of indistinguishable particles.
Theory of simple gases – Ideal gas in various quantum mechanical ensemble, Maxwell-Boltzmann, Bose-Einstein, Fermi-Dirac distributions, statistics of occupation number.
- Unit -IV** Ideal Bose and Fermi gases -Thermodynamic behavior of an ideal Bose gas, Bose-Einstein condensation and, elementary excitations in liquid helium II, Thermodynamic behavior of an ideal Fermi gas, the electron gas, nonrelativistic and relativistic degenerate electron gas, theory of white dwarf stars.
- Unit -V** Statistical Mechanics of interacting systems – the method of cluster expansion for a classical gas, Virial expansion of the equation of state. Theory of phase transition – general remark on the problem of condensation, Fluctuations: thermodynamic fluctuations, Spatial correlation in a fluid Brownian motion: Einstein Smoluchowski theory of Brownian motion.

TEXT & REFERENCE BOOKS –

1. R. K. Pathria, Statistical Mechanics (Pergamon Press).
2. L. D. Landau & E. M. Lifshitz (Butter worth and Heinemann Press).
3. Frederick Reif, Fundamental of statistical and thermal physics (McGraw-Hill publishers).
4. Kerson Huang, Statistical Mechanics (Wiley Eastern).

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PAPER –III: ELECTRONIC & PHOTONIC DEVICES AND OPTICAL MODULATORS

- Unit – I:** Special Bipolar devices: Thyristors- the four-layer diodes and their basic characteristics, Shockley diode, three terminal thyristor, Diac & Triac, SCR, UJT, Field controlled Thyristors.
- Unit- II:** Unipolar Devices : JFET, MESFET and MOSFET, basic structure, working and device I-V characteristics, small signal equivalent circuit for Microwave performance Introduction to MIS and MOS diodes, charge coupled devices (CCDs), basic structure and working principle , MOSFET-basic device characteristics, types of MOSFET.
- Unit-III:** Special Microwave Devices: Tunnel diode and backward diode- basic device characteristics, IMPATT diodes and their static and dynamic characteristics, Transfer electron devices- transferred electron effect, Gunn diodes.
- Unit-IV :** Photonic Devices : Radiative transitions, LEDs, Visible and infrared SC lasers; Photo detectors; Photo conductor, & Photodiode, Solar cells, Solar radiation and ideal conversion efficiency, p-n junction solar cells, Hetero junction. Interface thin film solar cells.
- Unit -V:** Optical Modulators and Display Devices :Modulation of light- Birefringence, Optical activity, Electro-optic, Magneto-optic and Acoustic- optic effects, Materials exhibiting these properties, Non-linear optics.Display devices: Luminescence, Photo-luminescence, Electro-luminescence, Liquid crystal displays, Numeric displays.

TEXT & REFERENCE BOOKS-

1. Semiconductor Devices – Physics and Technology, by S M Sze ,Wiley (1985)
2. Introduction to semiconductor device, M.S. Tyasi, John Wiley and sons
3. Measurement, Instrumentation and experimental design in physics and engineering by M.Sayer and A.Mansingh, Prentice Hall India 2000
4. Optical electronics by Ajay Ghatak and K.Thyagarajah, Cam.Univ. Press.
5. Opto electronics – An introduction: J.Wilson and JFB Hawkes (Eastern Economy Edition).
6. Optical Communications: J.H. Franz and V.K. Jain (Narosa).

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PAPER – IV: COMPUTATIONAL METHODS AND PROGRAMMING

- Unit –I** Methods for determination of zeroes of linear and nonlinear algebraic equations and transcendental equations, convergence of solutions. Solution of simultaneous linear equations, Gaussian elimination, pivoting, iterative method, matrix inversion.
- Unit –II** Finite differences, interpolation with equally spaced and unevenly spaced points, curve fitting, polynomial least squares and cubic spline fitting. Numerical differentiation and integration, Newton-Cotes formulae, error estimates, Gauss method.
- Unit –III** Numerical solution of ordinary differential equations, Euler and Runge-Kutta methods, predictor-corrector method, elementary ideas of solutions of partial differential equations.
- Unit- IV** Elementary information about digital computer principles, compilers, interpreters and operating systems(Windows/Linux) Fortran programming, flow charts, integers and floating point arithmetic, expressions, built in functions.
- Unit-V** Executable and non-executable statements, assignments, control and input-output statements, subroutines and functions; The statement functions, main features of functions and subroutines ,subprogram, function subprogram, overall structure of FORTRAN programe, external statement, subroutine subprogram ,common statement, equivalence statement, operations with files-open and close statement, Format statements, field specifications.

TEXT AND REFERENCE BOOKS

1. Sastry: Introductory Methods of Numerical Analysis.
2. Rajaraman: Numerical Analysis.
3. Antia: Numerical methods.
4. Raja Raman: FORTRAN programming.

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Laboratory Course

Lab II-A: Numerical Analysis & Computer Programming (Any ten)

1. To solve simultaneous Linear equation by Gauss Elimination method.
2. To calculate the root of a transcendental equation by Newton – Raphsons method.
3. Solving the system of linear simultaneous equation by Gauss Serdel method.
4. Numerical Integration by Simpson's 1/3 Rule.
5. Solving simultaneous Linear equation by Gauss-Jordon method.
6. Solution of Differential equation by Euler's Method.
7. To invert a given matrix by Gauss-Jordon Method.
8. Solution of Differential equation by Runge Kutta Method.
9. To fit the given data in a straight line by linear regression Method.
 - a) WAP to find the Largest of n number of series.
 - b) To calculate the standard deviation of a given set of data.
10. To write a program to compute the complex roots of a given polynomial of N^{th} degree by Graffe's Method.
11. To write a program to compute the Eigen values of a given matrix.
12. To integrate a given function by: (a) Trapezoidal method or by (b) Gauss Quadrature.
13. To find solutions of 1st order, ordinary differential equation by Taylor method

Lab II-B: Digital Electronics & Microprocessor (Any ten)

1. Study of R-S, D/T, J-K Flip-Flops.
2. Study of counters: Ripple, Mode 3, Mode 5 counters.
3. Study of Shift Register.
4. Study of R-2R D/A Converter.
5. Study of Random Access Memory (RAM) Read Only Memory. (ROM)
6. Study of A/D Converter.
7. Experiment with Microprocessor: - I
 - (a) Convert BCD in to HEXADECIMAL
 - (b) To transfer group of data blocks from one location to another location.
8. Experiment with microprocessor: - II
 - (a) To write programs for addition of two 1 byte data giving results of 2 bytes.
 - (b) To write programs for multiplication of two 1 byte data giving results of 2 bytes.
9. (a) To add 2 16-BIT numbers stored in locations from $x \times x \times x$ to $x \times x \times x + 3$ and add them store the results from $x \times x \times x + 4$ to $x \times x \times x + 6$ memory location
 - (b) To find the largest of n numbers of a series.
10. To arrange N numbers in an ascending orders.
11. Experiments with Microprocessor.
 - (a) Convert BCD in to binary and vice-versa.
 - (b) To transfer group of data blocks from one location to another location.
 - (c) To write programs for addition of two 1byte data giving result of 2byte data
 - (d) To write programs for multiplication of two 1 byte data giving result of 2byte data.
12. Logic gate study DTL and RTL.
13. Study of adder/Subtractor.

