SYLLABUS

FOR

FOUR YEAR INTEGRATED (EIGHT SEMESTER)

B Sc-B ED. COURSE

(AS PER NCTE REGULATION 2014)

Department of Higher Education, Govt. of M.P.

Under Graduate Semester wise Syllabus

As recommended by Central Board of Studies

Approved by

Coordination Committee of Madhya Pradesh Universities

Department of Higher Education, M.P.

JIWAJI UNIVERSITY,GWALIOR

Dr. Vivek Bapat

Dr. Vinod Singh Bhadoria

B.Sc. B. Ed. I Sem

Examination December 2020 Scheme

				External Marks		Internal Marks		Total	
S. No.	C/O/ H	Paper	Type	Max.	Min.	Max.	Min.	Max.	Min.
1	C	FC- Moral Value And Languagc- I	Th	85	34	15	6	100	40
2	C	FC- Development of Intrepreneurship-I	Th	35	14	15	6	50	20
3	H	Chemistry	Th	85	34	15	6	100	40
4	H	Chemistry Practical	PR	50	25			50	25
5	H	Physics	Th	85	34	15	6	100	40
6	H	Physics Practical	PR	50	25			50	25
7	H	Botany	Th	85	34	15	6	100	40
8	H	Botany Practical	PR	50	25			50	25
9	H	Zoology	Th	85	34	15	6	100	40
10	H	Zoology Practical	PR	50	25			50	25
11	H	Mathematics	Th	125	50	25	10	150	60
12	C	Education Status, Problems and Issues	Th	85	34	15	6	100	40
13	C	Childhood Growing Up	Th	85	34	15	6	100	40

Passing Marks: Th 40% And Pr 50%

C - Stand for Compulsory Paper

O - Stand For Optional Paper Select as per Subject Guidline or Your Interest

H - Stand for Subject select for Higher Education Guidline and Your Interest

Dr. Vivek Bapat **Dr. Vinod Singh Bhadoria**

JIWAJI UNIVERSITY,GWALIOR

B.Sc. B. Ed. II Sem

Examination June 2021 Scheme

				External Marks		Internal Marks		Total	
S. No.	C/O/ H	Paper	Type	Max	Min	Max	Min	Max	Min
1	C	FC- Moral Value And Language- II	Th	85	34	15	6	100	40
2	C	FC- Development of Intrepreneurship-II	Th	35	14	15	6	50	20
3	H	Chemistry	Th	85	34	15	6	100	40
4	H	Chemistry Practical	PR	50	25			50	25
5	H	Physics	Th	85	34	15	6	100	40
6	H	Physics Practical	PR	50	25			50	25
7	H	Botany	Th	85	34	15	6	100	40
8	H	Botany Practical	PR	50	25			50	25
9	H	Zoology	Th	85	34	15	6	100	40
10	H	Zoology Practical	PR	50	25			50	25
11	H	Mathematics	Th	125	50	25	10	150	60
12	C	Learning And Teaching	Th	85	34	15	6	100	40
13	C	Curriculum Development and School	Th	85	34	15	6	100	40

Passing Marks: Th 40% And Pr 50%

C - Stand for Compulsory Paper

O - Stand For Optional Paper Select as per Subject Guidline or Your Interest

H - Stand for Subject select for Higher Education Guidline and Your Interest

Dr. Vivek Bapat **Dr. Vinod Singh Bhadoria**

JIWAJI UNIVERSITY,GWALIOR

B.Sc. B. Ed. III Sem

Examination December 2021 Scheme

				External Marks		Internal Marks		Total	
S. No.	C/O/ H	Paper	Type	Max	Min	Max	Min	Max	Min
1	C	FC- Moral Value And Language- III	Th	85	34	15	6	100	40
2	C	FC- Environmental Studies - I	Th	35	14	15	6	50	20
3	H	Chemistry	Th	85	34	15	6	100	40
4	H	Chemistry Practical	PR	50	25			50	25
5	H	Physics	Th	85	34	15	6	100	40
6	H	Physics Practical	PR	50	25			50	25
7	H	Botany	Th	85	34	15	6	100	40
8	H	Botany Practical	PR	50	25			50	25
9	H	Zoology	Th	85	34	15	6	100	40
10	H	Zoology Practical	PR	50	25			50	25
11	H	Mathematics	Th	125		25		150	
12	C	Educational Policies School Leadership and Management	Th	85	34	15	6	100	40
13	C	Gender School And Society	Th	85	34	15	6	100	40
14	C	Reading And Reflecting on Text	PR	40	20	10	5	50	25

Passing Marks: Th 40% And Pr 50%
C - Stand for Compulsory Paper
O - Stand For Optional Paper Select as per Subject Guidline or Your Interest
H - Stand for Subject select for Higher Education Guidline and Your Interest

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JIWAJI UNIVERSITY,GWALIOR

B.Sc. B. Ed. IV Sem

Examination June 2022 Scheme

				External Marks		Internal Marks		Total	
S. No.	C/O/ H	Paper	Type	Max	Min	Max	Min	Max	Min
1	C	FC- Moral Value And Language- IV	Th	85	34	15	6	100	40
2	C	FC- Environmental Studies - II	Th	35	14	15	6	50	20
3	H	Chemistry	Th	85	34	15	6	100	40
4	H	Chemistry Practical	PR	50	25			50	25
5	H	Physics	Th	85	34	15	6	100	40
6	H	Physics Practical	PR	50	25			50	25
7	H	Botany	Th	85	34	15	6	100	40
8	H	Botany Practical	PR	50	25			50	25
9	H	Zoology	Th	85	34	15	6	100	40
10	H	Zoology Practical	PR	50	25			50	25
11	H	Mathematics	Th	125	50	25	10	150	60
12	C	Educational Technology And ICT	Th	85	34	15	6	100	40
13	C	Creating And inclusive Education	Th	85	34	15	6	100	40
14	C	Drama and art in Education	PR	40	20	10	5	50	25

Passing Marks: Th 40% And Pr 50%

C - Stand for Compulsory Paper

O - Stand For Optional Paper Select as per Subject Guidline or Your Interest

H - Stand for Subject select for Higher Education Guidline and Your Interest

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JIWAJI UNIVERSITY,GWALIOR

B.Sc. B. Ed. V Sem

Examination December 2022 Scheme

				External Marks		Internal Marks		Total	
S. No.	C/O/ H	Paper	Type	Max	Min	Max	Min	Max	Min
1	C	FC- Moral Value And Language- V	Th	85	34	15	6	100	40
2	C	FC- Basic Computer And IT - I	Th	35	14	15	6	50	20
3	H	Chemistry	Th	85	34	15	6	100	40
4	H	Chemistry Practical	PR	50	25			50	25
5	H	Physics	Th	85	34	15	6	100	40
6	H	Physics Practical	PR	50	25			50	25
7	H	Botany	Th	85	34	15	6	100	40
8	H	Botany Practical	PR	50	25			50	25
9	H	Zoology	Th	85	34	15	6	100	40
10	H	Zoology Practical	PR	50	25			50	25
11	H	Mathematics	Th	125	50	25	10	150	60
12	O (ANY ONE)	Value Education Health And Physical Education Guidance and Counselling in school Educational Administration and Management	Th	85	34	15	6	100	40
13	C	Action Research	Th	85	34	15	6	100	40
14	C	Educational Psychology Practical	PR	40	20	10	5	50	25

Passing Marks: Th 40% And Pr 50%
C - Stand for Compulsory Paper
O - Stand For Optional Paper Select as per Subject Guidline or Your Interest
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JIWAJI UNIVERSITY,GWALIOR

B.Sc. B. Ed. VI Sem

Examination June 2023 Scheme

				External Marks		Internal Marks		Total	
S. No.	C/O/ H	Paper	Type	Max	Min	Max	Min	Max	Min
1	C	FC- Moral Value And Language- VI	Th	85	34	15	6	100	40
2	C	FC- Environmental Education - II	Th	35	14	15	6	50	20
3	H	Chemistry	Th	85	34	15	6	100	40
4	H	Chemistry Practical	PR	50	25			50	25
5	H	Physics	Th	85	34	15	6	100	40
6	H	Physics Practical	PR	50	25			50	25
7	H	Botany	Th	85	34	15	6	100	40
8	H	Botany Practical	PR	50	25			50	25
9	H	Zoology	Th	85	34	15	6	100	40
10	H	Zoology Practical	PR	50	25			50	25
11	H	Mathematics	Th	125	50	25	10	150	60
12	O (Any One)	**Pedagogy Subject - I** Teaching of Maths Teaching of General Science Teaching of Biology	Th	85	34	15	6	100	40
18	O (Any One)	**Pedagogy Subject - II** Teaching of Physics Teaching of Chemisry	Th	85	34	15	6	100	40
19	C	Project	Practical	100	50	0	0	100	50

Passing Marks: Th 40% And Pr 50%

C - Stand for Compulsory Paper

O - Stand For Optional Paper Select as per Subject Guidline or Your Interest

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Dr. Vivek Bapat **Dr. Vinod Singh Bhadoria**

JIWAJI UNIVERSITY,GWALIOR

B.A.-B.Ed. / B. Sc.- B.Ed. VII Sem

Examination December 2023 Scheme

S. No.	C/O/ H	Paper	Type	External Marks		Internal Marks		Total	
				Max	Min	Max	Min	Max	Min
1	C	Micro Teaching (Eight Skills)	PR	0	0	50	25	50	25
2	C	School Internship	PR	0	0	50	25	50	25
3	C	Final Lesson I	PR	100	50	0	0	100	50
4	C	Final Lesson II	PR	100	50	0	0	100	50
5	C	Unit Plan I & II	PR	0	0	10	5	10	5
6	C	Unit Text (I&II) Administration, evalution and Interpretation	PR	0	0	10	5	10	5
7	C	Resource Unit / Instructional Kit / Work Book / Working Models	PR	0	0	20	10	20	10
8	C	Observation Record	PR	0	0	10	5	10	5

Passing Marks: Th 40% And Pr 50%

JIWAJI UNIVERSITY,GWALIOR

B.A.-B.Ed. / B. Sc.-B. Ed. VIII Sem

Examination June 2024 Scheme

S. No.	C/O/ H	Paper	Type	External Marks		Internal Marks		Total	
				Max	Min	Max	Min	Max	Min
1	C	Proficiency of English	Th	85	34	15	6	100	40
2	C	Proficiency of Hindi	Th	85	34	15	6	100	40
3	C	Understading the Self	PR	40	20	10	5	50	25
4	C	Understading the ICT	PR	40	20	10	5	50	25

Passing Marks: Th 40% And Pr 50%
C - Stand for Compulsory Paper
O - Stand For Optional Paper Select as per Subject Guidline or Your Interest
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Dr. Vivek Bapat **Dr. Vinod Singh Bhadoria**

सत्र 2014–15 से लागू होने वाले आधार पाठ्यक्रम की सेमेस्टर व्यवस्था

Semester	Paper I (100 Marks)			Paper II (50 Marks)		
	Title	Internal-15	Theory-85	Title	Internal	Theory
I	नैतिक मूल्य और भाषा– I (Moral Values & Language I)	Part.A: Moral Values + Hindi = 05+05 = 10 Marks Part.B: English = 5 Marks	Part A: Moral Values + Hindi = 15+35 = 50 Marks Part B: English = 35 Marks	उद्यमिता विकास – I (Development of Entrepreneurship I)	15 Marks	35 Marks
II	नैतिक मूल्य और भाषा– II (Moral Values & Language-II)	Part-A: Moral Values + Hindi = 05+05 = 10 Marks Part-B: English = 5 Marks	Part-A: Moral Values + Hindi = 15+35 = 50 Marks Part- B: English = 35 Marks	उद्यमिता विकास – II (Development of Entrepreneurship-II)	15 Marks	35 Marks
III	नैतिक मूल्य और भाषा– III (Moral Values & Language-III)	Part-A: Moral Values + Hindi = 05+05 = 10 Marks Part-B: English = 5 Marks	Part-A: Moral Values + Hindi = 15+35 = 50 Marks **Part-B:** English = 35 Marks	पर्यावरणीय अध्ययन– I (Environmental Studies-I)	15 Marks	35 Marks
IV	नैतिक मूल्य और भाषा– IV (Moral Values & Language-IV)	Part-A: Moral Values + Hindi = 05+05 = 10 Marks Part-B: English = 5 Marks	**Part-A:** Moral Values + Hindi = 15+35 = 50 Marks Part-B: English = 35 Marks	पर्यावरणीय अध्ययन– II (Environmental Studies-II)	15 Marks	35 Marks
V	नैतिक मूल्य और भाषा– V (Moral Values & Language-V)	Part-A: Moral Values + Hindi = 05+05 = 10 Marks Part-B: English = 5 Marks	Part-A: Moral Values + Hindi = 15+35 = 50 Marks Part-B: English = 35 Marks	Basic of Computer & Information Technology-I	15 Marks	35 Marks
VI	नैतिक मूल्य और भाषा– VI (Moral Values & Language-VI)	Part-A: Moral Values + Hindi = 05+05 = 10 Marks Part-B: English = 5 Marks	Part-A: Moral Values + Hindi = 15+35 = 50 Marks **Part-B:** English = 35 Marks	Basic of Computer & Information Technology-II	15 Marks	35 Marks

अ. प्रत्येक सेमिस्टर के प्रथम प्रश्न–पत्र में निम्न तीन पाठ्यक्रम विषय निम्नानुसार समाहित होगे

1. नैतिक मूल्य – इकाई 1
2. हिन्दी भाषा – इकाई 2 एवं 3
3. अंग्रेजी भाषा – इकाई 4 एवं 5

ब. प्रत्येक सेमिस्टर का द्वितीय प्रश्न–पत्र पूर्वानुसार कुल 50 अंकों का रहेगा।

मूल्यांकन एवं परीक्षा व्यवस्था

आंतरिक मूल्यांकन

प्रथम प्रश्न–पत्र के आंतरिक मूल्यांकन में निम्नानुसार व्यवस्था रहेगी

1. इकाई 1 (नैतिक शिक्षा) – 05 अंक
2. इकाई 2 एवं 3 (हिन्दी भाषा) – 05 अंक
3. इकाई 4 एवं 5 (अंग्रेजी भाषा) – 05 अंक

द्वितीय प्रश्न–पत्र के आंतरिक मूल्यांकन में निम्नानुसार व्यवस्था रहेगी

इकाई 1 से 5 तक – 15 अंक

सैद्धांतिक मूल्यांकन

(अ) प्रथम प्रश्न–पत्र का सैद्धांतिक मूल्यांकन तीन घंटों में किया जावेगा। इस प्रश्न–पत्र में दो खण्ड अ तथा ब होगे। इस हेतु परीक्षार्थी को दो उत्तर पुस्तिकाएं पृथक–पृथक दी जावेगी। खण्ड–अ हेतु प्रथम उत्तर पुस्तिका में तीन इकाईयाँ (नैतिक शिक्षा एवं हिन्दी भाषा) को सम्मिलित करते हुए उत्तर देने बाबत स्थान निर्धारित रहेगा। इसी प्रकार खण्ड–ब हेतु द्वितीय उत्तर पुस्तिका में इकाई 4 और 5 (अंग्रेजी भाषा) को सम्मिलित करते हुए स्थान रहेगा। अंकों का विवरण निम्नानुसार है–

1. खण्ड–अ प्रथम उत्तर पुस्तिका (नैतिक शिक्षा एवं हिन्दी भाषा) – 50 अंक

वस्तुनिष्ठ प्रश्न कुल 05, अंक 05 (5 ×1), केवल इकाई 2 और 3 से कुल 05 बहुविकल्पीय प्रश्न पूछे जावेगें।

लघु उत्तरी प्रश्न कुल 03, अंक 15 (3×5), इकाई 1, 2 और 3 से एक–एक प्रश्न आंतरिक विकल्प के साथ पूछे जावेगें।

दीर्घ उत्तरी प्रश्न कुल 03, अंक 30 (3×10), इकाई 1, 2 और 3 से एक–एक प्रश्न आंतरिक विकल्प के साथ पूछे जावेगें।

2. खण्ड–ब द्वितीय उत्तर पुस्तिका (अंग्रेजी भाषा) – 35 अंक

वस्तुनिष्ठ प्रश्न कुल 05, अंक 05 (5 ×1), केवल इकाई 4 और 5 से कुल 05 बहुविकल्पीय प्रश्न पूछे जावेगें।

लघउत्तरी प्रश्न कुल 02, अंक 10 (2×5), इकाई 4 और 5 से एक–एक प्रश्न आंतरिक विकल्प के साथ पूछे जावेगें।

दीघउत्तरी प्रश्न कुल 02, अंक 20 (2×10), इकाई 4 और 5 से एक–एक प्रश्न आंतरिक विकल्प के साथ पूछे जावेगें।

(ब) द्वितीय प्रश्न–पत्र का सैद्धांतिक मूल्यांकन पूर्वानुसार रहेगा।

Dr. Vivek Bapat

Dr. Vinod Singh Bhadoria

B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

FIRST YEAR

SEMESTER-I

Subject: Foundation Course – I

Title of Paper: नैतिक शिक्षा और भाषा **(Moral Values & Language)**

Max. Marks: 85 (Moral Education- 15, Hindi- 35, English- 35)

Max. Marks - 100
External Marks - 85
Internal Marks - 15

Particulars

Part- A

Unit — I	नैतिक मूल्य 1. नैतिक मूल्य परिचय एवं वर्गीकरण – डॉ. शशि राय 2. आचरण की सभ्यता – सरदार पूर्ण सिंह	15
Unit — II	हिन्दी भाषा 1. स्वतंत्रता पुकारती (कविता) – जयशंकर प्रसाद 2. जाग तुझको दूर जाना (कविता) – महादेवी वर्मा 3. उत्साह (निबंध) – रामचन्द्र शुक्त 4. शिरीष के फूल (ललित निबंध) – हजारी प्रसाद द्विवेदी 5. वाक्य संरचना और अशुद्धियों (संकलित)	17
Unit — III	हिन्दी भाषा 1. नमक का दरोगा (कहानी) – प्रेमचंद्र 2. हार की जीत (कहानी) – सुदर्शन 3. भगवान बुद्ध (निबंध) – स्वामी विवेकानन्द 4. लोकतंत्र एक धर्म है निबंध – सर्वपल्ली राधाकृष्णन 5. पर्यायवाची – विलोम शब्द, एकार्थी–अनेकार्थी शब्द, शब्दयुग्म (संकलित)	18
	Part -B	
Unit — IV	English Language 1. John Keats : Ode to a Nightingale 2. Rabindra Nath Tagore : Where the Mind is Without Fear 3. Rajgopalachari : Preface to the Mahabharata 4. Maharishi Mahesh Yogi: The Beacon Light of the Himalayas	17
Unit — V	English Language Comprehension/ Unseen Passage Composition and Paragraph writing (Based on the expansion of an idea) **Basic language skills :** vocabulary, synonyms, antonyms, word formation, prefixes, suffixes, confusing words, misused words, similar words with different meanings. proverbs **Basic language skills :** Grammer and Usage, Tenses, Prepositions, determiners, countable/ uncountable nouns, verbs, articles and adverbs.	18

** सैद्धान्तिक परीक्षा हेतु उपरोक्तानुसार 85 (15+35+35) अंक और आन्तरिक मूल्यांकन (सी.सी.ई) हेतु पृथक से 15 (5+5+5) अंक निर्धारित है।

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B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

FIRST YEAR

SEMESTER-I

Subject: Foundation Course – II

Title of Paper: उद्यमिता विकास **(Entrepreneurship)**

Max. Marks - 50
External Marks - 35
Internal Marks - 15

Particulars

इकाई–1	उद्यमिता–परिभाषा, विशेषताऐं एवं महत्व, एक उद्यमी के प्रकार एवं कार्य, उद्यमिता अभिप्रेरणा घटक **Entrepreneurship-** Definition, Characteristics and importance, Types and functions of an entrepreneur, motivational factors of entrepreneurship.
इकाई–2	अ) लक्ष्य प्राप्ति की प्रेरणा एवं विचारों की स्थापना। लक्ष्य निर्धारित एवं चुनौती का सामना। समस्या समाधान एवं सृजनात्मकता। क्रमबद्ध योजना एवं क्षमता की दिशबद्धता। आत्मविश्वास का विकास। ब) सम्प्रेण कला। शब्दिक व अशब्दिक संप्रेषण, प्रभावित करने की क्षमता। सम्प्रेषण की आधुनिक तकनीक a) Motivation to achieve targets and establishment of ideas. Setting targets and facing challenges. Resolving problems and creativity. b) Sequenced planning and guiding capacity, Development of self confidence. Communication skills, Verbal & Non Verbal Communication, Capacity to influence, Modern Techniques of Communication.
इकाई–3	अ) परियोजना प्रतिवेदन, चुनी हुई प्रक्रिया का मूल्यांकन, विस्तृत परियोजना प्रतिवेदन – आवश्यकता एवं प्रासंगिकता परियोजना प्रपत्र के प्रमुख भाग, परियोजना प्रतिवेदन तैयार करा। ब) संगठन के प्रकार का चयन – एकाकी व्यवसाय, साझेदारी एवं सहकारी समिति का अर्थ एवं विशेषताएं संगठन के चयन को प्रभावित करने वाले घटक। स) आर्थिक प्रबंध – वित्तीय संस्थान एवं बैकों की भूमिका, बैंकिग, वित्तीय योजना, कार्यशील पूँजी–मूल्यांकन तथा प्रबंधन, लागत एवं मूल्य निर्धारण तथा लाभ का मूल्यांकन आर्थिक लेखा–जोखा रखना। a) Project Report- Evaluation of selected process. Detailed project report — Preparation of main part of project report pointing out necessary and viability. b) Selecting the form of Organisation — Meaning and characteristics of sole Proprietorship, Partnership and cooperative committees, elements affecting selection of a form of an organisation. c) Economic management — Role of banks and financial institutions banking, financial plans, working capital-evaluation and management, keeping of accounts.

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इकाई–4	अ) उत्पादन का प्रबंध, कच्चा माल क्रय करने की प्रक्रिया चल सम्पत्ति / माल का प्रबंधन गुणवत्ता प्रबंधन कर्मचारी प्रबंधन पैकिंग ब) विपणन प्रबंधन बिक्री एवं बेचने की कला बाजार की समझ एवं विपणन विपणन नीति उपभोक्ता प्रबंधन समय प्रबंधन a) Production management Methods of purchase of Raw Materials. Management of movable assets/goods. Quality management. Employee management. Packing. b) Marketing Management. Sales and the art of selling. Understanding the market and market policy. Consumer management. Time management.
इकाई–5	1. नियामक संस्थाओं की भूमिका–जिला उद्योग केन्द्र, प्रदूषण निवारण मंडल, खाद्य एवं औषधि प्रशासन, विद्युत विभाग तथा नगर निगम का विशेष अध्ययन। 2. विकासात्मक संस्थाओं की भूमिका, खादी एवं ग्रामीण आयोग / बोर्ड, मध्यप्रदेश वित्त निगम, अनुसूचित बैंक, मध्यप्रदेश की महिला आर्थिक विकास निगम। 3. स्वरोजगार मूलक योजनाएँ – प्रधानमंत्री रोजगार योजना, स्वर्ण जयंती शहरी रोजगार योजना, रानी दुर्गावती योजना, दीनदयाल स्वरोजगा योजना। 4. विभिन्न अनुदान योजनाएँ– लागत पूँजी अनुदान, ब्याज अनुदान, प्रवेश कर से छूट, परियोजना प्रतिवेदन, प्रतिपूर्ति अनुदान आदि। 5. महिला उद्यमियों हेतु विशेष प्रेरणाएँ, संभावनाएँ एवं समस्याएँ। 6. मध्य प्रदेश आदिवासी वित्त विकास निगम की योजनाएँ, मध्य प्रदेश अन्त्यावसायी निगम की योजना, मध्य प्रदेश पिछड़ा वर्ग एवं अल्पसंख्यक वित्त विकास निगम की योजनाएँ। a) Role of Regulatory institutions — District Industry Centre, Pollution Control Board, Food and Drug Administration, special study of Electricity Development and Municipal Corporation. b) Role of development organizations, Khadi & village Commission/ Board, MP Finance Corporation, scheduled banks, MP Women's Economics Development Corporation. c) Self-employment-oriented schemes, Prime Minister's Employment schemes, Golden Jubilee Urban environment scheme, Rani Durgavati Self- Employment scheme, Pt. Deendayal Self-employment scheme. d) Various grant schemes - Cost of Capital grant, interest grant, exemption from entry tax, project report, reimbursement grant, etc. e) Special incentives for Women Entrepreneurs, prospects & possibilities, f) Schemes of M.P. Tribal Finance Development Corporation, schemes of M.P. Antyavasai Corporation, schemes of M.P. Backward Class and Minorities Finance Development Corporation.

