ಕರ್ನಾಟಕ ಸರ್ಕಾರ
ಶಾಲಾ ಶಿಕ್ಷಣ ಇಲಾಖೆ ಆಯುಕ್ತರ ಕಛೇರಿ,
ಕೇಂದ್ರೀಕೃತ ದಾಖಲಾತಿ ಘಟಕ
ಕೆಂಪೇಗೌಡ ರಸ್ತೆ, ಬೆಂಗಳೂರು - 560 009
ದೂರವಾಣಿ ಸಂಖ್ಯೆ: 080 - 22483140, 22483145 ಇ-ಮೇಲ್ ವಿಳಾಸ : cackarnataka1@gmail.com

ಸಂಖ್ಯೆ: 1990185:DPI-CPI0CAC(OTH)/9/2025-CAC ದಿನಾಂಕ : 21.01.2026

ಪ್ರಕಟಣೆ

ವಿಷಯ : ಸರ್ಕಾರಿ ಪ್ರೌಢ ಶಾಲಾ ವೃಂದದಿಂದ ಸರ್ಕಾರಿ ಪದವಿ ಪೂರ್ವ ಕಾಲೇಜುಗಳ ಉಪನ್ಯಾಸಕರ ವೃಂದದ ಹುದ್ದೆಗೆ ಬಡ್ತಿ ಸಂಬಂಧ ನಡೆಸುವ ಅರ್ಹತಾ ಪರೀಕ್ಷೆ ನಡೆಸುವ ಬಗ್ಗೆ

ಸರ್ಕಾರಿ ಪ್ರೌಢ ಶಾಲಾ ವೃಂದದಿಂದ ಸರ್ಕಾರಿ ಪದವಿ ಪೂರ್ವ ಕಾಲೇಜುಗಳ ಉಪನ್ಯಾಸಕರ ವೃಂದದ ಹುದ್ದೆಗೆ ಬಡ್ತಿ ಸಂಬಂಧ ನಡೆಸುವ ಅರ್ಹತಾ ಪರೀಕ್ಷೆಯನ್ನು ನಡೆಸುವ ಬಗ್ಗೆ ಅಧಿಸೂಚನೆಯನ್ನು ಹೊರಡಿಸಿದ್ದು, ಅದಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ಈ ಕೆಳಗಿನ ಮಾಹಿತಿಯನ್ನು ಅಭ್ಯರ್ಥಿಗಳ ಗಮನಕ್ಕಾಗಿ ನೀಡಲಾಗಿದೆ. ಇವುಗಳನ್ನು ಅನುಸರಿಸಿ ಪರೀಕ್ಷೆಗೆ ಸೂಕ್ತ ತಯಾರಿಯನ್ನು ನಡೆಸಲು ಕೋರಲಾಗಿದೆ.

1. ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ ವಿನ್ಯಾಸ

1. **Question and mark weightage**					
Sl No	Type of Questions	No. Of Questions	No. of Internal choice Questions	Total No. Questions	**Total Marks**
1	2 Mark Questions	12	0	12	2×12 = 24
2	3 Mark Questions	9	1	10	3×9 = 27
3	4 Mark Questions	6	1	7	4×6 = 24
4	5 Mark Questions	5	1	6	5×5 = 25
	Total	**32**	3	35	**100**
2. **Content Area wise question coverage**					
Sl No	Content Area	No. Of Questions	Percentage	Marks	**Total Marks**
1	1st PUC	13	40%	40	40
2	2nd PUC	13	40%	40	40
3	Master Degree	6	20%	20	20
	Total	**32**	**100%**	**100**	**100**
3. **Difficulty Level in Question Paper**					
Sl No	Difficulty Level	No. Of Questions	Percentage	Marks	**Total Marks**
1	Easy	13	40%	40	40
2	Average	13	40%	40	40
3	Difficult	6	20%	20	20
	Total	**32**	**100%**	**100**	**100**

2. ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ ಸ್ವರೂಪ

ಉತ್ತರ ಬರೆಯಲು ಅಭ್ಯರ್ಥಿಗಳಿಗೆ ಪ್ರಶ್ನೋತ್ತರ ಪುಸ್ತಿಕೆಯನ್ನು ನೀಡಲಾಗುವುದು. ಪ್ರತಿ ಪ್ರಶ್ನೆಯ ನಂತರದಲ್ಲಿ ಉತ್ತರವನ್ನು ಬರೆಯಲು ಪ್ರಶ್ನೋತ್ತರ ಪುಸ್ತಿಕೆಯಲ್ಲೇ ಸಾಕಷ್ಟು ಸ್ಥಳಾವಕಾಶವನ್ನು ನೀಡಲಾಗುವುದು. ನೀಡಿರುವ ಸ್ಥಳ ಮಿತಿಯೊಳಗೇ ತಮ್ಮ ಉತ್ತರವನ್ನು ನೀಲಿ ಅಥವಾ ಕಪ್ಪು ಶಾಯಿಯ ಪೆನ್ನಿನ ಮೂಲಕ ಉತ್ತರವನ್ನು ಬರೆಯುವುದು. ಪ್ರಶ್ನೋತ್ತರ ಪುಸ್ತಿಕೆಯ ಕೊನೆಯಲ್ಲಿ ಕಚ್ಚಾ ಬರವಣಿಗೆಯನ್ನು ಮಾಡಲು ನಾಲ್ಕು ಪುಟಗಳನ್ನು ನೀಡಲಾಗುವುದು.

3. ಪರೀಕ್ಷಾ ಕೇಂದ್ರಗಳು

ಈ ಪರೀಕ್ಷೆಯನ್ನು ಜಿಲ್ಲಾ ಕೇಂದ್ರಗಳಲ್ಲಿ ನಡೆಸಲು ಉದ್ದೇಶಿಸಿ ಅಧಿಸೂಚನೆಯನ್ನು ಹೊರಡಿಸಲಾಗಿದ್ದು, ಜಿಲ್ಲಾವಾರು ಅಭ್ಯರ್ಥಿಗಳ ಸಂಖ್ಯೆ ಕಡಿಮೆಯಿರುವುದರಿಂದ ಪರೀಕ್ಷೆಯನ್ನು ವಿಭಾಗವಾರು ನಡೆಸಲಾಗುವುದು. ಪರೀಕ್ಷಾ ಕೇಂದ್ರಗಳ ವಿವರವನ್ನು ಪರೀಕ್ಷಾ ಪ್ರವೇಶ ಪತ್ರದಲ್ಲಿ ನೀಡಲಾಗುವುದು.

4. ಪರೀಕ್ಷಾ ವೇಳಾಪಟ್ಟಿ

ಕೆಲವು ಅಭ್ಯರ್ಥಿಗಳು ತಾವು ಪದವಿಯಲ್ಲಿ ಪ್ರಧಾನವಾಗಿ ಮೂರು ವರ್ಷಗಳಲ್ಲಿ ಕಲಿತ ವಿಷಯಗಳು ಮತ್ತು ಪ್ರಸ್ತುತ ಬೋಧನಾ ವಿಷಯಗಳಲ್ಲಿ ಸ್ನಾತಕೋತ್ತರ ಪದವಿಯನ್ನು ಪಡೆದಿದ್ದು, ಎಲ್ಲಾ ವಿಷಯಗಳಲ್ಲಿ ಪರೀಕ್ಷೆಯನ್ನು ಬರೆಯಲು ಅರ್ಹತೆಯಿದ್ದು, ಅವಕಾಶ ನೀಡುವಂತೆ ಕೋರಿರುತ್ತಾರೆ. ಅದರಂತೆ ಅಧಿಸೂಚನೆಯಲ್ಲಿ ನಿಗದಿಪಡಿಸಿರುವ ವೇಳಾಪಟ್ಟಿಯನ್ನು ಮಾರ್ಪಡಿಸಿ ಪರೀಕ್ಷಾ ಪ್ರವೇಶಪತ್ರದಲ್ಲಿ ನೀಡಲಾಗುವುದು.

5. ಪರೀಕ್ಷಾ ಪಠ್ಯಕ್ರಮ

ಅಧಿಸೂಚನೆಯಲ್ಲಿ ಸೂಚಿಸಿರುವಂತೆ ಪದವಿ-ಪೂರ್ವ ವಿಭಾಗದ ಪಠ್ಯಕ್ರಮದ ಪ್ರಥಮ ವರ್ಷದ ಪಠ್ಯಕ್ರಮದ ಮೇಲೆ 40% ಮತ್ತು ದ್ವಿತೀಯ ವರ್ಷದ ಪಠ್ಯಕ್ರಮದ ಮೇಲೆ 40% ಹಾಗೂ ಸ್ನಾತಕೋತ್ತರ ಪದವಿಯ ಪಠ್ಯಕ್ರಮದ ಮೇಲೆ 20% ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದು. ಪದವಿ-ಪೂರ್ವ ವಿಭಾಗದ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸಂಬಂಧಿಸಿರುವಂತೆ ಚಾಲ್ತಿಯಲ್ಲಿರುವ ಪಠ್ಯಪುಸ್ತಕವನ್ನು ಅಭ್ಯಸಿಸುವುದು. ಸ್ನಾತಕೋತ್ತರ ಪದವಿಯ ಪಠ್ಯಕ್ರಮವು ವಿಶ್ವವಿದ್ಯಾಲಯದಿಂದ ವಿಶ್ವವಿದ್ಯಾಲಯಕ್ಕೆ ಭಿನ್ನತೆಯಿರುವುದರಿಂದ ಸಾಮಾನ್ಯ ಪಠ್ಯಕ್ರಮವನ್ನು ಗುರುತಿಸಿ ವಿಷಯವಾರು ಅನುಬಂಧದಲ್ಲಿ ಲಗತ್ತಿಸಿದೆ. ಅದನ್ನು ಅನುಸರಿಸುವುದು.

ಭಾಷಾ ವಿಷಯಗಳಿಗೆ ಸಂಬಂಧಿಸಿ ಎಲ್ಲಾ ಭಾಷೆಗಳ ಪಠ್ಯಕ್ರಮಗಳಿಗೆ ಅನುಗುಣವಾಗಿ ಸಾಮಾನ್ಯವಾಗಿ ಈ ಕೆಳಗಿನ ಅಂಶಗಳನ್ನು ಒಳಗೊಂಡ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಲಾಗುವುದು.

1. ಗದ್ಯಾಂಶ ಮತ್ತು ಅದರ ಮೇಲೆ ಪ್ರಶ್ನೆಗಳು
2. ಪದ್ಯಾಂಶ ಮತ್ತು ಅದರ ಮೇಲೆ ಪ್ರಶ್ನೆಗಳು
3. ಪದ್ಯಾಂಶದ ಭಾವಾರ್ಥ ಬರೆಯುವುದು
4. ವ್ಯಾಕರಣಾಂಶಗಳು
5. ಪತ್ರ ಲೇಖನ
6. ಪ್ರಬಂಧ ಲೇಖನ
7. ಸಂದರ್ಭಸಹಿತ ಸ್ವಾರಸ್ಯ ಬರೆಯುವುದು
8. ಗದ್ಯಾಂಶ / ಪದ್ಯಾಂಶದ ರೂಪಾಂತರ / ಲಿಪ್ಯಾಂತರ / ಭಾಷಾಂತರ
9. ಪ. ಪೂ. ವಿಭಾಗದ ಪಠ್ಯಕ್ರಮದ ಮೇಲಿನ ಪ್ರಶ್ನೆಗಳು
10. ಸ್ನಾತಕೋತ್ತರ ಪದವಿ ವಿಭಾಗದ ಪಠ್ಯಕ್ರಮದ ಮೇಲಿನ ಪ್ರಶ್ನೆಗಳು

Digitally signed by
VIKAS KISHOR SURALKAR
Date: 22-01-2026
13:51:46
ಆಯುಕ್ತರು
ಶಾಲಾ ಶಿಕ್ಷಣ ಇಲಾಖೆ, ಬೆಂಗಳೂರು

CAC BENGALURU

PG SYLLABUS FOR HSTR TO PU LECTURERS

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ಕನ್ನಡ PG SYLLABUS

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1.Geoffrey Chaucer: Prologue to the Canturbery Tales.
2.Edmund Spenser: Epithalamion and Prothalamion
3.John Keats: Ode on a Gracian Urn
4.P.B.Shelly: Ode to the West Wind
5.Alfred Lord Tennyson: Ulysses.
6.Toru Dutt: Our Casuarina Tree
7.Walt Whitman: Passage to India.
8.Wole Soyinka: A Telephone Conversation
9.Edwin Thumboo: Gods can Die
10.Seamus Heaney: Blackberry-Picking

DRAMA

1.William Shakespeare: Macbeth
2.Christopher Marlowe: Doctor Faustus
3.George Bernard Shaw: Arms and the Man
4.Manjula Padmanabhan: Harvest
5.Girish Karnard: Hayavadana

FICTION

1.R.K.Narayan: The English Teacher
2.Chinua Achebe: Things Fall Apart
3.Aphra Behn: Oroonoko

LITERARY CRITICISM

1.T.S.Eliot- Hamlet and His Problems
2.Elaine Showalter: Towards a Feminist Poetics
3.A.K. Ramanujan: Is there an Indian way of Thinking?
4.William Wordsworth: Preface to Lyrical Ballads

ENGLISH LANGUAGE TEACHING

1.Basics of English Language Teaching
2.Direct Method
3.Communicative Language Teaching
4.Bilingual Method
5.Language Skills:Listening,Speaking,Reading and Writing

LITERARY TERMS

Sonnet, Ode, Dramatic Monologue, Soliloquy, Blank Verse, Tragedy, Comedy, Figures of Speech, Elegy, Assonance and Consonance

SUGGESTED READING:

1.A Glossary of Literary Terms-M.H.Abrams
2.The Oxford Companion to English Literature-Birch and Drabble
3.History of English Literature-Edward Albert
4.The Nortom Anthology of American Literature-W.W.Norton Co.2010
5.Anatomy of Criticism-Hankang
6.African Literature-Dr.D.M. Sinha and B.S. Roy
7.Encyclopedia of Indian Literature Vol 1 to 6 New Delhi-Sahithya Akademy.