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Semester – III

PAPER –I: QUANTUM MECHANICS -II

- Unit-I** Variational method, expectation value of energy, application to excited states, ground state of He-atom, Zero point energy of one dimensional harmonic oscillator, Vander-waals interaction, the W.K.B. approximation, approximate solutions, asymptotic nature of the solution, solution near turning point, connection formulae, energy levels of a potential well and quantization rule.
- Unit -II** Theory of scattering: differential and total scattering cross section, wave mechanical picture of scattering & the scattering amplitude, Green's functions and formal expression for scattering amplitude, The Born approximation and its validity, Partial wave analysis, asymptotic behavior of partial waves and phase shifts, optical theorem, scattering by a square well potential, scattering by a hard sphere, scattering by a Coulomb potential..
- Unit – III** Time-dependent perturbation theory, first order perturbation, Harmonic perturbation, Fermi's Golden rule, Ionization of a H-atom, absorption and induced emission, Selection rules. Identical particles, symmetric and anti symmetric wave functions
- Unit -IV** Relativistic quantum mechanics, formulation of relativistic quantum theory, the Klein-Gordon equation; plane wave solutions, charge and current densities, The Dirac equation for a free particle, matrices alpha and beta, Lorentz covariance of the Dirac equation, free particle solutions and the energy spectrum, charge and current densities.
- Unit-V** The spin of the Dirac particle, Dirac particle in electromagnetic fields and the significance of the negative energy state, Dirac equation for a central field : Spin angular momentum, approximate reduction, spin -orbit energy, separation of equation, the hydrogen atom, classification of energy levels and negative energy states.

TEXT AND REFERENCE BOOKS –

1. L.I. Schiff: Quantum Mechanics (McGraw-Hill).
2. S.Gasiorowicz: Quantum Physics (Wiley).
3. Landau and Lifshitz : Quantum Mechanics.
4. B.Craseman and Z.D.Powell : Quantum Mechanics (Addison Wesley)
5. A.P. Messiah: Quantum Mechanics.
6. J.J. Sakurai: Modern Quantum Mechanics.
7. Mathews and Venkatesan: Quantum Mechanics.
8. Bjorken and Drell : Relativistic Quantum Mechanics.

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PAPER –II: ATOMIC AND MOLECULAR PHYSICS

Unit-I: Quantum states of one electron atoms-atomic orbitals, Hydrogen spectrum, spin-orbit(l-s) interaction energy, fine structure of hydrogen spectrum including l-s interaction and relativistic correction, spectra of alkali elements, fine structure in alkali spectra, penetrating and non-penetrating orbits, intensity rules.

Unit-II: Pauli's principle, equivalent and non-equivalent electrons, ground state(basic level of different elements), two electron systems, interaction energy in L-S. and J-J. Coupling, Hyperfine structure, line broadening mechanisms (general ideas).

Unit-III: Normal and anomalous Zeeman effect, early discoveries and developments, vector models of one electron system in a weak magnetic field, magnetic moment of a bound electron, magnetic interaction energy, selection rules, intensity rules, Paschen-Back (PB) effect – principal series effect, Zeeman and PB effects in hydrogen, Stark effect- discovery, Stark effect in Hydrogen, orbital model, weak and strong effect in Hydrogen.

Unit-IV: Types of molecules: linear diatomic molecules, symmetric top, asymmetric top and spherical top molecules. Rotational spectra of diatomic molecules: rigid rotator model, energy levels, selection rule, spectrum, comparison with observed spectrum and non-rigid rotator model, Intensities of spectral lines, microwave spectrometer, Raman spectrum; classical and quantum theory of Raman Effect, pure rotational Raman spectrum.

Unit-V: Vibrational spectra of diatomic molecules: simple harmonic model, energy levels and spectrum, comparison with observed spectrum and anharmonic model, Vibrating rotators, Interaction of rotations and vibrations, fine structures and P-Q-R branches, IR spectrometer, Vibrational Raman spectrum, Vibrational rotational Raman spectrum.

TEXT AND REFERENCE BOOKS:

1. Introduction to atomic spectra - H.E. White (T).
2. Fundamentals of molecular spectroscopy – C.N. Banwell and E.M McCash (T).
3. Spectroscopy vol. I, II and III – Walker and Straughner.
4. Introduction to Molecular spectroscopy – G.M. Barrow.
5. Spectra of diatomic molecules – Herzberg.
6. Molecular spectroscopy – Jeanne L. Mc-Hale.
7. Molecular spectroscopy – J.M. Brown.
8. Spectra of atoms and molecules – P.F. Berman.
9. Modern spectroscopy, J.M. Hollas.

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PAPER – III: SOLID STATE PHYSICS-I

Unit- I: Electrons in Solids and Electronic Properties

Energy bands: nearly free electron model, origin of energy gap and its magnitude, Bloch function, Kronig-Penny model, Wave equation of electron in periodic potential, restatement of Bloch theorem, crystal moment of an electron, solution of Central equation, Kronig-Penny model in reciprocal space, empty lattice Approximation, approximate solution near zone boundary, Number of orbitals in a band, metals and insulators.

Unit -II: Fermi surfaces and metals

Effect of temperature on F-D distribution, free electron gas in three dimension. Different zone schemes, reduced and periodic zones, construction of Fermi surfaces, nearly free electrons, electron, hole, open orbits, Calculation of energy bands, Tight binding, Wigner-Seitz, cohesive energy, pseudo potential methods. Experimental methods in Fermi surface studies, quantization of orbits in a magnetic field, de Haas van Alphen Effect, External orbits, Fermi surface of copper.

Unit- III: Crystal vibration and thermal properties

Lattice dynamics in monoatomic and diatomic lattice: two atoms per primitive basis, optical and acoustic modes, quantization of elastic waves, phonon momentum, inelastic neutron scattering by phonons, Anharmonic crystal interactions-thermal expansion, thermal conductivity, thermal resistivity of phonon gas, umklapp processes, imperfections.

Unit –IV: Electron-Phonon interaction- superconductivity

Experimental survey: occurrence of superconductivity, Destruction of superconductivity by magnetic field, Meissner effect, heat capacity, energy gap, MW, and IR properties, isotope effect. Theoretical survey : thermodynamics of superconducting transition, London equation, Coherence length, Cooper pairing due to phonons, BCS theory of superconductivity, BCS ground state, flux quantization of superconducting ring, duration of persistent currents, Type II superconductors, Vortex states, estimation of H_{c1} and H_{c2} , single particle and Josephson superconductor tunneling, DC/AC Josephson effect, Macroscopic quantum interference. High temperature superconductors, critical fields and currents, Hall number, fullerenes ring.

Unit – V: Semiconductor crystals

Band gap, equation of motion, physical derivation of equation of motion, holes, effective mass, physical interpretation of effective mass, effective masses of semiconductors Si and Ge, intrinsic carrier concentration, intrinsic mobility, impurity conductivity, donor and acceptor states, thermal ionization of donors and acceptors, thermo-electric effects.

TEXT AND REFERENCE BOOKS

1. C. Kittel: Introduction to Solid State Physics (Wiley and Sons).
2. J.M.Ziman: Principles of theory of solids (Cambridge Univ.Press).
3. Azaroff: X-ray crystallography.
4. Weertman and weertman : Elementary Dislocation Theory.
5. Verma and Srivastava: Crystallography for Solid State Physics.
6. Azeroff and Buerger: The Power Method.
7. Buerger: Crystal Structure Analysis.

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8. Thomas: Transmission Electron Microscopy.
9. Omar: Elementary solid state physics.
10. Ashcroft and Mermin: Solid State Physics.
11. Chalking and Lubensky: Principles of Condensed Matter Physics.
12. Madelung: Introduction to solid state theory.
13. Callaway: Quantum theory of solid state physics.
14. Huang: Theoretical Solid State Physics.
15. Kittel: Quantum theory of solids.