** सैद्धान्तिक परीक्षा हेतु उपरोक्तानुसार 35 अंक और आन्तरिक मूल्यांकन (सी.सी.ई) हेतु 15 अंक निर्धारित है।

B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

FIRST YEAR

SEMESTER-II

Subject: Foundation Course – I

Title of Paper: नैतिक शिक्षा और भाषा **(Moral Values & Language)**

Max. Marks: 85 (Moral Education- 15, Hindi- 35, English- 35)

Max. Marks - 100
External Marks - 85
Internal Marks - 15

Particulars

Part- A

Unit — I	नैतिक मूल्य 1. अंतर्ज्ञान और नैतिक जीवन – सर्वपल्ली राधाकृष्णन 2. अप्प दीपो भव – स्वामी श्रद्धानंद 3. बुद्ध की करुणा – डॉ. सद्धा तिस्स	15
Unit — II	हिन्दी भाषा 1. भारत वन्दना (कविता) – सूर्यकांत त्रिपाठी 'निराला' 2. पुष्प की अभिलाषा (कविता) – माखनलाल चतुर्वेदी 3. अकाल एवं उसके बाद (कविता) – नागार्जुन 4. निर्माल्य (ललित निबंध) – विद्यानिवास मिश्र 5. मानक हिन्दी का स्वरुप (संकलित)	17
Unit — III	हिन्दी भाषा 1. अफसर (व्यंग्य) – शरद जोशी 2. गोलाराम का जीव (व्यंग्य) – हरिशंकर परसाई 3. हिन्दुत्वा – वीर सावरकर 4. भारत देश और उसके निवासी (विश्लेषणतमक) – रामधारी सिंह दिनकर 5. पल्लवन और संक्षेपण (संकलित)	18
	Part- B	
Unit — IV	English Language 1. William Wordsworth : The Solitary Reaper 2. A Song of Kabir- Translated by Tagore 3. Khushwant Singh : The Portrait of a Lady 4. Vivekananda: *The East and the West* (1909)	17
Unit — V	English Language Comprehension, Unseen Passages, Report- writing, Composition, Short Essay, Paragraph Writing (Based on the expansion of an idea) Basic language skills : vocabulary, synonyms, antonyms, word formation, prefixes, suffixes, confusing words, similar words with different meanings, proverbs, situational conversations like conversation at the post office, bank, market place, railway station, college etc. Basic language skills : Grammer and Usage, Tenses, Prepositions,	18

** सैद्धान्तिक परीक्षा हेतु उपरोक्तानुसार 85 (15+35+35) अंक और आन्तरिक मूल्यांकन (सी.सी.ई) हेतु पृथक से 15 (5+5+5) अंक निर्धारित है।

Dr. Vivek Bapat **Dr. Vinod Singh Bhadoria**

B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

FIRST YEAR

SEMESTER-II

Subject: Foundation Course – II

Title of Paper: उद्यमिता विकास **(Entrepreneurship)**

Max. Marks - 50
External Marks - 35
Internal Marks - 15

Particulars

इकाई–1	उद्यमिता का आशय, मत, उद्यमिता के गुण, सफल उद्यमी के गुण Entrepreneurship- Meaning, Concept, Characteristics of entrepreneur, Qualities of Successful Entrepreneurs
इकाई–2	उद्यमिता के प्रकार, महत्व और विभिन्न विद्वानों के मत लक्ष्य निर्माण, लक्ष्य कैसे प्राप्त करें। लक्ष्य प्राप्ति में समस्याएँ, उनका समाधान स्वप्रेरणा, स्वप्रेरणा के तत्व एवं विकास विभिन्न विद्वानों के मत, आकलन, निष्कर्ष नेतृत्व समता, उनका विकास और प्रतिफलन Types of entrepreneurship, importance and views of various thinkers (Scholars) • Formation of goals, How to achieve goals. • Problems in achieving targets and solution. • Self motivation, elements of self motivation and development. • Views of various scholars, evaluation, solutions. • Leadership capacity: Its development and results
इकाई–3	परियोजनाएँ तथा विभिन्न संगठन (शासकीय–अशासकीय), शासकीय परियोजनाएँ, अशासकीय परियोजनाएँ, बैकों का योगदान, उनकी सीमाएँ, क्षेत्र Projects and various organisations (Govt., non-Govt.), Govt. Projects, Non- Govt. projects. Contribution of Banks, their limitations, scope.
इकाई–4	अच्छे उद्यमी के कौन–कौन से कार्य, गुण, प्रबंधन इत्यादि, अच्छे उद्यमी के गुण आधुनिक और पूर्ववर्ती, उद्यमी की प्रबंधन कला, उद्यमी के प्रेरक तत्व Functions, qualities, management of a good entrepreneur. Qualities of the entrepreneur (Modern and traditional). Management skills of the entrepreneur, Motive factors of the entrepreneur.
इकाई–5	उद्यमी की समस्याएँ, क्षेत्र, पूँजी की समस्या, शक्तिकरण की समस्या, पूँजीवन की समस्या प्रशासनिक समस्याएँ, स्वामित्व की समस्याएँ इत्यादि Problems and Scope of the Entrepreneur : • Problem of Capital • Problem of Power • Problem of Registration • Administrative problems • Problems of Ownership

** सैद्धान्तिक परीक्षा हेतु उपरोक्तानुसार 35 अंक और आन्तरिक मूल्यांकन (सी.सी.ई) हेतु 15 अंक निर्धारित है।

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B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

SECOND YEAR

SEMESTER-III

Subject: Foundation Course – I

Title of Paper: नैतिक शिक्षा और भाषा **(Moral Values & Language)**

Max. Marks: 85 (Moral Education- 15, Hindi- 35, English- 35)

Max. Marks - 100
External Marks - 85
Internal Marks - 15

Particulars

Part- A

Unit — I	नैतिक मूल्य 1. शिकागो व्याख्यान – स्वामी विवेकानन्द 2. धर्म एवं राष्ट्रवाद – महर्षि अरविंद 3. कालापानी – वीर सावरकर 4. भय से मुक्ति – जे. कृष्णमूर्ति 5. चित्त जहाँ भय शून्य – रवीन्द्रनाथ ठाकुर	15
Unit — II	हिन्दी भाषा 1. कछुआ धर्म (निबंध) – चन्द्र शर्मा 'गुलेरी' 2. वह तोड़ती पत्थर (कविता) – निराला 3. सपनों की उड़ान (प्रेरक निबंध) – ए.पी.जे. अब्दुल कलाम 4. चीफ दी दावत (कहानी) – भीष्म सहानी 5. वर्ण–विन्यास (व्याकरण) – विश्वनाथ प्रसाद मिश्र	17
Unit — III	हिन्दी भाषा 1. आदिवासी धरोहर (निबंध) – डॉ. श्यामाचरण दुबे 2. नारीत्व का अभिशाप (निबंध) – महादेवी वर्मा 3. ब्रह्माण्ड की रचना (वैज्ञानिक लेख) – जयंत विष्णु नार्लीकर 4. प्रमुख वैज्ञानिक आविष्कार (संकलित) 5. संधि और समास (संकलित)	18
	Part- B	
Unit — IV	English Language 1. Tree : Tina Morris 2. Night of the scorpion : Nisssirn Ezekiel 3. What is Science? : George Orwell 4. On the Rule of the Road : A.G. Gardiner	17
Unit — V	English Languag Comprehension of Unseen Passages, Paragraph Writing, Report- writing, Short Essay on a given topic Correspondence skills (Formal & Informal Letters and Application)	18

** सैद्धान्तिक परीक्षा हेतु उपरोक्तानुसार 85 (15+35+35) अंक और आन्तरिक मूल्यांकन (सी.सी.ई) हेतु पृथक से 15 (5+5+5) अंक निर्धारित है।

Dr. Vivek Bapat **Dr. Vinod Singh Bhadoria**

B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

SECOND YEAR

SEMESTER-III

Subject: Foundation Course – II

Title of Paper: पर्यावरण अध्ययन -II **(Environment Study)**

Max. Marks - 50
External Marks - 35
Internal Marks - 15

Particulars

इकाई–1	Study of Environment and ecology: 1. Definition and Importance. 2. Public participation and Public awareness.
	पर्यावरण एवं पारिस्थितकीय अध्ययन 1- परिभाषा एवं महत्व 2- जनभागीदारी एवं जन जागरण
इकाई–2	Environmental Pollution : 1. Air, water, noise, heat and nuclear pollution- Definition, Causes, effect and prevention of pollution. 2. Disaster management — Flood, Earthquake, cyclones and landslides.
	पर्यावरण प्रदूषण 1. वायु, जल, ध्वनि, ताप, आणविक, प्रदूषण–परिभाषा, प्रदुषण के कारण, प्रभाव एवं रोकथाम 2. आपदा प्रबंधन – बाढ़, भूकंप, चक्रवात एवं भूरखलन
इकाई–3	Environment and social problems - 1. Sustainable development- Introduction 2. Energy problems of cities, solar energy, biogas and wind energy 3. Water conservation — rain- water harvesting.
	पर्यावरण एवं सामाजिक समस्याएँ 1. धारणीय विकास 2. नगरों की ऊर्जा समस्या, सौर ऊर्जा, जैविक ईधन तथा पवन ऊर्जा 3. जल संरक्षण – वर्षा, जल–संग्रहण
इकाई–4	Role of mankind in conserving natural resources ; 1. Food resources — World food problem. 2. Energy resources — increasing demand for energy.
	प्राकृतिक संसाधनों के संरक्षण में मनुष्य की भूमिका 1. खाद्य–आहार संसाधन –विश्व आधार समस्या 2. ऊर्जा संसाधन – ऊर्जा की बढ़ती मांग
इकाई–5	Environment conservation laws : 1. Conservation laws for air and water pollution. 2. Wildlife conservation laws. 3. Role of information technology in protecting environment & health.
	पर्यावरण संरक्षण कानून 1. वायु तथा जल प्रदूषण–संरक्षण कानून 2. वन्य प्राणी संरक्षण कानून 3. पर्यावरण तथा स्वास्थय रक्षा में सूचना प्रौद्योगिकी की भूमिका

** सदर्भ पुस्तक हिन्दी ग्रंथ अकादमी, भोपाल द्वारा प्रकाशित पुस्तक।

Dr. Vivek Bapat

Dr. Vinod Singh Bhadoria

B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

SECOND YEAR

SEMESTER-IV

Subject: Foundation Course – I

Title of Paper: नैतिक शिक्षा और भाषा **(Moral Values & Language)**

Max. Marks: 85 (Moral Education- 15, Hindi- 35, English- 35)

Max. Marks - 100
External Marks - 85
Internal Marks - 15

Particulars

Part- A

Unit — I	नैतिक मूल्य 1. भारतीय संविधान की प्रस्तावना 2. नगरिक के अधिकार और कर्तव्य 3. राज्य की नीति–निदेशक तत्व	15
Unit — II	हिन्दी भाषा 1. दिमागी गुलामी (निबंध) – राहुल सांकृत्यायन 2. फॉस (कहानी) – गोविन्द मिश्र 3. हमारा सौर मण्डल (संकलित) 4. जीवन : उत्पत्ति और संरचना (संकलित) 5. विराम चिन्ह – उपयोग और प्रयोग (संकलित)	17
Unit — III	हिन्दी भाषा 1. इन्द्रधनुष का रहस्य (वैज्ञानिक लेख) – डॉ. कपूरमल जैन 2. चली फगुनहट बौरे आम (ललित निबंध) – विवेकी राय 3. भोजन और स्वास्थ्य (संकलित) 4. निबंध रचना (संकलित) 5. संक्षिप्तियॉ (संकलित)	18
	Part- B	
Unit — IV	**English Language** 1- Three Questions : C. Rajgopalachari 2- Ramanujan : C.P. Snow 3- The Power of W.E. : Roger Rosenblatt 4- A Short Extract from the Naked Ape : Desmond Morris	17
Unit — V	**English Language** Narrative skills — narration of events and situations. Production of speech : Classification of sounds. Correction of common errors in the sentence structure, Drafting C.V. Basic language skills : Tenses, prepositions, determiners, verbs & Articles, Nouns Sr_ Pronouns.	18

** सैद्धान्तिक परीक्षा हेतु उपरोक्तानुसार 85 (15+35+35) अंक और आन्तरिक मूल्यांकन (सी.सी.ई) हेतु पृथक से 15 (5+5+5) अंक निर्धारित है।

Dr. Vivek Bapat

Dr. Vinod Singh Bhadoria

B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

SECOND YEAR

SEMESTER-IV

Subject: Foundation Course – II

Title of Paper: पर्यावरण अध्ययन -II **(Environment Study)**

Max. Marks - 50
External Marks - 35
Internal Marks - 15

Particulars

इकाई–1	Problem of natural resources 1. Problem of water resources — Utilization of surface and ground water, over utilization, flood, drought, conflicts over water, dams-benefits and problem. 2. Problems of forest resources — uses and over utilization, deforestation, utilization of timber, non-wood forest products, dams and its effect on forests. 3. Problems of land resources — Land as a source, erosion of land, man- induced landslides and desertification.
	प्राकृति संसाधन की समस्याएँ 1. जल संसाधन की समस्या – सतह एवं भूजल का उपयोग, अतिदोहन, बाढ़, सूखा, जल पर संघर्ष, बांध–लाभ एवं समस्याएँ 2. वन ससाधन की समस्याएँ – उपयोग एवं अतिदोहन, वनोन्मूलन, इमारती लकड़ी, अकाष्ठ वनोत्पाद, बांध एवं उनका वन पर प्रभाव 3. भूमि संसाधन की समस्याएँ– स्रोत के क्रय में भूमि, भूमि का अवध्रमण, मानव प्रेरित भू–रखलन और मरुस्थलीकरण
इकाई–2	Bio-diversity and its protection ~ 1. Introduction- Genetic, species and ecosystem diversity 2. Value of bio-diversity — Consumable use: Productive use, Social. moral and aesthetic values. 3. India as a nation of mega bio-diversity centre, bio-diversity at national and local levels. 4. Threats to bio-diversity —- Loss of habitat, poaching of wildlife, man- wildlife conflicts.
	जैव विवधिता और उसका संरक्षण 1. प्रस्तावना : अनुवांशिक, जातीय तथा पारिस्थितिक विविधता। 2. जैव विविधता का मूल्य – उपभोग्य उपयोग, उत्पाक उत्पादक उपयोग, सामाजिक, नैतिक तथा सौन्दर्यगत मूल्य। 3. वृहत जैव विविधता केन्द्र के राष्ट्र रुप में भारत, राष्ट्रीय तथा स्थानीय स्तरों पर जैव विविधता। 4. जैव विविधता के खतरे – आवासीय हानि, वन्य जीवन में अनधिकार घुसपैठ तथा मानव, वन जीवन–संघर्ष।
इकाई–3	Human Population and Environment 1. Population growth, disparities between countries. 2. Population explosion, family welfare Programme. 3. Environment and human health.
	जनसंख्या तथा पर्यावरण 1. जनसंख्या–बृद्धि, राष्ट्रों के बीच अन्तर 2. जनसंख्या–विस्फोट, परिवार कल्याण कार्यक्रम 3. पर्यावरण और मानव स्वास्थय
इकाई–4	Ecology and Ecosystem 1. Ecology-Introduction 2. Ecosystem- Concepts, components, structure & function, energy flow, food chain, food web, ecological pyramids and types.

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	पारास्थातकी तथा पारास्थातकी तंत्र 1. पारिस्थितिकी –प्रस्तावना 2. पारिथितिक तंत्र – अवधारणा, घटक, संरचना, तथा कार्यप्रणाली, ऊर्जा का प्रवाह, खाद्य श्रृंखला जाल, पारिस्थितिक पिरामिड तथा प्रकार
इकाई–5	Environmental Wealth 1. Main rivers of India and grasslands 2. Rural, Industrial, Agricultural fields. 3. Study of common plants, insects and birds.
	पर्यावरण सम्पदा 1. भारत की प्रमुख नदियाँ तथा घास के मैदान 2. ग्रामीण, औद्योगिक एवं कृषि क्षेत्र 3. सामान्य पौधे, कीटों एवं पक्षियों का अध्ययन

** सदर्भ पुस्तक हिन्दी ग्रंथ अकादमी, भोपाल द्वारा प्रकाशित पुस्तक।

Reference Book : Text Book for Environmental Studies University Grants Commission, New Delhi & Bharati Vidyapeeth institute of Environment Education and Research, Pune

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B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

THIRD YEAR

SEMESTER-V

Subject: Foundation Course – I

Title of Paper: नैतिक शिक्षा और भाषा **(Moral Values & Language)**

Max. Marks: 85 (Moral Education- 15, Hindi- 35, English- 35)

Max. Marks - 100
External Marks - 85
Internal Marks - 15

Particulars

Part- A

Unit — I	नैतिक मूल्य विश्व के प्रमुख धर्म एवं महत्त्वपूर्ण विशेषाऐं 1. हिन्दू धर्म 2. जैन धर्म 3. बौद्ध धर्म 4. सिक्ख धर्म 5. ईसाई धर्म 6. इस्लाम धर्म	15
Unit — II	हिन्दी भाषा 1. पृथ्वी के क्रोध में है (पर्यावरणीय निबंध) – प्रभाकर श्रोत्रिय 2. मेरे सहयात्री (यात्रा वृत्तांत) – अमृतलाल बेगड़ 3. कक्षा और अध्यापक (लेख) – डॉ. विजयबहादूर सिंह 4. दूरदर्शन : अतीत और वर्तमान (संकलित) 5. लोकोक्तियाँ एवं मुहावरें (संकलित)	17
Unit — III	हिन्दी भाषा 1. जनसंचार के माध्यम (प्रिंट, इलेक्ट्रानिक एवं सोशल मीडिया) (संकलित) 2. पत्रकारिता के विविध आयाम (संकलित) 3. कम्प्यूटश्र – हमारी जरुरत (संकलित) 4. राजभाषा हिन्दी (संकलित) 5. अनुवाद कला (संकलित)	18
	Part- B	
Unit — IV	**English Language** 1. O Captains My Captain : Walt Whitman 2. The Last Leaf : 0 Henry 3. The Axe : R.K. Narayan 4. Water : Dr. C.V. Raman	17
Unit — V	**English Language** Guided composition, Paragraph writing & Article writing on a given topic, Meaning & importance of translation Basic language skills : One word substitution, Homonyms, Homophone, words that confuse and punctuation Marks.	18

** सैद्धान्तिक परीक्षा हेतु उपरोक्तानुसार 85 (15+35+35) अंक और आन्तरिक मूल्यांकन (सी.सी.ई) हेतु पृथक से 15 (5+5+5) अंक निर्धारित है।

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B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

THIRD YEAR

SEMESTER-V

Subject: Foundation Course – II

Title of Paper: Basics of Computer & Information Technology - I

Max. Marks - 50
External Marks - 35
Internal Marks - 15

Particulars (For 35 Marks)

Unit-I	**INTRODUCTION TO COMPUTER** **Basic Organization of Computer System:** Block diagram & Functions (Central Processing Unit, Input/Output Unit, Storage Unit): Characteristics; Capabilities & Limitations. **Types of Computing Devices:** Desktop, Laptop & Notebook, Handheld, Smart-Phone, Tabiet PC, Server, Workstation & their Characteristics. **Primary Memory & Their Types:** RAM (DRAM, SRAM, DDR, RDRAM & EDORAM); ROM, PROM, EPROM, EEPROM: Cache Memory.
	कंप्यूटर का परिचय कंप्यूटर प्रणाली के मूल संगठन, ब्लॉक, आरेख एंव कार्य (केंन्द्रीय प्रोसेसिंग इकाई, निवेशी/निर्गत इकाई, भण्डारण इकाई), अभिलक्षण, क्षमताऐं एवं सीमाऐं। कंप्यूटर युक्तियों के प्रकार : डेस्कटॉप, लैपटॉप एवं नोटबुक, हैण्डहेल्ड, स्मार्ट–फोन, टेबलेट, पीसी, सर्वर, वर्कस्टेशन एवं इनके अभिलक्षण प्राथमिक स्मृति एवं उसके प्रकारः RAM (DRAM, SRAM, DDR, RDRAM, एवं EDORAM), ROM, PROM, EPROM, EEPROM, कैश स्मृति।
Unit-II	**PHERIPHERAL DEVICES** **Input Devices:** Keyboard, Mouse, Trackball, Joystick, Digitizer or Graphic tablet, Scanners, Digital Camera, Web Camera, MICR, OCR, OMR, Bar-Code Reader, Voice Recognition devices, Light pen & Touch Screen, **Output Devices:** Display Devices (CRT, TFT, LCD, LED, Multimedia Projectors); Video Standard: VGA, SVGA, XGA etc; Impact Printers (Daisy Wheel, Dot Matrix & Line Printer); Non-Impact Printers (Inkjet, Laser, Thermal); Plotters (Drum & Flatbed): Speakers. **General introduction of Cards, Ports and SMPS:** Expansion Cards (Display/Video/Graphic, Sound and Network Interface), Ports (USB, Serial and Parallel, Network), SMPS.
	परिधीय उपकरण निवेशी युक्तियाँः कुंजीपटल, माउँस, ट्रैकबॉल, जॉयस्टिक, डिजीटाईजर, अथवा ग्राफिक टेबलेट, स्कैनर, डिजिटर कैमरा, वेब कैमरा, MICR, OCR, OMR, बारकोड रीडर, ध्वनि अभिज्ञान युक्तियाँ, लाइट–पेन, एवं टच–स्क्रीन निर्ग युक्तियाँः प्रदर्शन युक्तियाँ, (CRT, TFT, LCD, LED,मल्टोमीडिया) विडियों मानक, VGA, SVGA, XGA आदि आघात प्रिंटर (डेजीव्हील, डॉट–मैट्रिक्स, एवं लाइन प्रिंटर), गैर–आघात प्रिंटर (इंकजेट, लेजर, एवं थर्मल) प्लॉटर्स (ड्रम एवं फ्लैड–बैड), स्पीकर्स। कार्ड्स पोर्टस एवं एम.एम.पी.एस. का सामान्य परिचय : विस्तार कार्ड (प्रदर्शन/दृश्य/ग्राफिक, ध्वनि एवं नेटवर्क इंटरफेस), पोर्ट्स (यू.एस.बी., श्रेणीक्रम, समानान्तर, नेटवर्क), एस.एम.पी.एस।

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Unit-III	**STORAGE DEVICES** Magnetic Tape, Cartridge Tape, Data Drives, Hard Disk Drives (Internal & External), FloppyDisks, CD, VCD, CD-R, CD-RW, Zip Drive, DVD, DVD-RW, USB Flash Drive, Blue Ray Disc & Memory cards. Brief description of above storage devices with elementary idea about their capacity and speed.
	चुम्बकीय टेप, कार्ट्रिज टेप, डाटा ड्राइव, हार्डडिस्क ड्राइव, (आंतरिक एवं बाह्य), फ्लॉपी डिस्क, CD, VCD, CD-R, CD-RW जिप ड्राइव, DVD, DVD-RW यू.एस.बी. फ्लैश ड्राइव, ब्लू रे डिस्क, स्मृति कार्ड। उपरोक्त संग्रहण युक्तियाँ की क्षमता एवं गति के प्रारंभिक ज्ञान के साथ इनका संक्षिप्त विवरण।
Unit-IV	**OPERATING SYSTEM (OS)** Functions of Operating System. Types of Operating System. Introduction to Operating System for i-pad & Smartphones. Elementary idea of DOS, WINDOWS & LINUX Operating Systems. **DOS Basics:** FAT, File & directory structure and naming rules, Booting process, DOS system files. Internal & External DOS commands. **Windows basics (Only elementary idea):** I. **Windows 7 & 8:** Desktop, Control Panel; Saving, Renaming, Moving, Copying & Searching files & folders, Restoring from Recycle Bin. Creating Shortcut, Establishing Network Connections. II. **Features of Windows 8.1:** Touch Screen Features, Tiles, Charms, Customizations and Apps. **LINUX basics:** Features of LINUX, Starting & Shutting down Linux, Introduction to Linux files & Directory. General idea about popular mainstream Linux distribution such as Debian, Ubuntu & Fedora.
	परिचालन प्रणाली परिचालन प्रणाली के कार्य, परिचालन प्रणाली के प्रकार। आई–पैड एवं स्मार्ट–फोन के लिए प्रयुक्त परिचालन प्रणालियों से परिचय। डॉस, विंडोस, एवं लिनक्स परिचालन प्रणालियों का प्रारंभिक ज्ञान। डॉस के मूल तत्वः FAT फाइल एवं डायरेक्टरी संरचना एवं उसके नामकरण के नियम, बूटिंग, प्रक्रिया, डॉस प्रणाली की फाइलें। डॉस के आंतरिक एवं बाह्य निर्देश। 1. विण्डोज 7 व 8 : डेस्क्टॉप, कण्ट्रोल पैनल, फाइल एवं फोल्डर का नाम–परिवर्तन, स्थानांतरण, प्रतिलिपिकरण और खोज, रीसायकल–बिन से फाइल की पुनः की पुनः प्राप्ति, शॉर्टकट बनाना, नेटवर्क कनेक्शन की स्थापना। 2. विण्डोज 8.1 की विशेषताएँ : टच स्क्रीन गुण, टाइल्स, चार्म्स, अनुकूलन (Customization)एवं (Apps)एप्स। लिनक्स की मूल तत्व :– लिनक्स की विशेषताऐं, लिनक्स के शुरु एवं बंद करना, लिनक्स फाइल एवं डायरेक्टरी से परिचय, Debian, Ubunto एवं Fedora जैसे मुख्यधारा के लोकप्रिय लिनक्स वितरण के बारे में सामान्य जानकारियों।
Unit-V	**Reading & Editing Software** General information about PDF readers: Adobe Acrobat, Nitro, PDF-XChange, efc. General information about application packages: Microsoft Office, Open Office & WPS office. Text editing and formatting using Word-2007 & onwards versions: Creating documents using Template; Saving word file in various file formats: Previewing documents, Printing document to file/page; Protecting document, Editing of Selected Text, Inserting, Deleting and Moving text. Formatting Documents: Page Layout, Paragraph formats, Aligning Text and Paragraph, Borders and Shading, Headers and Footers.
	पाठ्य सामग्री वाचन एवं संपादन पोर्टेबल डॉक्यूमेंट फॉर्मेट (pfg) वाचकों की सामान्य जानकारी : एडोब एक्रोबैट, नाइट्रो, पी.डी. एफ–X चेंज, इत्यादि।

	एप्लीकेशन पैकेज का सामान्य जानकारी : माइक्रोसॉफ्ट ऑफिस, ओपन–ऑफिस एवं डब्लू.पी.एस. (WPS) ऑफिस का प्रारंभिक ज्ञान। वर्ड–2007 एवं आगामी संस्करणों द्वारा पाठ्य सामग्री का संपाइन एवं फॉर्मेटिंग– टेम्पलेट द्वारा दस्तावेज बनाना, वर्ड फाइल फार्मेट में सुरक्षित करना, दस्तावेज का पूर्वावलोकन , दस्तावेज का फाइल अथवा पेज पर मुद्रित करना, दस्तावेज का संरक्षण, वयनित पाठ्य सामग्री का संपादन, पाठ्य सामग्री को जोड़ना, हटाना एवं स्थांनातरित करना। दस्तावेजों की फॉर्मेटिंग : पेज लेआउट, पैराग्राफ फॉर्मेट, पाठ्य सामग्री एवं पैराग्राफ का संरेखण, बॉर्डर एवं शेडिंग, हैडर एवं फुटर।

Note: No separate external practicai examination will be conducted. **Max. Marks : 15**

Topic to be covered under practical for CCE

Minimum laboratory timing of two hours per week per batch will be allotted.