HINDI PG SYLLABUS

माध्यमिक से उच्च माध्यमिक पद के प्रोन्नति हेतु परीक्षा पाठ्क्रम

पाठ्क्रम:

1. प्रथम पी यू सी: हिन्दी पाठ्य पुस्तक एवं अभ्यास पुस्तिका : सम्पूर्ण
2. द्वितीय पी यू सी: हिन्दी पाठ्य पुस्तक एवं अभ्यास पुस्तिका : सम्पूर्ण
3. स्नातकोत्तर:
    1. हिन्दी भाषा, देवनागरी लिपि– हिन्दी भाषा –उद्गम और विकास, हिन्दी की बोलियाँ तथा उपभाषाएँ, देवनागरी लिपि–वर्तनी तथा विशेषताएँ ।
    2. हिन्दी साहित्य का इतिहास: आदिकाल–पृथ्वीराज रासो, विद्यापति
       मध्यकालीन कविता– कबीर, सूरदास, तुलसीदास, मीराबाई, रहीम, रैदास।
       रीतिकाल–बिहारी, रसखान
       आधुनिक एवं समकालीन कविता– मैथिलीशरण गुप्त, महादेवी वर्मा, सूर्यकान्त त्रिपाठी निराला, सच्चिदानंद हीरानंद वात्स्यायन 'अज्ञेय', सुभद्राकुमारी चौहान, सुमित्रानंदन पंत,
       कहानी– प्रेमचन्द, जयशंकर प्रसाद, यशपाल, भीष्म साहनी, मन्नू भंडारी, सुशीला टाकभौरे, ममता कालिया, सुभद्राकुमारी चौहान, आचार्य रामचन्द्र शुक्ल, हरिशंकर परसाई
    3. भाषा विज्ञान: ध्वनि विज्ञान, लेखन व्यवस्था और देवनागरी लिपि, भाषा की संरचना और संघटन
    4. प्रायोजनमूलक हिन्दी: अनुवाद स्वरूप और प्रविधि, कार्यालयी हिन्दी, पारिभाषिक शब्दावली, हिन्दी पत्रकारिता : उद्भव और विकास।

5. भारतीय काव्यशास्त्र

6. व्याकरण और रचना: वर्णमाला (स्वर, व्यंजन, बारहखड़ी), संज्ञा, सर्वनाम, विशेषण, क्रिया, काल, कारक, लिंग, वचन, विलोम शब्द, पर्यायवाची शब्द, उपसर्ग, प्रत्यय, वाक्य शुद्धि, पत्रलेखन, निबन्ध, अनुवाद, अपठित गद्यांश

संदर्भ ग्रंथ:

1. साहित्य वैभव– प्रथम पी यू सी हिन्दी पाठ्य पुस्तक
2. साहित्य वैभव– अभ्यास पुस्तिका– प्रथम पी यू सी (हिन्दी)
3. साहित्य गौरव द्वितीय पी यू सी हिन्दी पाठ्य पुस्तक
4. साहित्य गौरव–अभ्यास पुस्तिका– द्वितीय पी यू सी (हिन्दी)
5. हिन्दी साहित्य युग और प्रवृत्तियाँ– डॉ. शिवकुमार शर्मा
6. सुबोध हिन्दी व्याकरण और रचना– जी टी ओचाणी
7. हिन्दी भाषा : उद्‌भव–विकास एवं मानक रूप– डॉ. राजेन्द्र कुमार सिंग वी.
8. हिन्दी साहित्य का संक्षिप्त इतिहास– बाबू गुलाबराय
9. हिन्दी साहित्य का इतिहास– डॉ. धीरेंद्र वर्मा
10. हिन्दी साहित्य का इतिहास– आचार्य रामचन्द्र शुक्ल
11. भारतीय एवं पाश्चात्य काव्य सिद्धांत– डॉ. गणपति चन्द्र गुप्त
12. पृथ्वीराज रासो–प्रकाशन: नागरी प्रचारिणी सभा
13. अनुवाद विज्ञान– डॉ.भोलानाथ तिवारी
14. समसामयिक भाषा विज्ञान– वैश्ना नारंग

15. आधुनिक हिन्दी निबन्ध– डॉ. भुवनेश्वरी चरण सक्सेना

16. प्रायोजनमूलक हिन्दी– विनोद गोदरे

17. काव्य शास्त्र– हजारी प्रसाद द्विवेदी

18. कबीर ग्रंथावली– श्यामसुंदर दास

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URDU

PUC-I YEAR TEXT BOOK -	ادب شناسی
PUC-I YEAR WORK BOOK -	اردو مشقیہ
PUC-II YEAR TEXT BOOK -	ادب آگہی
PUC-II YEAR WORK BOOK -	اردو مشقیہ

URDU — **PG-SYLLABUS**

1۔ اُردو زبان کا آغاز وارتقاء

2۔اُردو کے بارے میں مختلف نظریات

3۔دکنیات

i)۔نظام بیدری (کدم راو پدمراو)
ii)۔قلی قطب شاہ
iii)۔نصرتی (گلشن عشق)
iv)۔مقیمی (چندر بدن ومہیار)
v)۔ملا وجہی (قطب مشتری)
vi)۔ابن نشاطی (پھول بن)

امدادی کتب:

1۔مقدمہ تاریخ زبان اردو	مسعود حسین خاں
2۔تاریخ زبان اردو	جمیل جالبی
3۔تاریخ ادب اردو	سید اعجاز حسین
4۔اردو کا ابتدائی زمانہ	شمس الرحمٰن فاروقی
5۔دکنی ادب کی تاریخ	محی الدین قادری زور
6۔دکن میں اردو	نصیر الدین ہاشمی

4.۔شعری اصناف

i)۔نظم کا فن

نظم گو شعرا

قلی قطب شاہ، نظیر اکبر آبادی، حالی، محمد حسین آزاد

ii) ۔غزل

غزل کا فن

غزل گوشعرا: ولی دکنی، سراج اورنگ آبادی، میر تقی میر، غالب، مومن، انشاء، داغ

iii)۔مثنوی

مثنوی کا فن

مثنوی کا آغاز وارتقا

میر حسن (سحر البیان) پنڈت دیا شنکر نسیم (گلزار نسیم) ملا وجہی (قطب مشتری)

iv)۔مرثیہ

مرثیہ کا فن

مرثیہ کے اجزائے ترکیبی

مرثیہ نگار :میر ببر علی انیس، مرزا سلامت علی دبیر

v) قصیدہ

قصیدہ کا فن

قصیدہ نگاری کے اجزائے ترکیبی

قصیدہ نگار: سودا، ذوق

امدادی کتب:

1۔اردو شاعری پر ایک نظر	کلیم الدین احمد
2 ۔غزل کی سرگذشت	اختر انصاری
3۔اردو شاعری کا ارتقاء	فرمان فتح پوری
4۔اردو مثنوی کا ارتقاء	عبدالقادر سروری
5۔اردو مرثیے کا ارتقاء	ڈاکٹر مسیح الزماں
6۔موازنہ انیس و دبیر	شبلی نعمانی
7۔فن شاعری	اخلاق حسین قاسمی
8۔جدید غزل	رشید احمد صدیقی
9۔جدید نظم کی کروٹیں	وزیر آغا

نثری اصناف

1۔ داستان

ا۔داستان کا فن

۲۔اردو کی اہم داستانیں

میر امن (باغ و بہار) رجب علی بیگ سرور (فسانۂ عجائب)

2۔ ناول

ا۔ناول کا فن اور اسالیب

۲۔ناول نگار: منشی پریم چند، (گئودان) قراۃ العین حیدر (آگ کا دریا) راجندر سنگھ بیدی (ایک چادر میلی سی)
شمس الرحمٰن فاروقی (کئی چاند تھے سر آسماں)

3۔ افسانہ

ا۔افسانہ کا فن

۲۔ترقی پسند افسانہ

۳۔اہم افسانہ نگار؛ پریم چند، کرشن چند، سعادت حسن منٹو، جیلانی بانو، سید محمد اشرف

4۔ ڈراما

ا۔ڈرامہ کا فن

۲۔ڈرانہ کا آغاز وارتقا

۳۔اردو کے اہم ڈرامہ نگار؛ امتیاز علی تاج (انارکلی) حبیب تنویر (آگرہ بازار)

5۔ طنز و مزاح

ا۔ طنز و مزاح کا فن

۲۔طنز و مزاح نگار

پطرس بخاری (مضامین پطرس) مشتاق احمد یوسفی (چراغ تلے) مجتبیٰ حسین (قطع کلام)

6۔ خاکہ نگاری

ا۔خاکہ نگاری کا فن

۲۔اہم خاکہ نگار

مولوی عبدالحق (چند ہم عصر) رشید احمد صدیقی (گنج ہائے گراں مایہ) شاہد احمد دہلوی (چند اہم شخصیتیں)

7۔ تنقید کا فن

ا۔اسالیب تنقید

۲۔اہم تنقید نگار: مولانا حالی ، شبلی ،آل احمد سرور، احتشام حسین، شمس الرحمٰن فاروقی، گوپی چند نارنگ

8۔ اردو میں انشاء پردازی ومکتوب نگاری

اہم مکتوب نگار: غالب، اقبال، ابوالکلام آزاد

انشاء پرداز: سرسید احمد خاں

9۔ اردو ادب کی مختلف تحریکات ورجحانات

ا۔علی گڈھ تحریک ۲۔ترقی پسند تحریک

۳۔حلقہ ارباب ذوق ۴۔جدیدیت

10۔ دبستان

ا۔دبستان لکھنوی ۲۔دبستان دہلی

۳۔دبستان گولکنڈہ

امدادی کتب:

1۔داستان کا فن	ڈاکٹر اطہر پرویز
2 ۔داستان سے افسانے تک	وقار عظیم
3۔ناول کیا ہے	گیان چند جین
4۔اردو تنقید کا ارتقاء	عبادت بریلوی
5۔غالب کی مکتوب نگاری	پروفیسر نظیر احمد
6۔اردو افسانہ روایت اور مسائل	گوپی چند نارنگ
7۔فن تنقید اور تنقید نگاری	نورالحسن نقوی
8۔اردو میں خاکہ نگاری	عبادت بریلوی
9۔بیسویں صدی میں طنز ومزاح	نامی انصاری
10۔اردو میں خاکہ نگاری	صابرہ سعید
11۔اردو ڈرامہ فن اور منزلیں	وقار عظیم
12۔اردو ڈراما تاریخ وتنقید	عشرت رحمانی

PG SYLLABUS

SANSKRIT (09) SYLLABUS

1.माघस्य शिशुपालवधम् । (1 , 2 सर्गौ)

2.लघुसिद्धान्तकौमुदी ।

(संज्ञाप्रकरणम्, सन्धिप्रकरणम , समासप्रकरणम , विभक्त्यर्थाः)

3.कालिदासस्य जीवनम् , कृतयः च ।

4.साहित्यशास्त्रेतिहासः।

(भरतः , भामहः , दण्डी , वामनः , आनन्दवर्धनः , मम्मटः)

5.बाणभट्टस्य कादम्बरी । (महाश्वेतावृत्तान्तः)

6.भगवद्गीता । (14,15,16 अध्यायाः)

7.रामायणस्य महाभारतस्य च परिचयः।

8.भोजविरचितम् चम्पूरामायणम् (बालकाण्डम्)

9.वैदिकसाहित्यपरिचयः। (वेदाः , उपवेदाः , ब्राह्मणानि , आरण्यकानि , उपनिषदः , वेदाङ्गानि)

10. संस्कृतभाषाशास्त्रम् ।

11.नीतिकथासाहित्यम् । (पञ्चतन्त्रहितोपदेशकथानां परिचयः)

12.सुभाषितसामान्यपरिचयः।

13.भवभूतेः उत्तररामचरितम् ।

14.आनन्दवर्धनस्य ध्वन्यालोकः। (1, 2 उद्योतौ)

15.निबन्धलेखनम् , पत्रलेखनम् , अनुवादः।

SANSKRIT (09)

ಅಧ್ಯಯನಕ್ಕಾಗಿ ಗ್ರಂಥಗಳು:-

आकरग्रन्थाः:-

1. माघस्य शिशुपालवधम् , वल्लभदेवटीकासहितम् ।
2. लघुसिद्धान्तकौमुदी , गीताप्रेस् ।
3. सुभाषितरत्नभाण्डागारम् , चौखाम्बा संस्कृतभवनम् ।
4. बाणभट्टस्य कादम्बरी , चौखाम्बा संस्कृतभवनम् ।
5. भगवद्गीता , गीताप्रेस् ।
6. भोजराजकृतं चम्पूरामायणम् , निर्णयसागरः।
7. पञ्चतन्त्रम् , खेमराज श्री कृष्णदास
8. हितोपदेशः , चौखाम्बा संस्कृतभवनम् ।
9. History of Sanskrit poetics , P V kane
10. ಸಂಸ್ಕೃತ ಕಾವ್ಯ , ಡಾ.ಕೆ.ಕೃಷ್ಣಮೂರ್ತಿ.
11 ಸಂಸ್ಕೃತ ಸಾಹಿತ್ಯ ಪರಂಪರೆ , ಡಾ.ಎಂ.ಶಿವಕುಮಾರಸ್ವಾಮಿ.
12. ವೈದಿಕ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ , ಡಾ.ಎಸ್.ಅನಂತರಂಗಾಚಾರ್.
13. ಭಾರತೀಯ ಕಾವ್ಯಮೀಮಾಂಸೆ , ತೀ.ನಂ.ಶ್ರೀಕಂಠಯ್ಯ.
14. ಗೀತಾ ಭಾವಧಾರೆ , ಸ್ವಾಮಿ ಸೋಮನಾಥಾನಂದ.
15. ಮಹಾಭಾರತ ಪಾತ್ರಪ್ರಪಂಚ , ಡಾ.ಕೆ.ಎಸ್.ನಾರಾಯಣಾಚಾರ್ಯ.
16. ಹದಿನೆಂಟರ ನಂಟು, ಬನ್ನಂಜೆ ಗೋವಿಂದಾಚಾರ್ಯ.
17. ಸಂಸ್ಕೃತ ವಾಙ್ಮಯ ಮಂಜೂಷಾ , ಡಾ.ಎಂ.ಎನ್.ಜೋಶಿ.
18. ಸಂಸ್ಕೃತ ಭಾಷಾಶಾಸ್ತ್ರ ಮತ್ತು ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ , ಡಾ.ಕೆ.ಕೃಷ್ಣಮೂರ್ತಿ ಮತ್ತಿತರರು.
19. ಭವಭೂತಿಯ ಉತ್ತರರಾಮ ಚರಿತ , ಡಾ.ಕೆ.ಕೃಷ್ಣಮೂರ್ತಿ
20. ಕನ್ನಡ ಧ್ವನ್ಯಾಲೋಕ , ಡಾ.ಕೆ.ಕೃಷ್ಣಮೂರ್ತಿ

Post Grduation(PG) Syllabus for History

Definitions of History: History as a science and Arts- Historical Method – Importance of Archives-Important Historians and their contributions-DD Kosambi, V .A Smith, Romila Thapar. K.P.Jayaswal, K.A Nilakanta Shastri

Sources of India History-Literasy and Archaeological Sources –Ancient Period-Indus Valley Civilization-The Vedic Age Second Urbanisation - Mahajanapadas-The age of Mauryas-Polity Ashoka And his Dharma-Guptas –Goldan Age myth or reality-Schools of Art.

The South—Sangam Age & Literature –Pallavas-Art and Architecture-The Cholas-Art & Architecture Philosophy of Bhakti Movement-Alwass , mayanmars

Medieval Period: The Advent of Islam –Delhi Sultans Political Structure-Iltumish, Raziya, Balban-Alla-ud-din Khilji-Expansion-Administration Economic Reforms-Tughlaqs, Mohammed Bin Tughlaq-experiments-Contributions-The Mughels Akbar-Aurangzeb-Deccan Policy-Contributions Bhakti and Sufi Movements.

Modern Perioid: Advent of Europeans to India-Socio-Religious Reform Movements-Rajaram Mohan Rai, Swami Dayananda Saraswathi, Swami Vivekannda, Jotiba Phule.

Indian National Movement-Causes for the rise of Indian Nationalism-Foundation of Indian National Congress-Moderates-Extremists-Economic Nationalism-Economic Drain-Commercialisation of Agriculture Gandhian Phase-Dr.B R Ambedkar and Dalit Movement in India- leftist Movement peasant Movement-Freedom-Partition-Sardar Patel and Integration of Princely states.