PAPER –IV (A): ASTRONOMY AND ASTROPHYSICS-I

- Unit – I** Stars-apparent magnitudes, Colour index, Spectral classification, Stellar distances, Absolute magnitude, The H-R diagram of stars.
Stellar interiors: The basic equations of stellar structure, Hydrostatic equilibrium, Thermal equilibrium, Virial Theorem, Energy sources, Energy transport by radiation and convection, Equation of state
- Unit – II** Formation and evolution of stars: Inter stellar dust and gas, Formation of protostars, Pre-main sequence evolution, Post main sequence evolution and Evolution on the main sequence for low and high mass stars, Late stages of evolution, Fate of massive stars, Supernovae and its characteristics.
- Unit – III** End states of stars, Electron degeneracy pressure, White dwarfs, and Chandrasekhar limit, Neutron stars and Pulsars, Black holes.
Binary stars and their classification, close binaries, Roche Lobes, Evolution of semidetached systems: Algols, Cataclysmic variables and X-ray binaries.
- Unit- IV** Solar Physics: Physical Characteristics of sun, Photosphere: Limb darkening, Granulation, Faculae, Solar Chromosphere and Corona, Prominences, Solar Cycle and Sunspots, Solar Magnetic Fields, Theory of Sunspots, Solar flares, solar wind, Helioseismology.
- Unit – V** Kepler's law and its implication to Binary Stars, Doppler Effect and its use in velocity measurement e.g. rotation of Saturn and its Ring, determination of velocity of galaxies, Hubble's law and Age of the Universe, Star clusters, HR diagram of star clusters, distance and age determination through HR diagram. Variable stars, Cepheid Variables, Period Luminosity relation and Distance measurement. Period, dispersion and distance of the Pulsars. Photometer and photoelectric photometry.

TEXT AND REFERENCE BOOKS:

1. Astrophysics for Physicists, Arnab Rai Choudhuri, Camb. University Press, 2010.
2. Astrophysics : Stars and Galaxies, K.D. Abhayankar, Universities Press (India) Ltd, 2001.
3. An Introduction to Astrophysics, Baidyanath Basu, PHI, 2010.
4. Modern Astrophysics, B.W. Carroll and D.A. Ostlie, Addison-Wealey, 2007.
5. Introductory Astronomy and Astrophysics, M.Zeilik and S.A. Gregory, 4th ed., Saunders College Publishing, 1998.

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6. The Physical Universe: An introduction to astronomy, F.Shu, University Science Books 1982.
7. Textbook of astronomy and astrophysics with elements of cosmology, V.B. Bhatia, Narosa Publishing House, 2000.
8. The new cosmos, A.Unsold and B. Baschek, Newyork, Springer 2002.
9. Theoretical Astrophysics, vol. I: Astrophysical Processes T. Padmanabhan, Cambridge University Press, 2000.
10. Theoretical Astrophysics, vol. – II: Stars and stellar systems, T. Padmanabhan, Cambridge University Press 2001.
11. A Workbook for Astronomy, Jerry Waxman, Cambridge University Press, 1984.

Paper – IV (B) ELECTRONICS (Communication)-I

Unit I Microwave devices

Klystron ,magnetron & traveling wave tubes ,velocity modulation ,basic principal of two cavity klystrons & relex klystrons ,principle of operation of magnetrons ,helix traveling wave tubes .

Unit II Microwave wave guides & components

(Wave modes) rectangular wave guides: solution of wave equation in rectangular coordinates, TE modes in rectangular wave guides ,TM modes in rectangular wave guides ,excitations of modes in rectangular wave guides .

Circular wave guides :solutions of wave equation in Cylindrical coordinates, TE modes in Circular wave guides ,TM modes in Circular wave guides , TEM modes in Circular wave guides, excitations of modes in Circular wave guides .

Unit-III Microwave cavities: rectangular cavity resonator, circular –cavity resonator & semi –circular –cavity resonators Q- factor of a cavity resonator.

Transferred Electrons devices (TEDs)

Gunn effect diodes, principle of operation, modes of operations, read diodes, IMPATT diodes, TRAPATT diodes.

Microwave communications: advantages of microwave transmission, loss in free space, propagation of microwave, components of antennas used in MW communication system.

Unit-IV Radar system:

Radar block diagram & operation ,radar frequencies ,pulse consideration, radar range equation ,derivation of radar range equation ,minimum detectable single receiver noise ,signal to noise ratio ,integration of radar pulses ,radar cross sections ,pulse reflections frequency ,antenna ,parameters ,systems losses & propagation losses ,radars transmitters receivers ,antennas displays

Unit V Satellite communication

Orbital Satellite, geostationary satellite ,orbital patterns ,look angles ,orbital spacing , satellite system ,link modules

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REFERENCE BOOKS

- 1) "Microwaves" by K.L. Gupta Wiley Eastern Ltd. Delhi.
- 2) Advanced Electronic communication system by Wayne Toms Physics education.
- 3) Principle of communication of system-by Toub & Schilling: 2nd ed. TMH 1994
- 4) Communication system: by Siman Haykin, 3rd ed. John Wiley & sons inc. 1994.
- 5) Microwave devices & circuits by : Samuel, Y. Liau.
- 6) Electronic communication: George Kennedy.

Paper IV (C) PHYSICS OF NANO MATERIALS - I

Unit I: Nano Materials

Properties of Nano-Particles: Metal nano-clusters, theoretical modeling of nanoparticles, geometric and electronic structure, magnetic clusters, Semiconductor nanoparticles, optical properties, rare gas and molecular clusters, Bulk nano-structured materials: Solid disordered nanostructures, methods of synthesis, properties, nano-cluster composite glasses, porous silicon, nano structured crystals.

UNIT II: Carbon Nano Tubes (CNTs)

Nature of carbon bonds, different allotropies of carbon, structure and properties of C_{60} , graphene, carbon nanotubes and its types, laser vaporization techniques, arc discharge method and chemical deposition technique, purification techniques, Properties of Carbon Nanotubes and Graphene: Optical, electrical, electronic, mechanical, thermal, optical, and vibrational properties.

UNIT III: Synthesis of Nano- Materials

Top-down & Bottom-up approaches: Formation of nanostructures by mechanical milling (ball milling) and mechanical attrition, Chemical Vapor Deposition (CVD), Physical Vapour Deposition (PVD), thermal and e beam evaporation, Pulsed Laser Ablation (PLD).

Chemical Routes for synthesis of Nanomaterials: Chemical precipitation and co-precipitation, chemical bath deposition (CBD), Sol-gel synthesis, Microemulsions or reverse micelles, Solvothermal synthesis, Thermolysis routes and spray pyrolysis.

UNIT IV: Characterization of Nano-materials (a)

X-ray Diffraction (XRD), powder and single crystal Diffraction, X-ray fluorescence (XRF), X ray photoelectron spectroscopy (XPS), Energy Dispersive X-ray analysis (EDAX), Extended X ray absorption and fluorescence spectroscopy (EXAFS), Dispersive high pressure XRD and Diamond anvil cells (DAC).

Nuclear Magnetic Resonance (NMR) and Raman spectroscopy: description and analysis. Surface analysis methods: Secondary ion mass spectroscopy (SIMS), Auger Electron Spectroscopy, ESCA, Deep Level Transient Spectroscopy (DL TS), Thermo Gravimetric Analysis (TGA), Differential Scanning Calorimetry (DSC), Differential Thermal Analysis.