A)	Know your computer: • Input / Output devices and their connections with CPU. • Identify different ports. • Identify types of RAM & its Capacity. • Identify different types of cards. • Identify different types of connecting cables and their connections. • Identification of Network & Wireless devices.
	अ) अपने कम्प्यूटर को जानिए • निवेशी / निर्गत युक्तियाँ एवं सी.पी.यू. के साथ इसका संयोजन • विभिन्न पोर्ट्स की पहचान करना। • विभिन्न प्रकारों की रैम एवं उनकी स्मति क्षमता की पहचान करना। • विभिन्न कार्ड्स की पहचान करना। • विभिन्न कम्प्यूटर केबलों की पहचान करना एवं उनको जोड़ना। • नेटवर्क एवं वायरलेस युक्तियों की पहचान।
B)	DOS: • Internal & external DOS commands. • Searching files & directories using wildcard characters. • Creating & editing simple batch (BAT) file.
	ब) डॉस • आंतरिक एवं बाह्य डॉस निर्देश। • वाइल्ड कार्ड चिन्हों का प्रयोग कर फाइल एवं डायरेक्ट्रियों को खोजना। • सरल बैच फाइलों को बनाना वं उनका सम्पादन करना।
C)	Windows 7/8/8.1: • Desktop setting: Customizing of Desktop, Screen saver, background settings. • Creating folder using different options. • Creating shortcut of files & folders. • Control panel utility.
	स) विन्डोज 7/8/8.1 • डेस्कटॉप सेटिंग : डेस्कटॉप को अनुकूलित करना, स्क्रीन सेवर, पृष्ठभूमि सेटिंग। • विभिन्न विकल्पों का प्रयोग करते हुए फोल्डर का निर्माण करना। • फाइल एवं फोल्डर के शॉर्टकट बनाना। • कंट्रोल पैनल उपयोगिताएं।

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b)	MS-Word: • Features of MS Word: Office Button, Customize Ribbon, Quick Access Toolbar. • Creating file: Save & Save as HTML, Text, Template, RTF format, etc. • Page setup: Margin settings, paper size setting & page layout. • Editing: Use of cut, copy, paste, paste special, undo, redo, find, replace, goto, spellcheck, etc. • View Menu: Views (Read Mode, Outline, Print Layout, Web Layout, Draft Layout); Show (Ruler, Gridlines, Navigation Pane); Zoom; Split. • Insert: Page break, page number, symbol, date & time, auto text, object, hyperlink, picture, equation, header, footer, footnote, etc. • Format: Font, Paragraph, Bullets & Numbering, Border & shading, Change case, Columns, text color, Inserting text using IME fonts (Unicode), etc.
	एम. एस. वर्ड : • एम. एस. वर्ड की विशेषताएँ : ऑफिस बटन, कस्टमाइज रिबन, क्विक एक्सेस टूलबार। • फाइल निर्माण : फाइल सुरक्षण, फाइल का एच.टी.एम.एल., टेक्स्ट, टेम्पलेट, आर.टी.एफ. आदि फॉर्मेट में सुरक्षण। • पेज सेटअप : मार्जिन सेटिंग, पेपर साईज, सेटिंग एवं पेज लेआउट। • संपादन : कट, कॉपी, पेस्ट, स्पेशल, अन–डू, री–डू, फाईड, रिप्लेस, गो–टू, स्पेल चेक आदि का प्रयोग करना। • व्यू मेनू : व्यूज, (रीड मोड, आउटलाइन, प्रिंट लेआउट, वेब लेआउट, ड्राफ्ट लेआउट), शो (रुलर, ग्रिड लाइन्स, नेविगेशन पेन), स्प्लिट। • इन्सर्ट : पेज ब्रेक, पेज नंबर, प्रतीक(Symbol), डेट एवं टाइम, ऑटो–टेक्स्ट, ऑब्जेक्ट, हाइपरलिंक, पिक्चर, समीकरण, हैडर, फूटर फुटनोट, आदि। • फॉर्मेट : फॉन्ट, पैराग्राफ, बुलेट एवं नंबरिंग, बॉर्डर एवं शेडिंग, चेंजकेस, कॉलम, टेक्स्ट कलर, आई.एम.ई. फॉण्ट (यूनिकोड) का प्रयोग कर टेक्स्ट का समावेशन आदि।

B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

THIRD YEAR

SEMESTER-VI

Subject: Foundation Course – 1

Title of Paper: नैतिक शिक्षा और भाषा **(Moral Values & Language)**

Max. Marks: 85 (Moral Education- 15, Hindi- 35, English- 35)

Max. Marks - 100
External Marks - 85
Internal Marks - 15

Particulars

Part- A

Unit — I	नैतिक मूल्य 1. श्री रामचरितमानस में निहित नैतिक मूल्य	15
Unit — II	हिन्दी भाषा 1. आत्म निर्भरता (वैचारिक निबंध) – पंडित बालकृष्ण भट्ट 2. गूलर का फूल (एक अरण्य कथा) – कुबेरनाथ राय 3. मध्यप्रदेश की लोक कलाएँ (संकलित) 4. मध्यप्रदेश की लोक साहित्य (संकलित) 5. हमारी समस्याऐं – वीर सावरकर 6. पत्र लेखन – प्रारुपण, टिप्पणी, आदेश, परिपत्र, ज्ञापन, अनुरमारक (संकलित)	17
Unit — III	हिन्दी भाषा 1. पूछो न प्रात की बात आज (चिंतनपरक) – रमेशचन्द्र शाह 2. गेहूँ और गुलाब (वैचारिक निबंध) – रामवृक्ष बैनीपुरी 3. दूरभाष और मोबाइल (संकलित) 4. मध्यप्रदेश का चित्रकला, मूर्तिकला एवं स्थापत्य कला (संकलित) 5. हिन्दी की शब्द सम्पता (संकलित)	18
	Part- B	
Unit — IV	**English Language** 1. Stopping by Woods On a Snowy Evening : Robert Frost 2. Communication Education and Information Technology : K. Adudiopillai 3. The Gift of Magi : O Henry 4. The Cherry Tree : Ruskin Bond	17
Unit — V	**English Language** Translation of a short passage from Hindi to English and English to Hindi Communication through social media Preparation of power point presentation **Basic language skills :** Correction of common errors in the sentence structure, use of tense, prepositions, verbs, adverbs, nouns, pronouns and articles. Short essay on a given topic. Expansion of idea and summary writing.	18

** सैद्धान्तिक परीक्षा हेतु उपरोक्तानुसार 85 (15+35+35) अंक और आन्तरिक मूल्यांकन (सी.सी.ई) हेतु पृथक से 15 (5+5+5) अंक निर्धारित है।

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THIRD YEAR

SEMESTER-VI

Subject: Foundation Course – II

Title of Paper: Basics of Computer & Information Technology - II

Max. Marks - 50
External Marks - 35
Internal Marks - 15

Particulars (For 35 Marks)

Unit-I	PowerPoint-I • Creating presentation using Slide master and Template in various Themes & Variants. • Working with slides: New slide, move, copy, delete, duplicate, slide layouts, Presentation views. • Format Menu: Font, Paragraph, Drawing & Editing. • Printing presentation: Print slides, notes, handouts and outlines. • Saving presentation in different file Jormats,
	माइक्रोसॉफ्ट पॉवरपॉइंट – I • स्लाइड मास्टर और टेम्पलेट का उपयोग करते हुए विभिन्न थीम्स और वैरिएंटस में प्रस्तुति बनाना। • स्लाइड के साथ कार्य करना : नई–स्लाइड बनाना, मूव करना, प्रतिलिपि बनाना, डिलीट करना, डुप्लीकेट बनाना, स्लाइड ले–आइट, प्रेजेंटेशन व्यूज, • फॉर्मेट मेनू : फॉन्ट, पैराग्रॉफ, ड्राइंग, और संपादन, • प्रस्तुति का मुद्रण : स्लाइड्स, नोट्स पेजेस, हैंडआउट्स, और रुपरेखा की प्रिंटिंग • विभिन्न फाइल स्वरुपों में प्रस्तुति का सुरक्षण
Unit-II	PowerPoint-II • Idea of SmartArt graphics, inserting text/data using SmartArt. Converting old style presentation into new style through SmartAtt. • Inserting objects (Video, Audio, Symbol, Equation, etc.), table & excel sheets, picture, Chart, photo album, Shapes and SmartArt; Trimming of audio/videos. • Connecting slides through hyperlink and action button. • Slide sorter, slide transition and animation effects. • Presenting the slide show: Setup Slide Show, Rehearse Timing.
	माइक्रोसॉफ्ट पॉवरपॉइंट – II • स्मार्ट–आर्ट ग्राफिक्स, स्मार्ट–आर्ट द्वारा टेक्सट/डाटा डालना, स्मार्ट–आर्ट की सहायता से पुराने प्रस्तुति को नयी प्रस्तुति में बदलना। • ऑब्जेक्ट्स (विडियो, ऑडियो, प्रतीक, समीकरण, इत्यादि), सारणी, एक्सेल शीट, चित्र, चार्ट, फोटो एल्बम, आकार एवं स्मार्ट–आर्ट को प्रस्तुति में डालना, ऑडियो/विडियो की काटना/छाटना • हाइपरलिंक और एक्शन बटन की सहायता से स्लाइड्स को जोड़ना • स्लाइड सॉर्टर, स्लाइड ट्रांजीशन एवं एनीमेशन प्रभाव • स्लाइड शो को प्रस्तुत करना : सेटअप स्लाइड शो एवं रीहर्सा–टाइमिंग

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Unit-III	MS Excel • Workbook & Worksheet Fundamentals: Concept of Row, Column & Cell: Creating a new workbook through blank & template. • Working with worksheet; Entering data into worksheet (General, Number, Currency, . Date, Time, Text, Accounting, etc); Renaming, Copying, Inserting, deleting & protecting worksheet. • Working with Row & Column (Inserting, Deleting, Pasting, Resizing & Hiding), Cell & Cell formatting, Concept of Range. • Charts: Preparing & editing different types of Charts, Inserting trendline, Backward & forward forecasting. • Working with formulas: Formula bar; Types of functions: Syntax & uses of the following functions: SUM, TOTAL, COUNT, AVERAGE, MAX, MIN, ROUND & IR
	माइक्रोसॉफ्ट एक्सेल – (MS Excel) • वर्कबुक और वर्कशीट के मूल तत्व : पंक्ति, स्तम्भ और सेल की अवधारणा, नई वर्कबुक को ब्लेंक और टेम्पलेट की सहायता से बनाना। • वर्कशील में कार्य : वर्कशील में डाटा (सामान्य, नंबर, करन्सी, डेट, टाइम, टेक्स्ट, एकाउंटिंग, इत्यादि) प्रविष्ट करना, वर्कशील का नाम बदलना, प्रतिलिपि बनाना, प्रविष्ट करना, हटाना तथा रक्षित करना • पंक्ति और स्तम्भ के साथ कार्य (डालना, हटाना, फस्ट करना, आकार बदलना और छुपाना) सेल और सेल फॉमेटिंग, रेंज की अवधारणा • चार्ट : विभिन्न प्रकार के चार्ट्स बनाना और उनका संपादन करना, ट्रैड–लाइन डालना, पीछे एवं आगे का पूर्वानुमान लगाना। • फार्मूले के साथ कार्य : फार्मूला बार, फंक्शन के प्रकार, निम्न फंक्शन्स के सिंटेक्स और उपयोग, SUM, TOTAL, COUNT, AVERAGE, MAX, MIN, ROUND, एवं IF
Unit-IV	Internet & Web Services • Internet: World Wide Web, Dial-up connectivity, leased line, VSAT, Broad band, Wi-Fi, URL, Domain name, Web Browser (Internet Explorer, Firefox, Google Chrome,Opera, UC browser, efc.); Search Engine (Google, Bing, Ask, etc.); Website: Static & Dynamic; Difference between Website & Portal. • E-mail: Account Opening, Sending & Receiving Mails, Managing Contacts & Folders. • Basics of Networking: Types of Networks (LAN, WAN, MAN); Network Topologies (Star, Ring, Bus, Hybrid). • Elementary idea of - Cloud Computing & Office Web Apps, Mobile Computing & Mobile Apps.
	इंटरनेट : वर्ल्ड–वाइड–वेब, डायलअप, कनेक्टिविटी, लीज्ड लाइन, व्ही.सेट, ब्रॉडबैड, वाय–फाई, यू.आर.एल., वेब–ब्राउजर, (इंटरनेट एक्स्प्लोरर, फायरफॉक्स, गूगल क्रोम, ऑपेरा, यूसी ब्राउजर, इत्यादि), सर्च इंजन (गूगल, बिंग, Ask इत्यादि), वेबसाइट : स्थैतिक व गतिकीय, पोर्टस और वेबसाइट में अंतर इमेल : खाता खोलना, मेल का भेजना एवं प्राप्त करना, कॉन्टेक्ट्स एवं फोल्डर्स का मैनेज करना नेटवर्किंग के मूल तत्व : नेटवर्क के प्रकार (LAN, WAN, MAN), नेटवर्क टोपोलॉजी (स्टार, रिंग बस, हाइब्रिड) क्लाउड कम्प्यूटर व ऑफिस वेब एप्स और मोबाइल कम्प्यूटिंग व मोबाइल एप्स का प्राथमिक ज्ञान
Unit-V	Cyber Ethics, Security & Privacy • Email, Internet & Social Networking Ethics • Types of viruses & antivirus • Computer security issues & its protection through Firewall & antivirus • Cyber Policies, Intellectual Property Rights (IPR), Violation of Copyright & Redressal. • Making secured online transactions.
	साइबर शिष्टाचार, सुरक्षा और गोपनीयता • इमेल, इंटरनेट और सोशल नेटवर्किंग शिष्टाचार • वाइरस और एंटीवायरस के प्रकार

	• कम्प्यूटर सुरक्षा के मुद्दे और एंटीवायरस के माध्यम से सुरक्षा • साइबर नीतियों, बौद्धिक सम्पदा आधिकार (आई.पी.आर.), कॉपीराइट का उल्लंघन और निवारण • सुरक्षित तरीके से ऑनलाइन लेन–देन का निष्पादन करना

Note: No separate external practical examination will be conducted. **Max. Marks : 15**

Topic to be covered under practical for CCE

Particulars

Minimum laboratory timing of two hours per week per batch will be allotted.

A)	MS-Excel: • Features of MS Excel: Office Button, Customize Ribbon, Quick Access Toolbar. • Creating new workbook using blank & tempiate format; inserting new sheet in a workbook; renaming of sheet, move, copy & protect sheet. • Page layout: Margins, Orientation, Size, Print area, Print titles. • Format Cell: Number, Alignment, Font, Border, Fill & Protection. • Charts: Column, Bar, Pie, Line, Area, X-Y (scatter), Stock. Use of Trendline & Forecasting in charts. • Data: Sorting and Filter. • Functions: SUM, TOTAL, COUNT, AVERAGE, MAX, MIN, ROUND, IF, etc.
	एम. एस. एक्सेल • एम. एस. एक्सेल की विशेषताऐं : ऑफिस बटन, करस्टमाइज रिबन, क्विक एक्सेस टूलबार। • ब्लेक एवं टेम्पलेट फॉर्मेट से नयी वर्कबुक का निर्माण, नयी शीट को वर्कबुक में जोड़ना, शीट का नाम परिवर्तित करना, प्रतिलिपि बनाना एवं संरक्षित करना। • पेज ले–आउट : मार्जिन, ओरिएंटेशन, साइज, प्रिंट एरिया, प्रिंट टाइटल्स • फॉर्मेट सेल : नंबर, एलाइनमेंट, फॉण्ट, बॉर्डर, फिल एवं प्रोटेक्शन। • चार्ट्स : कॉलम, बार, पाई, लाइन, एरिया X-Y (स्कैटर), स्टॉक, ट्रेंडलाइन एवं फाफरकास्टिंग का चार्ट में उपयोग • डाटा : सोंटिग एवं फिल्टर • फंक्शन : SUM, TOTAL, COUNT, AVERAGE, MAX, MIN, ROUND, IF, etc.
B)	MS-PowerPoint: • Features of MS PowerPoint: Office Button, Customize Ribbon, Quick Access Toolbar. • Creating new slide, formatting slide layout, Slide Show & Slide Sorter, Inserting new slide, slide number, date, time, chart, formatting slide. • Use of transition & animation in presentation. • Setup slide show and use of rehearse timing
	एम. एस. पॉवरपॉइंट • एम. एस. पॉवरपॉइंट की विशेषताऐं, ऑफिस बटन, करस्टमाइज रिवन, क्विक एक्सेस दूरबार। • स्लाइड बनाना, स्लाइड लेआउट की फॉर्मेटिंग, स्लाइड शो एव स्लाइड सोर्टर, नयी स्लाइड डालना, स्लाइड नंबर, डेट, टाइम, चार्ट स्लाइड फॉर्मेटिंग। • ट्रांजीशन और एनीमेशन का प्रस्तुति में उपयोग। • स्लाइड शो का सेलअप करना, रीहर्स–टाइमिंग का उपयोग।
C)	Internet & Email: • Understanding of a dial-up/broadband connection. • Opening new e-mail account (Gmail, Yahoo, Rediffmail, etc). • Understanding of e-mail structure.

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	• Managing contacts and folders of an e-mail account. • Send and receive e-mail (Downloading/Uploading of attachments). • Sharing of files, Images & Videos through e-mail, Skype, Skydrive & Cloud. • Managing safe email account through mobile/smartphone. • Normal and advanced searching, use of filters in searching of any content on Internet,
	इंटरनेट एवं ईमेल : • डायल–अप/ब्रॉड–बैंड कनेक्शन को समझना • नया ई–मेल खाता खोलना (Gmail, Yahoo, Rediffmail, etc). • ई–मेल की संरचना समझना • ई–मेल खाते के कॉन्टेक्ट्स एवं फोल्डर्स का प्रबंधन करना • ई–मेल भेजना एवं प्राप्त करना (संलग्नक को डाउनलोड/अपलोड करना) • ई–मेल, स्काईप, स्काईड्राइव एवं क्लाउड द्वारा फाइल, इमेज तथा इमेज तथा विडियो का आदान–प्रदान • मोबाइल/स्मार्टफोन द्वारा ई–मेल खाते का सुरक्षित रुप से संचालन करना • इंटरनेट पर किसी टेक्सट को ढूढने के लिए सामान्य एवं उच्च स्तरीय खोज, सही खोज के लिए फिल्टर का उपयोग करना।

B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

FIRST YEAR

SEMESTER-I

Subject: Education Course

Title of Paper: EC 01 – Education in India – Status, Problem and Issues

Max. Marks - 100
External Marks - 85
Internal Marks - 15

Objectives:

- To develop perception of the role and functions of a teacher as envisaged in the NPE 1986 and to familiarize the Student Teacher with the different projects and schemes at Secondary level in M.P.
- To develop an understanding of the brief historical background of Indian Education with special reference to with special reference to Secondary Education.
- To develop an understanding of the objectives and scope of Secondary Education.
- To develop an awareness of the professional ethics.

Content:

Unit I: Concept of Education –

- Indian and Western, Aims of Education; Functions of Education
- Education as an instrument of Social Control, Social Change
- Preservation of Cultural Heritage and Values
- School and the society, Culture and Education, School as a Social System,

  Agencies of Education – Information, Formal and Non-formal.

Unit II: Salient Features of Ancient Indian Education –

- Vedic, Buddhist, Jainism, Islamic
- Tradition in Education. (Specially Gurukul System)
- Major Landmarks of British System of Education in Colonial India particularly from the viewpoint of Aims, Structure, Curricula and Methods of Educations.
- Efforts towards evolving a national system of Education.

Unit III: Ancient Education System of India –

- Ancient education system of India: A Way of Life
- Vihars and Universities: Nalanda University, Takshashila or Taxila University, Vikramshila University, Morena Golden Triangle University and Nagarjuna Vidyapeeth.
- Role of Teacher
- Role of Community
- Continuation of Indian Education System

Unit IV: Secondary Education –

- General Aims and Objectives of Secondary Education and Structure, Education during Post Independence Period. Constitutional provisions for education,

  Secondary Education Commission 1952-53, Education Commission 1964-66, New Education Policy 1986 with Programme of Action 1992 and National Education Policy 2020.
- Different streams of Secondary Education (1) C.B.S.E. (2) I.C.S.C. and (3) KSEEB with

respect to curriculum (4) Examination System etc.,

- Secondary School Teacher – Qualifications, Competences, Job Profile, Professional Code of Ethical conduct.
- Role of Secondary school teacher in Emerging India.

Unit V: Teacher Education and Secondary School Curriculum –

- Status, Aims and Objectives of Teacher Education in India.
- Role and Responsibilities of NCTE, NCERT, DSERT, CTE IASE.
- Professional organization in the field of Teacher Education.
- Rastriya Madhyamika Shikshana Abiyana (RMSA), NCF-2005.
- Programmes for enhancing efficiency and productivity of school teachers – In-service training – orientation and content enrichment programmes.

Assignments: (Any two of the following)

- Prepare and execute a plan for making at least two children and one adult literate from the community.
- Plan and organize a field trip/excursion to a nearby area of educational important and submit a report.
- Visit to block or district and divisional educational offices and study their educational management pattern and submit the report.
- Prepare one project for institutional planning.
- Critically Study the working of the one of the parent teacher association in any two secondary schools.
- A critical survey of co-curricular activities in secondary school.

References:

- Anand C.L. et al., (1993) Teacher and Education in the emerging Indian society NCERT New Delhi.
- Government of India (1952) Report of the Secondary Education Commission, New Delhi: - Ministry of Education.
- Government of India MHRD (1986) (Revised 1992) National Policy of Education, New Delhi.
- Government of India (1992) Report of Core Group on Value Orientation of Education Planning Commission.
- Mani R.S. (1964) Educational Ideas and Ideas of Gandhi and Tagore, New Book Society, New Delhi.
- Mathur S.S. (1988) A Sociological Approach to Indian Education, Agra. Vinod Prakashan.
- NCTE (1988) Gandhi on Education, New Delhi.

B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

FIRST YEAR

SEMESTER-I

Subject: Education Course

Title of Paper: EC 02 – Childhood Growing Up

Max. Marks - 100
External Marks - 85
Internal Marks - 15

Objectives:

- To develop an understanding of different aspects of a child's physical, motor, social and emotional development.
- To understand the developmental process of children with diverse abilities in social, cultural and political context.
- To build sensitivity towards children's developmental needs and capabilities, within their socio-cultural context.
- To develop a sensitive and critical understanding of the different social / educational / cultural / political realities at the core of the exploration into childhood.
- To build an interdisciplinary frame work to interpret, analyze observations and interactions from cross culture psychology.
- To develop critical deconstruction of significant events that media highlights and creates during childhood.
- To provide hands-on experiences to interact with children, and training in methods to understand aspects of the development of children.
- To develop the power to interpret how gender caste and social class may impact the lived experience of children.

CONTENT:

Unit I: Perspectives in Development:

- Concept, Meaning, Scope and Function of Educational Psychology.
- Introduction to development: Concept and introduction to perspectives in development, humanistic psychology and developmental theory.
- Enduring themes in the study of development: Development as multidimensional and plural; Development as continuous / discontinuous? Socio-cultural contexts influencing development.
- Gathering data about children from different contexts: Naturalistic observations; interviews; reflective journals about children; anecdotal records and narratives; clinical methods with reference to Piaget.
- Method: Longitudinal, Cross Sectional, Sequential, Cohort Methods, Biographical, Case Study and Observational Method.

Unit II: Stages of Human Development:

- Child as a developing individual; a psycho-social entity; stage of development.
- Developmental characteristics of a child and an adolescent: physical, cognitive, social, emotional, moral and language; their interrelationships.
- Developmental tasks of childhood and adolescence and their implications.

- Factors influencing development such as heredity & environment, media nutrition, child-rearing practices, siblings an peers.
- Commonalities and diversities within the notion of childhood and how multiple childhoods are constructed with particular reference to the Indian context-Living in an urban Slum, Growing up in dalit household.

Unit III: Social and Emotional Development:

- Basic understanding of emotions, how differential gender socialization occurs. Personality development: Freud; psycho-social development-Erikson; influence of early childhood experiences on later personality.
- Social theories and gender development: Meaning of gender roles; influences on gender roles, stereotypes, gender in the playground.
- Development of emotions: functions of emotions, attachment-Bowlby.

Unit IV: Contexts of Socialization:

- Concept of socialization: Family add child relationships; parenting, child rearing practices.
- Schooling: Peer influences, school culture, relationships with teachers, teacher expectations and school achievement; being out of school, overage learner.
- Relationships with peer: Friendships and gender; competition and cooperation, competition and conflict; aggression and bullying from early childhood to adolescence.
- Social, economic and cultural differences in socialization: Implications for inclusion.

Essential Readings:

- Cole, M., Cole, S. R. and Lightfoot, C. (2004). The Development of Children. New York: Worth Publishers. Chapter 1: The study of Human Development.
- Newman, B. M. and Newman, P. H. (2007). Theories of Human Development London: Lawrence Erlbaum Associates, publishers. Chapter 1: Introduction.
- Papalia, D. E. and Olds, S. W. (2003). Human Development. New York: McGraw Hill Higher Education. Chapter 1: The study of Human Development. Chapter 2: Theory and Research, Chapter 4: Physical Development During the First Three Years, Chapter 7: Physical Development in Early Childhood, Chapter 9: Physical Development in Middle Childhood.
- Saraswathi, T. S. (Ed.) (1999). Culture, Socialization and Human Development: Theory, Research and Applications in India. Sage publication. Chapter 4: Theoretical Frameworks in Cross-cultural Psychology, Chapter 6: Individualism in a Collective Culture: A Case of Co-existence of Opposites.
- Vasanta, D. (2004). Childhood, Work and Schooling: Some Reflections. Contemporary Education Dialogue, Vol. (2), 5-29, 6. Mukunda, K. V. (2009). What Did You Ask in School Today? A Handbook on Child Learning. Noida: Harper Collins. Chapter 4: Child Development, 79-96.
- Readings for Discussion 1. Aries, P. (1965), Centuries of Childhood-A social history of the family life, Random House Inc. Chapter 1: The Ages of Life, Chapter 2: The Discovery of Childhood, and Conclusion – The two concepts of childhood. 2. Harris, M. and Butterworth, G. (2002). Developmental Psychology: A student's handbook. New York: Taylor & Francis. Chapter 1: Brief History of Developmental Psychology.

Advanced Readings:

- Kakkar, S. (1978). Indian Childhood: Cultural Ideas, And Social Reality. New Delhi: Oxford.
- Nambissan, G. (2010), Exclusion and Discrimination in Schools: Experiences of Dalit Children; Working paper series Volume 01, Number 01, Indian Institute of Dalit Studies and

- Kakkar S. (1991). The Inner World: A Psycho-analytic study of childhood and society in India. Delhi: Oxford University Press.
- Sandra, L. Bem (1987). Gender Schema Theory and its Implications for Child Development: Raising gender a schematic children in a gender schematic society, in M. R. Walsh (ed.). The Psychology of Women. Harvard University Press Cambridge, 206-226.
- Weiner, M. (1991). The State and the Child in India: Child Labour and Education Policy in Comparative Perspective. Princeton: Princeton University Press.

B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

FIRST YEAR

SEMESTER-II

Subject: Education Course

Title of Paper: EC 03 – Learning and Teaching

Max. Marks - 100
External Marks - 85
Internal Marks - 15

Aims of the Course:

- To become aware of different contexts of learning and situate schools as a special environment for learning;
- To reflect on their own implicit understanding of the nature and kinds of learning;
- Gain an understanding of different theoretical perspectives on learning with a focus on cognitive views of learning as well as social-constructivist theories;
- Explore the possibilities of an understanding of processes in human cognition and meaning-making them as basis for designing learning environments and experiences at school; and
- Appreciate the critical role of learner's based on differences and contexts in making meanings, and hence draw out implications for schools and teachers.

Unit I: Theoretical Perspectives on Learning

- Implicit knowledge and beliefs about learning (demystifying misconceptions).
- Perspectives on human learning; Behaviourist (conditioning paradigm in brief), cognitivist, information-processing view, humanist, social-constructivist (drawing selectively on the ideas of Skinner, Piaget, Rogers, Vygotsky).
- Concepts and principles of each perspective and their applicability in different learning situations.

Unit II: Role of Learner in Learning

- Role of learner in various learning situations, as seen in different theoretical perspectives
- Role of teacher in teaching-learning situations: (a) Transmitter of knowledge, (b) Model, (c) Facilitator, (d) Negotiator, (e) Co-learner. (The focus is on building understanding of different psychological perspectives of learning and helping student teachers to learn to apply them in different learning situations).
- Distinctions between learning as 'construction of knowledge' and learning as 'transmission and reception of knowledge'.

Unit III: Learning in 'Constructivist' Perspective

- Social-constructivist perspective (also Bruner and Ausubel's perspective) and applications of Vygotky's ideas in teaching.
- Understanding processes that facilitate 'construction of knowledge': (i) Experiential learning and reflection (ii) Social mediation (iii) Cognitive negotiability (iv) Situated learning and cognitive apprenticeship (v) Meta-cognition.
- Creating facilitative learning environments, teachers' attitudes, expectations – Enhancing, Motivation, Positive emotions, Self-efficacy, Collaborative and self regulated learning. (The focus is on learning as a constructive rather than a reproductive process The learner-centered orientation has implications for understanding learning as contextual and self-regulated process and following suitable classroom practices).

Unit IV: Individual Differences Among Learners

Dimensions of differences in psychological attributes – cognitive abilities, interest, aptitude, creativity, personality, values.

- Understanding learners from multiple intelligences perspective with a focus on Gardner's theory of multiple intelligences. Implications for teaching-learning in the light of changing concept of intelligence, including emotional intelligence.
- Differences in learners based on predominant 'Learning styles'.
- Differences in learners based on socio-cultural contexts: Impact of home 'languages of learners' and language of instruction, impact of differential 'cultural capital' of learners.
- Understanding differences based on a range of cognitive abilities – learning difficulties, slow learners and dyselxics, intellectual deficiency, intellectual, giftedness. Implications for catering to individual variations in view of 'difference' rather than 'deficit' perspective. (The focus is on understanding the differential learning needs of the learners with regard to abilities, learning styles, language, socio-cultural differences/disadvantage, learning difficulties, and their implications for classroom practices and teaching).