Constitutional History of India-Minto-Morley reforms of 1909-Montague Chelmsford reforms of 1919 Government of India Act of 1935 Indian Independence Act.

Ancient Karnataka: Satavahanas-Kadambas-Educational System-Chalukyas-Guild System-Act and Architecture.

Medieval Karnataka: Vijayanagara-Contributions- Nayakas of Keladi-Revenue Police Haridasa Movement in Karnataka-Tippu Sultan-Economic Reforms-Freedom Movement of Karnataka Non-Brahmin Movement in Mysore-Tourism of Karnataka-World Heritage sites of Karnataka .

World History:

Civilizations Greek Civilization-Unification of Germany-World Wars.

Economics

POST GRADUATION – ECONOMICS

Micro Economics:-

1. Demand and Supply Analysis- Utility Analysis-Indifference Curves-Revealed Preference Theory Elasticity of Demand

2. Theory of Production and Costs
   Production Function. Short Run and long Run, Production Possibility Curves, Law of variable proportions and Returns to Scale Economies of scale.

3. Market Structure- Perfect- Competition-Monopoly-Monopolistic Competition-Oligopoly
4. Equilibrium-Short Run and Long Run.

Macro Economics:

1. Theories of Employment- Classical and Keyne's Theories of Employment & Role of Government.
2. Consumption Function and Investment Function.
3. Keyneian IS –LM Model.
4. Closed Economy-Nature and Significance.

Statistics for Economics

1. Introduction-Data-Type, Sources
2. Arithmetic Mean, Median, Mode
3. Measures of Dispresion
4. Regression
5. Comcept of Estimator
6. Least Square Method

Mathematics for Economics:

Equation-Types-Functions-Linear and Non-Linear-Applications, Demand Function, Cost Function, Revenue Function.

Economics of Growth and Development

1. Introduction Growth and Development.
   Measurement of Economic Development.

Human Development Index.
IMF and World Banks-developing countries.
Role of Society and Community

Agriculture Economics:

1. Nature and Scope
2. Agriculture and Economic Development.
3. Stages of Agricultural development-Johnson and Mellor
4. Agricultural Growth in India-Pre and Post Independence Period
5. Organic Farming in
6. Food Security in India
7. Agricultural risks and their management

Welfare Economics:-

Basic Concept-Economic and Pareto Optimality, Maximitation of Social Welfare . Theory of Public Choice.

Monetary Economics

Demand for Money
Supply of money
Theories of Interest
Financial Intermediaries
Non Banking Financial Institutions
Demonitisation

Econometrics

1. Regression Model-OLS-BLUE Properties R square and Adjusted R Square
2. Dummy Variable

Indian Economy

Features of Indian Economy-Demographic features of India's populations, Structural changes in the economy , planning Commission, NITI ayog, Occupational Structure-Trends .
PQLI

Public Economics:-

1. Public Goods, Private Goods.
   Principal of Maximum Social advantage-Musgrave
2. Pubilc Expenditure
3. Public Revenue and Taxation

International Trade and Finance

1. Classical Theories- Opportunity Cost, Absolute Cost and Comparative Cost Theory, Purchasing Power parity Theory
2. Economies of Scale, Barriers to Trade
3. Intra- Industry Trade
4. Currency Market
5. Balance of Payments-Concepts, Types, Measurement, Disequilibrium
6. WTO

Indian Financial System and Markets

1. Financial System-Significance
   Intermediaries and Economic Development in India
   NBFIs
   Capital Markets

Rural Development

1. Rural-Urban Linkage,
   Agriculture and allied activities, Agricultural Marketing, Regional Pattern
   Non-agricultural Employment in India

MSMEs
Non- Government Organisations-SHGs
Co-Operative Societies.

Environmental Economic

Sustainable Development
Property Rights
Enviromental Regulation-System.
Externalities.
Laws of Thermodynamic Principles

ಭೂಗೋಳಶಾಸ್ತ್ರ : PG SYLLABUS

ರಾಜ್ಯ ಪಠ್ಯಕ್ರಮದ

- ಪ್ರಥಮ ಪಿಯುಸಿಯ ಎಲ್ಲಾ ಅಧ್ಯಾಯಗಳಿಂದ-ಶೇ 40ರಷ್ಟು ಪ್ರಶ್ನೆ ಗಳು
- ದ್ವಿತೀಯ ಪಿಯುಸಿಯ ಎಲ್ಲಾ ಅಧ್ಯಾಯಗಳಿಂದ-ಶೇ 40ರಷ್ಟು ಪ್ರಶ್ನೆಗಳು.
- ಭೂಗೋಳಶಾಸ್ತ್ರ ಪದವಿ ಮತ್ತು ಸ್ನಾತಕೋತ್ತರ ಪದವಿ ಭೋದಿಸುವ ಎಲ್ಲಾ ವಿಶ್ವವಿದ್ಯಾಲಯಗಳ ಈ ಕೆಳಗಿನ ಆಯ್ದ ಪಠ್ಯಕ್ರಮದಿಂದ ಉಳಿದ ಶೇ 20 ರಷ್ಟು ಪ್ರಶ್ನೆಗಳು.

ಭಾಗ-I ಪ್ರಾಕೃತಿಕ ಭೂಗೋಳಶಾಸ್ತ್ರ

ಖಗೋಳ ಭೂಗೋಳಶಾಸ್ತ್ರ:
ಸೌರವ್ಯೂಹ ಮತ್ತು ಭೂಮಿ,
ಭೂಮಿಯ ಉಗಮ - ಜ್ಯೋತಿರ್ಮೇಘ ಸಿದ್ಧಾಂತ, ನಿಹಾರಿಕಾ ಸಿದ್ಧಾಂತ ಮತ್ತು ಉಬ್ಬರವಿಳಿತ ಸಿದ್ಧಾಂತ.
ಭೂಮಿ ಒಂದು ಗ್ರಹ, ಭೂಮಿಯ ನೈಸರ್ಗಿಕ ಉಪಗ್ರಹ- ಚಂದ್ರ, ಚಂದ್ರನ ಕಲೆಗಳು.
ಗಣಿತ ಭೂಗೋಳಶಾಸ್ತ್ರ:
ಭೂಮಿಯ ಆಕಾರ ಮತ್ತು ಗಾತ್ರ, ಭೂಭಾಗ ಮತ್ತು ಜಲಭಾಗಗಳ ಹಂಚಿಕೆ, ಭೂಮಿಯ ಚಲನೆಗಳು, ಅಕ್ಷಾಂಶಗಳು,
ರೇಖಾಂಶಗಳು ಮತ್ತು ವೇಳೆ, ಕಾಲವಲಯಗಳು, ಅಂತರರಾಷ್ಟ್ರೀಯ ದಿನಾಂಕ ರೇಖೆ.
ಭೂಸ್ವರೂಪ ರಚನಾ ಶಾಸ್ತ್ರ:
ಭೂಮಿಯ ಅಂತರಿಕ ರಚನೆ ಮತ್ತು ಸಂಯೋಜನೆ, ಭೂಮಿಯ ಆಂತರಿಕ ಶಕ್ತಿಗಳು-ಭೂಕಂಪಗಳು ಮತ್ತು ಜ್ವಾಲಾಮುಖಿಗಳು,
ಶಿಲೆಗಳು ಮತ್ತು ಖನಿಜಗಳು, ಶಿಥಲೀಕರಣದ ಪ್ರಕ್ರಿಯೆಗಳು, ಭೂಸವೆತ ಚಕ್ರ-WM ಡೇವಿಸ್, ಮತ್ತು W ಪೆಂಕ್,
ಭೂನಗ್ನೀಕರಣದ ಕರ್ತೃಗಳು-ನದಿ, ಅಂತರ್ಜಲ, ಮಾರುತ, ಹಿಮನದಿ ಮತ್ತು ಸಮುದ್ರದ ಅಲೆಗಳು ಮತ್ತು ಅವುಗಳ
ಕಾರ್ಯಗಳು. ನಗ್ನೀಕರಣದಿಂದುಂಟಾಗುವ ಭೂಸ್ವರೂಪಗಳು.
ವಾಯುಗುಣ ಶಾಸ್ತ್ರ/ಹವಾಮಾನ ಶಾಸ್ತ್ರ:
ಹವಾಮಾನ ಮತ್ತು ವಾಯುಗುಣ, ವಾಯುಮಂಡಲದ ರಚನೆ ಮತ್ತು ಸಂಯೋಜನೆ,
ವಾಯುಮಂಡಲದ ಉಷ್ಣಾಂಶ, ಒತ್ತಡ, ಮಾರುತಗಳು, ಆರ್ದ್ರತೆ, ಮೋಡಗಳು, ವೃಷ್ಟಿ(ಮಳೆ), ವೃಷ್ಟಿ ರೂಪಗಳು,
ಪ್ರಪಂಚದ ವಾಯುಗುಣದ ವರ್ಗೀಕರಣ-ಕೊಪೆನ್ಸ್ ಮತ್ತು ಥ್ರಾಂತ್ವೈತ್ , ಮತ್ತು ತ್ರಿವಾರ್ಥರವರ ವಿಂಗಡಣೆ.
ಸಾಗರಶಾಸ್ತ್ರ:
ಜಲಚಕ್ರ, ಜಲಗೋಳ-ಸರೋವರಗಳು, ವಿಧಗಳು, ಸಮುದ್ರ, ಸಾಗರಗಳು, ವಿಧಗಳು, ಸಾಗರ ತಳದ ಮೇಲ್ಮೈ ಲಕ್ಷಣಗಳು,
ಸಾಗರದ ನೀರಿನ ಉಷ್ಣಾಂಶ ಮತ್ತು ಲವಣತೆ, ಸಾಂದ್ರತೆ, ಸಾಗರದ ನೀರಿನ ಚಲನೆಗಳು-ಸಮುದ್ರದ ಅಲೆಗಳು, ಸಾಗರ
ಪ್ರವಾಹಗಳು ಮತ್ತು ಉಬ್ಬರವಿಳಿತಗಳು, ಸಾಗರ ನಿಕ್ಷೇಪಗಳು, ಹವಳದಿಬ್ಬಗಳು.
ಪರಿಸರ ಭೂಗೋಳಶಾಸ್ತ್ರ;

ಜೀವಗೋಳ-ಪರಿಸರ ಮತ್ತು ಅದರ ವಿಧಗಳು, ಜೀವಿಪರಿಸರಶಾಸ್ತ್ರ, ಜೈವಿಕ ವೈವಿಧ್ಯತೆ, ಜೀವಸಮೂಹಗಳು, ಪರಿಸರ ಸಮಸ್ಯೆಗಳು ಮತ್ತು ಮಾಲಿನ್ಯದ ಪ್ರಕಾರಗಳು,ಅವುಗಳ ಕಾರಣ ಮತ್ತು ಪರಿಣಾಮಗಳು, ಹಸಿರು ಮನೆ ಪರಿಣಾಮ, ಹವಾಮಾನ ಬದಲಾವಣೆ ಮತ್ತು ಭೂತಾಪಮಾನ ಹೆಚ್ಚಳ, ನೈಸರ್ಗಿಕ ವಿಕೋಪಗಳು ಮತ್ತು ವಿನಾಶಕಗಳು,

ಭಾಗ-II. ಮಾನವ ಭೂಗೋಳಶಾಸ್ತ್ರ

ಭೌಗೋಳಿಕ ಚಿಂತನೆ:
ಅಧ್ಯಯನ ಪಂಥಗಳು-ಪರಿಸರ ಪ್ರಭುತ್ವವಾದ, ಸಾಧ್ಯತಾವಾದ ಮತ್ತು ನಿಂತು ಹೊರಡುವ/ಸಮನ್ವಯವಾದ,ಮಾನವ ಪರಿಸರ ಸಂಬಂಧ ಮತ್ತು ಪ್ರಭಾವ, ಮಾನವ ಭೂಗೋಳಶಾಸ್ತ್ರದ ಬೆಳವಣಿಗೆ, ಭೂಗೋಳಶಾಸ್ತ್ರದ ಅಂಧಕಾರ ಯುಗ ಭೂಗೋಳಶಾಸ್ತ್ರದ ಸಂಪ್ರದಾಯಗಳು(ಕ್ರಿಯಾಮಾಲೆ) ಅಧ್ಯಯನ ಸಲಕರಣೆಗಳು.ಸ್ವಾಭಾವಿಕ ಪ್ರದೇಶಗಳು ಮತ್ತು ಮಾನವನ ಜೀವನ ವಿಧಾನಗಳ ಪರಿಕಲ್ಪನೆ. ಆಹಾರ, ವಸತಿ ಮತ್ತು ಉಡುಪು. ಗ್ರೀಕ್, ರೋಮನ್, ಫ್ರೆಂಚ್, ಬ್ರಿಟಿಷ್, ಆಸ್ಟ್ರೇಲಿಯಾ, ಅರಬ್ ಮತ್ತು ಭಾರತೀಯ ಪ್ರಮುಖ ಭೂಗೋಳಶಾಸ್ತ್ರಜ್ಞರು ಮತ್ತು ಅವರ ಕೊಡುಗೆಗಳು,, ಸ್ಥಳ/ದೇಶವೊಂದರ ಸ್ಥಾನದ ಪರಿಕಲ್ಪನೆ -ವಿಧಗಳು, ಭೂಗೋಳಶಾಸ್ತ್ರದಲ್ಲಿ ನಿಯಮಗಳು, ಸಿದ್ಧಾಂತ ಮತ್ತು ಮಾದರಿಗಳು. ಭೂಗೋಳಶಾಸ್ತ್ರದ ಶಾಖೆಗಳು.

ಆರ್ಥಿಕ ಭೂಗೋಳಶಾಸ್ತ್ರ:
ಮಾನವನ ಆರ್ಥಿಕ ಚಟುವಟಿಕೆಗಳು, ಪ್ರಾಥಮಿಕ, ದ್ವಿತೀಯ,ತೃತೀಯ ಮತ್ತು ಚತುರ್ಥಿಯ. ನೈಸರ್ಗಿಕ ಸಂಪನ್ಮೂಲಗಳು- ಸಾಂಪ್ರದಾಯಿಕ ಮತ್ತು ಅಸಾಂಪ್ರದಾಯಿಕ. ಕೃಷಿ, ವಾನ್ ಥುನೆನ್ ಅವರ ಕೃಷಿ ಸ್ಥಳ ಸಿದ್ಧಾಂತ. ಪಶುಸಂಗೋಪನೆ, ಹೈನುಗಾರಿಕೆ, ಮೀನುಗಾರಿಕೆ, ಕೈಗಾರಿಕೆಗಳು,

ಸಾಂಸ್ಕೃತಿಕ/ಸಾಮಾಜಿಕ ಭೂಗೋಳಶಾಸ್ತ್ರ:
ಮಾನವ ಜನಾಂಗಗಳು, ವಿಂಗಡಣೆ, ಪ್ರಪಂಚದ ಪ್ರಮುಖ ಧರ್ಮಗಳು, ಭಾಷೆಗಳು, ಪ್ರಪಂಚದ ಪ್ರಮುಖ ಬುಡಕಟ್ಟುಗಳು ಮತ್ತು ಅವರ ಆರ್ಥಿಕ ಹಾಗೂ ಸಾಮಾಜಿಕ ಜೀವನ.