UNIT V: Characterization of Nano-materials (b)

Scanning Tunneling Microscopy (STM), Contact and non contact Atomic Force Microscopy (AFM), Magnetic Force Microscopy (MFM), Nano indentation, Scanning Electron Microscopy (SEM), Transmission electron microscopy (TEM), High resolution TEM Field emission SEM, Electron Energy Loss Spectroscopy (EELS).

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Spectrophotometry: UV-Vis spectrophotometers, IR spectrophotometers, Fourier Transform Infrared Radiation (FTIR), Photoluminescence (PL), electroluminescence and thermoluminescence spectroscopy, Near-field Scanning Optical Microscopy (NSOM).

References: Books/ Research Monographs

1. Nano materials: Synthesis properties ,characterization and application: A.S Edelstein and R.C Cammarata
2. Introduction to Nanotechnology: Charles P. Poole Jr and Franks J. Qwens
3. Nanotechnology, Kohl, Michael.
4. Nanoelectronics and Nanosystems , Karl Goser, Peter Glosekotter, Jan Dienstuhl., Springer, 2004
5. Handbook of Analytical instruments, R.S. Khandpur
6. X-ray diffraction procedures, H. P. Klung and L.E.Alexander
7. The Powder Method IV. Azaroff and M. J. Buerger
8. Elements of X-ray diffraction, B. D.Cullity
9. Differential Thermal Analysis, R.C.Mackenzie
10. Thermal Methods of Analysis, W.W.Wendlandt
11. Synthesis, Functionalization and Surface treatment of Nanoparticles :Maric Isbella and Buraton
12. Encyclopedia of Nanotechnology, H.S. Nalwa
13. Nanomaterial Systems Properties and Application, A.S.Eldestein and R.C.Cammarata.
14. Handbook of Nanotechnology: Bhushan (Ed), Springer Verlag, New York (2004).
15. Nanostructures and Nanomaterials- Synthesis properties and Applications by Guozhong Cao (Empirical College Press World Scientific Pub., 2004).
16. Nanocomposite Science and Technology, Ajayan, Schadler and Braun
17. Fullerene & Carbon nanotubes, Dressel Shaus
18. Carbon Nanotubes, Elizer
19. Physical properties of CNT, Saito
20. Carbon nanotechnology, Liming Dai
21. Nanotubes and nanowires, CNR Rao and Govindaraj RCS Publishing.
22. Piezoelectric Sensors: Force, Strain, Pressure, Acceleration and Acoustic Emission Sensors, Materials and Amplifiers, G. Gautschi.
23. Block Copolymers in Nanoscience Massimo Lazzari
24. Supramolecular Chemistry, Jonathan W. Steed, Jerry L. Atwood
25. Nanotechnology: Importance and Application by M.H. Fulekar, IK International, 2010.
26. Nanotechnology in Biology and Medicine: Methods, Devices and Application by Tuan Vo-Dinh, CRC press, 2007.
27. Nanosystem characterization tools in the life sciences by Challa Kumar. Wiley-VCH, 2006.
28. Nanolithography M.Gentili et al.(edits),Springer.
29. Environanotechnology by Mao Hong fan, Chin-pao Huang, Alan E Bland, Z Honglin Wang, Rachid Sliman, Ian Wright. Elsevier, 2010.
30. Nanotechnologies, Hazards and Resource efficiency by M. Steinfeldt, Avon Gleich, U. Petschow, R. Haum. Springer, 2007.
31. Nanotechnology: Health and Environmental risk by Jo Anne Shatkin. CRC press, 2008.
32. An Introduction to Quantum Computing Phillip Kaye, Raymond Laflamme, Michele Mosca
33. The Physics of Quantum Information: Quantum Cryptography, Quantum Teleportation, Quantum Computation by Dirk Bouwmeester, Artur K. Ekert, Anton Zeilinger
34. Problems And Solutions in Quantum Computing And Quantum Information Yorick Hardy Willi-Hans Steeb

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PAPER –IV (D): SPACE PHYSICS - I

Unit I: Solar Physics

Physical Characteristics of sun, Source of solar energy, thermonuclear reaction and building up of higher elements, Description of solar internal and external layers, Photosphere: Limb darkening, Granulation, Faculae, Solar Chromosphere and Corona, Heating of the solar chromosphere and corona, Prominences, Solar Cycle and Sunspots, Solar Magnetic Fields, Theory of Sunspots, Solar flares, Solar wind, Coronal mass ejections, Helioseismology.

Unit II: Planetary System

Solar planetary system, Major characteristics of the Planets, Atmospheric Composition, Planetary magnetism, Magnetic fields, Magnetic dipole, Asteroids, Comets, Extra Solar Planets, Magnetic fields of Extra Solar Planets

Unit III: Celestial Mechanics

Time and Coordinate system: Celestial Sphere, Solar Time, Sidereal Time, Julian Date, Right Ascension and Declination, Azimuth and Elevation, galactic coordinates, WGS 84 coordinate system, GPS – operation, accuracy, time and position information.

Unit IV: Space and Observational tools

Electromagnetic bands of observation: radio, infrared, optical, UV, X-ray and Gamma-ray windows. Ground-based, balloon-borne and satellite-borne telescopes, Resolution of Instruments and Limitations, Optical telescopes, Photometers, Spectrographs, CCDs, Polarimeters. Radio telescopes - interferometry, X-ray and Gamma-ray detectors, Neutrino and Cosmic Ray astronomy, Radar.

Unit V: Space Missions

Planetary Exploration, Early spacecraft visits to the moon, Unmanned Lunar landers; The Apollo program - man on the moon – instruments and experiments, Lunar structures; Exploration of Mercury, Venus, Mars - the Red Planet – Structure of Mars, Martian atmosphere; ice at the poles, Martian landscapes: linear features, volcanoes, and impact craters; exotic terrains; Study of Planetary moons with space missions, The Cassini-Huygens Mission, The Deep Impact Mission. Search for extra terrestrial life – SETI experiments.

Text and Reference Books

1. Solar System Astrophysics, J. C. Brandt and P. W. Hodge
2. Introduction to Experimental Physics, W. B. Fretter.
3. The Magnetic Field of the Earth, Roland T. Merrill, Michael W. McElhinny, Phillip L. Mcfadden, Academic Press
4. Physics of Geomagnetic Phenomena, Vol. I and II, S. Matsushita. and W. H. Campbell, Academic Press
5. Earth's Magnetospheric Process, Ed. B. M. McCormac, D. Reidel Publishers
6. Physics of the Magnetosphere, Eds. R. L. Corovillano, J. T. McCaulley and H. Radosky, D. Reidel Publishers
7. Solar System Plasma Physics, Vol. I, II and III, Eds. C. F. Kennel, L. J. Lanzenrutti and E. N. Parker
8. Dynamics of the Geomagnetically Trapped Radiation (Physics and Chemistry in Space, Vol II)