Unit V: Guidance and Counselling

- Meaning. Aim, Objectives and Need of Guidance & Counselling
- Types of Guidance
- Principles of Guidance

References:

- Agrawal J.C. Essential of Educational Psychology, Vikas Publishers, Delhi, 1998.
- Bhargava, Mahesh, Introduction of Exceptional Children, Sterling Publishers, New Delhi, 1994.
- Chauhan, S.S. Advanced Educational Psychology, Vikas Publishing New Delhi, 1996.
- Eshwar, H.S. and Nataraj P., Shaikshanika Manovijnana, Parichaya Bhaga I and II, Institute of Kannada Studies, Union of Mysore, 1995.
- Mangal, S.K. Advanced Educational Psychology, Prentice Hall of India. Pvt. Ltd., 1999.
- Mathur, S.S., Educational Psychology, 9th Ed., Vinod Pustak Mandir, Agra, 1981.
- Sharma, R.N. Educational Psychology and Guidance, Vikas Publishers, Delhi, 1998.

FIRST YEAR

SEMESTER-II

Subject: Education Course

Title of Paper: EC 04 – Curriculum Development and School

Max. Marks - 100
External Marks - 85
Internal Marks – 15

Objectives:

- To acquaint students with the nature and types of curriculum.
- To acquaint students with the context of curriculum development and some Innovative Curriculum Models.
- To familiarize students with Designing of Curriculum.
- To give practical experience in Evaluating, Designing and Reviewing Currriculum.

Content:

Unit I: Curriculum: Meaning, Definition and scope

Curriculum – Meaning and Nature, types of Curriculum, Syllabus and Text books – Their interrelationship. Issues and problems of existing curriculum.

Unit II: Curriculum: Construction and Design

Curriculum Construction, Curriculum Development and Curriculum Designing: Concepts and differences. Determinants and motives of Curriculum Development. Different Curriculum Models-open university, Open school, etc.

Unit III: Implementation of Curriculum

Steps of Designing different Curriculum. Selection, Gradation and Organization of Curriculum. Development and Implementation of Curriculum. Enrichment of Curriculum.

Unit IV: Principles of Curriculum construction

Concept and Principles of Curriculum, Strategies of Curriculum Development, Stages in the Process of Curriculum development, Foundations of Curriculum Planning - Philosophical Bases (National, democratic), Sociological basis (socio cultural reconstruction), Psychological Bases (learner's needs and interests)

Unit V: Meaning and types of Curriculum change, Factors affecting curriculum change, Approaches to curriculum change, Role of students, teachers and educational administrators in curriculum change and improvement, Scope of curriculum research and Types of Research in Curriculum Studies

Practicals

- Evaluation of B.Ed. Curriculum
- Designing a Curriculum in a given condition

Reviewing of Syllabus/Books

References:

- Ashcroft, Kate an Palacio, David: The Primary Teacher's Guide to the New National Curriculum. London: Flamer Press, 1995.
- Doll, Ronald C.: Curriculum Improvement – Decision Making and Process. London; Allyn and Bacon, 1996.
- Prasad, Janardan & Kaushik, V.K. Advanced Curriculum Construction. New Delhi: Kanishka

Publishers, 1997.

- Richmond, K.W.: The School Curriculum. Methuen and Co. Ltd., London 1973.
- Saylor, J.G. and Alexander, W.H.: Curriculum, Planning for Modern Schools, London: Holt, Rinehart and Winston, Inc., 1966.
- Wiles, Jon & Bondi, Josph C.: Curriculum Development – A Guide to Practice, London: E. Merrill Publishing Co., 1984.

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SECOND YEAR

SEMESTER-III

Subject: Education Course

Title of Paper: EC 05 – Education Policies School Leadership and Management

Max. Marks - 100
External Marks - 85
Internal Marks - 15

Objectives:

- To develop perception of the role and function of a teacher as envisaged in the NPE 1986 and to familiarize the student teacher with the different projects and schemes at secondary level in Madhya Pradesh.
- To develop an understand of the brief historical background of Indian Education with special reference to secondary education.
- To acquire elementary knowledge of education administration and management.

Unit I: Education Policies

- General aims and objectives of education policies in reference of secondary education.
- Different education policies during pre and post – Independence period wood dispatch, maqualey minutes, wardh summit, Indian Act – 1935, Basic Shiksha (cqfu;knh f'k{kk) and mudaliar Commission Taleem. Radha Krishnan commission, Kothari Commission, NPE-1986, NPE amended 1992, Sarva Shiksha Abhiyan and RTE-2010.

Unit II:School Curriculum

- Main features of secondary school curriculum and the process of curriculum development.
- General principles of school curriculums
- Critical analysis of secondary school curriculum in context of Madhya Pradesh.

Unit III: Leadership

- Leadership in school: Concept need and importance of leadership, Dimension and style of leadership at secondary levels. Role of leadership in school effectiveness.
- Implementation of leadership at secondary level issues and challenges.
- Types, styles problems of leadership role of school Head Master / Principal in institutional planning.

Unit IV: Education Management

- Concept, need, characteristics, principles of educational management.
- Basic of Management – Planning, Organization, Control decision making and financing.
- Prevailing education management pattern in Madhya Pradesh.

Unit V: Function of Management

- Time Management – Principles and importance of time management in school curricular and co-curricular activities.
- Resource management – Different types of resources at school level maximum optimization of resources.

References:

- Agrawal, J.C., 2005: Nai Shiksha Nati, Prabhat Prakashan, New Delhi.
- Bhatnagar, R.P., Vidhya Shaikishik Prashan, Engle Book Depot, Meerut.
- NCERT (1998): School mapping, New Delhi.

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SECOND YEAR

SEMESTER-III

Subject: Education Course

Title of Paper: EC 06 – Gender School and Society

Max. Marks - 100
External Marks - 85
Internal Marks - 15

Objectives: To enable the Student Teacher to:

- To acquaint the student teachers with the concept of gendered roles in society and their challenges.
- To develop an understanding of the inequality and disparities in equal opportunities in education in societal context.
- To enable the student teachers to critically examine the stereotypes and rethink their beliefs.
- To help student teachers to develop abilities to handle notion of gender and sexuality.

Content:

Unit I: Gender Issues: Key Concepts

- The meaning and concept of gender and experience of gender in across different social groups, regions an time-periods. Challenges in gendered roles in society: Family, caste, religion, culture, the media and popular culture (films, advertisements, songs etc.), law and the state.
- Unequal access of education to girls; access to schools; gender identity construction at home and in society.
- Indian societal context: Power and authority in Indian Social System (patriarchy). Socialization of child into a specific gender influences and opportunities for education.

Unit II: Gender Challenges and Education

- Challenging gender inequalities or reinforcing gender parity: The role of schools, peers, teachers, curriculum and textbooks, etc.
- Representation of gendered roles, relationships and ideas in textbooks and curricula.
- Schools nurture or challenge creation of young people as masculine and feminine selves.

Unit III: Gender Issues and Role of Teacher

- Counseling and Guidance: Teachers' need help to develop abilities to handle notions of gender and sexuality, (often addressing the issues under diverse cultural constraints, their own and their students', instead of shying away from the same).
- Sex Education: Perceptions of safety at school, home and beyond (The formulation of positive notions of sexuality among young people impact larger issues).
- Identification of sexual abuse / violence and its verbalization, (combating the dominant societal outlook of objectification of the female body and so on).

Unit IV: Role of the Media and Life Skills Education

- Role of the media in propagation of popular beliefs, reinforcing gender roles in the popular culture and by implication, at school.
- Life Skills course in school: Provisions to deal with some issues of gender identity roles and performativity for the development of positive notions of body and self.

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- Gender equality Education of regions and exploring the roles of the institutions (family, caste, religion, culture, media and popular culture, law and the state).

Assignment:

- **Group Discussion:** B.Ed. student will observe and study the distribution of roles and responsibilities in schools and classrooms, rituals and school routines, processes of disciplining distinctly as for girls and boys, and in classroom interaction. Studying the everyday activities where the majority of girls constitute the assembly choir group and the boys form the inter-school cricket team; girls partnered to be seated with other girl students and bys with boys; sciences associated with boys and humanities with girls; art and craft considered to be the domain of the girls and physical education that of the boys; etc. Teachers need to question such stereotypes and help students rethink their beliefs. Why these issues are delineated only for supplementary extra-curricular periods in school and not integrated into subjects of study need to be discussed.
- **Group Work & Activities, Brainstorming, Audio-Visual Presentations:** Prospective teachers to attend and themselves undertake sessions of open verbalization with school students, voluntary cum friendly involvement in discussions, together with the co-participation of school (teachers, counselors and other resources), home (parents and siblings) and society (NGOs, other expert groups, etc.).
- **Assignments and Projects:** Student-teachers will be exposed and trained to prepare pedagogic material and practice a pedagogy which can develop abilities and confidence in their students to critically evaluate and challenge gender inequalities, while being sensitive to social groups.

References:

- Acker, S. (1994), Feminist theory and the study of gender and education; In S.
- Acker, Gendered Education; Sociological Reflections on women, Teaching and
- Feminism, Buckigham: Open University Press
- Barks, O. (1971) Sociology of Education Ed. 2 Landon: Batsford.
- Kumar, K. (1991) Political Agenda of Education, New Delhi: Sage.
- Lips, Hilary M. (1989) Sex and Gender an Introduction, California
- Child in South Asia', Indian, Journal of Social Sciences. Vol 3 No. 1.

B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

SECOND YEAR

SEMESTER-III

Subject: Education Course (Practicum)

Title of Paper: EPC 07 – Reading and Refelecting on Texts

Max. Marks - 50
External Marks - 40
Internal Marks – 10

Objectives:

- To enable the students to read and response to a Varity of text in different ways
- To develop Meta cognitive awareness
- To enhance the capacities as readers and writers by becoming participants in the process of reading
- To enable the student teachers to work on the field and make predictions and check their predictions and then to summarize

Unit I: Reading Skills

- Creating environment for reading – Reading clubs, Class libraries
- Reading aloud and silent reading
- Scaffolding: Concept and activities
- Reading different texts types stories, poems, riddles, jokes and instructions for games.

Unit II: Reading with Comprehension

- Reading for global and local comprehension extrapolation
- Inferences, analysis and
- Reading strategies including word-attack strategies
- Discourse analysis
- Using reading as a tool for reference skills i.e. use of dictionary, encyclopedia and internet
- Using ideas of critical literacy to analyze chapters from textbooks
- Acquisition of Reading Skills

Unit III: Types of Text

- Narrative text
- Expository
- Autobiographical Narratives
- Field Notes
- Ethnographics and strategies
- Addressing different types of skills

Mode of Transaction

- Participating in tasks and activities to improve proficiency in the receptive and productive of English.
- Text analysis of school textbooks to improve skills in critical literacy.
- "Reflecting on one" shown learning to make connections with pedagogy.

Essential Readings:

1. Lightbown, P.M. & Spada, N. (1999). How Languages are Learned Oxford: Oxford University Press.
2. Morgan, J. & Rinvolucri, M. (1983). Once upon a time: Using stories in the language

classroom. Cambridge., Cambridge University Press.

Advanced Readings:

1. Parrot M. (1993). Tasks for language teachers Cambridge: Cambridge University Press.
2. Slatterly, M. Willis, J. (2001). English for primary teachers: A handbook of activities & classroom language. Oxford: Oxford University Press.

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SECOND YEAR

SEMESTER-IV

Subject: Education Course

Title of Paper: EC 08 – Educational Technology and ICT

Max. Marks - 100
External Marks - 85
Internal Marks – 15

Objectives: Upon the completion of the course the student-teachers will able to:

- Explain meaning, components, functions of computer and its historical backgrounds.
- Understand the computer peripherals and its organization in computer system.
- Develop skill in handling computer and using word documents.
- Develop skill in computation, analysis and interpretation of data by using Excel Spread Sheets.
- Understand the Educational implications of Power Point Presentation and its use in classroom context.
- Under the applications of Information Technology in the field of teacher education programme and training.

Content:

Unit I: Fundamental of Computer

- History and Generations of Computer
- Meaning, Definition and Characteristics of Computer
- Basic Functions of Computer – Input-Process-Output Concepts
- Anatomy of Computer
- Classification of Computer:
  1. Based on size and capacity (Micro, Mini, Mainframe and Super Computers)
  2. Based on working principle (Analog, Digital and Hybrid Computers)

Unit II: Computer Organization: Hardware and Software

- **Input Devices:** Keyboard, Mouse, Scanner, Digital Camera, Mike, Digital Board
- **Central Processing Unit:** Arithmetic and Logic Unit, Control Unit and Memory Units.
- **Memory Devices (Storage Devices):**
  1. Primary Memory Devices: RAM, ROM, PROM, EPROM & EEPROM.
  2. Secondary Memory Devices: Hard Disk, CD-ROM, DVD, Optical Disk, Pen Drive
- **Output Devices:** Monitor, Printer, Plotter, Speaker
- **Operating System:**
  1. Needs and Functions of Operating System
  2. Types of Operating System – Single user and Multi user
- **Programming Languages:** Types of Languages – LLL and HLL
- **Computer Software:** System Software, Application Software and Operating System

- Computer Virus and its prevention.

Unit III: Microsoft Windows (System Software)

- **Introduction to MS-Windows:** Elements of MS-Windows, Start Menu, Desktop, Window Accessories, Control Panel, Windows Explorer.

- **Application Programme:** MS-Office (Application Software), MS-Word, MS-Excel & MS-Power Point.

- **Microsoft Word:**

  1. Parts of MS-Word Windows, MS-Word Standard, Formatting, Drawing Toolbars.

  2. Starting MS-Word, Opening a New Document, Opening Old Document, Naming the New Document, Saving the Document using save and save as commands.

  3. **Formatting the Documents:**

  Fonts: Font Style, Size, Bold, Italics, Underline, Normal, Spacing.

  Paragraph: Line spacing, Paragraph spacing, Paragraph borders, Bullets, Numbered list, Shadings.

  Page Setup: Paper orientation, Margins and Paper.

  Size: Alignment: Centre, Left, Right, Justified.

  4. **Editing the Document:**

  Cut, Copy, Paste, Special, Undo, Redo, Select All, Find, Replace, Go to, Page Number, Clear

  5. **Inserting:** Frame, Objects, Pictures, Headers, Footers, Page Number, Date and Time.

  6. **Tabs, Tables, Columns:** Insert Table, Delete Cells, Merge Cells, Split Cells, Select Row, Select Column, Select Table, Table Auto Format, Cell Height and Width Headings, Soft Text and Formula.

  7. **Working with the Drawing Tools:** Line, Rectangle, Ellipse, Arc, Style, Freeform, Text Box, Callout, Format Callout, Fill Colour, Line Colour, Line Bring to Front, Send to Back, Bring to Front to Text Send Behind Text, Flip Vertical, Flip Vertical, Rotate Right, Reshape.

  8. Page setting and printing the document and Mail merge.

  9. **Educational Based Applications:** Preparation of lesson plans using MS-Word

- **Microsoft Excel:**

  1. Parts of Excel Windows, Excel Standard, Formatting, Drawing, Toolbars.

  2. Creating a New Worksheet, Opening as Existing Worksheet, Saving the Worksheet.

  3. Working with Worksheet, Inserting and Deleting Rows & Columns Merge Cells, Formulae, Sorting, Inserting Charts.

  4. Preparation of School Time Table, Marks List, Salary Bills etc.

- **Microsoft Power Point:**

  1. Parts of Power Point Windows, Power Point Standard, Formatting, Drawing Toolbars.

  2. Working with Text: Changing Fonts, Changing Font Size and Bold, Alignments, Moving Text etc.

  3. Working with Graphics: Moving the Frames and Inserting Clip Arts, Inserting Pictures, Inserting New Slide, Organization of Charts, Tables, Designing Templates, Master Slide, Colour Box etc.

  4. Presentation of Slides: Saving Slides, Auto Content Wizard Slide Show, Animation, etc.

Unit IV: Applications Information and Communication Technology in Education

- **Introduction to ICT:** Meaning, Need and importance of ICT
- **Introduction to Multi Media:**
  1. Meaning of Multi Media
  2. Scope of Multi Media
  3. Components of Multi Media
  4. Pre-requisites of Multi Media PC
  5. Graphic Effects and Techniques
  6. Sound and Music
  7. Uses of Multi Media for Teaching
  8. Developing a Lesson Plan Using a Multi Media Package

- **Introduction to Internet:**
  1. Meaning of Internet
  2. Characteristics of Internet
  3. Uses of Internet
  4. Educational based applications of Internet
- **Computer Application in Education:**
  1. Computer Assisted Instruction: Concept, Characteristics, Modes, Merits and Demerits.
  2. Computer Assisted Testing: Concept, Characteristics, Modes, Merits and Demerits.
  3. Computer Managed Instruction: Concept, Characteristics, Modes, Merits and Demerits.
- **Introduction to / website:** Meaning and Importance.
- Social Websites (Blog / Twitter / Face book)

Requirements:

- **Infrastructure Requirements:** In order to implement ICT literacy in in-service teacher education and ICT laboratory / Multimedia centre may have to be setup No. of PCs / Systems will be required.
- It is recommended that for each student teacher get hands on experience at least one hour per week. College is free to design the practical time table.
- It is recommended that out of 4 hours a week (2 hours theory and 2 hours practical's).
- Institution should have to appoint ICT Teacher with minimum qualification of PGDCA / BCA / MCA

Assignments: (Any One Uniform Pattern)

- Write the History and Generations of Computer.
- Write the Input, Output and Storage devices of Computer System.
- Preparation of a Lesson Plan, Student List, Letters, Invitation: Hard Copy and Soft Copy.
- MS-Excel: Preparation of a School Time Table, Marks List – Analysis of Data and Graphical Representation – Hard copy and Soft copy.
- MS-Power Point: Preparation of Animated Slides (Insert Picture, Clip Arts, Word Art, Sound, Effects, Animation, etc.) for teaching any concept on your subjects.
- Internet: Surfing Educative Websites, Downloading, Taking a Printout, Creating E-mail Id.

- Balaguruswamy E. (2001), Programming in Basic, New Delhi; Tata McGraw Hill Publishing Company Limited.
- Gupta Vikas (1997), Micro Soft Windows, New Delhi; Pustak Mahal.
- Gupta Vikas (1997), Rapidex Computer Course, New Delhi; Pustak Mahal.
- Jain, V.K. (1997), Computer for Beginners, , New Delhi; Pustak Mahal.
- Leon, Alexis and Mathews (1998), E mail in a Nutshell, Chennai; Leon Tech World.

SECOND YEAR

SEMESTER-IV

Subject: Education Course

Title of Paper: EC 09 – Creating an Inclusive School

Max. Marks - 100
External Marks - 85
Internal Marks – 15

Objectives: On completion of the Course the Student Teacher will be able to:

- Identify the children of special needs.
- Understand the nature of special needs their psycho-educational characteristics and functional limitation.
- Familiarize with assessment and placement procedure for children with special needs.
- Develop understanding about accommodating special needs in regular classroom.
- Appreciate the education of children with special needs.

Content:

Unit I: Special Needs and Education

- Concept and types of special needs.
- Education of children with special needs and its implication for universilization of elementary education.
- Understanding and respecting diversity.
- Trends of education for children with special need in India.
- Policies schemes and legislations about the education of children with special educational needs.

Unit II: Nature, Types and Characteristics of Children with Special Needs

- Psycho-social and educational characteristics functional limitations with reference to:
- Locomoter impairment
- Hearing impairment
- Visual impairment
- Learning disability
- Gifted and disadvantaged children
- Mental retardation and slow learners

Unit III: Inclusive Education

- Concept and philosophy of inclusive education
- Teaching competencies required for inclusive education
- Roll of class teachers and resource teachers in inclusive education
- School and classroom management for implementing inclusive education
- Guidance and counseling in inclusive education
- Specific roll of family and community participation
- Support services needed for inclusive schools

Unit 1 : Identification and Assessment of Children with Special Educational Needs

- Concept and techniques of assessment
- Identification and functional assessment of children with special needs
- Implication of assessment for instructional planning and curriculum.
- Curriculum, adaptation, teaching strategies and evaluation in inclusive school.
- Principles and methods of curriculum adaptations and adjustment to address diversity.
- Teaching learning strategies for children with special educational needs.
- Comparative learning, peer tutoring, behaviour modification, multisensory approach, perceptual strategy and system approach.
- Individual educational program (IEP) and use of emerging technology.
- Adaptation in evaluation procedures.

Practicum: Any one of the following: Suggested practicum but more activities can be taken up by the teacher based on any topic from above unit.

- Preparation of a report on importance of education for children with special needs.
- Case study of children with special needs school in school situation.
- Observation of classroom situation and identification of special needs.
- Identification of gifted / creative / slow learner / children with learning disability using standardized test.
- Preparation of teaching plan for accommodation special need (any one type) in regular classroom.
- List out the resources for effective implementation of integration programme with reference to any one category of special needs.

Apart from the above similar activities from the five units will be identified and given.

References:

- Montgomary, D. (1990), Special need in ordinary schools; children with learning difficulties, Cassel Educational limited, Londan.
- Ainscow, M. (1990) Special needs in the classroom; A teacher education resource pack UNESCO.
- Hallahan and Kuffiman J.M. (1984) Exectional children, Prentice hall
- Haring N.G. (1986) Exceptional Children and youth Ohio; Columbus Charles E Meml Publishing Co. A Bell and Howell Co.

SECOND YEAR

SEMESTER-IV

Subject: Education Course (Practicum)

Title of Paper: EPC 10 – Drama and Art in Education

Max. Marks - 50
External Marks - 40
Internal Marks – 10

Introduction:

- The need to integrate arts education in the formal schooling of our students is to retain our unique cultural identity in all its diversity and richness and encourage young students and creative minds to do the arts. An understanding of the arts will give our youth the ability to appreciate the richness and variety of artistic traditions as well as make them liberal, creative thinkers and good citizens of the Nation. Keeping in view some of these ideas, the National Curriculum Framework-2005, introduced arts education as a mainstream curricular area, which must be taught in every school as a compulsory subject (up to X) and facilities for the same may be provided in every school. Keeping this in view, it is all the more important that arts education is integrated in the school curriculum to provide an aesthetically viable atmosphere in schools encouraging creativity. For this, not only Art teachers but every teacher in the school system should be sensitized to understand and experience the use of Arts of holistic development of the learner, as a teacher as well as an individual.

Objectives:

- Understanding basics of different Art forms – Impact of Art forms of the human mind
- Enhance artistic and aesthetic sensibility among learners to enable them to respond to the beauty in different Art forms, through genuine exploration, experience and free expression
- Enhance skills for integrating different Art forms across school curriculum at secondary level
- Enhance awareness of the rich cultural heritage, artists and artisans.

Course Content:

Unit I: Visual Arts And Crafts (Practical)

- Experimentation with different materials of Visual Art, Such as pastel, poster, pen and ink, rangoli materials, clay, etc.
- Exploration and experimentation with different methods of Visual Arts like Painting, block printing, collage, clay modeling, paper cutting and folding, etc.
- Paper framing and display of Art works.

Unit II: Performing Arts: Dance, Music, Theatre & Puppetry (Practical)

- Listening / viewing and exploring Regional Art forms of music, dance, theatre and puppetry.
- Viewing / listening to live and recorded performances of Classical and Regional Art forms.
- Participation and performance in any one of the Regional Arts forms keeping in mind the integrated approach.
- Planning a stage-setting for a performance / presentation by the student-teacher.

Unit III: Appreciation of Arts

- Meaning and concepts of Arts and aesthetics and its significance at secondary level of school education.

What is the difference between Education in Arts and Arts in Education.

- Identification of different performing Art forms and artists; dance, music and musical instrument, theatre, puppetry, etc. (based on a set of slides, selected for the purpose)
- Knowledge of Indian Craft Traditions and relevance in education (based on a set of slides, selected for purpose)
- Knowledge of Indian Contemporary Arts and Artists; Visual Arts (based on a set of slides, selected for the purpose)
- Indian festivals and its artistic significance.

Project Work (Unit I & II)

- Theme-based projects from any of the circular areas covering its social, economic, cultural and scientific aspects integrating various Arts and Craft forms; Textbook analysis to find scope to integrate Art forms either in the text or activities or exercises; Documentation of the processes of any one Art or Craft from with the pedagogical basis such as weaving or printing of textiles, making of musical instruments, folk performances in the community, etc. – how the artist design their products, manage their resources, including raw materials, its marketing, problems they face, to make them aware of these aspects of historical, social, economic, scientific and environmental concerns. Student-teacher should prepare at least ten lesson plans in their respective streams of subject (Science/Maths/Social Sciences/Languages etc.) while integrating different art forms.

Workshop:

- Two workshops of half a day each, of one week duration for working with artists/artisans to learn basis of Art and Crafts and understand its pedagogical significance. The Arts forms learnt during the course should be relevant to the student-teachers in their profession. Activities, such as drawing and painting, rangoli, clay modeling, pottery, mixed collage, woodcraft, toy making, theatre, puppetry, dance, music, etc. region specific should be given more importance for making arts learner-centered. The focus of the workshops should be on how art forms can be used as tool/method of teaching-learning of Languages, Social Sciences, Mathematics and Science.

Practical Part:

- **Body Movement:** Different theatre games, Exercises, Material Arts, Folk Dances.
- **Meditation:** Focus, Concentration.
- **Script Writing:** Characterization, dialogue, time and space, beginning, middle, end.
- **Poetry Recitation:** Rigved Mantras, Vaachik Abhinay.
- Selection of Play for Children.
- Casting.
- Building of a Character.
- **Parts of Speech:** Volume, Pitch, Speed, Clarity, Audibility, Diction, Intonation, Feel and Toner Quality, Projection.
- Design of a Production.
- **Production:** Poster Making, Audience, Execution of Different Aspects of Production, Analysis of Increase in Understanding of Children through Drama.

Suggested Approach for Teaching-learning Process:

- Every student-teacher must participate and practice different Art forms. They need to be encouraged to visit places of art/see performances/exhibitions/art and craft fairs/local craft bazaars, etc. Artists and artisans may be invited for demonstrations and interactions from the community. Student-teachers should be encouraged to maintain their diary on art interactions to enhance their knowledge and awareness in this area. Student-teachers can also be motivated to interpret art works/commercials/events etc. to enhance their aesthetics sensibility.
- A Resource Centre for Arts and Crafts should be a part of all the RIEs, where materials, including books, CDs, audio and video cassettes, films, software, props, art works of Regional and National level, books and journals must be displayed for the purpose of reference and continuous motivation.
- Applications of Arts and Aesthetics in day-to-day life, in the institute and in the community are some of the practical participate in the celebrations of festivals, functions, special days, etc.

Mode of Assessment:

- The complete course is of 50 marks. It is recommended that evaluation of this course should be done at both the levels; (i) Internal as well as (ii) External. Practical Activities (Unit I and II of 30 marks) in nature are more on the process than the project, hence need continuous and comprehensive evaluation (CCE). Therefore, recommended to be evaluated by the internals. The theory and project part (Unit-III and project work of 20 marks) can be in viva-voce and in presentation mode therefore recommended to be evaluated by the externals. The engagement of student-teacher in the above set of experiences should be evaluated on continuous and comprehensive manner, based on (a) Submission of work/project; (b) Participation in the activities; (c) Creative potential displayed; (d) Application of aesthetic sensibility in campus events and in other course activities.

THIRD YEAR

SEMESTER-V

Subject: Education Course (Optional)

Title of Paper: EC 11(1) – Value Education

Max. Marks - 100
External Marks - 85
Internal Marks – 15

Objectives: Upon completion of the course the student-teachers will be able to:

- Understand the concept and types of values.
- Understand the meaning and basic-theories of axiology.
- Get an insight into the strategies of inculcation of values among children.
- Develop awareness about the different agencies working in the sphere of value education.
- Develop skills and techniques needed to teach value education.
- Understand the role of the teacher in value education.