ವಸತಿ ಭೂಗೋಳಶಾಸ್ತ್ರ:
ಮಾನವ ವಸತಿಗಳು-ಗ್ರಾಮೀಣ ಮತ್ತು ನಗರ, ವಸತಿಗಳ ಆಕಾರ, ರಚನೆ ಮತ್ತು ಮಾದರಿ. ನಗರಗಳ ವರ್ಗೀಕರಣ, ಪ್ರೈಮೇಟ್ ಸಿಟಿ, ರ್ಯಾಂಕ್ ಸೈಜ್ ರೂಲ್, ಕ್ರಿಸ್ತಲರನ ಕೇಂದ್ರ ಸ್ಥಳ ಸಿದ್ಧಾಂತ.

ಜನಸಂಖ್ಯಾ ಭೂಗೋಳಶಾಸ್ತ್ರ:
ಪ್ರಪಂಚದ ಜನಸಂಖ್ಯಾ ಬೆಳವಣಿಗೆ, ಜನಸಂಖ್ಯಾ ಬೆಳವಣಿಗೆಯ ಸಿದ್ಧಾಂತಗಳು, ಮಾಲ್ತೂಸಿಯನ್ ಸಿದ್ಧಾಂತ, ಹಂಚಿಕೆ, ಸಂಯೋಜನೆ, ಮಾನವನ ಉಗಮ, ಮಾನವ ವಲಸೆ, ಮಾನವನ ಉಗಮ ಮತ್ತು ವಿಕಾಸ, ಮಾನವ ವಲಸೆ, ವಿಧಗಳು, ಜನಸಂಖ್ಯಾ ಆವರ್ತ ಮತ್ತು ಮಾನವ ಅಭಿವೃದ್ಧಿ.

ರಾಜಕೀಯ ಭೂಗೋಳಶಾಸ್ತ್ರ:
ಭೌಗೋಳಿಕ ಗಡಿಗಳು ಮತ್ತು ಮೇರೆಗಳು, ಗಾತ್ರ, ಆಕಾರ, ರಾಷ್ಟ್ರ ಮತ್ತು ರಾಜ್ಯದ ಪರಿಕಲ್ಪನೆ, ರಾಜಕೀಯ ವಿಭಾಗಗಳು, ಹಾರ್ಟ್‌ಲ್ಯಾಂಡ್ ಸಿದ್ಧಾಂತ, ಸ್ಪೀಕ್ ಮಾಹ್ನ್ ನ ರಿಮ್ಲ್ಯಾಂಡ್ ಸಿದ್ಧಾಂತ.

ಭಾಗ III ಭಾರತದ ಭೂಗೋಳಶಾಸ್ತ್ರ

ಭಾರತ- ಸ್ಥಾನ ಮತ್ತು ಗಾತ್ರ ಹಾಗೂ ಭೌಗೋಳಿಕ ಹಿನ್ನೆಲೆ, ನೆರೆಹೊರೆಯ ದೇಶಗಳು, ಗಡಿಗಳು ಮತ್ತು ಮೇರೆಗಳು. ಆಡಳಿತ ವಿಭಾಗಗಳು. ಜನಸಂಖ್ಯೆ, ಬೆಳವಣಿಗೆ, ಸಾಂದ್ರತೆ, ವಿತರಣೆ, ಸಂಯೋಜನೆ, ಭಾಷಾ ಸಂಯೋಜನೆ.
ಭಾರತದ ಪ್ರಾದೇಶಿಕ ಪ್ರಾಕೃತಿಕ ವಿಭಾಗಗಳು ಮತ್ತು ವಿಶೇಷ ಭೂಸ್ವರೂಪಗಳು, ಅವುಗಳ ಹಂಚಿಕೆ ಹಾಗೂ ಪ್ರಾಮುಖ್ಯತೆ.
ಭಾರತದ ನದಿವ್ಯವಸ್ಥೆ, ನದಿ ವಿವಾದಗಳು ಮತ್ತು ನದಿಗಳ ಅಂತರ್ಜೋಡಣೆ. ಭಾರತದ ವಾಯುಗುಣದ ಗುಣಲಕ್ಷಣಗಳು, ಋತುಗಳು, ಉಷ್ಣಾಂಶ ಮತ್ತು ಮಳೆಯ ಹಂಚಿಕೆ. ಭಾರತದ ಮಣ್ಣುಗಳು-ವಿಧಗಳು ಮತ್ತು ಹಂಚಿಕೆ,
ಭಾರತದ ಸ್ವಾಭಾವಿಕ ಸಸ್ಯವರ್ಗ- ಅರಣ್ಯಗಳು, ವಿಧಗಳು ಮತ್ತು ಹಂಚಿಕೆ. ರಾಷ್ಟ್ರೀಯ ಉದ್ಯಾನಗಳು,ಅಭಯಾರಣ್ಯಗಳು ಮತ್ತು ಪಕ್ಷಿಧಾಮಗಳ ಹಂಚಿಕೆ. ಭಾರತದ ಭೂ ಮತ್ತು ಜಲಸಂಪನ್ಮೂಲಗಳು-ಭೂಬಳಕೆ, ನೀರಾವರಿ ವಿಧಗಳು, ಪ್ರಮುಖ ವಿವಿದ್ದೋದ್ದೇಶ ನದಿ ಕಣಿವೆ ಯೋಜನೆಗಳು.
ಭಾರತದ ವ್ಯವಸಾಯ- ವಿಧಗಳು, ಕೃಷಿ ವಾಯುಗುಣ ಪ್ರಧೇಶ , ಭಾರತದಲ್ಲಿ ವ್ಯವಸಾಯದ ಹೊಸ ಆಯಾಮಗಳು- ಹಸಿರು ಕ್ರಾಂತಿ, ಜೈವಿಕ ಕೃಷಿ, ಅಂಗಾಂಶ ಕೃಷಿ. ತೋಟಗಾರಿಕೆ ಮತ್ತು ಪುಷ್ಪ ಕೃಷಿ. ಭಾರತದ ಪ್ರಮುಖ ಕೃಷಿ ಬೆಳೆಗಳು ಮತ್ತು ಅವುಗಳ ಭೌಗೋಳಿಕ ಹಂಚಿಕೆ ಮತ್ತು ಉತ್ಪಾದನೆ. ಭಾರತದ ಖನಿಜ ಮತ್ತು ಶಕ್ತಿ ಸಂಪನ್ಮೂಲಗಳು ಅವುಗಳ ಭೌಗೋಳಿಕ ಹಂಚಿಕೆ ಮತ್ತು

ಉತ್ಪಾದನೆ. ಶಕ್ತಿ ಮುಗ್ಗಟ್ಟು. ಭಾರತದ ಕೈಗಾರಿಕೆ- ವಲಯಗಳು, ಭೌಗೋಳಿಕ ಹಂಚಿಕೆ ಮತ್ತು ಉತ್ಪಾದನೆ, ಭಾರತದ ಜನಸಂಖ್ಯೆ- ಹಂಚಿಕೆ ಮತ್ತು ಸಂಯೋಜನೆ, ವಲಸೆ, ಮಾನವ ಅಭಿವೃದ್ಧಿ. ಭಾರತದ ಸಾರಿಗೆ ಮತ್ತು ಸಂಪರ್ಕ ಹಾಗೂ ವ್ಯಾಪಾರ. ಭಾರತದಲ್ಲಿ ಮೀನುಗಾರಿಕೆ, ಪಶುಸಂಗೋಪನೆ. ಮತ್ತು ಪ್ರವಾಸೋದ್ಯಮ ಮತ್ತು ವಿಧಗಳು.

ಭಾಗ IV ಕರ್ನಾಟಕದ ಭೂಗೋಳಶಾಸ್ತ್ರ

ಕರ್ನಾಟಕ - ಸ್ಥಾನ ಮತ್ತು ಗಾತ್ರ ಹಾಗೂ ಭೌಗೋಳಿಕ ಹಿನ್ನೆಲೆ, ಆಡಳಿತ ವಿಭಾಗಗಳು.
ಕರ್ನಾಟಕದ ಪ್ರಾದೇಶಿಕ ಪ್ರಾಕೃತಿಕ ವಿಭಾಗಗಳು ಮತ್ತು ಅವುಗಳ ವಿಶೇಷತೆಗಳು - ಅವುಗಳ ಹಂಚಿಕೆ ಮತ್ತು ಪ್ರಾಮುಖ್ಯತೆ.
ಹವಾಮಾನ ಮತ್ತು ವಾಯುಗುಣ, ಮಣ್ಣುಗಳು, ಸ್ವಾಭಾವಿಕ ಸಸ್ಯವರ್ಗ, ನದಿ ವ್ಯವಸ್ಥೆ ಮತ್ತು
ಕರ್ನಾಟಕದ ಪ್ರಮುಖ ನದಿ ಕಣಿವೆ ಯೋಜನೆಗಳು, ಜಲಪಾತಗಳು. ಕರ್ನಾಟಕದಲ್ಲಿನ ರಾಷ್ಟ್ರೀಯ ಉದ್ಯಾನವನಗಳು, ಅಭಯಾರಣ್ಯಗಳು ಮತ್ತು ಪಕ್ಷಿಧಾಮಗಳ ಹಂಚಿಕೆ , ಕರ್ನಾಟಕದಲ್ಲಿ ಕೃಷಿ ವಾಯುಗುಣ ಪ್ರದೇಶ, ತೋಟಗಾರಿಕೆ, ಪುಷ್ಪ ಕೃಷಿ, ಮೀನುಗಾರಿಕೆ, ರೇಷ್ಮೆ ಕೃಷಿ, ಪಶುಸಂಗೋಪನೆ ಮತ್ತು ಪ್ರವಾಸೋದ್ಯಮ. ಪ್ರಾದೇಶಿಕ ಯೋಜನೆ.

ಭಾಗ IV. ಪ್ರಾಯೋಗಿಕ ಭೂಗೋಳಶಾಸ್ತ್ರ

ನಕ್ಷಾಶಾಸ್ತ್ರ, ನಕ್ಷೆಗಳು, ನಕ್ಷಾವಾಚನ, ನಕ್ಷಾ ರಚನೆ ವಿವಿಧ ಭೌಗೋಳಿಕಾಂಶಗಳ ಸ್ಥಾನ ಗುರುತಿಸುವಿಕೆ, ಭೌಗೋಳಿಕ ದತ್ತಾಂಶ ನಿರೂಪಣೆ, ಅಲೇಖಗಳು, ಭೌಗೋಳಿಕ ಚಿಹ್ನೆ ಮತ್ತು ಸಂಕೇತಗಳು, ಆಧುನಿಕ ಮೋಜಣಿ ವಿಧಾನಗಳು, ಭೌಗೋಳಿಕ ಮಾಹಿತಿ ವ್ಯವಸ್ಥೆ, ಜಾಗತಿಕ ಸ್ಥಾನ ನಿರ್ಧಾರ ವ್ಯವಸ್ಥೆ, ದೂರಸಂವೇದಿ ತಂತ್ರಜ್ಞಾನ ಮತ್ತು ಉಪಗ್ರಹ ಸಂಪರ್ಕ.

GEOGRAPHY

PUC State Syllabus

- **All chapters of First PUC-. 40% questions**
- **All chapters of Second PUC-. 40% questions.**
- **The remaining 20% of the questions from the selected common syllabus of all universities offering Geography in undergraduate and postgraduate degrees is as follows.**

Part I Physical Geography

Astronomical geography:

Solar System and The Earth, Origin of the Earth - The Nebular Hypothesis and Tidal Hypothesis. Earth is a planet, Moon-Natural satellite of the Earth, Phases of the Moon.

Mathematical Geography:

Shape and Size of the Earth, Distribution of Land and Water Bodies,
Movements of the Earth, Latitudes, Longitudes and Time, Time zones, International Date Line.

Geomorphology:

The Internal Structure and Composition of the Earth, Internal forces of the Earth - Earthquakes and Volcanoes, Rocks and Minerals, Processes of Weathering, Concepts of Geomorphic Cycle

- WM Davis and Walther Penck, Agents of Denudation- Work of River, Underground Water, Wind, Glacier and Sea Waves. Landforms associated with denudation.

Climatology and Meteorology:

Weather and Climate, Structure and Composition of the Atmosphere, Temperature of the Atmosphere, Pressure, Winds, Humidity, Clouds, Precipitation(Rain) Climatic Classification of the World -Koeppen and Thornthwaite's Classification. And Triwartha classification.

Oceanography:

Water Cycle, Hydrosphere- Lakes, types, Topography of the Ocean Floor,
Temperature and Salinity, Density of the Ocean Water, Movements of the Ocean Water -Sea Waves, Ocean Currents and Tides, Ocean Deposits, Coral Reefs.

Environmental Geography:

Biosphere-Environment and its types, Ecology, Biodiversity, Biomes, Environmental Problems and Types of pollution, Their Causes and Effects, Green House Effect, Global warming and Climate change, Natural Hazards and Disasters.

Part II Human Geography

Geographical Thought:

Schools of Thoughts-Determinism, Possibilism and Stop and Go Determinism, Man and Environment Relationship and impacts, Development of Human Geography, Dark age in geography, Traditions(Paradigm)in Geography, Tools of study, Concept Natural regions and modes of human life. Food ,Clothes and Shelter.Important Geographers - Greek, Roman, French, British, Australian, Arab and Indian Geographers and their contributions, Geographical discoveries, Effects, concept of location of a place/country. branches of geography.Theories, Laws and Models. Branches of Geography.

Economic Geography:

Human Economic Activities, Primary, Secondary, Tertiary and Quaternary. Natural Resources-Conventional and Non-Conventional. Agriculture,Vonthunen's Agricultural location theory. Animal Husbandry,Dairying, Fisheries, Industries,

Cultural/Social Geography:

Human Races, Classification, Major Religions of the World, Languages,
Major Tribes of the World and their Socio-Economic life.

Settlement Geography:

Human Settlements-Rural and Urban, Classification of Cities, Primate City, Rank Size Rule, Central Place Theory of Christallers, Concentric zone theory of Burgess.

Population Geography:

Growth of World Population, Population growth theories, Malthusian theory, Distribution, Composition, Origin and evolution of man.Human Migration, types, Demographic Cycle and Human Development.

Political Geography:

Geographical Boundaries and Frontier,Size, Shapes, Concept of the Nation and State, Political Divisions, Heartland Theory, Rimland Theory by Spykman.

Part III Geography of India

India- Location and Size and Geographical Background,Neighbouring countries, borders and boundaries. Administrative divisions. Population, growth, density, distribution, composition, Linguistic composition. Regional Physical Divisions and Special Landforms of India, Their Distribution and Importance. River System of India, River Disputes and Interlinking of Rivers. Climatic Features of India, Seasons,Distribution of Temperature and Rainfall. Soils of India- Types and Distribution. Natural Vegetation of India- Forests, Types and Distribution. Distribution of National Parks, Wildlife Sanctuaries and Bird Sanctuaries. Land and Water Resources of India-Land Use, Types of Irrigation,Major Multi-Purpose River Valley Projects. Agriculture of India- Types, Agro-Climatic region, New Dimensions of Agriculture in India- Green revolution, Organic Farming, Tissue Culture. Horticulture and Floriculture. Major Agricultural Crops of India and their Geographical Distribution and Production. Mineral and Power Resources of India and their Geographical Distribution and Production. Energy crisis.Industry of India - Zones, Geographical Distribution and Production, Population of India - Distribution and Composition, Migration, Human Development. Transport and Communication and Trade of India. Fisheries, Animal Husbandry and Tourism in India, and their Types.Regional Planning.