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9. Solar Terrestrial Physics, Ed. E. R. Dyer, D. Reidel Publishers
10. Solar Magneto-Hydrodynamics, E.R. Priest; D Reidel, 1982
11. R.C. Smith, Observational Astrophysics; CUP, 1995.
12. C.R. Kitchin, Astrophysical Techniques; Adam Hilger, 1984.
13. Digital Image Processing, R. C. Gonzales and R. E. Woods, 2nd Ed, Pearson India, 2002
14. Satellite Meteorology, S. Q. Kidder and T. H. Von der Haar, Academic Press, 1995
15. Lecture Notes on Satellite Meteorology, Vol 1 and 2, SAC, Ahmedabad
16. Remote Sensing and Image Interpretation, T. M. Lillesand and R. W. Kieffer, John Wiley, 2002
17. Fundamentals of Space Systems, V. L. Pisacane and R. C. Moore, Oxford University Press, 1994
18. Fundamentals of Remote Sensing, George Joseph, 2003
19. Processing Remote Sensing Data, M. C. Girgurd and C. Girgurd, Oxford-IBH, 1999
20. Quantitative Remote Sensing of Land Surfaces, Shunlin Liang, Wiley Interscience, 2004
21. Scale in Remote Sensing and GIS, D. A. Quattrachi and M. F. Goodchild
22. Theory of Satellite Orbits in an Atmosphere, King-Hele Desmond, Butterworths, 1964
23. Uncertainty in Remote Sensing and GIS, Ed: G. M. Foddy and P. M. Atkinson
24. Remote Sensing by George Joseph
25. Concepts in Space Sciences Edited by R.R. Daniel
26. Mathematical Principles of Remote Sensing by A.. Milman
27. An Introduction to Ionosphere and Magnetosphere, J. A. Ratcliffe
28. Solar System Astrophysics, J. C. Brandft and P. W. Hodge
29. Plasma Diagnostic Techniques, R. H. Huddleston and S. L. Leonard
30. Introduction to Experimental Physics, W. B. Fretter
30. High Vacuum Techniques, J. Yarwood
31. Plasma Diagnostics, Vol. I, O. Anciello and D. L. Flamm
32. The Earth's Ionosphere: Plasma Physics and Electrodynamics, Michael C. Kelley, Academic Press
33. Ionospheric Techniques and Phenomena, A. Giraud and M. Petit, D. Reidel Publish.
34. Physics of Geomagnetic Phenomena, Vol. I and II, S. Matsushita and W. H. Campbell, Academic Press
35. Introduction to Ionospheric Physics, H. Risbeth and H. Garriot, Academic Press
36. Space Weather, Physics and Effects by Volker Bothmer and Ioannis A. Depl Springer
37. Aerospace Environment by T Beer
38. Free flight of a rocket By Gantmaker
39. Orbital Mechanics, Ed. Vladimir A. Chobotov, AIAA Edn Series
39. Introduction to Celestial Mechanics, S. W. McCusky, Addison-Wesley
40. Fundamentals of Astrodynamics, R. R. Bates et al, Dover
41. Orbital Motion, A. E. Roy, Adam Hinglar Ltd
42. Orbital Methods in Astrodynamics, P. R. Escobal, John Wiley
43. Fundamentals of Astrodynamics, R. R. Bates et al, Dover
44. Orbital Motion, A. E. Roy, Adam Hinglar Ltd
45. Design of Orbital Flights, J. Johnson et al., McGraw Hill
46. Modern Astrophysics, B. W. Carroll and D. A. Ostlie, Addison -Wesley
47. The Physical Universe, F. Shu, University Science Books
48. The Physics of Astrophysics, Vol. I and II, F. Shu, University Science Books

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49. Theoretical Astrophysics, Vol. I, II and III, T. Padmanabhan, Cambridge Uni.Press
50. The Physics of Fluids and Plasmas, Arnab Rai Choudhuri, Cambridge Uni.Press
51. Astrophysical Concepts, M. Harwit, Springer-Verlag
52. Galactic Astronomy, J. Binney and M. Merrifield, Princeton University Press
53. Galactic Dynamics, J. Binney and S. Tremaine, Princeton University Press
54. Quasars and Active Galactic Nuclei, A. K. Kembhavi and J. V. Narlikar, Cambridge University Press
55. An Introduction to Active Galactic Nuclei, B. M. Peterson

Lab III-A: Materials Science & General

At least ten experiments should be performed from the following list of experiments or parallel level experiment depending upon the facilities available.

1. To determine activation energy of ionic/superionic solid by Temperature depended conductivity measurement.
2. To study Electron Spin(ESR) Resonance in DPPH (Diphenyl Pricyl Hydrazy) sample.
3. To study I-V characteristics of photovoltaic solar cell and find the efficiency.
4. To study the decay of photoconductivity of given sample and find out trap depth.
5. Study of decay of photoluminescence of a given sample.
6. Measurement of electrical conductivity using Impedance Spectroscopy technique.
7. To determine drift velocities of Ag^+ ion in AgI from temperature dependence of ionic transference number study.
8. Electrical conductivity of Ball milled/Mechano-chemical synthesized materials.
9. Determination of strength of a given radioactive source.
10. Study of complete spectra of radioactive sources, and study of photo peak efficiency of NaI(Tl) crystal for different energy gamma rays.
11. Structural analysis of powder sample by XRD and particle size determination using Scherrer's formula.
12. FTIR studies of solid samples.
13. Mechanoluminescence of sucrose crystals.
14. Thermoluminescence of irradiated samples.
15. Study of Op-Amp.-IC-741 is inverting/ Non inverting amplifier and draw frequency response curve.
16. Construction of Schmitt triggers using IC-741 and study of its characteristics.
17. Study of Astable and monostable Multi Vibrator using IC 555.
18. Digital electronics experiments on bread board using IC-7400.

Lab III-B: Astronomy & Astrophysics

1. Study of Quasar.
2. Study of the orbit of a visual binary Star.
3. Determine the mass of Saturn & it's rotational velocity.
4. Verification of Hubble's law and determination of Hubble's constant.
5. Identification of element from Fraunhofer spectrum of the sun.
6. Study of sun spots.
7. Study of light curves of Cepheid variable stars.
8. Study of Proper motion of stars.

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9. Determination of Pulsar period and distance.
10. Photo-electric photometry of Pleiades star cluster.
11. Study of expansion of the universe and calculate the age of the Universe.

OR III -B: Electronics

- (1) Experiments with microprocessor.
 - (a) Convert BCD in to binary & vice versa.
 - (b) To transfer group of data blocks from one location to another location.
 - (c) To write programme for addition & subtraction.
 - (d) To write programme for multiplication & division.
- (2) Logic gate study DTL & RTL.
- (3) To study & verify the Demorgan's Theorem.
- (4) Study of Adder/ Subtractor.
- (5) Study of Encoder & Decoder.
- (6) Study of Multiplexer & Demultiplexer
- (7) Study of digital to analog converter.
- (8) Study of analog to digital converter.
- (9) Study of 4-bit Counter/ ripple Counter.
- (10) Study of left/right shift register.
- (11) Study of read only memory.
- (12) Study of Random Access Memory.
- (13) Study of Phase locked loop.
- (14) Study of BCD to seven segment Decoder.
- (15) Study of modulation & demodulation.
- (16) Optical fiber based experiment.
- (17) Microwave characterization and measurements.

OR III -B: Physics of Nano-material

1. Synthesis of II-IV semiconductor nanoparticles by wet chemical method.
2. Synthesis of nanoparticles (ZrO_2) by Combustion method.
3. Synthesis of nanoparticles by Sol-gel method.
4. Synthesis of nanoparticles by Ball milling method.
5. Synthesis of Quantum cells structures using vacuum coating unit.
6. Synthesis of nanoparticles using Solid state reaction method.
7. Measurement of band gap energy and size of the nano particle of II-IV semiconductor using absorption spectrophotometer.
8. To make the peak analysis of IR transmission spectra of nanoparticle using FTIR spectrometer.
9. Study of effect of capping agent on the size of the nanoparticle during synthesis.
10. To determine the average particle size of nano materials by XRD using Sherer's formula.
11. To determine the Hall coefficient and carrier type for a semiconducting nanoparticles.
12. To determine the Band gap of a given semiconductor using Four probe method from room temperature to $100^\circ C$.
13. To determine the average size of nanoparticles using Zetasizer.