Content:

Unit I: Introduction to Values

- Values: Concept, Nature, Types and Significance
- Classification of Values: Intrinsic Values, Instrumental Values, Moral Values, Aesthetic Values, Economic Values, Social Values.
- Contemporary Values in Indian Context:
  1. Panchakosha Theory of Values
  2. Basic Human Values: Truth, Beauty, Goodness, Love, Peace, Non-Violence
  3. Contemporary Values: Scientific Temper, Intellectual Honesty, Social Service and Protection of Environment.

Unit II: Strategies of Inculcation of Values

- Sources of Value Education – Autobiography and Biography of Great People, Parables, Vedas, Bhagavadgita, Shlokas, Poems, Newspaper Clippings, Episodes from Real Life, Documents etc.
- Techniques of inculcating Values in Life: Ashtangayoga (Yama, Niyama, Asana, Pranayama, Prathyahara, Dhyana, Dharana and Samadhi)
- Role of Teachers in Value Education

Unit III: Role of Social Agencies in Value Education

- Family
- Religion
- Educational Institutions
- Community
- Mass Media (Print & Electronic)
- Information & Communication Technology (Computer & Internet)

Unit IV: Value Education in Secondary Schools

- Integrated Approach
- Direct Approach
- Incidental Approach
- Co-curricular & Extra-curricular Activities

1. Resolving Value Conflicts (value crisis)

3. Project Work & Community Centered Activities

Assignments (any one):

- Visit to religious institutions which are involved in Educational endeavor
- Documentation of the contributions of the great personalities and institutions for the promotion and protection of values
- Selection of incidences / episodes from the biographies depicting particular / selected value
- Preparation of Value Judgment Scale

References:

- Broudy S. Hary (1961) Building a Philosophy of Education, USA, Prentice-hall Inc.
- Dewey, J. (1916) Democracy and Education. New York: Macmillan.
- Doyle, T.F. (1973) Educational Judgments. London: Roufledge and Kegam Paul.
- Feather T., Norman (1975) Values in Education and Society, New York : A Division of Macmillan Publishing Co.

THIRD YEAR

SEMESTER-V

Subject: Education Course (Optional)

Title of Paper: EC 11(2) – Health and Physical Education

Max. Marks - 100
External Marks - 85
Internal Marks – 15

Objectives: Upon completion of the course the student-teacher will be able to:

- Understand the significance of Health Education for the all-round development.
- Maintain and promote good health.
- Develop the understanding of physical education and its related fields.
- Acquire the knowledge about the teaching methods of physical education and its activities.
- Know about the effective organization of physical education activities.

Content:

Unit I: Health and Physical Education

- Health: Meaning, Aims and Objectives, Importance and Scope
- Physical Education: Meaning, Aims and Objectives, Importance and Scope
- Related fields: Recreation, Health Education and Education
- National and Emotional Integration through Sport and Physical Education
- Yoga – Meaning – Astanga Yoga – Significance in Modern Society

Unit II: Health Service and Supervision

- Medical Inspection: Meaning, Procedure and Importance
- Personal Care: Skin, Eyes, Ears and Teeth
- Safety Education: Meaning and Significance, Safety in Classroom, Play field, Gymnasium, Roads and Homes.
- First Aid: Meaning, Significance, Principles of giving first aid
- Fatigue: Meaning, Causes and Remedies.
- Balanced DIET: Meaning and Benefits.

Unit III: Leadership, Discipline, Incentives and Awards

- Leadership
  1. Qualities of good leader in physical education
  2. Teacher leadership
  3. Student leadership
- Discipline
  1. Meaning
  2. Common form of indiscipline in schools
  3. Causes for indiscipline

5. Rewards and discipline
6. Punishment and discipline

- Incentives and Awards
  1. Letter – Crest
  2. Cup
  3. Trophy
  4. Medal
  5. Honour Board
  6. Scholarship
  7. Certificate
  8. Cash Prize – Based on the Player's Performance

Unit IV: Organization of Physical Education Activities

- Intramural and Extramural Competitions: Meaning, Organization, Benefits
- Tournaments: Meaning, Types-Knock-Out and league, Benefits
- Sports Meet: Meaning, Organization, Benefits
- Campus and Hikes: Meaning, Organization, Benefits

Practicum:

- Participation in any one major game and one sports item
- Ground marking for selected games and sports
- Commands, line formation and marching, ceremonial parade
- Participation in two National festival programmes for flag hoisting

References:

- Kamalesh and Sangral, (2000), Principles and History of Physical Education, Ludhiana: Tandon Publication.
- Nadgir, K.G. (1998), Sharir Shikshanad Vidhanagalu, Dharwad: Mallesajjan Vyayama Shale.
- Prakash Brothers (2000) Organization, Adminstration and Recreation in Physical Education, Ludhiana: Prakash Brother Publicaiton.
- Rao, V.K. (2003), Physical Education, New Delhi: A.P.H. Publishing Corporation.

THIRD YEAR

SEMESTER-V

Subject: Education Course (Optional)

Title of Paper: EC 11(3) – Guidance and Counselling in School

Max. Marks - 100
External Marks - 85
Internal Marks – 15

Objectives: Upon completion of this course the student-teacher will be able to:

- Understand the principles, scope and need of guidance and counselling in schools
- Acquaint himself with nature of different problems faced by children in context of learning and development.
- Understand the acquisition and process of learning in children with special needs.
- Acquaint himself with learning disabilities of children and its remedies.
- Take up minimum guidance programme at school level.

Content:

Unit I: Guidance and Counselling

- Introduction of Guidance and Counselling
- Nature, Purpose and Scope of Guidance and Counselling
- Difference between Guidance and Counselling
- Counselling
  1. Principles
  2. Approaches
- Areas of Guidance
  1. Educational Guidance
  2. Vocational Guidance
  3. Personal Guidance

Unit II: Problems of Developments in Children

- Problems related to Physical Development
  1. Common problems faced by children
  2. Nutrition
- Problems related with Emotional Development
  1. Adjustment to Home
  2. Adjustment to School
  3. Adjustment to Peer Group
  4. Problems related to academic achievement
  5. Problems related to Gender bias and Gender related issues
- Applications of the whole child concept for parents, teachers and counselors
- Acquisition and Process of Learning
  1. Concept of learning
  2. Factors affecting learning

3. Physiological factors
4. Psychological factors
5. Socio-emotional factors
6. Educational factors

Unit III: Learning Disabilities of Children

- Factors Contributing to Learning Problems
  1. External factors: Psychological and Educational
  2. Internal factors: Low general ability, attention, specific reading, writing etc.
- Assessment of the child
  1. Case history
  2. Assessment of general abilities
- Remediation
  1. Principles of Guidance Services
  2. Designing remedial strategies

Unit IV: Guidance for Children with Special Needs

- Meaning, definitions and types of exceptional children
- Gifted and creative children
- Slow learners and backward children
- Strategies for helping exceptional children to overcome their problems

Assignments (Any One):

- Case study of a child with special problem.
- Publication of a career bulletin based on authentic sources of Jobs, Employment
- Organization of career conference, campus interviews, etc.
- Organization of Counselling session for (Individual / Groups) students who are genuinely in need of Counseling.
- Organization of Guidance sessions about services and facilities available in a school or college.

References:

- Adams, J.F. (1965) Counselling and Guidance: A Summary, New York: The Mc Millan Company Ltd.
- Aggarwal, J.C. Educational & Vocational Guidance & Counselling. Delhi: Doaba House.
- Asha Bhatnagar (1999) Guidance and Counselling: Theoretical Perceptive. Vol-1. New Delhi: Vikas Publishing House.
- Berki B.G. & Mukhopadhya B. Guidance & Counselling: A Manual: Sterling Publishers.
- Weomberg, C (1966) Social Foundations of Guidance. New York: Free Press.

Dr. Vivek Bapat
Dean- Education, Jiwaji University Gwalior

Dr. Vinod Singh Bhadoria

THIRD YEAR

SEMESTER-V

Subject: Education Course (Optional)

Title of Paper: EC 11(4) – Educational Administration and Management

Max. Marks - 100
External Marks - 85
Internal Marks – 15

Course Objectives:

- To acquaint the student teachers with the concept and concerns of educational administration.
- To develop an understanding of the role of the headmaster and the teacher in school management.
- To enable the students to understand to concept at importance of communication and its possible barriers in educational administration.
- To enable the student teacher to critically analyze the administrative scenario in relation to the functioning of the other secondary schools of the area.
- To acquaint the student teacher with the scientific practices of educational management and keep him to apply it in work situation.

Course Content:

Unit I:

- Conceptual framework concept of educational administration.
- Concept of educational management human beings as inputs, process and products inputs.
- Nature, objectives and scope of educational administration.

Unit II:

- Role and functions of headmaster / teacher: Basic functions administration planning, organizing directing and controlling.
- Maintenance of discipline, control management.
- Co-ordination and growth, development.
- Supervision and inspection, defects in the present supervision and inspection.
- Scope of educational supervision.
- Types of supervision.
- Providing guidance; leadership function.
- Crisis in management
- Decision making

Unit III:

- Communication in Educational Administration Role of communication in effective management and administration.
- Methods of communication.
- Barriers of communication in educational administration.
- Overcoming barriers to communication and effective communication in educational

administration.

Unit IV:

- Management of School: Role of headmaster in planning of school activities, approaches to management – Manpower approach, cost benefit approach, social demand approach, social justice approach.
- Involvement of other functionaries and agencies in the preparation of a plan.
- Delegation of authority and accountability.
- Role of the headmaster in monitoring, supervision and evaluation.
- Role of the headmaster in motivating the staff, in resolution of interpersonal conflicts.
- Role of the headmaster in creating resources and managing financial matters.
- Optimum use of available resources for growth and development of the school.
- Staff development programmes.
- Role of teachers in school management and administration.

Unit V:

- Educational administration in the state : The administrative structure in the field of education in the state.
- Control of school education in the state – A critical analysis.
- Functions of the state government in relation to secondary and higher secondary schools.
- Functions of the board of secondary education in controlling secondary schools.
- Problems of secondary school administration in government schools.

Practicum:

- The student-teacher is expected to conduct a study on any issue or problem relating to a school administration. The report should be in about 700 words.

References:

- Bhatnagar, R.P. & Verma, I.B.; Educational Administration, Lyall Book Depot Meerut.
- Bhatnagar, R.R. & Agrawal, Vidya : Educational Adminstration, Supervision Planning and Financing. R. Lall book Depot, Meerut.

THIRD YEAR

SEMESTER-V

Subject: Education Course

Title of Paper: EC 12 – Action Research

Max. Marks - 100
External Marks - 85
Internal Marks – 15

Objectives: Upon completion of this course the student-teacher will be able to:

Content:

Unit I: Research and Educational Research

- Research: Meaning, Definition & Importance.
- Educational Research: Meaning, Definition & Importance.
- Steps in Educational Research.
- Type of Research: Fundamental / Basic, Applied and Action Research: Meaning, Definition & Importance.
- Methods of Research: Historical, Experimental and Survey.
- Differences between applied and action research with reference to: (i) Purpose (ii) Definition (iii) Hypothesis (iv) Sample (v) Data collection instruments (vi) Data analyses (vii) Generalization (viii) Limitations

Unit II: Action Research

- Meaning, Definition and Scope of research.
- Importance of action research to classroom teachers, administrators and guidance personnel.
- Limitations of action research.
- Action problems in different areas in schools – Examples.

Unit III: Research Steps and Tools

- Steps in Action Research

1. Identifying the problem area (examples – experimental design and qualitative design).
2. Pinpointing the problem.
3. Problem analysis in terms of causes
4. Identifying the objectives
5. Formulating action hypotheses
6. Designing action plan
7. Execution of the plan
8. Analyzing the data
9. Findings
10. Reporting

- Tools of Data Collection

1. Achievement Test, Questionnaire, Interview Schedule, Checklist, Rating Scale – Meaning, Need, Advantages and Limitation.

2. Tools / Inventories of Aptitude, Attitude, Interest, Personality, Values, Intelligence and Creativity (Knowledge of at least 2 tests in each category).

3. Measure in classroom: Sociometric technique and classroom social distance scale (uses of these tools in action research)

- Quantitative and Qualitative Data: Meaning and Examples

1. Analysis of the data: Frequency distribution, measures of central tendency, variability.

2. Co-efficient of correlation (Person's rank difference method)

3. Interpretation of data with an example: Descriptive and graphical.

(Note: To be discussed without computation)

Unit IV: Action Research Report

- Format of report in terms of steps of action research
- Summary, bibliography and appendix.

Assignments (Any One):

Preparation of an action plan on a classroom problem such as:

- Identifying causes of poor reading ability and suggesting remedial measures.
- Identifying the causes and types of spelling errors and suggesting remedial measures.
- Identifying the causes of poor map-reading skills and suggesting remedial measures.
- Identifying the causes for poor drawing of diagrams and suggesting remedial measures.
- Identifying the causes of truancy and suggesting remedial measures.
- Identifying the causes of problem behaviour of students in the classroom and suggesting remedial measures. (Any other problems similar to above mentioned)

References:

- Aggarwal, J.C. (1975), Educational Research: An introduction, New Delhi: Arya Book Depot.
- Best, J.W. and Kahn, J.V. (2002), Research in Education, (7th Ed.) New Delhi: Prentice Hall Pvt. Ltd.
- Sidhu, K.S. (1984), Methodology of Research in Education, New Delhi: Sterling Publishers Pvt. Ltd.
- Van Dalen, D. (1973) Understanding Educational Research: An Introduction. New Delhi: McGraw Hill Book Co.

THIRD YEAR

SEMESTER-V

Subject: Education Course (Practicum)

Title of Paper: EPC 13 – Educational Psychology Practical and Test

Max. Marks - 50
External Marks - 40
Internal Marks – 10

(Group A- any three test and Group B – any three Experiments)

SUGGESTED PSYCHOLOGY PRACTICUM AREAS

Group A –Tests	**Group B-Experiments**
Interest	Intelligence
Intelligence	Aspiration
Adjustment	Creativity
Anxiety	Transfer of Learning
Achievement Motivation	Trial and Error
Personality	Personality

THIRD YEAR

SEMESTER-VI

Subject: Education Course

Title of Paper: EC 14(1) – Pedagogy of School Subject – 1
Mathematics

Max. Marks - 100
External Marks - 85
Internal Marks – 15

Objectives: Upon completion of this course student teachers will be able to

- Recall the meaning, nature and scope of Mathematics.
- Acquaint aims and objectives of teaching Mathematics in Secondary school level.
- Plan teaching in Mathematics at micro and macro level.
- Prepare unit plans, resource unit and organize lesson to meet at different classroom situations.
- Analyze and evaluate the curriculum of Mathematics at Secondary level.
- Apply different approaches and methods of teaching Mathematics in classroom situation.
- Prepare and use instructional materials in teaching Mathematics.
- Prepare different kinds of test and understand the comprehensive evaluation.
- Participate and organize the different co-curricular activities in Mathematics.
- Understand the professional competencies, commitments and expectations of Mathematics teacher.

Content:

Unit I: Meaning, Nature and Scope Mathematics

- Meaning of Mathematics
  1. As a Science of Number
  2. As a Science of Quantity
  3. As a Science of Measurement
  4. As a Science of Logical Reasoning
- Nature of Mathematics
- Scope of Mathematics
  1. Place of Mathematics in day today life activities
  2. Mathematics use in day to day life activities
  3. Relation with school subjects
  4. Relation with other Disciplines – Engineering, Agriculture, Medicine

Unit II: Aims and Objectives of Teaching Mathematics

- Aims / Values of Teaching Mathematics
  1. Meaning of Aim / Values
  2. Utilitarian Aim / Values
  3. Disciplinary Aim / Values
  4. Cultural Aim / Values
  5. Intellectual Aim / Values
  6. Aesthetic and Recreational Aim / Values
- Instructional objectives of Teaching Mathematics
  1. Meaning of Instructional Objectives

2. Instructional Objectives and their specifications of teaching Mathematics

3. Knowledge 4. Understanding

5. Application 6. Skill

7. Attitude 8. Appreciation

9. Interest 10. Formulation and Statement of objectives in behavioural terms

Unit III: Instructional Design in Mathematics and Co-curricular Activities in Mathematics

- Lesson Planning: Meaning, Steps, Importance and Format of Lesson Plan
- Unit Plan: Meaning, Steps, Importance and Format of Lesson Plan
- Resource Unit: Meaning, Steps, Importance and Format of Lesson Plan
- Yearly Planning: Meaning, Principles and Format
- Mathematics Club: Objectives of Maths club, organization and activities
- Mathematics Olympiads: Objectives and importance
- Mathematics Quiz: Organization and importance
- Mathematics Museum: Organization and importance
- Mathematics Fair: Organization and importance
- Mathematics Laboratory: Objective, importance and uses
- Recreational Activities in Mathematics: Games, Puzzles, Riddles, etc.
- Ethno Mathematics

Unit IV: Approaches, Methods and Techniques of Mathematics

- Learner Centered Approach
  1. Inductive method and Deductive method
  2. Analytical method and Synthetic method
- Activity Centered Approach
  1. Guided discovery method and problem solving method
  2. Project method and Discovery learning method
  3. Active learning strategies
  4. CAI in teaching Mathematics
- Concept Mapping – Meaning, Advantages and Disadvantages
- Techniques of teaching Mathematics
  1. Supervised study
  2. Oral work and written work
  3. Drill and review
  4. Assignment in Maths
  5. Home work

References:

- Butler and Wren (1960), The Teaching of Secondary Mathematics, Tokyo; McGraw Hill Book Company.
- Mangal, S.K. (1989), Teaching of Mathematics, Ludhiana; Prakash Brother Publishers.
- Sidhu, K.S. Teaching of Mathematics, B'lore Sterling Publishers.
- Wren (1973), Basic Mathematical concepts, New York, McGraw Hill.
- Yadawad S.B. and Rabanal R.T. (2000) Vishayadharit Ganit Badhane, Vidyanidhi Prakashan, Gadag.

THIRD YEAR

SEMESTER-VI

Subject: Education Course

Title of Paper: EC 14(2) – Pedagogy of School Subject – 1
Biological Science (Biology)

Max. Marks - 100
External Marks - 85
Internal Marks – 15

Objectives: On completion of the course the student teacher will be able to:

- Understand the nature, scope & importance of Biological Sciences and get acquainted with ancient as well as modern developments in the field of Bio-Sciences.
- Understand the aims, Objectives of teaching Bio-Science and will be able to state the objectives in behavioural terms.
- Acquaint with the Resources for teaching Biology & their effective Utilization.
- Get exposed to Micro teaching and preparing Resource Unit, Unit Plan & Lesson Plans.
- Understand the concept of curriculum, principles of curriculum construction and trends curriculum revision.
- Be introduced to various methods, approaches & models of teaching Biological Sciences and implement them in them in their teaching practice.
- Understand and prepare the different types of test items for the Evaluation of students performance in Biology.
- Appreciate and inculcate the Competencies and commitments needed for a biological Science Teacher.
- Plan & execute various curricular & co-curricular activities related to teaching of Bio-Science.

Content:

Unit I:

- **Introducing to Biological Science:**
  1. Biological Science: Meaning, Nature and Scope
  2. Relationship between Biology & human welfare
  3. Latest developments in the field of Biology
- **Co-curricular Activities and Resources in Teaching Biological Science:**
  1. Bio-Science Laboratory: Need and importance, equipping, Bio-lab, Organizing the practical work
  2. Project Activities: Aquarium, Viverium, Terrariums, Museum, School garden
  3. Preservation of Specimen through Plastination: Meaning, Importance and Steps.
  4. Meaning, Importance and Organization of Co-Curricular Activities
  5. Bio-Science Club: Organization & its activities.
  6. Bio-Science Exhibition
  7. Field Trips
  8. Bio-Science Quiz
  9. Nature Study
  10. Bird Watching

Unit II:

- **Aims and Objectives:**
  1. Utilitarian, Cultural and Disciplinary Aims
  2. Scientific Attitude and Training in Scientific Method
- **Instructional Objectives: Bio-Science in Secondary Schools:**
  1. As per NCERT Curriculum Framework-2000
  2. As per NCERT Curriculum Framework-2009/2014
  3. As per National Curriculum Framework-2005
- **Behavior Specifications of Instructional Objectives:**
  1. Knowledge
  2. Understanding
  3. Application
  4. Skill

Unit III: Approaches, Methods and Models of Teaching Biology

- **Approaches:**
  1. Structure and function Approach
  2. Types specimen Approach
  3. Inductive and Deductive Approach
- **Methods of Teaching:**
  1. Guided Discovery Method
- **Models of Teaching:**
  1. Biological Science Enquiry Model (Joseph Schwab)
  2. Memory Model (J. Lucas)

Unit IV:

- **Instruction Design in Teaching Biological Science:**

  1. Pedagogical Analysis: Analysis of 8th, 9th and 10th Standard Biology Text Book of Karnataka State.

  2. Lesson Planning: Meaning, Importance and format according to active learning strategies.

  3. Unit Plan: Meaning, Importance and Steps.

  4. Resource Unit: Meaning, Importance and Components.

Assignments (any one):

- Preparing power point slides for any selected unit in VIII or VIII class Biology.
- Preparing a set of (OHP) transparencies
- Slides for a selected Unit in 10th Student Biology.

Practicum:

- Writing of Instructional objectives & behavioral specifications on a selected unit
- Preparing improved apparatus in Biology
- Preparing a lesson Plan on any topic in Biology using any innovative Method / Model of Teaching
- Developing an Achievement test / Diagnostic test

References:

- Buffaloe, N.D. Throneberry (1969) – Principles of Biology, Prentice Hall of India, New Delhi.
- Chikkara & Sharma (1989) Teaching of Biology, Prakash Bros. Ludhiyana.
- Mangal S.K., (1997) Teaching of Physcial & Life Sciences Avg. Book Depot, New Delhi.
- NCERT (1982) Teaching of Science in Secondary Schools, New Delhi.
- UNESCO (1978) – New Source book of Science Teaching, Oxford & BH Pub. Co. Ltd., New Delhi.

THIRD YEAR

SEMESTER-VI

Subject: Education Course

Title of Paper: EC 15(1) – Pedagogy of School Subject – II
Physics

Max. Marks - 100
External Marks - 85
Internal Marks – 15

Objectives: Upon completion of the courses, the student teacher will be able to:

- Understand the nature, scope and importance of Physical science with special reference to secondary school content.
- Understand the aims and objectives of teaching Physics.
- State the specific behavioural changes under each objective.
- Understand and make use of different approaches & methods of teaching Physics.
- Prepare objective based lesson plans and use them in their internship.
- Understand and employ several teaching techniques helpful to develop scientific attitude and scientific method.
- Plan, use and maintain the physical science laboratory systematically.
- Understand the principles of text-book constructions.
- Understand the importance of appropriate instructional materials (hardwares and softwares) in teaching Physical science and use them by preparing/selecting them in their practice teaching.
- Understand the importance of principles of curriculum construction in the organization of Physics.

  contact.
- Get mastery in Physics content and imbibe the special qualities of Physics teacher.
- Prepare and use different tools of evaluation to assess the achievements of students in Physics.
- Develop professionally by attending lectures of professional interest, reading journals, and magazines and enroll as members of professional organization.
- Organize co-curricular activities in science i.e. seminars, field trips, exhibitions discussions etc through the science club.
- Apply the knowledge of physical science to develop scientific thinking and scientific outlook.
- Develop skills in analyzing the content in terms of concepts and in learning experiences.
- Construct and administer unit test, conduct experiments improves teaching aids.

Content:

Unit I: Meaning, Nature and Impact of Physics

- Concept of science – Science as process and science as a project
- Nature and Scope of Physics
- Impact of Science and Technology on modern living
- Scientific Attitude – Meaning definition and importance

Qualities of a person who possesses scientific attitude

- Scientific Method-Meaning, importance and steps involved (with an illustration).

Unit II: Aims and Objectives of Teaching Physics

1. Aims of teaching Physics in Secondary school

- Personal development aim,
- Learner's academic and process skills development aim,
- Disciplinary aim and
- Cultural aim.

2. Objectives of teaching physics:

- Bases for formulation of objectives
- Objectives of teaching Physics at Secondary level; (To be Discussed keeping in view of the objectives of teaching Physics enunciated in physics syllabi of secondary school of M.P.); Instructional objectives of teaching physics and stating them in observable behavioral changes:

  (i) Knowledge (ii) Understanding (iii) Application (iv) Skill (v) Attitude (vi) Interest (vii) Appreciation.

Unit III: Approaches and Methods of Teaching Physics

- Enquiry Approach – Meaning, Uses with Illustrations, Advantages and disadvantages.
- Inductive Approach – Meaning, Uses with Illustrations, Advantages and disadvantages.
- Deductive Approach – Meaning, Uses with Illustrations, Advantages and disadvantages.
- Problem Solving Approach – Meaning, Uses with Illustrations, Steps, Advantages and disadvantages.
- Demonstration Method – Meaning, Uses, Advantages and disadvantages.
- Lectures-Cum-Demonstration Method – Meaning, Uses, with Illustrations, Advantages and disadvantages.
- Laboratory Method – Meaning, Uses, with Illustrations, Advantages and disadvantages.
- Guided Discovery Method – Meaning, Uses, with Illustrations, Advantages and disadvantages.
- Biographical Method – Meaning, Uses, with Illustrations, Advantages and disadvantages.
- Individual Instruction Techniques and Active Learning Strategies.
- Concept Mapping: Its use for summarizing a unit and evaluating students understanding.

Unit IV: Instructional Design, Resources and Teaching Aid for Teaching Physics

- Lesson Planning – Meaning, Steps, Importance and Format of Lesson Plan according to active learning strategies
- Unit Plan – Meaning, Steps, Importance and Format of Lesson Plan
- Resource Unit – Meaning, Steps, Importance and Format of Lesson Plan
- Audio-Visual Aids (Preparation and Use):

  (a) Charts (b) Models (c) OHP transparencies (d) Filmstrips

(c) Slides (d) Video tapes (e) Films (f) Educational C.D.'s

- Mass Media:

  (a) Television (T.V.) (b) Radio-Meaning and importance

- Community Resources and Self Learning Materials: Meaning and importance

- Physics Library
  library
- Importance & organizing of physics

- Sections of science library
- Choice of book for science library

References:

- Bhandula & Chand (1986) Teaching of Science, Prakash Brothers, Ludhina.
- Bose, A.H. Sood, J.K. and Vaidya, N. (1970), Strategies in Science Education. Regional Institute of Education, Ajmer.
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THIRD YEAR

SEMESTER-VI

Subject: Education Course

Title of Paper: EC 15(2) – Pedagogy of School Subject – II
Chemistry

Max. Marks - 100
External Marks - 85
Internal Marks – 15

Objectives: Upon completion of the courses, the student teacher will be able to:

- Understand the nature, scope and importance of Chemistry with special reference to secondary school content.
- Understand the aims and objectives of teaching Chemistry.
- State the specific behavioural changes under each objective.
- Understand and make use of different approaches & methods of teaching Chemistry.
- Prepare objective based lesson plans and use them in their internship.
- Understand and employ several teaching techniques helpful to develop scientific attitude and scientific method.
- Plan, use and maintain the Chemistry laboratory systematically.
- Understand the principles of text-book constructions.
- Understand the importance of principles of curriculum construction in the organization of Physical science contact.
- Get mastery in Physical science content and imbibe the special qualities of Chemistry teacher.
- Prepare and use different tools of evaluation to assess the achievements of students in Chemistry.
- Develop professionally by attending lectures of professional interest, reading journals, and magazines and enroll as members of professional organization.
- Organize co-curricular activities in science i.e. seminars, field trips, exhibitions discussions etc through the science club.
- Apply the knowledge of physical science to develop scientific thinking and scientific outlook.
- Develop skills in analyzing the content in terms of concepts and in learning experiences.
- Construct and administer unit test, conduct experiments improves teaching aids.