Part IV -Geography of Karnataka

Karnataka- Location and Size and Geographical Background, Administrative Divisions. Regional Physical Divisions of Karnataka and their Specialities-Distribution and Importance. Weather and Climate, Soils, Natural Vegetation, River System and Major River Valley Projects of Karnataka, Waterfalls.Distribution of National Parks, Wildlife Sanctuaries and Bird Sanctuaries, Agro-Climatic regions, Horticulture and Floriculture,Fisheries, Sericulture, Animal Husbandry and Tourism in Karnataka.

Part-V Practical Geography

Cartography, Maps, Map drawing, Location and identifications of various geographical factors, Geographical data Representation, Graphs, Geographical Symbols and Signs, Modern surveying methods, Geographical Information System,
Global Positioning System, Remote Sensing Technology and Satellite Communication.

****

ಆಕರ ಗ್ರಂಥಗಳು/**Reference Books**:

1. ಪ್ರಥಮ ಪಿಯುಸಿ ಪ್ರಾಕೃತಿಕ ಭೂಗೋಳಶಾಸ್ತ್ರದ ಮೂಲಾಂಶಗಳು ಮತ್ತು ಭಾರತದ ಪ್ರಾಕೃತಿಕ ಪರಿಸರ. ಪದವಿ ಪೂರ್ವ ಶಿಕ್ಷಣ ಇಲಾಖೆ, ಕರ್ನಾಟಕ ಸರ್ಕಾರ,
2. ದ್ವಿತೀಯ ಪಿಯುಸಿ: ಮಾನವ ಭೂಗೋಳಶಾಸ್ತ್ರ ಮೂಲಾಂಶಗಳು, ಭಾರತದ ಮಾನವ ಮತ್ತು ಆರ್ಥಿಕ ಭೂಗೋಳಶಾಸ್ತ್ರ, ಪದವಿ ಪೂರ್ವ ಶಿಕ್ಷಣ ಇಲಾಖೆ, ಕರ್ನಾಟಕ ಸರ್ಕಾರ.
3. ಡಾ.ರಂಗನಾಥ್ ಪ್ರಾಕೃತಿಕ ಭೂಗೋಳ ಶಾಸ್ತ್ರದ ಮೂಲ ತತ್ವಗಳು.
4. ಪ್ರೊಫೆಸರ್ ಪಿ ಮಲ್ಲಪ್ಪ ಪ್ರಾಕೃತಿಕ ಭೂಗೋಳ ಶಾಸ್ತ್ರದ ಮೂಲ ತತ್ವಗಳು.
5. ಡಾ.ರಂಗನಾಥ್ ಮಾನವ ಭೂಗೋಳ ಶಾಸ್ತ್ರದ ಮೂಲ ತತ್ವಗಳು.
6. ಪ್ರೊಫೆಸರ್ ಪಿ ಮಲ್ಲಪ್ಪ ಮಾನವ ಭೂಗೋಳ ಶಾಸ್ತ್ರದ ಮೂಲ ತತ್ವಗಳು.
7. ಕರ್ನಾಟಕದ ಭೂಗೋಳಶಾಸ್ತ್ರ. ಪಿ.ಮಲ್ಲಪ್ಪ

8. ಕರ್ನಾಟಕದ ಭೂಗೋಳಶಾಸ್ತ್ರ, ಡಾ.ರಂಗನಾಥ್.
9. RL Singh Element of practical Geography Kalyani Publication
10. Geography of India, Majid Husain, McGraw Hill Education (India)
11. Physical Geography. D.R. Khullar, Kalyani Publishers.
12. Practical Geography. R.L.Singh and Rana P.B.Singh, Kalyani Publisher.
13. Majid Husain -Evolution of geographical thought Rawat Publication.
14. Savinder Singh physical geography Prayag Pustak Bhawan Allahabad
15. Savinder Singh bio Geography Prayag Pustak Bhawan Allahabad.
16. Majid Husain human Geography Rawat Publication Jaipur.
17. D.R.Kullar regional geography of India
18. Professor P mallappa geography of Karnataka.
19. Dr Rangnath geography of Karnataka.
20. Karnataka state gazetteer,,.....,

political science

SYLLABUS OF POST -GRADUATION

I. Political theory and thought:
   1) Behaviouralism, Democracy
   2) Indian political thought: Koutilya, Mahatma Gandhi, Ambedkar
   3) Greek political thought Socrates, plato, and Aristotle
   4) European political thought: Mechiavelli, Hobbes, John locke, Karl Marx, JJ Rousseau, Hegel
II. Comparative politics and political analysis.
III. Public administration .
IV. International relations.
V. Elections, Electrole reforms and political parties in India.
VI. Indian constitution and politics.

SUBJECT ; SOCIALOGY (FIRST YEAR MA)

I **THEORETICAL FOUNDATIONS OF SOCIOLOGY**

1. INTRODUCTION
   - EMERGENCE OF SOCIOLOGY
   - PROGRESS
   - SOCIAL EVOLUTION
   - UTOPIAN SOCIALISM
2. SOCIOLOGICAL IDEAS
   (A) AUGUSTE COMTE
   (B) HERBERT SPENCER
   (C) MAX WEBER
   (D) EMILE DURKHEIM
   (E) KARL MARX
3. BASIC CONCEPTS OF SOCIOLOGY
   - SOCIETY, COMMUNITY, ASSOCIATION, SOCIAL GROUPS

II. MODERN SOCIOLOGICAL THEORIES

1. STRUCTURAL FUNCTIONALISM
   -STRUCTURAL THEORY, CONTRIBUTIONS OF SOCIAL ANTHROPOLOGISTS : FUNCTIONAL ANALYSIS
   - ROOTS OF FUNCTIONALISM
     DURKHEIM AND RADCLIFF BROWN
   - EMPIRICAL FUNCTIONALISM OF ROBERT MERTON
2. CONFLICT THEORY :
   -MARXIAN THEORY
   -DIALECTICAL CONFLICT THEORY OF **DAHRENDORF**
   - POST CAPITALIST SOCIETY AND CRITIQUE OF MARXIAN THEORY'
   - CONFLICT FUNCTIONALISM OF **SIMMEL AND COSER**
3. INTERACTIONIST THEORY

III. (A) TRADITION AND STRUCTURAL PERSCPECTION ON INDIAN SOCIETY .

1. G.S GHURYE
2. R.K MUKHERJI
3. D.N MAJUMDAR

4. K.M KAPADIYA
5. IRAVATI KARVE
6. M.N SRINIVASA
7. DR. PARVATHAMMA

(B) SOCIAL INSTITUTIONS

FAMILY, MARRIAGE,EDUCATION, KINSHIP

IV RESEARCH METHODOLOGY OF SOCIOLOGY

1. OBJECTIVE
2. PHILOSOPHICAL FOUNDATIONS OF SOCIAL RESEARCH
   - SOCIAL RESEARCH :-NATURE AND TYPES, THEORY BUILDING, INTERDISCIPLINARY AND MULTI DISCIPLINARY DIMENSIONS
3. DATA COLLECTION
4. USES OF SOCIAL RESEARCH
5. RESEARCH DESIGN
6. HYPOTHESIS

7. RESEARCH REPORT
8. TYPES OF SAMPLING- PROBABILITY AND NON PROBABILITY
9. TECHNIQUES OF PRIMARY DATA COLLECTION
   - OBSERVATION
   - QUESTIONNAIRE
   - INTERVIEW SCHEDULE
10. SOCIAL WORK , SOCIAL WELFARE AND SOCIAL SECURITY

V. CULTURE AND SOCIETY

- INDIVIDUAL -CULTURE AND SOCIETY
- CULTURE MEANING, FUNCTIONS AND DEVELOPMENT
- SOCIALISATION AND CULTURE
- SOCIAL GROUPS

ORGANISED AND UNORGANISED GROUPS

SUBJECT ; SOCIOLOGY (SECOND YEAR M.A)

I. SOCIOLOGY OF FAMILY

1. INTRODUCTION
2. THE CHANGING NATURE OF MODERN MARRIAGES AND FREEDOM OF CHOICE:-
   -MARRIAGE AND FAMILY IN INDIA
   -CHANGING LIFE STYLES AND FAMILY
   -CHANGING STRUCTURE AND FUNCTIONS OF FAMILY
   -SOCIAL CHANGE:- MEANING,NATURE,THEORIES AND FACTORS OF SOCIAL CHANGE
   -AGENCIES OF SOCIAL CHANGE:- INDUSTRIALISATION , URBANISATION EDUCATION

II. RURAL SOCIOLOGY IN INDIA

1. OBJECTIVES
2. HISTORICAL BACKGROUND OF VILLAGE COMMUNITY IN INDIA:- CASTE SYSTEM
3. CASTE,ESTATES AND CLASS
4. RURAL POWER STRUCTURE
   -VILLAGE PANCHAYATH
   -DECENTRALISATION OF POWER
5. SOME ASPECTS OF SOCIAL MOBILITY
   -SANSKRITISATION, WESTERNISATION,MODERNISATION

III. SOCIAL DEMOGRAPHY

1. DEFINITION, NATURE,SCOPE AND CONCEPTS OF DEMOGRAPHY
2. STUDY OF POPULATION:- ITS RELEVANCE, SCOPE AND NATURE
3. BASIC CONCEPTS OF POPULATION-
   -FERTILITY
   -MORTALITY
   -MIGRATION
   -MORBIDITY
   -DENSITY
   -BIRTH RATE AND DEATH RATE

4. COMPOSITION OF INDIAN POPULATION:- SEX , EDUCATION LEVEL, EMPLOYMENT, CENSUS AND GENDER DISCRIMINATION

IV. SOCIAL MOVEMENTS

1. CONCEPT, DEFINITION AND CHARACTERISTICS OF SOCIAL MOVEMENTS
2. TYPES OF SOCIAL MOVEMENTS
3. ARYA SAMAJA, BRAHMA SAMAJ, RAMAKRISHNA MISSION, NARAYANA GURU, AND SATYA SAI MOVEMENTS

V. SOCIOLOGY OF KARNATAKA

1. INTRODUCTION
2. SOCIAL ORGANISATIONS
    - RELIGIOUS GROUPS IN KARNATAKA
    - SCHEDULED CASTES AND SCHEDULED TRIBES IN KARNATAKA
    - OTHER BACKWARD CASTES OF KARNATAKA
    - ART , CULTURE AND LITERATURE OF KARNATAKA
3. DEVELOPMENT SCENARIO OF KARNATAKA
    - REGIONAL IMBALANCE IN KARNATAKA
    - HK REGION (KALYANA KARNATAKA) ISSUES AND CHALLENGES

VI. SOCIAL PROBLEMS

1. INTRODUCTION
2. CRIME:- TYPES AND CAUSES OF CRIME
3. JUVENILE DELINQUENCY
4. POVERTY
5. OVER POPULATION
6. UNEMPLOYMENT
7. CORRUPTION
8. BLACK MONEY

VII. SOCIAL CONTROL

1. MEANING AND NATURE OF SOCIAL CONTROL
2. FOLKWAYS-MORES-CUSTOMS AND SANCTIONS
3. SOCIAL NORMS AND SOCIAL VALUES
4. RITUALS, RITES AND ETIQUETTES

PG SYLLABUS FOR MATHEMATICS
ALGEBRA 1

Group Theory (Recapitulation): Groups, Subgroups, Cyclic groups, Normal Subgroups, Quotient groups, Homomorphism, Types of homomorphisms.

Unit-1: Permutation groups, symmetric groups, cycles and alternating groups, dihedral groups, Isomorphism theorems and its related problems, Automorphisms, Inner automorphisms, groups of automorphisms and inner automorphisms and their relation with centre of a group.

Unit-2: Group action on a set, Orbits and Stabilizers, The orbit-stabilizer theorem, The CauchyFrobenius lemma, Conjugacy, Normalizers and Centralizers, Class equation of a finite group and its applications.

Unit-3: Sylow's groups and subgroups, Sylow's theorems for a finite group, Applications and examples of p-Sylow subgroups.

Unit-4: Solvable groups, Simple groups, Applications and examples of solvable and simple groups,
Jordan - Holder Theorem.

Ring Theory (Recapitulation): Rings, Some special classes of rings (Integral domain, division ring, field).

Unit-5: Homomorphisms of rings, Kernel and image of Homomorphisms of rings, Isomorphism of rings, Ideals and Quotient rings, Fundamental theorem of homomorphism of rings,

Unit-6: Theorems on principle, maximal and prime ideals, Field of quotients of an integral domain,
Imbedding of rings

Unit-7: Euclidean rings, Prime and relatively prime elements of a Euclidean ring, Unique factorization theorem, Fermat's theorem, Polynomial rings, The division algorithm.

Unit-8: Polynomials over the rational field, Primitive polynomial, Content of a polynomial. Gauss lemma, Eisenstein criteria, Polynomial rings over commutative rings, Unique Factorization Domains.

TEXT BOOKS

1. Herstein I.N. Topics in Algebra, 2nd Edition, Wiley India, 2016.
2. Surjeet Singh and QaziZameeruddin, Modern Algebra, 8th edition, Vikas Publishing House, 2006.
3. N. Jacobson, Basic Algebra-I, 2nd Revised edition edition, Dover Publications, 2009.

REFERENCE BOOKS

1. M. Artin : Algebra, Second Edition, Prentice Hall of India, 2011.
2. Darek F. Holt, Bettina Eick and Eamonaa. Obrien. Handbook of computational group theory, Chapman & Hall/CRC Press, 2005
3. J. B. Fraleigh : A first course in abstract algebra, 7thed., Addison-Wesley Longman, 2002.

REAL ANALYSIS

Unit-1: The Riemann - Stieltjes Integral: Definitions and existence of the integral, Linear properties of the integral, the integral as the limit of sums, Integration and Differentiation, Integration of vector valued functions. Function of bounded variation- First and second mean value Theorems, Change of variable rectifiable curves.

Unit-2: Sequence and series of Functions: Pointwise and Uniform Convergence, Cauchy Criterion for uniform convergence, Weierstrass M-test, Uniform convergence and continuity, Uniform convergence and Riemann - Stieltjes Integration, Bounded variation, Uniform convergence and Differentiation. Uniform convergence and bounded variation - Equicontinuous families of functions,
uniform convergence and boundedness.

Unit-3: The stone-Weierstrass theorem and Weierstrass approximation of continuous function, illustration of theorem with examples.

Properties of power series, exponential and logarithmic functions, trigonometric functions. Topology of R^n, k-cell and its compactness, Heine-Borel Theorem, Bolzano Weirstrass theorem, Continuity,
Compactness and uniform continuity.