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14. To measure the change of dielectric constant and dielectric loss of nanoparticle with the change of signal frequency by impedance analyzer.
15. To characterize the mechanical properties by tensile testing.
16. To estimate the particle size by SEM.
17. To perform electron diffraction analysis from TEM image.
18. To do roughness analysis of nanostructured sample using AFM.

OR III -B: Space Physics

1. The flow of energy out of the Sun.
2. Study of Sun-spot.
3. Astrometry of asteroids.
4. Study of expansion of the universe and calculate the age of the Universe.
5. Identification of element from Fraunhofer spectrum of the sun.
7. The transit of Venus and Mercury.
8. Jupiter's Moon and speed of light.
9. Determination of Pulsar period and distance.
10. Photo-electric photometry of Pleiades star cluster.
11. The large scale structure of the Universe.

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Semester – IV

PAPER – I: NUCLEAR AND PARTICLE PHYSICS

- Unit-I Nuclear Interactions :** Nucleon-nucleon interaction, Two-nucleon system, The ground state of the deuteron, Tensor forces, Nucleon-nucleon scattering at low energy, Scattering length, Effective range theory, Spin dependence of nuclear forces, Charge independence and charge symmetry of nuclear forces, Iso-spin formalism, Exchange forces, Meson theory of nuclear forces and the Yukawa interaction.
- Unit-II Nuclear Reactions :** Reaction energetics: Q-equation and threshold energies, Reactions cross sections, Resonance: Breit-Wigner single-level formula, Direct and compound nuclear reactions, Formal reaction theory: Partial wave approach and phase shifts, Scattering matrix, Reciprocity theorem,
- Unit-III Nuclear Decay :** Beta decay, Shape of the beta spectrum and problems in conservation laws, Pauli's neutrino hypothesis, Femi's theory of beta decay, Total decay rate, Angular momentum and parity selection rules, Comparative half-lives, Allowed and forbidden transitions, Parity violation, Detection and properties of neutrino, Gamma decay, Multiple transitions in nuclei, Angular momentum and Parity selection rules, Internal conversion.
- Unit –IV Nuclear models :** Liquid drop model, Bohr-Wheeler theory of fission, Shell Model, Experimental evidence for shell effects, Single particle shell model, Spin-orbit interaction and magic numbers, Analysis of shell model predictions, Magnetic moments and Schmidt lines, Collective model of Bohr and Mottelson.
- Unit –V Elementary particle Physics:** The fundamental interactions, Classification of elementary particles, Leptons and Hadrons, Symmetries, groups and conservation laws, SU(2) and SU(3) multiplets and their properties, Quark model, Properties of Quarks, the standard model.

TEXT AND REFERENCE BOOKS:

1. A. Bohr and B.R.Mottelson, Nuclear structure, vol. 1 (1969) and vol.2, Benjamin, Reading, A, 1975.
2. Kenneth S. Krane, Introductory Nuclear Physics, Wiley, New York, 1988.
3. Ghoshal, Atomic and Nuclear Physics vol.2.
4. P.H.Perking, Introduction to high energy physics, Addison-Wesley, London, 1982.
5. Shriokov Yudin, Nuclear Physics vol.1 & 2, Mir Publishers, Moscow, 1982.
6. D.Griffiths, introduction to elementary particles, harper and row, New York, 1987.
7. H.A.Enov, introduction to Nuclear Physics, Addison-Wesley, 1973.
8. G.E.Brown and A.D.Jackson, Nucleon-Nucleon interaction North-holland Amsterdam, 1976.
9. S.D.Benedetti, Nuclear interaction, John Willey and sons, NewYork, 1964.
10. M.K.Pal, theory of Nuclear structure, affiliated East West, Madras, 1982.
11. Y.R.Waghmare, introductory nuclear physics, Oxford, IBH, Bombay, 1981.
12. J.M.Longo, elementary particles, McGraw Hill, New York, 1971.
13. R.R.Roy and B.P.Nigam, Nuclear Physics, Wiley-Eastern Ltd. 1983.

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PAPER – II LASER PHYSICS AND APPLICATIONS

Unit-I Laser Characteristics –

Spontaneous and stimulated emission, Einstein's quantum theory of radiation, theory of some optical processes, coherence and monochromaticity, kinetics of optical absorption, line broadening mechanism, Basic principle of lasers, population inversion, laser pumping, two & three level laser systems, resonator, Q-factor, losses in cavity, threshold condition, quantum yield.

Unit – II Laser Systems

Solid state lasers- the ruby laser, Nd:YAG laser, Nd: Glass laser, semiconductor lasers – features of semiconductor lasers, intrinsic semiconductor lasers, Gas laser - neutral atom gas laser, He-Ne laser, molecular gas lasers, CO₂ laser, Liquid lasers, dye lasers and chemical laser.

Unit-III Advances in laser Physics

Production of giant pulse -Q-switching, giant pulse dynamics, laser amplifiers, mode locking and pulling, Non-linear optics, Harmonic generation, second harmonic generation, Phase matching, third harmonic generation, optical mixing, parametric generation and self-focusing of light.

Unit – IV Multi-photon processes; multi-quantum photoelectric effect, Theory of two-photon process, three- photon process, second harmonic generation, parametric generation of light, Laser spectroscopy : Rayleigh and Raman scattering, Stimulated Raman effect, Hyper-Raman effect, Coherent anti-stokes Raman Scattering, Photo-acoustic Raman spectroscopy.

Unit – V Laser Applications – ether drift and absolute rotation of the Earth, isotope separation, plasma, thermonuclear fusion, laser applications in chemistry, biology, astronomy, engineering and medicine. Communication by lasers: ranging, fiber Optics Communication, Optical fiber, numerical aperture, propagation of light in a medium with variable index, pulse dispersion.

TEXT AND REFERENCE BOOKS:

1. Laud, B.B.: Lasers and nonlinear optics, (New Age Int.Pub.1996).
2. Thyagarajan, K and Ghatak, A.K.: Lasers theory and applications (Plenum press, 1981).
3. Ghatak, A.K.and Thyagarajan, K : Optical electronics (Cambridge Univ. Press 1999).
4. Seigman, A.E.: Lasers (Oxford Univ. Press 1986)
5. Maitland, A. and Dunn, M.H. : Laser Physics (N.H.Amsterdam, 1969).
6. Hecht, J.The laser Guide book (McGraw Hill, NY, 1986).
7. Demtroder, W. : Laser Spectroscopy (Springe series in chemical physics vol.5, Springe verlag, Berlin, 1981).
8. Harper, P.G.and Wherrett B.S. (Ed.): Non-linear-optics (Acad.press, 1977).

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PAPER – III: SOLID STATE PHYSICS- II

Unit- I: Plasmons, Polaritons

Dielectric function of the electron gas, Plasma optics, Dispersion relation for EM wave, Transverse optical modes in Plasma, Transparency of Alkali metals in the ultraviolet, Longitudinal Plasma oscillations, Plasmon, electrostatic screening and screened Coulomb potential, Mott metal-insulator transition, screening and phonons in metals, Polaritons, LST relation.

Unit –II: Dielectric and ferroelectrics

Maxwell's equations, polarization, macroscopic electric field, depolarization field, E1:local electric field at an atom, Lorentz field E2, fields of dipoles inside cavity E3; dielectric constant and polarizability, electronic polarizability; structural phase transition; ferro-electric crystals, classification; displacive transition, soft optical phonons, Landau theory of phase transitions, first and second order transition, antiferro-electricity, ferro-electric domain, piezoelectricity, ferro-elasticity, optical ceramics.