Content:

Unit I: Meaning, Nature and Impact of Chemistry

- Concept of science – Science as process and science as a project
- Nature and Scope of Chemistry
- Impact of Science and Technology on modern living
- Scientific Attitude – Meaning definition and importance
- Qualities of a person who possesses scientific attitude
- Scientific Method-Meaning, importance and steps involved (with an illustration).

Unit II: Aims and Objectives of Teaching Chemistry

1. Aims of teaching Chemistry in Secondary school

- Personal development aim,
- Learner's academic and process skills development aim,
- Disciplinary aim and Cultural aim.

2. Objectives of teaching physical science:

- Bases for formulation of objectives
- Objectives of teaching Physical science at Secondary level; (To be Discussed keeping in view of the objectives of teaching Physical science enunciated in physical science syllabi of secondary school of M.P.); Instructional objectives of teaching physical science and stating them in observable behavioral changes:

  (i) Knowledge (ii) Understanding (iii) Application (iv) Skill (v) Attitude (vi) Interest (vii) Appreciation.

Unit III: Approaches and Methods of Teaching Chemistry

- Enquiry Approach – Meaning, Uses with Illustrations, Advantages and disadvantages.
- Inductive Approach – Meaning, Uses with Illustrations, Advantages and disadvantages.
- Deductive Approach – Meaning, Uses with Illustrations, Advantages and disadvantages.
- Problem Solving Approach – Meaning, Uses with Illustrations, Steps, Advantages and disadvantages.
- Demonstration Method – Meaning, Uses, Advantages and disadvantages.
- Lectures-Cum-Demonstration Method – Meaning, Uses, with Illustrations, Advantages and disadvantages.
- Laboratory Method – Meaning, Uses, with Illustrations, Advantages and disadvantages.
- Guided Discovery Method – Meaning, Uses, with Illustrations, Advantages and disadvantages.
- Biographical Method – Meaning, Uses, with Illustrations, Advantages and disadvantages.
- Individual Instruction Techniques and Active Learning Strategies.
- Concept Mapping: Its use for summarizing a unit and evaluating students understanding.

Unit IV: Instructional Design, Resources and Teaching Aid for Teaching Chemistry

- Lesson Planning – Meaning, Steps, Importance and Format of Lesson Plan according to active learning strategies
- Unit Plan – Meaning, Steps, Importance and Format of Lesson Plan
- Resource Unit – Meaning, Steps, Importance and Format of Lesson Plan
- Audio-Visual Aids (Preparation and Use):

  (a) Charts (b) Models (c) OHP transparencies (d) Filmstrips

  (e) Slides (f) Video tapes (g) Films (h) Educational C.D.'s
- Mass Media:

  (a) Television (T.V.) (b) Radio-Meaning and importance
- Community Resources and Self Learning Materials: Meaning and importance
- Chemistry Library
- Importance & organizing of Chemistry library
- Sections of science library
- Choice of book for science library

References:

- Bhandula & Chand (1986) Teaching of Science, Prakash Brothers, Ludhina.
- Bose, A.H. Sood, J.K. and Vaidya, N. (1970), Strategies in Science Education. Regional Institute of Education, Ajmer.
- Craig (1958) Science for the Elementary School Teacher, Ginn & Co., New York.
- Das R.C. (1985) Science Teaching in Schools, Sterling Publishers, Pvt. Ltd., New Delhi.
- Gupta S.K. (1983) Technology of Science Education, Vikas Publishing House, Pvt. Ltd., New Delhi.
- Gupta S.K. (1985) Physical Science Teaching in Secondary Schools, Sterling Publishers, Pvt. Ltd., New Delhi.
- UNESCO (1985) Teaching School Chemistry, Sterling Publishers, Pvt. Ltd., New Delhi.
- UNESCO (1978) New UNESCO Source Books for Science Teaching, New Delhi; Oxford and IBH Publishing Co.
- Waiter a Thurkar and Alferd T. Collette (1964) Teaching Science in Todays Secondary Schools, New Delhi, Prentice Hall.

THIRD YEAR

SEMESTER-VI

Subject: Education Course

Title of Paper: EC 15(3) – Pedagogy of School Subject – II
General Science

Max. Marks - 100
External Marks - 85
Internal Marks – 15

Objectives:

- Understand science its nature its process and epistemic criteria.
- Understand the aims and objectives of teaching science at various school levels.
- Develop the ability to design, manage and assess appropriate teaching learning experiences in the context of school science.
- To create an understanding of difficulties faced in teaching and learning of science and suggest remedial mea sure.
- Prepare a sketch to present the contribution of Indian scientists in the development of science.
- To design different types of tests to evaluate understanding of students in science.

Unit-I: Nature of Science and its Knowledge

- Concept of science. Need and place of general science in school curriculum.
- Nature of Science.
- Paradigmatic changes in scientific knowledge. Path breaking discoveries and land mark development in science. Eminent world scientists and Emiment Indian Scientists.
- Ethics and Science - values associated with science current debates on the ethics of scientific endeavouris globlisation and science.

Unit-II: Aims and Objectives of Science

- General aims of teaching of science at upper primary and secondary stages.
- Taxonomy of educational objectives organizing learning experiences of achieving specified learning out comes.
- Development of scientific temper.

Unit-III: The Curriculum

- Curriculum meaning, importance and principles of designing a_ good curriculum for general science. Adapting the curriculum to local needs and requirements and the availability of local resources.
- Exploring different ways of creating different learning situations for different content areas (e.g. lecture cum demonstration method, project method, problem solving method, investigation, discovery method, team teaching method and inquiry training model).

Unit-IV: Classroom Planning and Management

- Concept-importance and process of planning.
- Planning for teaching (yearly plan, unit plan) planning a single lesson, documenting objectives, developing rapport, absesing previous knowledge, transaction of content, assessment of reflecting on transaction.
- Develop ing resource materials tor teachmg science - Learner knowledge, real objects, models, charts, local materials, case studies, journals, hand outs, science, magazine, hand books etc. science laboratory, science fair, science exhibition excursion science museums, science clubs aquarium.

Unit-V: Evaluation in Science

- Meaning and importance of evaluation in science.
- Continuous and comprehensive evaluation.
- Evaluation according to areas cognitive, affective, psychomoter.
- Use of tools and techniques of evaluation

  - Achievement test - Diagnostic test - Check list
  - A remedial teaching - On line evaluation

- Blue Print

Activities:

1. Student teachers develop an interview schedule to interact with family and friends to get an understanding of how they view science and its relevance to their lives; they analyse the data and present it in the form of a report along with their own views.-
2. Preparation of two lesson plans for different standard to teach the same unit.
3. Preparation of a detailed assessment report of learners continuous and periodic assessment.
4. Critical analysis of existing science syllabus and text books.
5. Student teachers develop resource material related to local context.
6. Action research / research project for solving problems in science teaching.

References:

1. Bhat, B.D. and Sharma S.R. Methods of Science Teaching - New Delhi - Kanishka Publishing House 1993.
2. Bhatnagar A B. Bhatnagar S.S. (2005) Teaching of Science, Meerut R. Lali Book Depot.
3. Gupta S.K. Teaching of Science Education New Delhi, Vikas Publishers 1983.
4. Rawat D.S. Teaching of Science Vinod Pustak Mandir 1981.
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6. Sharma H.L. (1989) School Science Education in India, Common Wealth Publisher New Delhi.
7. Vidya Narendra (1999) Science Teaching in School for the 21st Century Deep and Deep Publishers New Delhi.
8. Science and Human Life (1933) Harper arid Broters Ayer Co. Reprint (J.B.S. Haldon)
9. Teaching of Science, Malhotra Bros. Jammu
10. How to torch Science, Vivek Publishers Ambalacity.
11. Teaching of Science, Wilson Publication New Delhi.

B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

FORTH YEAR

SEMESTER-VII

Subject: Education Course

Title of Paper: SIP 16 – School Internship Programme

Max. Marks - 350
External Marks -200
Internal Marks – 150

School Internship Guide

Description of Roles:

- Interns are students who is a graduate in their subject major, and are spending a four month working with experienced mentor teachers on their teaching practice while taking graduate courses in the Teacher Education department.
- Mentor Teachers are experienced school teachers who mentor interns. They provide guidance, insight and opportunities for supported practice.
- Supervisors work with school administrators Mentors to determine school experience for interns, mediate in difficult situations, and oversee interns' progress in schools and with respect to program requirements. They are faculty who organize campus based lectures and seminars in each area. They provide supervision and guidance for the interns in and out of the campus.

Intern Responsibilities:

- Interns are students of teaching. In contrast to traditional student teaching programs, interns are not expected to begin the year ready to teach on their own. Instead, they are expected to engage in observations, co-planning and co-teaching with their mentor teachers and to build their capacity toward assuming responsibility for extended lead teaching during the semester.
- Interns are in a period of transition from students to professional teachers. During this transition, they must retain the perspective of a learner as they take on the new and unfamiliar role of a teacher. Interns are expected to take an active role in their own learning and to contribute to the learning of follow interns.

Planning and Communication:

- Keep supervisor informed about classroom schedules and events.
- Direct questions or concerns to supervisors or mentor.
- Schedule observations and conferences with the mentor and inform supervisor of changes promptly.
- Meet regularly with the mentor to discuss planning for instruction.
- Prepare written lesson and unit plans according to both mentor teacher and supervisor's expectations.
- Arrange to share all plans and materials with the mentor in a timely way, to allow for feedback before using them.
- Keep the focus class binder up to date with plans and materials and ensure that it is accessible to the mentor and times.
- Engage in reflective diary writing or other communication forums required by mentors and / or supervisors.
- Provide mentor / supervisor with copies of plans and materials.
- Confer regularly with the mentor teacher and supervisor about progress and concerns.

Professional Activities:

- Prepare for and participate in seminars.
- Participate in orientation activities, faculty meetings and other school events.
- Initiate introductions to school faculty, staff and administrators.
- Maintain accurate contact information for mentor teacher(s) and supervisor.
- In case of absence, inform everyone affected promptly, i.e. prior to the absence.
- Comply with the school absence policies and have substitute teacher plans available if scheduled to teach lessons during the absence.
- Comply with the internship attendance policy.
- Dress professionally.
- Comply with the Professional Conduct policy.
- Consult mentor teacher and supervisor about the work schedule for any part time job and arrange a mutually acceptable schedule.

Personal Learning:

- Take initiative in asking questions, searching out resources, inviting feedback and creating opportunities to learn.
- Reflect on teaching an learning through discussions and assignments.
- Prepare a professional portfolio (reflective diary)
- Work with intern as a co-teacher as soon as possible, sharing decisions and observations.
- Observe intern's teaching an help the intern think about student understanding, alternative approaches, grouping, management, etc.
- Provide interns with oral and written feedback about their teaching, including written feedback.
- Observe teachers and students carefully, taking notes and asking questions.
- Study and participate in the formation and maintenance of a classroom learning community.
- Begin the year co-planning and co-teaching lessons and activities, moving towards independent planning and teaching as the year progresses.
- Mentor Teacher Responsibilities

Planning and Communication:

- Negotiate with intern and supervisor a sequence of intern responsibilities in accordance with the program standards.
- Provide intern with an outline or list of topics intern will be responsible for teaching, allowing extra time for intern to locate resources, plan, receive feedback from mentor teacher and supervisor and revise.
- Establish regular times to confer with the intern about unit planning and provide support for identifying big ideas and appropriate curriculum materials.
- Help identify places in the curriculum where the intern can try out ideals learned in seminars.
- Confer regularly with the supervisor about progress and concerns.
- Participate in all school activities from morning assembly to evening assembly.

Supporting Intern Learning:

- Facilitate and monitor intern's progress from observation to co-planning and co-teaching to lead teaching.
- Guide the intern through daily school-based experiences such as working with other teachers, dealing with classes on an assembly day, etc.
- Provide appropriate, classroom-based learning opportunities throughout the year.
- Reflect with the intern about teaching student learning and ideas and strategies studied in seminars.

Assessment:

- Participate in assessment conferences.
- Write and submit an Exit Performance Description at the end of the internship programme.
- Help interns think about their careers as educators and assist with reviewing portfolios, videotaping, writing letters of recommendation, etc.
- Supervisor Responsibilities

Meeting, Observation Visits and Assessments:

- Provide copies of written assessments to interns and mentor teachers.
- Conduct five feedback sessions with the intern and mentor teacher, at the appropriate point of time.
- Prepare participants for sessions by explaining what to bring and topics to discuss.
- Make at least five observation visits during a week.
- Prepare written assessments prior to feedback sessions, using the appropriate forms for your intern's subject area and provide copies for the intern and mentor teacher at the conference.
- Write and submit an Exit Performance Description at the end of the internship programme.

Communication:

- Facilitate communication among interns, mentor teachers and others involved with the internship
- Communicate regularly with each intern, at least every other day
- Communicate regularly with each monitor teacher
- Communicate regularly, as scheduled, with subject area leaders about interns' progress and problems
- Provide the intern and mentor teacher with detailed notes and written feedback about observation visits
- Make sure intern and mentor clearly understand expectations and program standards
- Keep informed about program developments and pass this information on to interns and mentors promptly
- Know where to direct questions and relay answers as soon as possible

Support of Intern Learning by The Supervisor:

- Observe the intern's teaching and confer about the planning and teaching of each observed lesson
- Provide constructive written and oral feedback for each observed lesson
- Identify the intern's specific needs and work on them with the intern and mentor teacher.

- Inform subject area leader about problems promptly.
- Help interns to develop their portfolios by giving feedback on materials, assisting with videotaping, etc. records
- Keep notes of all observation visit including date, progress observed, suggestions made and actions taken
- Keep notes of all communication with interns and mentor teachers
- Keep examples of intern work indicative of progress of problems
- Keep copies of all written assessments and professional development plans
- Submit evaluation reports and professional development plans to the department head
- This highlights the intern's field experience that contribute to the overall design of the internship year experience. In schools with other configurations of class time, interns and mentors should discuss with their field instructors how the intern's lead teaching time will be distributed throughout the year. Key aspects of any intern's lead teaching schedule include:
- After the initial week or two of school, the intern should have teaching responsibility (but not sole teaching responsibility) for at least one class period in a week.
- Interns are novice teachers for whom out-of-class preparation and reflection takes longer than it does for more experienced teachers. Having regular time during the school day to plan well for their teaching and reflect carefully on it is vital for the growth of the intern's practice and for the quality of the instruction they can provide to the students they share with their mentor. Interns may spend some of this time outside the classroom and they may spend some of it in observation and analysis of the mentor's teaching.
- In the initial internship programme, short periods of increased lead (sole) teaching responsibilities should be preceded and followed by periods during which interns return to teaching only the focus class. From each period of increased lead teaching responsibility to the next, the demands on the intern's planning, teaching and / or assessing should increase.
- Intern's on-campus classes do not meet every week of the internship. During certain weeks, the classes do not meet so that interns can be in their placement schools all five days of the week. Intern's obligations to their courses during this time focus more on at school or in-class activities and less on lengthy reading or writing assignments.

SI 1: Method of Teaching - I

Mathematics

Biology

SI 2: Method of Teaching - II

Physics

Chemistry

General Science

SI 3: Unit Plan (I & II)

SI 4: Unit Test (I & II)

SI 5: Work Book / Working Model

SI 6: Micro Teaching (Eight Skills)

SI 7: Observation Lesson (5 lesson each teaching subject)

B.A.-B.Ed./ B Sc-B.Ed. INTEGRATED PROGRAMME

FORTH YEAR

SEMESTER-VIII

Subject: Education Course

Title of Paper: EC 17 – Proficiency of English

Max. Marks - 100
External Marks -85
Internal Marks – 15

Unit I: Basic Language Skills: Grammar & Usages

- Simple, Compound and Complex sentences
- Clauses
- Tenses
- Prepositions
- Direct and Indirect Narration
- Active and Passive Voice
- Modals
- Subject – Verb agreement

Unit II: Writing Skills

- Paragraph Writing: Describing an event, object, process.
- Letter Writing: Business / Official / Social.
- Report Writing
- Notice and Circulars
- Expansion of an Idea

Unit III: Literary Texts

1. Poetry:

- John Keats: When I have fears that I may cease to be
- Wilfred Owen: Futility
- W.B. Years: Lake Isle of Innisfree.
- Gieve Patel: On killing a tree.
- Jayanta Mahapatra: The captive air of Chandipur on Sea.
- Sarojini Naidu: Coromandel Fishers.

2. Prose:

- Brooker T. Washington: My struggle for an Education

3. Short Stories:

- R. N. Tagore: Hungry Stones.
- Ruskin Bond: The Tunnel
- Leo Tolstoy: How much land does a man need.

4. Speech:

- John F. Kennedy: A Tiny Ripple of Hope.

Dr. Vivek Bapat
Dean, Education, Jiwaji University, Gwalior

Dr. Vinod Singh Bhadoria

- Martin Luther King: I have a Dream.

Unit IV: Phonetics:

- Production of speech sounds: Vowels and Consonants.
- Stress: Strong and Weak Syllables.

Suggested Readings:

- English phonetics: Peter Roach.
- Phonetics and Spoken English: Bala Subhramanium.

FORTH YEAR

SEMESTER-VIII

Subject: Education Course

Title of Paper: EC 18 – Hindi of English

Max. Marks - 100
External Marks -85
Internal Marks – 15

Section-A:

1. History of Hindi Language and Nagari Lipi.

- Grammatical and applied forms of Apbhransh, Awahatta & Arambhik Hindi.
- Development of Braj and Awadhi as literary language during medieval period.
- Early form of Khari-boli in Siddha-Nath Sahitya, Khusero, Sant Sahitaya, Rahim etc. and Dakhni Hindi.
- Development of Khari-boli and Nagari Lipi during 19th Century.
- Standardization of Hindi Bhasha and Nagari Lipi.
- Development of Hindi as national Language during freedom movement.
- The development of Hindi as a National Language of Union of India.
- Scientific & Technical development of Hindi Language.
- Prominent dialects of Hindi and their inter – relationship.
- Salient features of Nagari Lipi and the efforts for its reform & Standard form of Hindi.
- Grammatical structure of Standard Hindi.

Section-B

2. History of Hindi Literature

I. The relevance and importance of Hindi literature and tradition of writing History of Hindi Literature.

II. Literary trends of the following four periods of History of Hindi Literature.

- Adikal: Sidh, Nath and Raso Sahitya. Prominent Poets: Chandvardai, Khusaro, Hemchandra, Vidyapati.
- Bhaktikal: Sant Kavyadhara, Sufi Kavyadhara, Krishna Bhaktidhara and Ram Bhaktidhara. Prominent Poets: Kabir, Jayasi, Sur & Tulsi.
- Ritikal-Ritikavya, Ritibaddhakavya & Riti Mukta Kavya, Prominent Poets: Keshav, Bihari, Padmakar and Ghananand.
- **Adhunik Kal.**
  - (a) Renaissance, the development of Prose, Bharatendu Mandal.
  - (b) Prominent Writers: Bharatendu, Bal Krishna Bhatt & Pratap Narain Mishra.
  - (c) Prominent trends of modern Hindi Poetry: Chhayavad, Pragativad, Proyogvad, Nai Kavita, Navgeet and Contemporary poetry and Janvadi Kavita.
- Prominent Poets: Maithili Sharan Gupta, Prasad, Nirala, Mahdevi, Dinkar, Agyeya, Mukitbodh, Nagarjun.

- Upanyas & Realism
- The origin and development of Hindi Novels
- Prominent Novelists: Premchand, Jainendra, Yashpal, Renu and Bhism Sahani
- The origin and development of Hindi short story
- Prominent Short Story Writers: Premchand, Prasad, Agyeya, Mohan Rakesh & Krishna Shobti.

IV. Drama & Theatre:

- The origin & Development of Hindi Drama.
- Prominent Dramatists: Bharatendu, Prasad, Jagdish Chandra Mathur, Ram Kumar Verma, Mohan Rakesh.
- The development of Hindi Theatre.

V. Criticism:

- The origin and development of Hindi criticism: Saiddhnktik, Vyavharik, Pragativadi, Manovishleshanvadi & Nai Alochana.
- Prominent Critics: Ramchandra Shukla, Hajrai Parsad Dwivedi, Ram Vilas Sharma & Nagendra.

VI. The other forms of Hindi Prose: Lalit Nibandh, Rekhachitra, Sansmanran, Yatravrittant.

FORTH YEAR

SEMESTER-VIII

Subject: Education Course

Title of Paper: EPC 19 – Understanding the Self

Max. Marks - 50
External Marks -40
Internal Marks – 10

Objectives:

- The main aim to this course is to facilitate the development of individuals who can take responsibility for their own learning and give a conscious direction to their lives.

  Students are encouraged to explore and develop through self-reflection a greater insignt into their aims of life, strengths and weaknesses and dynamics of formation of identify and a true individuality.

- Students also develop a capacity for social-relational sensitivity, effective communication skills and ways to create harmony within one's own self and society. The workshops are also aimed at equipping the students with positive attitudes, attributes and skills that help in facilitating the personal growth of their own students while teaching.

- To help student teachers discover and develop open-mindeness, the attitude of a self-motivated learner, having self-knowledge and self-restraint.

- To help student teachers develop the capacity for sensitivity, sound communication skills and ways to establish peace and harmony.

- To develop the capacity to facilitate personal growth and social skills in their own students.

Content:

Unit I: Exploring the Aim of Life Objectives

- To enable students to develop a vision of life for themselves.
- To encourage students to give conscious direction to their lives to take responsibility for their actions.
- To develop a holistic and integrated understanding of the human self and personality.
- **Workshop themes**
- Vision as person: Aspiration and purpose of life.
- Giving a conscious direction to life.
- Understanding different dimensions of self and personality and way in which they influence the dynamics of identity formation, values and direction of life.

Unit II: Discovering one's True Potential

- To facilitate the personal growth of the students by helping them to identify their own potential.
- To develop the power of positive attitude.
- To encourage students to develop the capacity for self observation exercises.
- **Workshop themes**
- Understanding one's strengths and weaknesses through self observation exercises.
- Taking responsibility for one's own actions.

- Developing positivity, self esteem and emotional integration.
- Exploring fear and trust: Competition and cooperation.
- Developing skills of inner self organization and self reflection.
- Writing a self-reflective journal.

Unit III: Developing Sensitivity

- To enable students to examine and challenge the stereotypical attitudes and prejudices that influence identity formation and the process of individuation.
- To encourage students to develop the capacity for perspective taking and appreciating different points of view.
- To develop sensitivity towards needs of children by connecting with one's own childhood experiences Workshop Themes.
- Understand and challenge the unconscious, conditioned attitudes that are stereotyped and prejudiced (gender, caste, class, race, region, disability etc.) and critically examine the sources of stereotyped messages (e.g., media).
- Defining consciously one's own values towards self and society and develop a capacity to understand and appreciate divergent points of view. Widening their realm of consciousness.
- Developing the capacity for empathic listening and communication skills.
- Understanding one's own childhood and adult-child gaps in society.

Unit IV: Peace, Progress and Harmony

- To develop the capacity to establish peace within oneself.
- To develop the capacity to establish harmony within a group and methods of conflict resolution.
- To understand the meaning of leadership and develop attitudes and skills of a catalyst.
- To understand the basis of social disharmony, the factors those contribute to it and ways to facilitate change.
- **Workshop themes**
- Establishing peace within oneself: Exercises of concentration and meditation.
- Understanding group dynamics and communication.
- Creating group harmony: Exploring methods of creating a collective aspiration for progress and conflict resolution.
- Exploring the bases of social disharmony: Becoming the agents and catalysts of change and exploring methods of facilitating change.

Unit V: Facilitating Personal Growth: Applications in Teaching

- To explore ways of integrating the facilitation of personal growth and social skills within the formal curriculum.
- **Workshop themes**
- Becoming a self-reflective practitioner: Becoming conscious of one's own attitudes and communication pattern while teaching.
- Observing children: Appreciating social, economic, cultural and individual differences in children and relating with them.
- Exploring and practicing ways to facilitate personal growth and develop social skills in students while teaching.

Mode of Transaction:

- There is no standard prescribed material for these workshops. The professional experts are expected to engage with the students with specially designed activities. These could be based on the facilitator's personal integration and unique individual and group characteristics and are rooted within the context of student's lives and contemporary realities. It is suggested that the students be given space to explore and articulate their own sense of life and its issues. They can be encouraged to think a fresh on issues that most closely concern them and use creativity and imagination to develop a perspective on them. The resource materials are an aid in this process. The resource materials can also include newspaper / web articles on contemporary concerns and movies / documentaries and other audio-visual materials. There is a suggested list of resource materials which should be contextualized and updated periodically. Expertise / Specialization required to teach this course Specialists who have conducted personal development workshops and who have a qualification in clinical and counseling Psychology.

Essential Readings:

- Antoine de Saint-Exupery, (1977). The Little Prince. London, UK: Wordsworth Edition Translated by Irene Testot-ferry (available in Hindi).
- Dalal, A.S. (2001). Our Many Selves. Pondicherry, India: Sri Aurobindo Ashram.
- Frankl, V. (1946). Man's Search for Meaning. New York: Pocket Books.
- Joshi, K. (ed) (2005). The Aim of Life, Auroville, India: Saiier.

Suggested Audio-Visual Resources:

- Aim of Life by Kireet Joshi (DVD) for DVD/facilitation contact mothersinstitute@hotmail.com
- Full of Life: A sensitive Japanese Teachers explores feelings, death with 10 year olds.
- Personality Development (Interactive CD, Computer Only) with Yoga and Guided Meditation Modules, Indus Quality Foundation.
- The House on Gulmohar Avenue by Samina Mishra (www.cultureunplugged.com)

Dr. Vivek Bapat

Dr. Vinod Singh Bhadoria

FORTH YEAR

SEMESTER-VIII

Subject: Education Course

Title of Paper: EPC 20 – Understanding of ICT

Max. Marks - 50
External Marks -40
Internal Marks – 10

Objectives: Upon the completion of the course the student-teachers will able to:

- Develop skill in handling computer and using word documents.
- Develop skill in computation, analysis and interpretation of data by using Excel Spread Sheets.
- Understand the Educational implications Technology in the field of teacher education programme and training.

Practicum:

Computer Fundamental:

- Instructions on operating the Computer.
- Connecting of all peripherals to CPU for a system.
- Switching on/off/restart
- Inserting / removing a floppy from the floppy drive
- Running a file from a floppy using floppy drive
- Copying a file from hard disk to floppy disk
- Inserting / removing a CD from the CD-ROM drive
- Running a file from a CD-ROM using CD-ROM drive
- Copying files from one drive to another
- Creating a new folder
- Running a file from hard disk
- Connecting the printer and print out hard copies

Exercise in Ms-Word:

- Creating a new document
- Formatting and editing of a document
- Inserting pictures, objects, frames and tables
- Practicing Mail-merge facility
- Working with the drawing tools

Exercise in Ms-Excel:

- Creating a new worksheet

- Inserting and deleting rows/columns in worksheet
- Formatting and editing of a document – sorting
- Preparation of statement of marks and using of some statistical concepts – Descriptive Statstics

- Preparation of School Time Table
- Preparation of Tables

Exercise in Ms-Power Point:

- Preparation of MS-Power Point presentation using text, picture, sound, word art, clipart and the other available tools with animation.