Unit-4: Functions of several variables, continuity and Differentiation of vector-valued functions, Linear transformation of R^k, properties and invertibility, Directional Derivative, Chain rule, Partial derivative, Hessian matrix. The Inverse Functions Theorem and its illustrations with examples.The Implicit Function Theorem and illustration and examples. The Rank theorem illustration and examples.

TEXT BOOKS

1. W. Rudin : Principles of Mathematical Analysis, McGraw Hill, 1983.
2. T. M. Apostol: Mathematical Analysis, New Delhi, Narosa, 2004.

REFERENCE BOOKS

1. S. Goldberg: Methods of Real Analysis, Oxford & IBH, 1970.
2. J. Dieudonne: Treatise on Analysis, Vol. I, Academic Press, 1960.

Topology I

Unit-1: Finite and Infinite sets. Denumerable and Non denumerable sets, Countable and Uncountable sets. Equivalent sets. Concept of Cardinal numbers, Schroeder- Bernstein Theorem. Cardinal number of a power set–Addition of Cardinal numbers, Exponential of Cardinal numbers, Examples of

Cardinal Arithmetic, Cantor's Theorem. Card X < Card P(X). Relations connecting $\aleph_0$ and c. Continuum Hypothesis.Zorn's lemma (statement only).

Unit-2: Definition of a metric. Bolzano - Weierstrass theorem. Open and closed balls. Cauchy and convergent sequences. Complete metric spaces. Continuity, Contraction mapping theorem.Banach fixed point theorem, Bounded and totally bounded sets. Cantor's Intersection Theorem. Nowhere dense sets.Baire's category theorem.Isometry.Embedding of a metric space in a complete metric space.

Unit-3: Topology: Definition and examples, Open and closed sets. Neighborhoods and Limit Points.Closure, Interior and Boundary of a set.Relative topology.Bases and sub-bases. Continuity and homeomorphism, Pasting lemma

Unit-4: Connected spaces: Definition and examples, connected sets in the real line, Intermediate value theorem, components and path components, local connectedness and path connectedness.

TEXT BOOKS

1. J. R. Munkres, *Topology*, Second Edition, Prentice Hall of India, 2007
2. W.J. Pervin : Foundations of General Topology - Academic Press, 1964.

REFERENCE BOOKS

1. G. F. Simmons: Introduction to Topology and Modern Analysis – Tata McGraw Hill, 1963.
2. J. Dugundji: Topology - Prentice Hall of India, 1975
3. G J.L. Kelley, General Topology, Van Nostrand, Princeton, 1955.
4. Beginning Topology, Sue E. Goodman

ORDINARY DIFFERENTIAL EQUATIONS

Unit-1: Linear differential equations of nth order, fundamental sets of solutions, Wronskian - Abel's identity, theorems on linear dependence of solutions, adjoint - self - adjoint linear operator, Green's formula, Adjoint equations, the n^{th} order nonhomogeneous linear equations - Variation of parameters
- zeros of solutions - comparison and separation theorems.

Unit-2: Fundamental existence and uniqueness theorem. Dependence of solutions on initial conditions, existence and uniqueness theorem for higher order and system of differential equations - Eigenvalue problems - Sturm-Liouville problems - Orthogonality of eigenfunctions - Eigenfunction expansion in a series of orthonormal functions- Green's function method

Unit-3: Power series solution of linear differential equations - ordinary and singular points of differential equations, Classification into regular and irregular singular points; Series solution about an ordinary point and a regular singular point - Frobenius method- Hermite, Laguerre, Chebyshev and Gauss Hypergeometric equations and their general solutions. Generating function, Recurrence relations, Rodrigue's formula Orthogonality properties. Behaviour of solution at irregular singular points and the point at infinity

Unit-4: Linear system of homogeneous and non-homogeneous equations (matrix method) Linear and Non-linear autonomous system of equations - Phase plane - Critical points - stability - Liapunov direct method - Limit cycle and periodic solutions-Bifurcation of plane autonomous systems

TEXT BOOKS

1. G.F. Simmons: Differential Equations, TMH Edition, New Delhi, 1974.
2. M.S.P. Eastham: Theory of ordinary differential equations, Van Nostrand, London, 1970.
3. S.L. Ross: Differential equations (3^{rd} edition), John Wiley & Sons, New York, 1984.

REFERENCE BOOKS

1. E.D. Rainville and P.E. Bedient: Elementary Differential Equations, McGraw Hill, NewYork, 1969.
2. E.A. Coddington and N. Levinson: Theory of ordinary differential equations, McGraw Hill, 1955.
3. A.C. King, J. Billingham& S.R. Otto: Differential equations, Cambridge University Press, 2006.

Discrete Mathematics

Unit-1: Logic: Introduction to logic, Rules of Inference (for quantified statements), Validity of Arguments, Normal forms. Methods of proof: Direct, Indirect proofs, Proof by contradiction, Proof by

cases etc.,

Unit-2: Counting Techniques: The product rule, The sum rule, The inclusion–exclusion principle, The Pigeonhole Principle and examples. Simple arrangements and selections.Arrangements and selections with repetitions, Distributions, Binomial Coefficients.

Unit-3: Modeling with recurrence relations with examples of Fibonacci numbers and the tower of Hanoi problem, Solving recurrence relations. Divide-and-Conquer relations with examples (no theorems).Generating functions, definition with examples, solving recurrence relations using generating functions, exponential generating functions.Difference equations.

Unit-4: Definition and types of relations. Representing relations using matrices and digraphs, Closures of relations, Paths in digraphs, Transitive closures, Warshall's Algorithm. Order relations, Posets, Hasse diagrams, external elements, Lattices.

Unit-5: Introduction to graph theory, types of graphs, Basic terminology, Subgraphs, Representing graphs as incidence matrix and adjacency matrix. Graph isomorphism. Connectedness in simple graphs.Paths and cycles in graphs. Distance in graphs: Eccentricity, Radius, Diameter, Center, Periphery. Weighted graphs Dijkstra's algorithm to find the shortest distance paths in graphs and digraphs

Unit-6: Euler and Hamiltonian Paths. Necessary and sufficient conditions for Euler circuits and paths in simple, undirected graphs.Hamiltonicity: noting the complexity of hamiltonicity, Traveling Salesman's Problem, Nearestneighbor method.

Unit-7: Planarity in graphs, Euler's Polyhedron formula. Kuratowski's theorem (statement only).Vertex connectivity, Edge connectivity, covering, Independence.

Unit-8: Trees, Rooted trees, Binary trees, Trees as models. Properties of trees.Minimum spanning trees.Minimum spanning trees.Prim's and Kruskul's Algorithms.

TEXT BOOKS

1. C. L. Liu: Elements of Discrete Mathematics, Tata McGraw-Hill, 2000.
2. Kenneth Rosen, WCB McGraw-Hill, 6th edition, 2004.

REFERENCE BOOKS

1. J.P. Tremblay and R.P. Manohar: Discrete Mathematical Structures with applications to computer science, McGraw Hill (1975).
2. F. Harary: Graph Theory, Addition Wesley, 1969.
3. J.H. Van Lint & R.M. Wilson, "A course on Combinatorics", Cambridge University Press (2006)
4. Allan Tucker, "Applied Combinatorics", John Wiley & Sons (1984).
5. Elements of Discrete Mathmatics, C.L.Liu.

ALGEBRA II

Extended Ring Theory (Recapitulation) : Rings, Some special classes of rings (Integral domain, division ring, field, maximal and prime ideals

Unit-1: Local ring, the Nil radical and Jacobson radical, operation on ideals, extension and contraction. The prime spectrum of a ring

Unit-2: *Modules Theory:* Modules, submodules and quotient modules, module homomorphisms, Isomorphism theorems of modules

Unit-3: Direct sums, Free modules, Finitely generated modules, Nakayama Lemma, Simple modules, Exact sequences of modules.

Unit-4: Modules with chain conditions - Artinian and Noetherian modules, modules of finite length, Artinian rings, Noetherian rings, Hilbert basis theorem

Unit-5: *Field Theory:* Extension fields, Finite and algebraic extensions. degree of extension, algebraic elements and algebraic extensions, adjunction of an element of a field.

Unit-6: Roots of a polynomial, Splitting fields, Construction with straight edge and compass

Unit-7: More about roots (Characteristic of a field), Simple and separable extensions, Finite field.

Unit-8: *Galois Theory:* Elements of Galois Theory, Fixed fields, Normal extension, Galois groups over the rationals, degree, distance

TEXT BOOKS

1. M. F. Atiyah and I. G. Macdonald: Introduction to Commutative Algebra, Addison - Wesley. (Part A)
2. I.N. Herstein: Topics in Algebra, 2nd Edition, Vikas Publishing House, 1976. (Part B)

REFERENCE BOOKS

1. C. Musili: Introduction to Rings and Modules, Narosa Publishing House, 1997.
2. Miles Reid: Under-graduate Commutative Algebra, Cambridge University Press, 1996.
3. M. Artin: Algebra, Prentice Hall of India, 1991.
4. N. Jacobson: Basic Algebra-I, HPC, 1984.
5. J. B. Fraleigh: A first courses in Algebra, 3rd edition, Narosa 1996.

COMPLEX ANALYSIS

Unit-1: Analytic functions, Harmonic conjugates, Elementary functions, Cauchy's Theorem and Integral formula, Morera's Theorem, Cauchy's Theorem for triangle, rectangle, Cauchy's Theorem in a disk, Zeros of Analytic function. The index of a closed curve, counting of zeros.Principle of analytic Continuation.Liouville's Theorem, Fundamental theorem of algebra

Unit-2: Series, Uniform convergence, Power series, Radius of convergences, Power series representation of Analytic function, Relation between Power series and Analytic function, Taylor's series, Laurent's series.

Rational Functions, Singularities, Poles, Classification of Singularities, Characterization of removable Singularities, poles. Behaviour of an Analytic function at an essential singular point

Unit-3: Entire and Meromorphic functions. The Residue Theorem, Evaluation of Definite integrals, Argument principle, Rouche's Theorem, Schwartz lemma, Open mapping and Maximum modulus theorem and applications, Convex functions, Hadmard's Three circle theorem

Unit-4: Phragmen-Lindelof theorem, The Riemann mapping theorem, Weistrass factorization theorem. Harmonic functions, Mean Value theorem. Poisson's formula, Poisson's Integral formula,
Jensen's formula, Poisson's - Jensen's formula.

TEXT BOOKS

1. J. B. Conway: Functions of one complex variable, Narosa, 1987.
2. L.V. Ahlfors: Complex Analysis, McGraw Hill, 1986.

REFERENCE BOOKS

1. R. Nevanlinna: Analytic functions, Springer, 1970.
2. E. Hille: Analytic Theory, Vol. I, Ginn, 1959.
3. S. Ponnuswamy: Functions of Complex variable, Narosa Publications
4. Complex Analysis, A.R. Vashista

Topology II

Unit-1: Compact spaces, Compact sets in the real line, limit point compactness, sequential compactness and their equivalence for metric spaces. Locally Compact spaces, compactification, Alexandroff's one point compactification.

The axioms of countability: First axiom space, Second countable space, Separability and the Lindelof property and their equivalence for metric spaces

Unit-2: The product topology, the metric topology, the quotient topology, Product invariant properties for finite products, Projection maps.

Separation axioms: T_0–space and T_1 spaces –definitions and examples, the properties are hereditary and topological. Characterisation of T_0 - and T_1 –spaces

Unit-3: T_2- space, unique limit for convergent sequences, Regularity and the T_3–axiom.
Characterisation of regularity, Metric spaces are T_2 and T_3.
Complete regularity, Normality and the T_4 - axiom, Metric space is T_4, compact Hausdorff space and regular lindelof spaces are normal
Unit-4: Urysohn's Lemma, Tietze's Extension Theorem, Complete normality and the T_5 -axiom.

Local finiteness, Paracompactness, Normality of a paracompact space, Metrizability, Urysohnmetrization theorem

TEXT BOOKS

1. J.R. Munkres: Topology, 2nd Ed., Prentice Hall of India (India), 2007.
2. W.J. Pervin: Foundations of General Topology - Academic Press, 1964.

REFERENCE BOOKS

1. G.F. Simmons: Introduction to Topology & Modern Analysis (McGraw-Hill InterlEdn), 1963
2. G J.L. Kelley, General Topology, Van Nostrand, Princeton, 1955.
3. J. Dugundji : Topology - Prentice Hall of India, 1975.

PARTIAL DIFFERENTIAL EQUATIONS

Unit-1: First Order Partial Differential Equations: Basic definitions, Origin of PDEs, Classification, Geometrical interpretation. The Cauchy problem, the method of characteristics for Semi linear, quasi linear and Non-linear equations, complete integrals, Examples of equations to analytical dynamics, discontinuous solution and shockwaves

Unit-2: Second Order Partial Differential Equations: Definitions of Linear and Non-Linear equations, Linear Superposition principle, Classification of second-order linear partial differential equations into hyperbolic, parabolic and elliptic PDEs, Reduction to canonical forms, solution of linear Homogeneous and non-homogeneous with constant coefficients, Variable coefficients,
Monge's method.

Unit-3: Wave equation: Solution by the method of separation of variables and integral transforms The Cauchy problem, Wave equation in cylindrical and spherical polar coordinates

Laplace equation: Solution by the method of separation of variables and transforms. Dirichlet's, Neumann's and Churchills problems, Dirichlet's problem for a rectangle, half plane and circle, Solution of Laplace equation in cylindrical and spherical polar coordinates

Unit-4: Diffusion equation: Fundamental solution by the method of variables and integral transforms, Duhamel's principle, Solution of the equation in cylindrical and spherical polar coordinates.

Solution of boundary value problems: Green's function method for Hyperbolic, Parabolic and Elliptic equations.

TEXT BOOKS

1. I. N. Sneddon, Elements of PDE's, McGraw Hill Book company Inc., 2006.
2. L Debnath, Nonlinear PDE's for Scientists and Engineers, Birkhauser, Boston, 2007.
3. F. John, Partial differential equations, Springer, 1971.

REFERENCE BOOKS

1. F. Treves: Basic linear partial differential equations, Academic Press, 1975.
2. M.G. Smith: Introduction to the theory of partial differential equations, Van Nostrand, 1967.
3. Shankar Rao: Partial Differential Equations, PHI, 2006.

NUMERICAL ANALYSIS

Examples from algebraic and transcendental equations where analytical methods fail.Examples from system of linear and non-linear algebraic equations where analytical solutions are difficult or impossible.Floating-point number and round-off, absolute and relative errors.

Unit-1: Solution of nonlinear equation in one variable
Fixed point iterative method - convergence and acceleration by Aitken's ^{2}-process.NewtonRaphson methods formultiple roots and their convergence criteria, Ramanujan method, Bairstow's method, Sturm sequence for identifying the number of real roots of the polynomial functions, complex roots-Muller's method.Homotopy and continuation methods.

Unit-2: Solving system of equations
Review of matrix algebra. Gauss-elimination with pivotal strategy.Factorization methods (Crout's, Doolittle and Cholesky).Tri-diagonal systems-Thomas algorithm. Iterative methods: Matrix norms, error analysis and ill-conditioned systems- Jacobi and Gauss-Seidel methods,

Chebyshev acceleration. Introduction to steepest descent and conjugate gradient methods. Solutions of nonlinear equations: Newton-Raphson method, Quasilinearization (quasi-Newton's) method, successive over relaxation method.