Unit –III: Magnetism

General ideas of dia- and para- magnetisms, quantum theory of paramagnetism, rare earth ions, Hund rule, iron group ions, crystal field splitting, quenching of orbital angular momentum, spectroscopic splitting factor, van vleck temperature dependent paramagnetism, Cooling by isentropic demagnetization, nuclear demagnetization, paramagnetic Susceptibility of conduction electrons.

Unit –IV: Ferromagnetism and anti ferromagnetism

Ferromagnetic order, Curie point and exchange integral, temp dependence of saturation magnetization, saturation magnetization at absolute zero; magnons, quantization of spin waves, thermal excitation of magnons; neutron magnetic scattering, Ferrimagnetic order, Curie temp and susceptibility of ferrimagnets, iron garnets. Antiferromagnetic order, susceptibility below neel temp, antiferromagnetic magnons, ferromagnetic domains.

Unit – V: Optical Processes & Excitons and defects

Optical reflectance, excitons, Frenkel and Mott-Wannier excitons, Alkali Halides and Molecular crystals Defects: lattice vacancies, Schottky and Frenkel point effects, colour centers, F and other centres, Line defect. Shear strength of single crystals, dislocations-edge and screw dislocations, Burger vectors, Stress fields of dislocations, low angle grain boundaries, dislocation densities, dislocation multiplication and slip, strength of alloys, dislocations and crystal growth, hardness of materials.

TEXT AND REFERENCE BOOKS

1. C. Kittel: Introduction to Solid State Physics (Wiley and Sons).
2. J.M.Ziman: Principles of theory of solids (Cambridge univ.press).
3. Azaroff : X-ray crystallography.
4. Weertman and weertman : Elementary Dislocation Theory.
5. Verma and Srivastava: Crystallography for Solid State Physics.
6. Azeroff and Buerger: The Power Method.
7. Buerger: Crystal Structure Analysis.
8. Thomas: Transmission Electron Microscopy.
9. Omar: Elementary solid state physics.

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10. Ashcroft and Mermin : Solid State Physics.
11. Chalkin and Lubensky: Principles of Condensed Matter Physics.
12. Madelung : Introduction to solid state theory.
13. Callaway: Quantum theory of solid state physics.
14. Huang: Theoretical Solid State Physics.
15. Kittel: Quantum theory of solids.

PAPER –IV (A): ASTRONOMY AND ASTROPHYSICS - II

- Unit- I:** The Milkyway Galaxy: Structure of the Milkyway, Oort's theory of galactic rotation, Dynamics of the spiral arms, Distribution of Interstellar matter. Normal Galaxies: Classification of galaxies, Hubble sequence: Elliptical, Lenticulars and Spiral galaxies, and their properties, Brightness profiles, Distribution of gas and dust in galaxies, Rotation curve and dark matter.
- Unit- II:** Active galaxies: Active Galactic Nuclei (AGNs), Seyfert galaxies, BL Lac Objects, Radio galaxies: General properties, Superluminal motion, Quasars: Properties and Energy requirements, Nature of quasar redshifts, Supermassive black hole model and Unified model of AGNs.
- Unit-III:** Failure of Newtonian gravity and need of General Relativity. Principle of Equivalence. Concept of curved space, Predictions of General Relativity: precession of perihelion of Mercury, bending of light, gravitational lensing, Gravitational wave and its detection through Laser interferometer. Weyl's Postulate, Cosmological Principle, Friedmann Model, Einstein's model with cosmological constant, Steady State Model.
- Unit- IV:** Relics of the big bang. The early universe, Thermodynamics of the early universe, Thermal History, Primordial neutrinos, Helium synthesis and other nuclei, Microwave background, The very early universe, The formation of structures in the Universe, Jeans Mass, Growth Rate, Recombination era, Onset of matter dominated era.
- Unit- V:** Observations of the cosmological significance, Measurement of Hubble's constant, Anisotropy of local large - scale velocity fields, Age of the universe, Abundance of light nuclei, Dark matter, The redshift-magnitude relation, Number counts of extragalactic objects, The variation of angular sizes with distance.

TEXT AND REFERENCE BOOKS:

1. Astrophysics for Physicists, Arnab Rai Choudhuri, Camb. University Press, 2010.
2. Astrophysics : Stars and Galaxies, K.D. Abhayankar, Universities Press (India) Ltd, 2001.
3. An Introduction to Astrophysics, Baidyanath Basu, PHI, 2010.
4. Modern Astrophysics, B.W. Carroll and D.A. Ostlie, Addison-Wealey, 2007.
5. Introductory Astronomy and Astrophysics, M.Zeilik and S.A. Gregory, 4th ed., Saunders College Publishing, 1998.
6. Quasars and active galactic neuclei, A.K. Kembhavi and J.V. Narlikar, Cambridge University Press, 1999.
7. Elements of Cosmology, J.V. Narlikar, Universities Press, 1996.
8. Introduction to cosmology, J.V. Narlikar, 3rd edition, Cambridge Uni. Press, 2002.

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9. The Physical Universe: An introduction to astronomy, F.Shu, University Science Books 1982.
10. Textbook of astronomy and astrophysics with elements of cosmology, V.B. Bhatia, Narosa Publishing House, 2000.
11. The new cosmos, A.Unsold and B. Baschek, Newyork, Springer 2002.
12. Theoretical Astrophysics, vol. I, II, III, T. Padmanabhan, Cambridge University Press.
13. A Workbook for Astronomy, Jerry Waxman, Cambridge University Press, 1984.
14. Structure formation in the universe, T.Padmanabhan, Cambridge University, press 1993.
15. Galactic Astronomy: Binney and Merrifield, Princeton University Press, 1981.
16. General relativity and Cosmology, J.V. Narlikar, Macmillan Company of India Ltd, New Delhi 1978.
17. General relativity, I.R. Kenyon, Oxford University Press 1990.
18. Classical theory of fields, vol. 2, L.D. Landau and E.M. Lifshitz, Oxford: Pergamon press 1971.
19. First course general relativity, B.P. Schutz – Cambridge Univ. Press 2009.

Paper – IV (B) Electronics II (Communication)

Unit-I Digital communications

Pulse modulation systems, Sampling Theorem, Low pass & Band pass signal, PAM- Channel BE for PAM signal, Natural Sampling, Flat-top sampling, Signal through holding, Quantization of signals, quantization error.

Unit-II Digital modulation techniques

PCM, Differential PCM, Delta modulation, Adaptive, delta modulation (CVSD). BPSK, DPSK, QPSK, PSK, QASK, BFSK, FSK, MSK

Unit-III Mathematical representation of noise

Sources of noise, Frequency domain representation of noise, Effect of filtering on the probability density of Gaussian noise, Spectral component of noise, Effect of a filter on the power spectral density of noise, Superposition of noise, Mixing involving noise, linear filtering, Noise bandwidth, Quadrature component of noise, Power spectral density of $n_c(t)$ $n_s(t)$ & their time derivatives.

Unit-IV Data Transmission I

Base band signal receiver, Probability of error optimum filter, White noise: Matched filter & probability of error, Coherent reception correlation, PSK, FSK, Non-Coherence detection on FSK, Differential PSK, QASK, Calculation of error probability for BPSK, BFSK, QPSK.

Unit-V Data Transmission II

Noise in pulse code & delta modulation system, PCM transmission, Calculation of quantization noise output signal power, Effect of thermal noise, output signal to noise ratio in PCM, DM, Quantization noise in DM, output signal power, DM output signal to quantization noise ratio, effect of thermal noise in delta modulation, output signal to noise ratio in DM

Text and Reference Books:

- 1) "Microwaves" by K.L. Gupta Wiley Eastern Ltd. Delhi.
- 2) Advanced Electronic communication system by Wayne Toms Physics education.