Exercise in Information and Communication Technology

- Browsing the Internet and down loading – Search word using search engine
- Working with Multimedia
- Receiving / Sending of E-mail and attachment

B.Sc-B.Ed. INTEGRATED PROGRAMME

FIRST YEAR

SEMESTER-I

Subject: Mathematics

Title of Paper: Matrix Theory, Calculus, Geometry

Max. Marks - 150
External Marks -125
Internal Marks – 25

Particulars

Unit	Syllabus
Unit-I	Rank of a matrix, Eigen values, Eigen vectors, Characteristic equation of a matrix, Cayley Hamilton theorem and its use in finding inverse of matrix, Application of matrix to a system of linear (both homogenous and non - homogenous) equations, Theorems on consistency and Inconsistency of a system of linear equations, Solving the linear equations with three unknowns.
	आव्यूह की जाति, आयगेन मान एंव आयगेन सदिश आव्यूह की चारित्रिकता, केल–हैमिल्टन प्रमेय एवं आव्यूह का व्यूत्क्रम ज्ञान करने में इनका उपयोग, रैखिय समीकरणों के निकाय (समघात एवं असमघात) के हल के लिये आव्यूहों का प्रयोग, रैखिय समीकरणों के निकाय की संगतता एवं असंगतता पर प्रमेय, तीन अज्ञात रशियों के रैखिक समीकरणों के हल।
Unit-II	Relation between the roots and coefficient general polynomial equation in one variable. Transformation of equations, Descarte's rule of signs, De Moivre's theorem and its applications, Direct and inverse circular and hyperbolic functions Expansion of trignometrical function.
	एक चर के सामान्य बहुपदों के समीकरण के गुणांकों एवं मूलों के बोच संबंध, समीकरणों का रुपांतरण, चिन्हों का दिकार्ते नियम, डी–मॉवर्स प्रमेय एवं इसके उपयोग, प्रत्यक्ष एवं व्यूत्क्रम, वृत्तीय एवं अतिपरवलयीय फलन, त्रिकोणमीतीय फलनों का विस्तार।
Unit-III	Continuity of function of one variable, Properties of continuous function, Uniform continuity, Chain Rule of differentiability, Mean value theorems and their geometrical interpretations, Darboux's Intermediate Value Theorem for derivatives.
	एक चर के फलनों का सांतत्य, संतत फलनों के गुणधर्म, एक समान सातत्य, अवकलनीयता का श्रृंखला का नियम, माध्यगान प्रमेय एवं उनका ज्यामितीय अर्थ, अवकलन के लिए डॉरबाक्रा का माध्यमान प्रमेय
Unit-IV	Integration of irrational algebraic functions and transcendental functions, Reduction formulae, Definite Integrals.
	अपरिमेय, बीजीय एवं अबीजीय फलनों का समाकलन। रामानयन सूत्र। निश्चित समाकलन।
Unit-V	Equation of cone with given base, generators of cone, condition for three mutually perpendicular generators, Right circular cone, Equation of Cylinder and its properties, Right circular cylinder, enveloping cylinder and their properties.
	दिये गये आधार के शंकु का समीकरण, शंकु के जनक, तीन परस्पर लम्बवत, जनकों हेतु शर्त, लंबवृत्तीय शंकु, बेलन का समीकरण एवं उसके गुणधर्म, लंबवृत्तीय बेलन, अन्चलोपित बेलन एवं उसके गुणधर्म।

Text Books :

1. S.L. Loney - Plane Trigonometry Part II
2. K.B. Datta - Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd. New Delhi 2000
3. Chandrika Prasad - A Text Book on Algebra and Theory of Equations, Pothishala Pvt. Ltd. Allahabad
4. N. Saran & R.S. Gupta - Analytical Geometry of Three dimensions. Pothishala Pvt. Ltd. Allahabad
5. S.L. Loney, Elements of Coordinate Geometry, Macmillan and Co. London.
6. Gorakh Prasad - Differential Calculus, Pothishala Pvt. Ltd. Allahabad
7. Gorakh Prasad - Integral Calculus, Pothishala Pvt. Ltd. Allahabad
8. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & sons, 1999,

Reference Books:

1. P. B. Bhattacharya, S. K. Jain and S.R. Nagpaul, First Courses in Linear Algebra, Wiley Eastern, New Delhi. 1983.
2. R.S. Verma and K.S. Shukla, Text Book on Trigonometry Pothishala Pvt. Ltd.
3. P.K. Jain & Khalil Ahmad, A text book of Analytical Geometry of Three Dimensions, Wiley Eastern Ltd. 1999
4. R.J.T. Bell : Elementary Treatise on Coordinate Geometry of Three dimensions, Macmillan India Ltd. 1994.
5. N. Piskunov, Differential and Integral Calculus. Peace Publishers, Moscow.
6. HLS. Hall and S.R. Knight, Higher Algebra. H.M. publication, 1994.
7. म. प्र. हिन्दी ग्रंथ अकादमी की पुस्तके।

FIRST YEAR

SEMESTER-I

Subject: Zoology

Title of Paper : Invertebrate

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	1. Elementary Knowledge of Zoological Nomenclature and International Code. 2. Classification of Lower Invertebrates (According to Parker and Haswell 7th edition) 3. Classification of Higher Invertebrates (According to Parker and Haswell 7th edition) 4. Protozoa- Type Study of Plasmodium. 5. Protozoa and Diseases.
Unit-II	1. Porifera- Type study of Sycon. 2. Types of Canal system. 3. Coelenterata- Type study of Obelia 4. Corals and Coral Reef formation.
Unit-III	1. Helminthes- Type study of Liver Fluke. 2. Nematodes and diseases. 3. Annelida- Type study of earthworm, metamerism. 4. Type Study of Hirudinaria. 5. Structure and significance of Trochophore larva.
Unit-IV	1. Arthropoda- Type study of Prawn. 2. Types study of Periplanata. 3. Larval forms of Crustacea. 4. Insect as Vectors of human diseases. .
Unit-V	1. Mollusca- 'Type study of Pila 2. Echinodermata- External features and water vascular system of Star fish. 3. Larval forms of Echinodemns. 4. Minor Phyla — Ectoprocta & Rotifera.

FIRST YEAR

SEMESTER-I

Subject: Botany

Title of Paper: Diversity of Microbes and Cryptogams

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**Prokaryots:** characteristics of Viruses, general account of TMV and T4 bacteriophage. Bacterial structure, nutrition, reproduction and economic, importance; General account of Mycoplasma Cynobacteria and Actinomycetes.
	प्रोकेरियोट : विषाणुओं के सामान्य लक्षण, टी. एम.बी. विषाणु एवं टी फोर बेक्टीरियोफेज का सामान्य विवरण। जीवाणु की संरचना, पोषण, प्रजनन एवं आर्थिक महत्व मायलोप्लाज्मा सायनो–बेक्टीरिया एवं एक्टीनोमाइसीटीज का सामान्य विवरण।
Unit-II	**Algae :** General characters, classification and economic importance. Important features and life history of Chlorophyceae- Volvox, Oedogonium, Charophyceae-Chara Xanthophyceae - Vaucheria, Phaeophyceae - Ectocarpus, Rhodophyceae -Polysiphonia.
	शैवाल : शैवालों के सामन्य लक्षण, वर्गीकरण एवं आर्थिक महत्व, मुख्य लक्षण, एवं जीवन चक्र क्लोरोफासयी–वॉल्वॉक्स, ऊडोगानियम, कैरोफायसी–कारा, जैन्थोफायसी–वाउचेरिया फियोफायसी–एक्टोकार्पस, रोडोफायसी–पोलीसाइफोनिया।
Unit-III	**Fungi:** General characters, classification and economic importance, Important features and life history of Mastigomycotina- Phytophthora, Zygomycotiana Mucor, Ascomycotina : Aspergillus, Peziza, Basibiomycotina - Puccinia, -Deurteromycotina Cercospora. General account of Lichens.
	कवक : कवकों के सामान्य लक्षण एवं वर्गीकरण एवं आर्थिक महत्व। प्रमुख लक्षणों के जीवन इतिहास का अध्ययन, मेस्टोगोमायकोटिना–फायटोफ्थोरा, जायगोमायकोटिना–म्यूकर। एक्कोमायकोटिना–एरपरजिलस, पेजाइजा, बेसिडियोमायकोटिना, पक्सीनिया, डयूटेरोमाकोटिना–सर्कोस्पोरा, लाइकेन्स का सामान्य विवरण।
Unit-IV	**Bryophyta :** Classification, study of morphology, anatomy, reproduction of Hepaticopsida : Riccia, Marchantia; Anthocerotopsida: Anthoceros, Bryopsida: Polytrichum
	ब्रायाफोइटा : बाह.य आकारिकी, आतंरिक संरचना एवं प्रजनन : हेपेटीकोप्सिडा–रिक्सिया गारकेन्शिया, एन्थोसिरोटोप्सिडा–एन्थोसिरोसः ब्रायोप्सिडा–पॉलीट्राइकम।
Unit-V	**Pteridophyta :** important characters and classification. Stelar organization. Morphology and anatomy of Rhynia. Structure, anatomy and reproduction in Lycopodium, Selaginella, Equisetum and Marsilea.
	टेरिडोफाइटा : प्रमुख लक्षण एवं वर्गीकरण। स्टीलर सगठन, राहिनिया की बाह.य एवं आंतरिक सरंचना। लाइकोपोडियम, सिलेजिनेला, इक्वीसिटम एवं मारसीलिया की बाह.य एवं आंतरिक संरचना एवं प्रजनन।

Suggested Books :

1. G.M. Smith 1971 Cryptogamic Botany. Vol - I Algae & Fungi Tata, McGrraw Hill Pub. Co. NewDelhi.
2. G.M. Smith 197] Cryptogamic Botany. Vol -II Bryophytes & Pteridophytes. Tata McGrraw Hill Pub. Co. New Delhi.
3. O.P.Sharma, 1992. Text book of Thallophyta McGrraw Hill Pub. Co.
4. O.P.Sharma, 1990. Text book of Pteridophyta McMillan india Ltd .
5. P.D.Sharma 1991. The Fungi. Rastogi & Co. Meerut.
6. H.C. Dubey. 1990. An introduction of Fungi. Vikas Pub. house Pvt. Ltd,
7. P. Punt 1980. Bryophyta Atma ram & Sons, Delhi.
8. A.Clifton. 1958. Introduction to the Bacteria. Mcgrew Hillpub. Co.New Delhi.

Practical

Objectives :

i. To develop the skills of staining and observation of lower organism.
ii. To impart the skills of temporary and permanent slide preparations.
iii. To enhance ability to identify the lower organisms using microscope.
iv. To familiarize the students with diseases and their causative agents.

Scheme of practical examination

Time: 4 hrs Marks: 50

Algaé / Fungi	05
Bryophyta	10
Pteridophyta	10
Plant disease	05
Spotting (1-5)	10
Viva	05
Sessional	05
Total	**50**

B Sc-B.Ed. INTEGRATED PROGRAMME

FIRST YEAR

SEMESTER-I

Subject: Chemistry

Title of Paper: Physical Chemistry

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**A. Mathematical Concepts**: Logarithmic relations, (rules and types), use of log table and antilog table in calculations, curves sketching, straight line and linear graphs, calculation of slopes, Differentiation of functions like K_x, e^x, x^n, sinx, logx; multiplication and division in differentiation, maxima and minima. Partial differentiation and reciprocity relations. Integration of some useful/relevant functions; Factorials, Probability. **B. Gaseous States and Molecular Velocities:** Critical phenomenon : PV isotherms of ideal gases, Andrew's experiment, continuity of states, the isotherms of van der Waals equations, relationship between critical constants and van der Waals constants. Root mean square, average and most probable velocities. Qualitative discussion of the Maxwell's distribution of molecular velocities, collision numbers, mean free path and collision diameter.
	अ. गणितीय अवधारणाएँ – लघुगणकीय संबंध (लघुगणक के नियम तथा प्रकार), लघुगणक तालिका तथा प्रतिलघुगणक तालिका का गणना में अनुप्रयोग, वक्र आरेखन, सरल रेखा तथा तथा रेखीय ग्राफ एवं ढाल की गणनाएँ K_x, e^x, x^n, sinx, logx; जैसे फलनों का अवकलन, उच्चतम एवं निम्नतम, आंशिक अवकलन एवं अन्योन्यता संबंध। कुछ उपयोगी एवं संबद्ध फलनों का समाकलन, क्रमगुणित (फेक्टोरियल्स), प्रायिकता। ब. गैसीय अवस्था तथा आविक गतियाँ – क्रांतिक परिघटनाएँ – वास्तविक गैसों के PV समतापीय वक्र, ऐन्ड्रूज का प्रयोग, अवस्था का सातत्य, वाण्डर वाल्स रामीकरण के समतापी वक्र, वाण्डर वाल स्थिरांक एवं क्रांतिक स्थिरांक के संबंध वर्गमाध्य मूल वेग, औसत वेग, प्रायिकतम वेग, आणविक वेगों के मैक्सावेल वितरण की गुणात्मक विवेचना, संघट.टन संख्या, माध्य मुक्त पथ, संघट.टन व्यास।
Unit-II	**A. Liquid State:** Intermolecular forces, structure of Liquids (a qualitative description) Liquid crystals: Difference between liquid crystal, solid and liquid. Classification, structure of nematic and cholestric phases.Thermography and seven segment cell. **B. Solid State:** Definition of space lattice, Unit cell, Laws of crystallography - (i) Law of constancy of interfacial angles (ii) Law of rationality of indices (iii) Laws of symmetry, Symmetry elements in crystals. One solid structures, radius ratio, radius ratio effect and coordination number, limitations of radius mule, lattice defects.
	अ. द्र अवस्था :– अंतरा अणुक बल, द्रवों की संरचना (गुणात्मक विवरण) द्रव क्रिस्टल : द्रव क्रिस्टल, ठोस एवं द्रव में अंतर, वर्गीकरण, नेमेटिक एव कोलिस्ट्रिक प्रावस्थाओं की संरचना, ऊष्णाग्राफी और सात खण्डीय सेल। ब. ठोस अवस्था :– त्रिविम जालक तथा ईकाई सेल की परिभाषा क्रिस्टलोग्राफी के नियम (i) अंतराफलक कोणों की स्थिरता का नियम (ii) परिमेय घातांक का निमय (iii) सममिति का नियम।

Dr. Vivek Bapat

Dr. Vinod Singh Bhadoria

	क्रिस्टल में समांगत तत्व। आयनिक ठोस संरचना, त्रिज्या अनुपात, त्रिज्या अनुपात प्रभाव और उप सहसंयोजक संख्या। त्रिज्या अनुपात की कमियाँ और जालक दोष।
Unit-III	**A. Elementary Quantum Mechanics:** Schrodinger wave equation, significance of Ψ and Ψ^2, radial and angular wave functions and probability distribution curves, effective nuclear charge. **B. Periodic Properties :** Definition, application and periodicity of Atomic and ionic radii, ionization energy, electron affinity and electronegativity **C. Chemical Bonding:** Covalent bonding as applied to valence bond theory and its limitations, directional characteristic of covalent bond. Hybridization and shapes of simple molecules and tons, Valence Shell Electron Pair Repulsion (VSEPR) theory to NH_3, SF_4, ClF_3, ICL_2, H_20.
	अ. प्रारंभिक क्वाण्टम यांत्रिकी :– श्रोडिंगर तरंग समीकरण Ψ और Ψ^2 का महत्व, रेडियल एवं कोणीय तरंग फलन और सम्भावित विरण वक्र, प्रभाव नाभिकीय आवेश। ब. आवर्ती गुण :– परमाणवीय एवं आयनिक त्रिज्या, आयनन ऊर्जा, इलेक्ट्रॉन बन्धुता एवं ऋण विधुतता की परिभाषा, अनुप्रयोग तथा आवर्तीता। स. रासायनिक बंध :– सहसंयोजकता, सहसंयोजकता बंध सिद्धान्त और उसकी कमियाँ, सहसंयोजन बंध का दिशात्मक गुण, संकरण के विभिन्न प्रकार, सरल अणुओं एवं आयनों के आकार। संयोजकता कोश इलेक्ट्रॉन युग्म प्रतिकर्षण सिद्धान्त – NH_3, SF_4, ClF_3, ICL_2, H_20. के लिए।
Unit-IV	**s-Block Elements:** Comparative study, diagonal relationship, salient features of hydrides, solvation and complexation tendencies including their, function in bio systems an introduction to alkyls and aryl complexes. **p-Block Elements :** Comparative study (including diagonal relationship) of groups 13-17 elements, compounds like hydrides, oxides, oxyacids and halides of groups 13-16. Hydrides of boron-diborane and higher boranes. Borazine, borohydrides.
	s– ब्लॉक तत्व :– तुलनात्मक अध्ययन, विकर्ण संबंध, हाइड्राइड के विशिष्ट गुण, विलायकन और संकुलन प्रवृत्ति तथा जैविक प्रणाली में इनके कार्य, एल्किल और एरिल संकुलों का परिचय। p– ब्लॉक तत्व :– समूह 13–17 के तत्वों का तुलनात्मक अध्ययन (विकर्ण संबंध भी) समूह 13–16 के तत्वों के यौगिक जैसे हाइड्राइड, आक्साइड, आक्सीएसिड.स और हैलाइड। बोरोन के हाइड्राइड डायबोरेन और उच्च बोरेन, बोराजीन, बोराहाइड्राइड।
Unit-V	**A. Bond Parameters Bond lengths and bond angles, bond energy:** Localized and delocalized chemical bond, Vander Waal interactions, with reference to supra molecular chemistry, resonance, hyperconjugation, inductive and field effects, hydrogen bonding. **B. Types of Reagents:** Electrophiles and nucleophiles. Types of organic reactions. Energy consideration. Hemolytic and heterolytic cleavage Reactive intermediates-carbocations, carbanions, free radicals and carbenes/benzynes. **C. Stereochemistry:** Concept of Stereoisomerism, types of Stereoisomerism, elements of symmetry Chiral and achiral compounds. Fischer projection formulae; optical isomerism of lactic and tartaric acids, enantiomerism and diastereoisomerism; configuration (relative and absolute); conformations of ethane and n-butane and cyclohexane. D, L-and R, S-notations of compounds containing chiral centers; projection formulae —Fischer, Newman

	and Sawhorse of compounds containing two adjacent chiral centers: meso and dl-isomers, erythro and threo isomers, racemization and resolution; geometrical isomers; E and Z notations.
	अ. आबंध के प्राचल बंध कोण, बंध ऊर्जा, बंध लंबाई :– स्थानित एवं विस्थानित रासायनिक बंध, रासायनिक बंध, वाण्डरवाल्स अंतर समिक्रिया आवेश स्थानांतरण, संकुल अनुनाद, अतिसंयुग्मन, ऐरोमेटिकता, प्रेरणिक एवं क्षेत्र प्रभाव हाइड्रोजन बंध। ब. अभिकर्मकों के प्रकार :– अभिकर्मकों के प्रकार इलेक्ट्रॉन स्नेही, नाभिकीय स्नेही। कार्बनिक अभिक्रिया के प्रकार (ऊर्जा की धारण सहित) सक्रिय मध्यवर्ती उत्पाद (कार्बोकेटायन, कार्बएनआयन, मुक्त, मूलक कार्बीनस, उदाहरण सहित)। स. त्रिविम रसायन :– त्रिविम समावयवता की अवधारणा, त्रिविम समावयकता के प्रकार, समगिति के तत्व, आणवितक किरैलिटी, कीरल एवं अकीरल अणु, फिशर प्रोजेक्शन सूत्र लेक्टिक तथा टार्टरिक अम्लों की प्रकाशित समावयवता, दर्पण प्रतिबिम्बरुपता तथा द्विस्टीरियोरुपता विन्यास (आपेक्षित एवं निरपेक्ष विन्यास), संरुपण, ईथेन एन–ब्यूटेन तथा साइक्लोहेक्जेन के संरुपण, कीरल, कीरल केन्द्र वाले यौगिकों के D तथा L, R तथा S नामकरण, प्रोजेक्शन सूत्र, दो निकटस्थ किराल केन्द्र वाले कार्बनिक योगिकों के लिए फिशर, न्यूमन तथा सॉहॉर्स, मेसो तथा dl-समावयी, इरीथ्री एवं थ्रीयो समावयी, रेसिमिकरण एवं उनका वियोजन, ज्योमितीय सामावयी, नामकरण की E एंव Z पद्धति।

Suggested books:-

Atkins P W & Julio D Poula, Physical Chemistry, Oxford University Press.

Silbey R J and Alberty R A, Physical Chemistry, John Wiley & Sons Inc.

Castellan G W, Physical Chemistry, Narosa Publising House.

Raj Gurudeep, Advance Physical Chemistry, Goel Publising House.

Puri, Sharma & Pathania, Physical Chemistry, S Chand & Company.

Dr. Vivek Bapat
Dean, Education, Hisar University, Haryana

Dr. Vinod Singh Bhadoria

B Sc-B.Ed. INTEGRATED PROGRAMME

FIRST YEAR

SEMESTER-I

Subject: Physics

Title of Paper: Mechanics and Properties of Matter

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**Mathematical Physics** Addition, subtraction and product of two vectors; Polar and axial vectors and their examples from physics; Triple and quadruple product (without geometrical applications); Scalar and vector fields; Differentiation of a vector; Repeated integral of a function of more than one variable; Unit tangent vector and unit normal vector: Gradient, Divergence and Curl; Laplacian operator; Idea of line, surface and volume integrals; Gauss', Stokes' and Green's Theorems, Jacobian Application.
	गणितीय भौतिकी दो सदिश का योग, अंतर व गुनणफलन, ध्रुवीय एवं अक्षीय सदिश व उनके भौतिकी उदाहरण तीन व चार सदिशों का गुणन (ज्यामितीय अनुप्रयोग के बिना), अदिश व सदिश क्षेत्र, सदिश का अवकलन, एक से अधिक चरों के फलन का बारम्बार समाकलन समाकलन, इकाई स्पर्श सदिश व इकाई नार्मल सदिश, सदिश का ग्रेडियन्ट, डायवर्जेंस एवं कर्ल, लाप्लासीयन आपरेटर, पृष्ठीय, आयतन समाकलन, गॉस स्टोक व ग्रीस प्रमेय, जेकोबियन अनुप्रयोग।
Unit-II	**Mechanics** **Kinematics:** Displacement, Time and Average Velocity (x-t graph illustrations to be included). Instantaneous Velocity (Finding of velocity on an x-t graph), Average and Instantaneous Acceleration (Illustration with v-t and a—t graph), Motion with Constant Acceleration (Illustration with a-t and v—t graph), Freely Falling Bodies (Up and down motion in fall with y-t and v_y-t graph), Velocity and Position by Integration, Position and Velocity Vectors, Acceleration Vector, Components of velocity and acceleration in different coordinate systems. Newton's Laws of motion and its explanation with problems, various types of farces in nature (explanation), Pseudo Forces (e.g. Centrifugal Force), Coriolis force and its applications. Motion under a central force, Derivation of Kepler's laws. Gravitational law and field, Potential due to a spherical body. Gauss & Poisson's equation of Gravitational self-energy. System of particles, Centre of mass and reduced Mass. Elastic and inelastic collisions.
	विस्थापन, समय और औसर वेग (x-t ग्राफ उदाहरण) तात्कालिक वेग (x-t ग्राफ पर वेग निकालना) औसत और तत्क्षणिक त्वरण (a-t आर v-t ग्राफ) मुक्त गिरते हुए पिण्ड का ग्रामीय प्रदर्शन (अप व डाउन गति का y-t ग्राफ v_y-t उदाहरण) समाकरन द्वार वेग व स्थिति, स्थिति व वेग सदिश, त्वरण सदिश, गति व त्वरण के विभिन्न निर्देशांक पद्धतियों में घटक। न्यूटन के गति के नियम व इसकी व्याख्या, प्रकृति के विगिन्न बल व व्याख्या, छद.म बल (उदाहरा : अभिकेंद्रीय बल) कोरियालिस बल व इसके उदाहरण, केंद्रीय बल के अन्तर्गत गति, केप्लर के नियमों की निष्पति, गुरुत्वाकर्षण का नियम व क्षेत्र, गोलाकार पिण्ड का गुरुत्वीय विभव, गॉस व पायसन की गुरुत्वीय स्व ऊर्जा की समीकरण, कणों का निकाय, द्रव्यमान केन्द्र व समानीत द्रव्यमान, प्रत्यास्थ व व अप्रत्यास्थ टक्कर।

Dr. Vivek Bapat
Dean, Education, Jiwaji University, Gwalior

Dr. Vinod Singh Bhadoria
Chairman, Board of Studies (Education)

	Elasticity: Hook's law and coefficient of elasticity; Young's modulus, Bulk modulus and Modulus of rigidity; Work done during longitudinal strain, volume strain, and shearing strain; Poisson's ratio; Relation between three elastic moduli (Y, η, K); Determination of Y of rectangular thin bar loaded at the centre; Torsional oscillations, Torsional rigidity of a wire. to determine η by torsional oscillations. **Surface Tension:** Surface Tension, Angie of Contact, Capillary Rise Method; Energy required to raise a liquid in capillary tube; Factors affecting surface tension; Jeager's method for Determination of surface tension; Applications of Surface Tension. **Viscosity and Fluid Mechanics:** Concept of Viscous Forces and Viscosity; Steady and Turbulent Flow, Reynolds's number, Equation of Continuity; Bernoulli's Principle; Application of Bernoulli's equation – (1) Speed of Efflux (2) Venturimeter (3) Aspirator Pump (4) Change of plane of motion of a spinning ball.
	द्रव्य के सामान्य गुण प्रत्यास्थता :– हुक का नियम एवं प्रत्यास्थता गुणांक, यंग प्रत्यास्थता गुणांक, आयतन प्रत्यास्थता गुणांक एवं दृढ़ता गुणांक, अनुदैर्ध्य विकृति, आयतन विकृति एवं ऐंठन विकृति में किया गया कार्य, पायसन निष्पति, रामदैशिक ठोस के तीन प्रत्यास्थता गुणांकों में संबंध (Y, η, K), मध्य में भारित पतली आयताकार छड़ (केन्टीलीवर) के Y का निर्धारण, ऐंठन दोलन, किसी तार की ऐंठन दृढ़ता, व इसका ऐंठन दोलन विधि से निर्धारण। पृष्ठ तनाव :– पृष्ठ तनाव, स्पर्श कोण, केशिका उन्नयन विधि, केशिका में द्रव चढ़ाने में आवश्यक ऊर्जा, पृष्ठ तनाव को प्रभावित करने वाले कारक, जेगर की विधि से पृष्ठ तनाव का निर्धारण, पृष्ठ तनाव के अनुप्रयोग। श्यानता एवं तरल यांत्रिकी :– श्यान बल की संकल्पना व श्यानता गुणांक, धारारेखीय व विक्षुब्ध प्रवाह, रेनॉल्ड संख्या, सातत्य समीकरण, बरनॉली का सिद्धान्त, बरनॉली प्रमेय के अनुप्रयोग – 1. एफ्लक्स की चाल 2. वेन्युरीमीटर 3. एस्पिरेटर पम्प 4. स्पिनिंग बॉल के तल का परिवर्तन
Unit-IV	**Oscillations alert** Concept of Simple, Periodic & Harmonic Oscillation with illustrations; Differential equation of harmonic oscillator; Kinetic and potential energy of Harmonic Oscillator, Oscillations of two masses connected by a spring; Translational and Rotational motion, Moment of Inertia and their Product, Principal moments and axes, Motion of Rigid Body, Euler's equation.
	दोलन सरल, आवर्ती व हार्मोनिक गति की सचित्र संकल्पना, आवर्ती दोलित्र का समीकरण, आवर्ती दोलित्र की गतिज व स्थितिज ऊर्जा, स्प्रिंग से जुड़े दो पिंडो का दोलन, स्थानान्तरणीय व घुर्णीय गति, जड़त्व आघुर्ण व उनका गुणन, मुख्य आघुर्ण एवं अक्ष दृढ़ पिण्ड की गति, यूलर समीकरण।
Unit-V	**Relativistic Mechanics:** Michelson-Morley experiment and its outcome: Postulates of Special Theory of Relativity; Lorentz Transformations. Simultaneity and order of events; Lorentz contraction: Time dilation; Relativistic transformation of velocity, frequency and wave number; Relativistic addition of velocities; Variation of mass with velocity. **Earlier Developments in Physics up to 18th Century:** Contributions of Aryabhatt, Archimedes, Nicolus Copernicus, Galileo Galilei, Huygens, Robert Hooke, Torricelli,

	Biot-Savarts. Cavendish, Galvani, Franklin and Bernoulli.
	सापेक्षकीय यांत्रिकी :– माइकल्सन व मोरले के प्रयोग एवं इसके निष्कर्ष, विशिष्ट सापेक्षिकता के सिद्धान्त की अवधारणाऐं, लॉरेंज रुपांतरण, समकालिक घटना एवं घटनाओं के क्रम, लॉरेंज संकुचन, समय विस्तारण, वेग, आवृत्ति तथा वेव नम्बर का सापेक्षकीय रुपान्तारण, वेगों का सापेक्षिकीय योग, वेग के साथ द्रव्यमान परिवर्तन। भौतिकी का प्रारंभिक विकास 18 वीं सदी तक :– आर्यभट.ट, आर्कमिडिज, निकोलस, कोपरनिकस, गेलिलीओ गेलिली, हॉयगन, राबर्टहुक, टॉरसेली, वर्नियर, पॉस्कल, केप्लर, न्यूटन, बॉयल, यंग, थॉमसन, कुलॉम्ब, ऐम्पीयर, गॉस, बॉयो–सेवर्ट केवनडिश, गेलवानी, फ्रेंकलीन और बरलॉली।

Useful links:

1. http://en.wikipedia.org/wiki/History of Physics
2. htto://en.wikipedia.org/wiki/Nobel Prizes in Physics

Reference Books:

1. University Physics: Sears and Zeemansky, X!- edition, Pearson Education
2. Concepts of Physics: H.C. Varma, Bharati Bnavan Publishers
3. Problems in Physics: P.K. Srivastava, Wiley Eastern Ltd.
4. Applied Fluid Mechanics: Mott Robert, Pearson Benjamin Cummir, VI" Edition, Pearson Education/Prentice Hail Internationa:. New Delhi
5. Properties of Matter: D.S. Mathur, Shamial Chritable Trust, New Delhi
6. Mechanics: D.S. Mathur, S Chand and Company. New Delhi-5.