Unit-3: Interpolation

Review of interpolations basics, Lagrange, Hermite methods and error analyses, Splines-linear, quadratic and cubic (natural, Not a knot and clamped), Bivariate interpolation, Least-squares, Chebyshev and rational approximations.

Unit-4: Numerical integration

Review of integrations. Gaussian quadrature - Gauss-Legendre, Gauss-Chebyshev, Gauss-Lagaurre, Gauss-Hermite and error analyses, adaptive quadratures, multiple integration with constant and
variable limits.

TEXT BOOKS

1. S.D. Cante& C de Boor: Elementary numerical analysis, Tata-Mc Graw-Hill,1980 3 edition.
2. R.L. Burden and J.D. Faires: Numerical Analysis, Thomson-Brooks/Cole, 1989, 7 edition.
3. D. Kincade and W Cheney: Numerical analysis, American Mathematical Society, 2002, 3 edition.

REFERENCE BOOKS

1. A Iserles: A first course in the numerical analysis of differential equations, Cambridge texts in applied mathematics, 2008, 2 edition

Elementary Number Theory

Unit-1: Divisibility and Primes: Recapitulation of Division algorithm, Euclid's algorithm, Least Common Multiples, Linear Diophantine equations. Prime numbers and Prime-power factorisations, Distribution of primes, Fermat and Mersenne primes, Primality testing and factorization.

Unit-2: Congruences : Recapitulation of basic properties of congruences, Residue classes and complete residue systems, Linear congruences. Reduced residue systems and the Euler-Fermat theorem, Polynomial congruences modulo p and Langrange's theorem, Simultaneous linear congruences, Simultaneous non-linear congruences, An extension of Chinese Remainder Theorem,
Solving congruences modulo prime powers.

Unit-3: Quadratic Residues and Quadratic Reciprocity Law : Quadratic residues, Legendre's symbol and its properties, Euler's criterion, Gauss lemma, The quadratic reciprocity law and its applications,
The Jacobi symbol, Applications to Diophantine equations.

Unit-4: Sums of squares, Fermat's last theorem and Continued fractions: Sums of two squares, Sums of four squares, The Pythagoras theorem, Pythagorean triples and their classification, Fermat's Last
Theorem (Case $n = 4$).

TEXT BOOKS

1. G. A. Jones and J. M. Jones, Elementary Number Theory, Springer UTM, 2007.
2. Tom M. Apostol - Introduction to Analytic Number Theory, Springer, 1989.
3. D. Burton; Elementary Number Theory, McGraw-Hill, 2005.

REFERENCES

1. Niven, H.S. Zuckerman & H.L. Montgomery, Introduction to the Theory of Numbers, Wiley, 2000.
2. H. Davenport, The Higher Arithmetic, Cambridge University Press, 2008.
3. Elementary number theory, David M Burton.

DIFFERENTIAL GEOMETRY

Unit-1: Calculus on Euclidean Space: Euclidean space. Natural coordinate functions. Differentiable functions. Tangent vectors and tangent spaces. Vector fields.Directional derivatives and their properties.Curves in E^3.Velocity and speed of a curve.Reparametrization of a curve. 1-forms and Differential forms. Wedge product of forms. Mappings of Euclidean spaces.Derivative map.

Unit-2: Frame Fields: Arc length parametrization of curves. Vector field along a curve. Tangent vector field, Normal vector field and Binormal vector field. Curvature and torsion of a curve. The Frenet formulasFrenet approximation of unit speed curve and Geometrical interpretation. Properties of plane curves and spherical curves. Arbitrary speed curves. Cylindrical helix Covariant derivatives and covariant differentials. Cylindrical and spherical frame fields. Connection forms. Attitude matrix.Structural equations. Isometries of E^3 - Translation, Rotation and Orthogonal transformation. The derivative map of an isometry.

Unit-3: Calculus on a Surface: Coordinate patch. Monge patch.Surface in E^3.Special surfaces - sphere, cylinder and surface of revolution. Parameter curves, velocity vectors of parameter curves, Patch computation. Parametrization of surfaces-cylinder, surface of revolution and torus. Tangent vectors, vector fields and curves on a surface in E^3. Directional derivative of a function on a surface of E^3. Differential forms and exterior derivative of forms on surface of E^3. Pull back functions on surfaces of E^3.

Unit-4: Shape Operators: Definition of shape operator. Shape operators of sphere, plane, cylinder and saddle surface. Normal curvature, Normal section.Principal curvature and principal direction.Umbilic points of a surface in E^3. Euler's formula for normal curvature of a surface in E^3. Gaussian curvature, Mean curvature and Computational techniques for these curvatures. Minimal surfaces. Special curves in a surface of E^3 - Principal curve, geodesic curve and asymptotic curves. Special surface - Surface of revolution.

TEXT BOOKS

1. Barrett O' Neil : Elementary Differential Geometry. Academic Press, New York and London, 1966.
2. T.J. Willmore : An introduction to Differential Geometry. Clarendon Press, Oxford 1959.

REFERENCE BOOKS

1. D.J. Struik: Lectures on Classical Differential Geometry, Addison Wesley, Reading, Massachusetts, 1961.
2. NirmalaPrakassh: Differential Geometry - an integrated approach. Tata McGraw-Hill, New Delhi, 1981.

FLUID MECHANICS

Unit-1: Coordinate transformations: Cartesian tensors - Basic Properties – Transpose - Symmetric and Skew tensors - Isotropic tensors - Deviatoric Tensors - Gradient, Divergence and Curl of a tensor field- Integral Theorems.

Continuum Hypothesis: Configuration of a continuum - Mass and density - Description of motion - Material and spatial coordinates - Material and Local time derivatives- Stream lines - Path lines - Vorticity and Circulation - Examples. Transport formulas - Strain tensors - Principal strains, Strainrate tensor- Stress components and Stress tensor - Normal and shear stresses - Principal stresses.

Unit-2: Fundamental basic physical laws: Law of conservation of mass - Principles of linear and angular momenta - Balance of energy - Examples.

Motion of non-viscous fluids: Stress tensor- Euler equation-Bernoulli's equation- simple consequences-Helmholtz vorticity equation - Permanence of vorticity and circulation - Dimensional analysis - Nondimensional numbers.

Unit-3: Motion of Viscous fluids: Stress tensor - Navier-Stokes equation - Energy equation - Simple exact solutions of Navier-Stokes equation: (i) Plane Poiseuille and Hagen-Poiseuille flows (ii) Generalized plane Couette flow (iii) Steady flow between two rotating concentric circular cylinders (iv) Stokes's first and second problems. Diffusion of vorticity - Energy dissipation due to viscosity.

Unit-4: Two dimensional flows of inviscid fluids: Meaning of two-dimensional flow -Stream function - Complex potential - Line sources and sinks - Line doublets and vortices - Images - MilneThomson circle theorem and applications - Blasiustheoremand applications.

TEXT BOOKS

1. D.S. Chandrasekharaiah and L. Debnath: Continuum Mechanics, Academic Press, 1994.
2. A.J.M. Spencer: Continuum Mechanics, Longman, 1980.
3. S. W. Yuan: Foundations of Fluid Mechanics, Prentice Hall, 1976.

REFERENCE BOOKS

1. P. Chadwick : Continuum Mechanics, Allen and Unwin, 1976.
2. L.E. Malvern : Introduction to the Mechanics of a Continuous Media, Prentice Hall, 1969.
3. Y.C. Fung, A First course in Continuum Mechanics, Prentice Hall (2nd edition), 1977.
4. Pijush K. Kundu, Ira M. Cohen and David R. Dowling, Fluid Mechanics, Fifth Edition, 2010.
5. C.S. Yih : Fluid Mechanics, McGraw-Hill, 1969.

FUNCTIONAL ANALYSIS

Unit-1: Normed linear spaces. BanachSpaces : Definition and examples. Quotient Spaces.Convexity of the closed unit sphere of a Banach Space.Examples of normed linear spaces which are not Banach.Holder's inequality.Minkowski's inequality.Linear transformations on a normed linear space and characterization of continuity of such transformations.

The set $B(N,N')$ of all bounded linear transformations of a normed linear space N into normed linear space N'. Linear functionals, The conjugate space N*. The natural imbedding of N into N**.

Reflexive spaces.

Unit-2: Hahn - Banach theorem and its consequences, Projections on a Banach Space. The open mapping theorem and the closed graph theorem.The uniform boundedness theorem.The conjugate of an operator, properties of conjugate operator.

Unit-3: Inner product spaces, Hilbert Spaces: Definition and Examples, Schwarz's inequality. Parallelogram Law, polarization identity. Convex sets, a closed convex subset of a Hilbert Space contains a unique vector of the smallest norm

Orthogonal sets in a Hilbert space. Bessel's inequality.orthogonal complements, complete orthonormal sets, Orthogonal decomposition of a Hilbert space. Characterization of complete orthonormal set. Gram-Schmidt orthogonalization process

Unit-4: The conjugate space H* of a Hilbert space H. Representation of a functional f as f(x) = (x, y) with y unique. The Hilbert space H*. Interpretation of T* as an operator on H. The adjoint operator T* on B (H). Self-adjoint operators, Positive operators.Normal operators. Unitary operators and their properties

Projections on a Hilbert space.Invariant subspace.Orthogonality of projections. Eigen values and eigen space of an operator on a Hilbert Space. Spectrum of an operator on a finite dimensional Hilbert

Space.Finite dimensional spectral theorem.

TEXT BOOKS

1. G.F. Simmons: Introduction to Topology & Modern Analysis (McGraw-Hill Intl. Edition), 1998.
2. G. Backman and L. Narici: Functional Analysis (Academic), 2006.

REFERENCE BOOKS

1. B. V. Limaye: Functional Analysis (Wiley Eastern), 1998.
2. P. R. Halmos: Finite dimensional vector paces, Van Nostrand, 1958.
3. E. Kreyszig: Introduction to Functional Analysis with Applications, John Wiley & Sons, 2000.

LINEAR ALGEBRA

Recapitulation: Vector Spaces, Subspaces, Linear Combinations and Systems of Linear Equations, Linear dependence and independence, Basis and Dimension, Maximal linearly independence subsets, Direct sums, Linear transformation, Linear Operators

Unit-1: Algebra of Linear transformations, Minimal polynomials, Regular and singular transformation, Range and rank of a transformation and its properties, characteristic roots and characteristic vectors.

Unit-2: The matrix representation of a linear transformation, Composition of a linear transformation and matrix multiplication, The change of coordinate matrix, transition matrix, The dual space. 6 Hrs.

Unit-3: Characteristic polynomials, Diagonalizability, Invariant subspaces, Cayley-Hamilton theorem.

Unit-4: Canonical Forms: Triangular canonical form, Nilpotent transformations, Jordan canonical form, The rational canonical form.

Unit-5: Inner Product Spaces, Orthogonal complements, Gram-Schmidt orthonormalization process.

Unit-6: Positive Definite Matrices, Maxima, minima and saddle points, Tests for positive definiteness, Singular value Decomposition and its applications.

Unit-7: Bilinear forms, symmetric and skew-symmetric bilinear forms, real quadratic forms, rank and signature, Sylvester's law of inertia.

TEXT BOOKS

1. K. Hoffman and R. Kunze, Linear Algebra, Pearson Education (India), 2003. Prentice-Hall of India, 1991.
2. I. N. Herstein, Topics in Algebra, 2nd Ed., John Wiley & Sons, 2006
3. S. Freidberg. AInsel, and L Spence: Linear Algebra, Fourth Edition, PHI, 2009.
4. J. Gilbert and L. Gilbert, Linear Algebra and Matrix theory, Academic Press, 1995.

REFERENCE BOOKS

1. S. Lang, Linear Algebra, Springer-Verlag, New York, 1989.
2. M. Artin, Algebra, Prentice Hall of India, 1994.
3. G. Strang: Linear Algebra and its Applications, Brooks/Cole Ltd., New Delhi, Third Edition, 2003.
4. L. Hogben-Handbook of Linear Algebra-Chapman and Hall-CRC (2006).

NUMERICAL ANALYSIS – II

Unit-1: Examples from ODE where analytical solution are difficult or impossible. Examples from PDE where analytical solution are difficult or impossible

Numerical solution of ordinary differential equations: Initial value problems: Picard's and Taylor series methods. Euler's and Modified Euler's methods, Runge-Kutta methods of second and fourth order, Runge-Kutta-Fehlberg methods.

Multistep methods - the Adams-Bashforth and Adams-Moulton predictor-corrector methods. Local and global errors, stability analyses for the above methods. Methods for systems and higher order differential equations. Boundary value problems: Shooting methods and cubic spline methods.

Unit-2: Numerical solution of partial differential equations: Elliptic equations: Difference schemes for Laplace and Poisson's equations. Parabolic equations: Difference methods for one-dimension– methods of Schmidt, Laasonen, Dufort-Frankel and Crank-Nicolson. Alternating direction implicit
method for two-dimensional equation.

Hyperbolic equations: Difference methods for one-dimension- explicit and implicit schemes, D'Yakonov split and Lees alternating direction implicit methods for two-dimensional equations.

Stability and convergence analyses for the above equations.

TEXT BOOKS

1. MK Jain: Numerical solution of differential equations, Wiley Eastern, 1979, 2 Edition.
2. RL Burden and JD Faires: Numerical Analysis, Thomson-Brooks/Cole, 1989, 7edition.
3. S Larsson and V Thomee: Partial differential equations with numerical methods, Springer, 2008, 1 edition.
4. JW Thomas : Numerical partial differential equations: finite difference methods, Springer, 1998, 2 Edition.

REFERENCE BOOKS

1. D Kincade and W Cheney: Numerical analysis, American Mathematical Society, 2002, 3 edn.
2. Alserles: A first course in the numerical analysis of differential equations, Cambridge texts in applied mathematics, 2008, 2 edition.

ELEMENTS OF CALCULUS

Unit-1: Differential Calculus: Limit and continuity, properties of limits and classification of discontinuities. Derivatives, Rules for Differentiation, higher order derivatives, chain rule, implicit differentiation. Successive differentiation and Leibnitz Theorem

Unit-2: Statement of Rolle's Theorem, Mean Value Theorem, Taylor and Maclaurin's theorems. Integral Calculus: Integration. Methods of Integration: substitution method, partial fractions, integration by parts, definite integrals, indefinite integrals.

Unit-3: Applications of differentiation and integration: Increasing and decreasing functions. Relative
Extrema maxima and minima, convexity, curve sketching.

Unit-4: Asymptotes, concavity, convexity and points of inflection. Determine the average value of a function, area between two curves, volume of a solid figure, simple examples.

TEXT BOOKS

1. L. Bers and F. Karal, Calculus, IBH Publishing, Bombay, 1976
2. S. Misra, Fundamentals of Mathematics-Differential Calculus, First Edition, Pearson, India, 2013.
3. S. Misra, Fundamentals of Mathematics-Integral Calculus, First Edition, Pearson, India, 2013.