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- 3) Principle of communication of system-by Toub & Schilling: second edition TMH 1994
- 4) Communication system: by siman Haykin, third edition John wiley & sons inc.1994.
- 5) Microwave devices & ckts by: Samuel, Y. Liao.
- 6) Electronic communication: George kennedy.

Paper – IV (C) PHYSICS OF NANO MATERIALS- II

UNIT I: Electrical transport in nano-structure

Crystal bonding, structure, growth and symmetries; Band structure and density of states at nano-scale; Electrical transport in nano-structure- Electrical conduction in metals, classical and quantum theory, Conduction in Insulator and Ionic crystal, electron transport in semiconductors, various conduction mechanism in 3D (bulk) and 2D (thin film) and low dimensional systems, thermoionic emission, Field –enhanced thermoionic emission, Arrhenius type thermally activated conduction, variable range hopping and Polaron conduction.

UNIT II: Application of CNT

Applications of Carbon NanoTubes (CNTs) in field emission, fuel cells, CNT FETs, Light Emitting Displays (LEDs) and Flat Panel Displays (FPD), hydrogen storage, solar panels. Application of functional nanomaterials: clean energy (Hydrogen Production from Biomass, Catalytic coal hydrogasification), environmental technologies (clean water and air), health care (tissue and bone repairs, bio medical sensors)

Unit III: Next Generation Applications for Polymeric Nanofibres

Background, Biomedical Applications, Medical Prostheses, Tissue Engineering Scaffolds, Drug Delivery, Wound Dressing, Cosmetics. Filtration applications, Filter media, Protective Clothing, Material Reinforcement, Electrical Conductors, Optical applications, Sensor devices, Conclusion. Reference: Nanotechnology: Global Strategies, Industry Trends and Applications (Editor: Jurgen Schulte)

UNIT IV: Nano-Lithography

Photolithography Principles; Phase Shifting Optical Lithography; Electron Beam Lithography (EBL); Neutral Atomic Beam Lithography; Ion-Beam Lithography (IBL); X-ray Lithography (XRL); Proximal Probe Lithography, Proximal Probes, STM based Electron-Beam Lithography, Soft Lithography. Nano lithographic applications and current research.

UNIT V: Sustainable Nanotechnology and Human Health

Application of industrial ecology to nanotechnology, Fate of nanomaterials in environment, environmental life cycle of nano materials, environmental and health impacts of nano materials, toxicological threats, eco-toxicology, exposure to nano particles – biological damage, threat posed by nano materials to humans, environmental reconnaissance and surveillance. Corporate social responsibility for nanotechnology, Nano materials in future - implications.

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References: Books/ Research Monographs

1. Nanostructures & Nanomaterials: Synthesis, Properties & Applications: Guozhang Cao.
2. Introduction to Nanotechnology: Charles P. Poole Jr and Franks J. Qwens.
3. Handbook of Analytical instruments, R.S. Khandpur
4. Nano materials: Synthesis properties ,characterization and application: A.S Edelstein and R.C Cammaratra
5. Nanoelectronics and Nanosystems , Karl Goser, Peter Glosekotter, Jan Dienstuhl.,
6. Springer, 2004
7. Nanomaterial Systems Properties and Application, A.S.Eldestein and R.C.Cammarata.
8. Handbook of Nanotechnology: Bhushan (Ed), Springer Verlag, New York (2004).
9. Nanocomposite Science and Technology, Ajayan, Schadler and Braun
10. Piezoelectric Sensors: Force, Strain, Pressure, Acceleration and Acoustic Emission Sensors, Materials and Amplifiers, G. Gautschi.
11. Block Copolymers in Nanoscience Massimo Lazzari Supramolecular Chemistry, Jonathan W. Steed, Jerry L. Atwood
12. Nanotechnology: Importance and Application by M.H. Fulekar, IK International, 2010.
13. Nanotechnology in Biology and Medicine: Methods, Devices and Application by Tuan Vo-Dinh, CRC press, 2007.
14. Nanosystem characterization tools in the life sciences by Challa Kumar. Wiley-VCH, 2006.
15. Nanolithography M.Gentili et al.(edits),Springer. Environanotechnology by Mao Hong fan, Chin-pao Huang, Alan E Bland, Z Honglin
16. Wang, Rachid Sliman, Ian Wright. Elsevier, 2010.
17. Nanotechnologies, Hazards and Resource efficiency by M. Steinfeldt, Avon Gleich, U. Petschow, R. Haum. Springer, 2007.
18. Nanotechnology: Health and Environmental risk by Jo Anne Shatkin. CRC press, 2008.
19. An Introduction to Quantum Computing Phillip Kaye, Raymond Laflamme, Michele Mosca
20. The Physics of Quantum Information: Quantum Cryptography, Quantum Teleportation, Quantum Computation by Dirk Bouwmeester, Artur K. Ekert, Anton Zeilinger
21. Problems And Solutions in Quantum Computing And Quantum Information Yorick Hardy Willi-Hans Steeb
22. Introduction to Nano Science and Nano Technology- K.K. Chatopadhyay and A. N. Banerjee

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PAPER -IV (D): SPACE PHYSICS - II

Unit I: Glimpse of Universe

Universe - description, origin, its evolution, age and size; Stars—birth, life, death, spectral analysis, stellar composition - element synthesis in stars, Exotic stars- novae, supernovae, pulsars, black holes and gamma ray bursts; Galaxies; Starbursts and Active Galactic Nucleus; Evidence for the Big Bang; Cosmic Background Radiation; Expansion Models; Dark Matter and Energy Recent innovations about the concept of Universe; Dark Energy and an accelerating universe

Unit II: Spacecrafts & Satellites

Satellite orbits and attitude: principles of satellite motion, Kepler's laws, orbital elements, satellite attitude and its control, types of orbits, polar and geostationary, earth and sunsynchronous, orbit optimization, viewing geometry, launch vehicles and spacecrafts, rocket propulsion concepts such as solid, hybrid, liquid, nuclear and antimatter. Rocket motors and their design, flight stability and recovery systems, stability and control system.

Unit III: Remote Sensing

Sensors and systems: visible, infrared, water vapour and microwave sensors, sensor characteristics, sensor materials, passive and active sensors, scanning radiometers, spectral signatures.

Satellite data processing: satellite data acquisition, satellite communications, data collection platforms, earth station, image processing, geometric and radiometric corrections, image navigation, registration, image enhancement techniques, noise removal methods, histogram methods, density slicing, image classification.

Applications of remote sensing in earth resources management, agriculture, forestry, water resources and disaster mitigation

Unit IV: Solar Wind and Interactions

The ionospheric layers D, E, F and their formation, effect of radiation on earth's atmosphere, photochemical processes,

Geomagnetic and magnetic coordinates, poles, measurement of geomagnetic field components, micropulsation indices, variations of geomagnetic field, quiet and disturbed variations, geomagnetic storms, equatorial and auroral phenomena.

Solar wind, model of solar winds, interaction in the interplanetary medium and with the planets. Magnetosphere: interaction of solar wind with the geomagnetic field and formation of the magnetospheric tail, storm and sub-storm phenomena, Van Allen radiation belts

Unit V: Space Weather

Space Weather Effects on Communication, Space Weather Effects on Power Grids, Space Radiation Protection, Effects on Spacecrafts hardware and Operations, Effects on Satellite Navigation, Forecast of Space Weather.

Text and Reference Books

Same as mentioned in Semester III, Paper IV (D)

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