REFERENCE BOOKS

1. Courant, R. and F. John, Introduction to Calculus and Analysis, Volume I, 1999
2. Courant, R. and F. John, Introduction to Calculus and Analysis, Volume II, 2000

Measure and Integration

Unit-1: Algebra of sets, sigma algebras, open subsets of real line, *F* and *G* sets, Borel sets.
(Lebesgue) Outer measure of a subset of R, existence, non-negativity and monotonicity of Lebesgue outer measure, Relation between Lebesgue outer measure and length of an interval; Countable subadditivity of Lebesgue outer measure; translation invariance. (Lebesgue) measurable sets, (Lebesgue) measure, Complement, union, intersection and difference of measurable sets, denumerable union, and intersection of measurable sets;

Unit-2: Countable additivity of measure; The class of measurable sets as an algebra, sigma-algebra, the measure of the intersection of a decreasing and increasing sequence of measurable sets; measures of limit superior, limit inferior of sequences of measurable sets. Measurable functions: Scalar multiple, sum, difference, and product of measurable functions.

Unit-3: Measurability of a continuous function and measurability of a continuous image of measurable function. Convergence pointwise and convergence in measures of a sequence of measurable functions.
Lebesgue Integral: Characteristic function of a set, simple function, Lebesgue integral of a simple function, Lebesgue integral of a bounded measurable function, Lebesgue integral and Riemann integral of a bounded function defined on a closed interval; Lebesgue integral of a non-negative function; Lebesgue integral of a measurable function, Properties of Lebesgue integral.

Unit-4: Convergence theorems and Lebesgue integral; The bounded convergence theorem, Fatou's lemma, Monotone convergence theorem, Lebesgue convergence theorem.

Differentiation of monotone functions, Vitali covering lemma, Functions of bounded variation, Differentiability of an integral, Absolute continuity and indefinite integrals.

TEXT BOOKS

1. H.L. Royden : Real Analysis, Macmillan, 1963
2. P.K. Jain, V.P. Gupta, Pankaj Jain: Lebesgue Measure &Integration, New Age International, 2011.

REFERENCE BOOKS

1.P.R. Halmos : Measure Theory, East West Press, 1962

2.W. Rudin : Real & Complex Analysis, McGraw Hill, 1966.

Measure and Integration, Gupta and Gupta

THEORY OF NUMBERS

Unit-1: Multiplicative and completely multiplicative functions. Euler Toteint function. Möbius and Mangoldt function. Dirichlet product and the group of arithmetical function.Generalised convolution.
Formal power series.Bell series.

Unit-2: Residue Classes and complete Residue Classes, Linear Congruences and Euler-Fermat Theorem, General Polynomial congruences and Lagrange Theorem, Wilson's Theorem, Chinese Reminder Theorem. Fundamental Theorem on Polynomial Congruences with prime power moduli.Quadratic Residue and Gauss's Law of Quadratic Reciprocity. (both for Legendre and Jacobi symbols) Primitive roots and their existence for moduli m=1, 2, 4, p^{α}, $2p^{\alpha}$.

Unit-3: Partition: partition of a +ve integer, Graphical representation, Conjugate, Generating functions, A theorem of Jacobi, Theorem 353 and 354, Applications of theorem 353. Congruence properties of P(n), Two theorems of Euler, Rogers - Ramanujan Identities (portion to be covered as per Chapter-XIX of "An Introduction to the Theory of Numbers" written by G. H. Hardy and E. M.
Wright.).

TEXT BOOKS

1. T. M. Apostol: Introduction to Analytical number theory, Oxford University Press, 2000.
2. G. H. Hardy and E. M. Wright: An introduction to the Theory of Numbers, Oxford University Press, 1996.
3. Thomas Keshy: Elementary Number Theory with Applications Acad. Press, 2005.

REFERENCE BOOKS

1. I. Niven and H. S. Zuckerman: An introduction to the Theory of Numbers, John Wiley, 2002.
2. J. V. Uspensky and M. A. Heaslott: Elementary Number Theory, McGraw-Hill, 1996.

GRAPH THEORY

Graph Theory (Recapitulation): Graph, subgraphs, spanning and induced subgraph, degree, distance, standard graphs, Graph isomorphism.

Unit-1: Connectivity: Cut-vertex, Bridge, Blocks, Vertex-connectivity, Edge-connectivity and some external problems, Mengers Theorems, Properties of n-connected graphs with respect to vertices and edges.

Unit-2: Planarity: Plane and Planar graphs, Euler Identity, Non planar graphs, Maximal planar graph

Outer planar graphs, Maximal outer planar graphs, Characterization of planar graphs, Geometric dual,

Crossing number.

Unit-3: Colorability: Vertex Coloring, Color class, n-coloring, Chromatic index of a graph, Chromatic number of standard graphs, Bichromatic graphs, Colorings in critical graphs, Relation between chromatic number and clique number/independence number/maximum degree, Edge coloring, Edge chromatic number of standard graphs Coloring of a plane map, Four color problem, Five color theorem, Uniquely colorable graph. Chromatic polynomial.

Unit-4: Matchings and factorization: Matching - perfect matching, augmenting paths, maximum matching, Hall's theorem for bipartite graphs, the personnel assignment problem, a matching algorithm for bipartite graphs, Factorizations, 1-factorization, 2-factorization. Partitions-degree sequence, Havel's and Hakimi algorithms and graphical related problems.

Unit-5: Domination concepts and other variants: Dominating sets in graphs, domination number of standard graphs, Minimal dominating set, Bounds of domination number in terms of size, order, degree, diameter, covering and independence number, Domatic number, domatic number of standard graphs.

Unit-6: Directed Graphs: Preliminaries of digraph, Oriented graph, indegree and outdegree, Elementary theorems in digraph, Types of digraph, Tournament, Cyclic and transitive tournament, Spanning path in a tournament, Tournament with a hamiltonian path, strongly connected tournaments.

TEXT BOOKS

1. F. Harary: Graph Theory, Addison -Wesley, 1969
2. G. Chartrand and Ping Zhang: Introduction to Graph Theory. McGraw Hill, International edition, 2005
3. J. A. Bondy and V.S.R. Murthy: Graph Theory with Applications, Macmillan, London, 2004.
4. T.W. Haynes, S.T. Hedetneime and P. J. Slater: Fundamental of domination in graphs, Marcel Dekker. Inc. New York.1998.

REFERENCE BOOKS

1. D. B. West, Introduction to Graph Theory, Pearson Education Asia, 2nd Edition, 2002
2. Charatrand and L. Lesnaik-Foster: Graph and Digraphs, CRC Press (Third Edition), 2010
3. J. Gross and J. Yellen: Graph Theory and its application, CRC Press LLC, Boca Raton, Florida, 2000
4. Norman Biggs: Algebraic Graph Theory, Cambridge University Press (2nd Ed.)1996
5. Godsil and Royle: Algebraic Graph Theory: Springer Verlag, 2002
6. N. Deo: Graph Theory: Prentice Hall of India Pvt. Ltd. New Delhi - 1990
7. V. R. Kulli, Theory of domination in graphs, Vishwa Int. Pub. 2012
8. Introduction to Graph Theory
9. Douglas B west

BIOLOGY -PG SYLLABUS

❖ CELL BIOLOGY AND CELL CYCLE

- Microscopy: principles: Light, Phase contrast, fluorescence,electron microscopy-scanning transmission electron microscopy. Autoradiography, cytophotometry and flow-cytometry and centrifugation.Applications of NMR,Chromatographic techniques-Principles and applications,Electrophoresis: Principle and application of PAGE, SDS PAGE, Spectroscopy-Raman spectroscopy,Cytochemical and histochemical staining technique
- Ultrastructure of prokaryotic and eukaryotic cells: Ultrastructure, organization and functionsof cell organelles: Endoplasmic reticulum, liposomes, Golgi complex and protein sorting,ribosomes and nucleus; Structure of mitochondrion, chloroplast. Cytoskeleton-microtubules, microfilaments, intermediary filaments. Centriole, cilia, flagella and cell motility
- Cell division and cell cycle-Mitosis and meiosis, their regulation, steps in cell cycle, regulation and control of cell cycle,cdks,apoptosis, necrosis and autophagy.

❖ MOLECULAR BIOLOGY

- Organization of chromosomes and genes in prokaryotes and eukaryotes -Operon, interrupted gene,gene families, unique and repetitive DNA, heterochromatin,euchromatin, transposons, mitochondrial and chloroplast genome organization, Transposable elements in prokaryotes and eukaryotes, genetic and evolutionary significance, mechanism of DNA replication in prokaryotes and Eukaryotes, proof reading and error correction mechanisms.
- Molecular mechanism of mutation, repair and recombination: - Mutation-DNA damage by spontaneous mutations, physical and chemical mutagens and their molecular mechanisms, Repair mechanisms- direct reversal of damage, base and excision repair, mismatch repair, recombinational repair, transcription coupled repair,Recombination- homologous recombination, models of recombination, mechanisms, site specific recombination, mechanism and biological significance.
- RNA synthesis, processing and translation: transcription activators and repressors, promoters, RNA polymerases and transcription factors, mechanism of transcription inprokaryotes and eukaryotes, RNA processing- capping, polyadenylation, splicing, alternative splicing, RNA editing, exon shuffling and RNA transport, Translation and processing- ribosomes,tRNA aminoacylation, aminoacyl tRNA synthetase, genetic code, wobble hypothesis, deciphering of the code, translation mechanism , translation proof reading, translation inhibitors and post translational modifications.

- Regulation of gene expression in Prokaryotes: Operon concept, regulation attranscription initiation- lac and trp operon control, regulation of lytic and lysogenic cycles in lambdaphage, regulation beyond transcription initiation-premature termination- trp operon, ribosomal proteins as translational repressors, riboswitches, Regulation of gene expression in eukaryotes-transcription activators and repressors, regulation after transcription initiation- alternative splicing RNA interference, role of chromatin inregulation of gene expression and gene silencing.

❖ BIOTECHNOLOGY

- RecombinantDNA technology; Tools in Genetic Engineering-
- Enzymes in genetic engineering - restriction endonucleases, types and their actions, other DNA modifying enzymes; Cloning vectors- plasmids isolation and purification - Ti Plasmid, pBR322, PUC-series. Phage vectors-M13 phage vectors, Cosmids -types, phasmids or phagemids, shuttle vectors-types; YAC and BAC vectors, Lambda phage vectors, Lamda phage DNA as a vectors; Cloning vectors and expression vectors; Vectors for plant cells; Vectors for animal cells, baculovirus vectors- adenoviruses, retroviruses, transposons as vectors, Synthetic construction of vectors.

- Primer designing; Principles and applications of PCR; Blotting techniques; Hybridization techniques; Micro-array; Next Generation Sequencing- Nucleic acid sequencing.

❖ GENETICS -PRINCIPLES OF INHERITANCE

- Mendel's principles of inheritance: The principles of dominance, segregation and independent assortment.
- Extensions of Mendelian principles: Allelic variations-a diagnostic test for alleles: Dominance:incomplete dominance, codominance, over-dominance, pseudoalleles, multiplealleles,lethal alleles, penetrance and expressivity, pleiotropy;
- Interaction of genes: Epistasis,Supressors; Polygenic inheritance; Phenocopy.
- Extranuclear inheritance: i) Organelle Heredity-Chloroplast-Variegation in 4'o clockplant; Mitochondria- Petite in Saccharomyces, ii) Maternal effect- Shell coiling in Limnaea,iii) Cytoplasmic Inheritance - Paramecium (Kappa Particle),
- Mutations: (i) Mutations: Types of Mutation: Synonymous, Nonsynonymous, Nonsense,missense, frameshift mutations, Transition and Transversion. (ii) Reverse mutations (iii)Intragenic suppressors (iv) Lethal mutation (v) Loss of function mutation (vi) Gain of function mutation.

- b. Chemical mutagens: (i) Base analogues (ii) Nitrous acid, Detection of mutations – Ames test (2) Drosophila: Sex-linkedrecessive lethals, autosomal recessive lethals, dominant lethal test
- Sex determination and dosage compensationParthenogenesis: Ex. Honey bees, Molecular basis of sex determination in Drosophilaand Man, Molecular basis of dosage compensation in C. elegans, Drosophila and Man
- Organization of genetic material -split genes, overlapping genes, pseudogenes and cryptic genes
- Special chromosomes: (i) Polytene chromosomes: Structural organization and significance.
- (ii) Lampbrush chromosomes: Structural organization and significance.
- Chromosomal rearrangement:i) Structural rearrangements in chromosomes: (i) Deletions, Evolution by geneduplications, Inversion heterozygotes, Permanent structural (Translocation)heterozygosity. Ex. Oenothera, Centric fusion and Centric fission (ii) Practical applications of rearrangements- Balancers, Ring chromosomes, Attached X-chromosome in Drosophila.
- ii) Numerical variations in chromosomes: (i) Aneuploidy – causes and consequences with examples from Man(Trisomy 21 and sex chromosomal) (ii) Polyploidy – causes and consequence

❖ ECOLOGY AND ENVIRONMENT

- Introduction and scope of Ecology: Plants and the environment- ecosystems, ecotypes, habitat ecology- fresh water and marine water ecology. MajorTerrestrial Biomes; Forests-Tropical Forests-Temperate Forests,Grasslands,Savanna,Temperate, Tundra, Desert and Chaparral
- Environmental Biology: Global warming: Greenhouse gases - causes and consequences; Ozone depletion- causes and consequences; Air, water and soil pollution – major pollutants, their source, permissible limits - and control methods; Radioactive pollution- Ionising radiation, disposal of radioactive waste, nuclear accidents; Environmental Education Programmes -WWF, UNEP, MAB; Role of plants in solving energy crisis and ameliorating global warming.
- Environmental pollution
- Definition, causes, effects and control measures and monitoring of – Air Pollution - greenhouse effect, global warming, Ozone layer depletion, photochemical smog and acid rain;Water Pollution with reference to major Indian rivers and marine pollution; Soil, Noise,Thermal, and Nuclear Pollution - with special reference to present scenario in India.
- Pollutants and their impact on flora, fauna and humans; Solids and Biomedical wastes -causes, effects and control measures and their management.

❖ MICRO-BIOLOGY & IMMUNOLOGY

- Monera-general characteristics Bacteria, mycoplasma, phytoplasmas, study of actinomycetes
- Mycology - general characteristics
- Virology – Classification structure of bacteriophages, viroids, prions.
- Microbial nutrition-types of culture media, Techniques of pure culture – batch, continuous, synchronous culture, Nutritional classification of bacteria – photo autotroph, photo heterotroph, chemo autotroph, chemo heterotroph, saprophytes and auxotrophs .
- Plant microbe interactions: symbiosis-Ecto and endomycorrhiza (VAM), Lichens, commensalism: parasitism. Microbial toxins.
- Immunology: History, detailed and comparative account of classification of immunity. Organs Cells and molecules of innate and acquired (adaptive) Immunity. Inflammation, Hypersensitivity, Autoimmunity, Primary and secondary immune response. Antigen, Immunogen and Hapten: Antibody – structure of immune globulins and antibody production. Somatic recombination and antibody and T cell receptors diversity. Antigen-antibody reactions-agglutination, precipitation, complement fixation test. Immunological tests – Immuno diffusion. Immuno electrophoresis, Immuno fluorescence. Radio immune assay. Antibody tests – ELISA, Western blotting: Principle, procedure, recent advances in Monoclonal and polyclonal antibody production.
- Immune response in transplantation of organs