B Sc-B.Ed. INTEGRATED PROGRAMME

FIRST YEAR

SEMESTER-II

Subject: Mathematics

Title of Paper : Advanced Calculus, Differential Equations, Vector Calculus

Max. Marks - 150
External Marks -125
Internal Marks – 25

Particulars

Unit	Syllabus
Unit-I	Successive differentiation, Leibnitz theorem, Maclaurin and Taylor series expansions, Asymptotes, Curvature .Tests for concavity and convexity, Points of inflexion, Multiple points, Tracing of curves in Cartesian co-ordinates.
	उत्तरोतर अवकलन, लैबनीज का प्रमेय, मैकलारिन एवं टेलरे श्रेणी में विस्तार, अनंत स्पर्शी, वक्रता, उत्तलता एवं अवतलता के परीक्षण, नती परिवर्तन बिन्दु, बहुबिन्दु कार्तीय निर्देशांकों में वक्रों का अनुरेखण।
Unit-II	Limit and continuity of functions of two variables, Introduction of Partial differentiation, Euler's Theorem on homogeneous function, Jacobians, Differentiability of real-valued functions of two variables. Tavior's theorem for functions of two variables, Double and triple integrals, Dirichlet's integrals.
	छो चरों के फलनों की सीमा एवं सांतत्य, आंशिक अवकलन की अवधारणा, समघात फलनों पर आयलर का प्रमेय, जेकोबियन, दो चरों के वास्तविक मान फलनों के आंशिक अवकलन एवं अवकलनीयता, दो चरों के फलनों के लिए, टेलर का प्रमेय, द्विश एवं त्रि–समाकलन, डिरिक्ले को समाकल।
Unit-III	Linear Differential equations and equations reducible to the linear form, Exact. differential equation, First order and higher degree equations Solvable for x, y and p. Clairaut's form and singular solutions, Linear differential equations with constant coefficients,
	रैखिक अवकल समीकरण, रखिक समीकरणों में रुपांतरणीय समीकरण, यथातथ अवकल समीकरण x, y और p में हल होने वाले प्रथम कोटि एवं उच्चघात के समीकरण, क्लारेट फार्म एवं विचित्र हल, अचर गुणांकों के रैखिक अवकल समीकरण।
Unit-IV	Homogenous linear ordinary differential equations. linear differential equations of second order, Transformation of the equation by changing the dependent variable and the independent variable, Method of Variation of parameters, Ordinary simultaneous differential equations.
	सामान्य समघात रैखिक अवकल समीकरण, द्विघात रैखिक अवकल समीकरण, परतंत्र एवं स्वतंत्र चरों को बदल कर समीकरण का रुपांतरण। प्राचल विचरण की विधि, साधारण युगपद अवकल समीकरण।
Unit-V	Vector differentiation, Gradient, Divergence and Curl, Vector integration, Theorem of Gauss (without proof) and problems based on it. Theorem of Green (without proof) and problems based on it, Stoke's theorem : without proof) and problems based on it.
	सदिश अवकलन, ग्रेडियट, डायव्जर्जेस एवं कर्ल, सदिश समाकलन, गॉस की प्रमेय (बिना उपपत्ति) एवं उस पर आधारित प्रश्न, ग्रोन का प्रमेय (बिना उपपत्ति) एवं उस पर आधारित प्रश्न, स्टोक का प्रमेय (बिना उपपत्ति) एवं उस पर आधारित प्रश्न।

Texts Books :

1. Gorakh Prasad - Differential Calculus, Pothishale Pvy. Ltd. Allahabad
2. Gorakh Prasad - Integral Calculus, Pothishala Pvt. Ltd. Allahabad
3. D.A. Murray - Introductory Course in Differential Eauations, Orient Long man, India 1967.
4. N. Saran & S.N. Nigam - Introduction to Vector Analyss. Pothishala Pvt. Lid., Allahabad.
5. Murray R. Spiegel, Theory & problems of Advanced Calculus. Schaum's outline series, Schaum Publishing Co. New Yark.

Dr. Vivek Bapat

Dr. Vinod Singh Bhadoria

FIRST YEAR

SEMESTER-II

Subject: Zoology

Title of Paper : Vertabrates & Evolution

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	1. Origin of Chordates Classification of phylum Chordata upto orders according to Parker and Haswell (Latest edition). 2. Hemichordata - External features and affinities of Balanoglossus. 3. Urochordata - Type study of Herdmania. 4. Cephalochordata - Type study of Amphioxus. Affinities of Amphioxus
Unit-II	1. Comparison between Petromyzon and Myxine. 2. Comparative account of integuments 3. Comparative account of limb bones and girdles of vertebrates (Amphibia, Reptiles, Birds and Mammals) 4. Comparative account of digestive system. 5. Comparative account of respiratory system.
Unit-III	1. Comparative account of aortic arches and heart. 2. Cormparative account of brain 3. Placentation in mammals
Unit-IV	1. Origan of life- modern concepts only. 2. Lamarekism Darwinism, 3. Modern synthetic theories: Variations, Mutation, Isolation & speciation 4. Adaptation and mimicry 5. Micro, macro evolution and mega evolution.
Unit-V	1. Fossils, methods of fossilization, determination of age of fossils. 2. Study of extinct forms: Dinosaurs and Archaeopteryx. 3. Zoogeographical distribution. 4. Evolution of man. 5. Geological time scale and Insular fauna.

Reference Books:

Text Book of Zoology Vol II (Vertebrate), Parkar & Haswell
Animal Biology Vol II, Adhikari, Ganguly & Sinha
Taxtbook of Vertebrates, R L Kotpal
Chordates, Jordan & Verma
Zoology of Chordates, Nigam H C
Comparative Anatomy of Vertebrates – Kent
Outline of comparative anatomy of Vertebrates – Kingsley

FIRST YEAR

SEMESTER-II

Subject: Botany

Title of Paper : Diversity & Systematics of Seed Plants (Phanerogames)

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**Gymnosperm:** General characters and Classification of Gymnosperms. Heterospory and Origin of Seed Habit. Diversity of Gymnosperm: Geological Time Scale and Fossilization. Fossil Gymnosperms: Lyginopteris and Lagenostoma.
	अनावृबीजी : अनावृतबीजियों के विशिष्ट लक्षण एवं वर्गीकरण, विषमबीजाणुकता एवं बीज स्वभाव का उद.गम,. अनावृतबीजियों की विविधताऐं, भू–वैज्ञानिक समय सारणी एवं जीवाश्मीभवन, अनावृतबीजो जीवाश्मीभवन, अनावृतबीजी जीवाश्म : लाइजीनोप्टेरिस एवं लेजीनोस्टोगा।
Unit-II	**Gymnosperm**: Morphology, Anatomy Reproduction and life cycle, of Cycas, Pinus and Ephedra.
	अनावृबीजी : आकारिकी, आन्तरिक संरचना, प्रजनन तथा जीवन–चक्र, साइकस, पाइनस, एवं एफिड्रा।
Unit-III	**Taxonomy**: Origin and Evolution of Angiosperms. Terminology for plant description in semi technical language: Principles and rules of Botanical Nomenclature, Herbarium and Botanical gardens; Classification of Angiosperms: Bentham and Hooker, and Hutchinson, Modern trends In Taxonomy,
	वर्गीकी : आवृतबीजियों का उद.गम एवं विकास। पौधों के वानस्पतिक विवरण की शब्दवली वानस्पतिक नामकरण के सिद्धांत एवं नियम, हरबेरियम एवं वानस्पतिक उद्यान, आवृतबीजियों का वर्गीकरण, बेन्थम तथा हुकर एवं हचिन्सन, वर्गिकी में आधुनिक प्रवृतियाँ।
Unit-IV	**Taxonomy**: Diagnostic characteristics and Economic Importance of Families — Ranunculaceae, Brassicaceae. Malvaceae, Rutaceae, Fabaceae, and Apiaceae.
	वर्गीकी : रेननकुलेसी, ब्रेसीकेसी, मालवेसी, रुटेसी, फेरेसी एवं एपिएसी कुलों के विशिष्ट लक्षण एवं आर्थिक महत्व।
Unit-V	**Taxonomy**: Diagnostic characteristics & Economic Importance of Families - Asteraceae, Asclepiadaceae, Solanaceae, Lumiaceae, Euphorbiaceae, Lihaceae and Poaceae.
	वर्गीकी : ऐस्टेरेसी एस्कलेपिएडेसी, सोलेनेसी, लेगिएसी, यूफोरबिएसी, लिलिएसी एवं पोएसी कुलों की विशिष्ट लक्षण एवं आर्थिक महत्व।

SUGGESTED READINGS:-

1. Agarwal, S.B. 2007. Unified Botany, Shivlal Agarwal & Company Indore.
2. Bhatnagar, S. P. and Moitra 1996. Gymnosperms. New Age International Limited, New Delhi.
3. Davis, P.H. and Heywood, V.H. 1963, Principles of Angtosperm taxonomy. Oliver and Boyd, London.
4. Gangulee. H.C. & Kar A. K. 2006. College Botany Voll III, New Central Book Agency (P) Ltd. Kolkata, 700009.
5. Heywood, V.H. and Moore. D.M. (eds 1984) Current concepts in plant taxonomy. Academic press London.
6. Jeffery, C. 1982. An Introduction of plant taxonomy. Cambridge University Press Cambridge, London.
7. Jones, S.B. Jr. and Luchsinger. A.E. 1986. Plant Systematic. Mc Graw Hill Book Co. New York.
8. Kaushik, M.P. 2003. Modem Textbook of Botany, Prakash Publication Muzaffar Nagar U.P.
9. Mukherjee, S.K. 2006. College Botuny Voll II, New Central Book Agency (P) Ltd. Kolkata, 700009.
10. Pandey, B. P. 2010. A Text book of Botany- Angiesperms, S. Chand & Company Ltd. Ramnagar, New Delhi-110053.
11. Radford. A. E. 1986. Fundamentals of Plant Systmatics. Happer and Raw, New York.
12. Saxena and Sarabhai. 1989. Text book of Botany. Rastogi Publication Meerut.
13. Singh, G. 1999. Plant Systematics : Theory and Practice. Oxford and IBH Pvt. Ltd. New Delhi.
14. Vasishta, P.C. 2005. Botany for degree students Voll. V, Gymnosperms. S. Chand & Company Ltd. Ramnagar, New Dethi- 110055.

FIRST YEAR

SEMESTER-II

Subject: Chemistry

Title of Paper : Organic Chemistry

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**Chemical Kinetics:** Chemical kinetics and its scope, rate of a reaction, factors influencing the rate of a reaction - concentration, temperature, pressure, solvent, light and catalyst. Dependence of| rate on concentration, mathematical characteristics of simple chemical reactions-zero order, first order, second and pseudo order, half life and mean life. Determination of the order of reaction-differential method, integration method, method of halt life period and isolation method. Study of chemical kinetics by polarimetry and spectrophotometery. **Theories of Chemical Kinetics:** effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy. Simple collision theory, transition state theory (equilibrium hypothesis).
	रासायनिक बलगतिकी : रासायनिक बलगतिकी एवं इसका कार्यक्षेत्र, अभिक्रिया की दर, अभिक्रिया दर को प्रभावित करने वाले कारक–सान्द्रण, ताप, दाब, विलायक, प्रकाश एवं उत्प्रेरक, अभिक्रिया दर की सान्द्रण पर निर्भरता, सरल रासायनिक अभिक्रियाओं के गणितीय अभिलक्षण–शुन्य कोटि, प्रथम कोटि, द्वितीय कोटि तथा छद्म कोटि अर्द्ध आयु काल एवं माध्य काल, अभिक्रिया की कोटि का निर्धारण अवकलन विधि, समाकलन विधि, अर्ध आयु काल विधि, विलगित विधि। रासायनिक बलगतिकी का पोलेरीमापी तथा स्पेक्ट्रोफोटोमिती विधियों द्वारा अध्ययन। रासायनिक बलगतिकी के सिद्धांत : रासायनिक अभिक्रिया दर पर ताप का प्रभाव, आरहीनियस समीकरण, सक्रियण ऊर्जा की अवधारणा, सरल संघट्य सिद्धांत, संक्रमण अवस्था सिद्धांत (साम्य परिकल्पना)
Unit-II	A. **Thermodynamics** — Definition of thermodynamic terms, System, surrounding, Types of systems, intensive and extensive properties State and path functions and their differential. Thermodynamic process. Concept of heat and work. B. **Molecular Orbital Theory**: homonuclear and heteronuclear (CO and NO) diatomic molecuies. Multicenter bonding in electron deficient molecules, bond Strength and bond energy, Calculation of percentage tonic character from dipole moment and serene difference. C. **Ionic Solids**: semiconductors, lattice energy and Borm-Haber, cycle, solvation energy and solubility of ionic solids, polarizing power and polarizability of ions. Fajan's rule, Metallic bond, free electron, Valence bond and Band theories.
	अ. ऊष्मागतिकी – ऊष्मागतिकी में प्रयुक्त होने वाले विभिन्न पदों की परिभाषाएं, ऊष्मागतिकी तंत्र, घिराव, तंत्र के प्रकार, विस्तीर्ण एवं गहन गुण, अवस्था तथा पथ फलन एवं उनके अवकल, ऊष्मागतिकी प्रक्रम, ऊष्मा एवं कार्य की अवधारणा। ब. आणविक कक्षक सिद्धांत – समनाभिकीय और विषम नाभिकीय (CO तथा NO) द्विपरमाणवीय अणुओं के लिए, इलेक्ट्रान अल्प अणुओं में बहुकेन्द्रीय बंध, बंध प्रबलता और बंध ऊर्जा, द्विध्रुव आघूर्ण और विद्युत ऋणात्मकता अंतर से आयनिक गुण प्रतिशतता की गणना। स. आयनिक ठोस – अर्धचालक, जालक ऊर्जा एवं बोर्न – हेबर चक्र विलायकन ऊर्जा और आयनिक ठोसों की विलेयता आयनों की ध्रुवण क्षमता और ध्रुवणता। फजान के नियम धात्विक बंध, मुक्त इलेक्ट्रॉन संयाजनकता बंध और बैण्ड सिद्धांत।
Unit-III	A. **Acids and Bases**- Arrhenics. Bronsted-Lowry, Solvent system Lewis Concepts. B. **Chromatographic Techniques**: Definition, classifications and principle, Separation of inorganic ions, amino acids and carbohydrates (by paper chromatography and TLC methods).

	ब. क्रोमेटोग्राफिक तकनीक – परिभाषा, वर्गीकरण एवं सिद्धांत, अकार्बनिक आयनों, अमीनों एवं कार्बोहाइड्रेटों का पृथक्करण। (पेपर एवं पतली परत क्रोमेटोग्राफी विधियों द्वारा)।
Unit-IV	**Alkanes**: Methods of preparation (with special reference to Wurtz, Kolbe, Corey-House reactions and decarboxylation of carboxylic acids). Physical properties 2nd chemical reactions of alkanes. Mechanism of free radical halogenation of alkanes. **Cycloalkanes** : methods of preparations, chemical reactions. Baeyer's strain theory and it imitations. Ring strain in cyclopropane and cyclobutanes Theory of strainless ring.
	एल्केन्स –बनाने की विधियाँ (विशेष संदर्भ – वुर्टज, कोल्बे, कोरे–हाऊस अभिक्रिया, कार्बोक्सिलिक अम्लों के डिकार्बोक्सिलिकरण के विशेष संदर्भ में) एल्केन्स के भौतिक गुण एवं रासायनिक अभिक्रियाएं, मुक्त मूलक हैलोजनीकरण की क्रियाविधि। साइक्लो एल्केन – बनाने के विधियाँ, रासायनिक अभिक्रियाऐं, बेयर का तनाव सिद्धांत एवं उसकी सीमाऐं, साइक्लोप्रोपेन तथा साइक्लोब्यूटेन में चक्र तनाव, तनावरहित चक्र का सिद्धांत।
Unit-V	**Dienes**: Methods of formation, classification of dienes, isolated, conjugated and cumulated dines. Butadiene: methods of formation, polymerization. Chemical reactions — 1, 2 and 1, 4 addition, Diels-Alder reaction. **Alkynes**: Methods of formation, Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration, oxidation and polymerization. **Alkyl Halides**: Nomenclature and Classification of alkyl halides, methods of formation, chemical reaction; mechanism of nucleophilic substitution reaction of alkyl halides, S_N^1 and S_N^2 reaction with energy profile diagrams.
	डाईन्स – बनाने की विधियाँ, डाइन्स का वर्गीकरण, आइसोलेटेड, कांजुग्रेटेड और क्यूमुलेटेड डाईन्स, ब्यूटाडाइन बनाने की विधियाँ बहुलीकरण। रासायनिक अभिक्रियाऐं –1.2 एवं 1.4 योगात्मक अभिक्रियाऐं डील्सएल्डर अभिक्रिया। एल्काइन्स – बनाने की विधियाँ, एल्काइन्स की रासायनिक अभिक्रियाऐं, एल्काइन्स की रासायनिक अभिक्रियाऐं, एल्काइन्स की अम्लीयता, इलेक्ट्रान स्नेही एवं नाभिकीय स्नेही योगात्मक अभिक्रिया की क्रिया विधि, हाइड्रोबोरीकरण, ऑक्सीकरण एवं बहुलीकरण। एल्किल हैलाइडस – एल्किल हैलाइड.स का नामकरण एवं वर्गीकरण, बनाने की विधियाँ, रासायनिक अभिक्रियाऐं, ऐल्किल हैलाइड.स की नाभिकीय स्नेही प्रतिस्थापन अभिक्रियाओं की क्रियाविधि। S_N^1 एवं S_N^2 अभिक्रियाऐं ऊर्जा प्रोफाइल चित्र सहित।

Suggested Reading:-

Paula Yurkanics Bralice, Organic Chemistry, Peasson Education Ltd.

Morison and Boyd, Organic Chemistry, Prentice Hall

Solomons and fryhle, Organic Chemistry, Willey International

Carey Franch A, Organic Chemistry, Tata Mc Grawhill

Tiwari K S, Vishnoi N K, A Textbook of Organic Chemistry, Vikash Publishing House

Agarwal O P, Organic Chemistry- Reactions and Reageets, Goel Publising House, Meerut

Bhal Arun & Bhal B S, Organic Chemistry, S Chand & Compony

FIRST YEAR

SEMESTER-II

Subject: Physics

Title of Paper : Thermodynamics and Statistical Physics

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	Thermodynamics-I Reversible and irreversible process, Heat engines, Definition of efficiency, Carnot's ideal heat engine, Carnot's cycle, Effective way to increase efficiency, Carnot's engines and refrigerator Coefficient of performance, Second law of thermodynamics, Various statements of Second law of thermodynamics, Carnot's theorem, Clapeyron's latent heat equation, Carnot's cycle and its applications. Steam engine, Otto engine, Petrol engine, Diesel engine.
	उष्मागतिकी-I उत्क्रमणीय एवं अनुत्क्रमणीय प्रक्रम, कार्नो का आदर्श चक्र, इसकी क्षमता बढ़ाने के प्रभावी तरीकें, कार्नो का उष्मीय इंजन व प्रशीतक, दक्षता गुणांक, उष्मागतिकी का द्वितीय नियम व इनके विभिन्न कथन, कार्नो का प्रमेय क्लेपरियॉन की गुप्त उष्मा समीकरण, कार्नो चक्र एवं उनके अनुप्रयोग। उष्मीय इंजिन, ऑटो इंजिन, पेट्रोल इंजिन, डीजल इंजिन।
Unit-II	Thermodynamics-II Concept of entropy, Change in entropy in adiabatic process, Change in entropy in reversible cycle. Principle of increase of entropy, Change in entropy in irreversible process. T-S diagram, Physical significance of Entropy, Entropy of a perfect gas, Kelvin's thermodynamic scale of temperature, The size of a degree, Zero of absolute scale, Identity of a perfect gas scale and absolute scale. Third law of thermodynamics, Zero point energy, Negative temperatures (not possible), Heat death of the universe. Relation between thermodynamic variables (Maxwell's relations).
	उष्मागतिकी-II एण्ट्रापी की संकल्पना, रुद्धोष्म प्रक्रम में एण्ट्रापी का परिवर्तन, चक्रीय प्रक्रम में एण्ट्रापी का परिवर्तन, एण्ट्रापी के वृद्धि का सिद्धान्त, उत्क्रमीय व अनुत्क्रमणीय प्रक्रम में एण्ट्रापी का परिवर्तन। T-S आरेख, एण्ट्रापी का भौतिक महत्व, आदर्श गैस की एण्ट्रापी, केलवीन का उष्मागतिक ताप पैमाना, परम पैमाने की शून्य ताप, आदर्श गैस व परम ताप पैमाने में साम्यता। उष्मागतिकी का तृतीय नियम, शून्य बिन्दु ऊर्जा, ऋणात्मक तापक्रम (सम्भव नहीं) ब्रहमाण्ड की उष्मीय समाप्ति। उष्मागतिकी चरों में संबंध (मेक्सवेल के समीकरण) ।
Unit-III	Statistical Physics-I **Description of a system:** Significance of statistical approach, Particle-states, System-states, Microstates and Macro-states of a System. Equilibrium states, Fluctuations, Classical & Statistical Probability, The equi-probability postulate, Statistical ensemble, Number of states accessible to a system, Phase space. Micro Canonical Ensemble, Canonical Ensemble, Helmholtz free energy, Enthalpy, First law of therinodynamics, Gibbs free energy. Grand Canonical Ensemble.
	सांख्यिकी भैतिकी-I निकाय का वर्णन : सांख्यिकी अवधारणा का महत्व, कण को अवस्थाऐं, निकाय की सूक्ष्म एवं स्थूल अवस्थाऐं, साम्य अवस्थाऐं, विचलन, विरसम्मत व सांख्यिकी प्रायिकता, पूर्व प्रायिकता

	माइक्रो केनोनीकल एन्सेम्बल, केनोनीकल एन्सेम्बल, हेल्मोल्टज मुक्त ऊर्जा, एन्थलपी, ऊष्मागतिकी का प्रथम नियम, गिब्स मुक्त ऊर्जा, ग्रेंड केनोनीकल एन्सेम्बल।
Unit-IV	Statistical Physics-II **Statistical Mechanics:** Phase Space, the probability of a distribution, The most probable distribution and its narrowing with increase in number of particles, Maxwell-Boltzmann Statistics, Molecular Speeds. Distribution and mean. r.m.s.. and most probable velocity, Constraints of accessible and inaccessible states **Quantum Statistics:** Partition Function, Relation between Partition Function and Entropy, Bose-Einstein statistics, Black-body radiation. The Rayleigh-Jeans formula, The Planck radiation formula, Fermi-Dirac- statistics, Comparison of results, Concept of Phase transitions.
	सांख्यिकी भैतिकी-II सांख्यिकी यांत्रिकी : कला आकाश, वितरण की प्रायिकता, अधिकतम संभाव्य वितरण व इनका कणों की संख्या बढ़ने पर संकुचन, मेक्सवेल बोल्टजमैन सांख्यिकी, आणविक चाल का वितरण, औसत चाल, वर्ग–माध्य–मूल चाल और अधिकतम प्रसाम्भाव्य वेग, प्रतिबंध, अभिगम्य एवं अनअभिगम्य अवस्थाओं के प्रतिबंध। क्वांटम सांख्यिकी : पार्टीशन फलन, एंट्रापी व पार्टीशन फलन में संबंध, बोस आइन्सटीन सांख्यिकी, कृष्ण पिण्ड विकिरण, रेले जीन्स सूत्र, प्लांक विकिरण सूत्र, फर्मी–डिराक सांख्यिकी, परिणामों की तुलना, फेस संक्रमण की संकल्पना।
Unit-V	Life and Contributions of Physicists S.N. Bose, M.N. Saha, Maxwell, Clausius, Boltzmann, Joule, Wien, Einstein, Planck, Bohr, Heisenberg, Fermi, Dirac, Max Born, Bardeen. Useful links for Unit-V: 1. http://en.wikipedia.orgAviki/History of Physics 2. hito://en.wikipedia.org/wiki/Nobel Prizes in Physics
	(भौतिकविदों का जीवन परिचय व उनका योगदान) एस. एन. बोस, एम.एन. साहा, मैक्सवेल, क्लासियस, बोल्टजमैन, जूल, वीन, आइन्सटीन, प्लांक, बोहर, हाईजनबर्ग फर्मी, डिराक, मेक्सबार्न, बार्डीन।

Text and Reference Books:

1. Heat and Thermodynamics: Mark W. Zemansky, Richard H. Dittman, Seventh Edition, McGraw-Hill International Editions.
2. Thermal Physics (Heat & Thermodynamics): A.B. Gupta, H.P. Roy, Books and Allied (P) Ltd. Calcutta.
3. Heat and Thermodynamics: Brijlal and N. Subrahmanyam, S. Chand &, Company Ltd, New Delhi.
4. Thermal and Statistical Physics: K,.M. Jain, South Asian Publication.
5. Concept of Physics: H.C. Verma, Bharati Bhavan Publishers.

SECOND YEAR
SEMESTER-III
Subject: Botany
Title of Paper : Structure Development & Reproduction in Flowering Plants

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**The Root system:** Root apical meristem. Differentiation of primary and secondary tissues and their role. Anatomy of Monocot and Dicot root. Secondary growth in root. Morphological modification of root for storage, respiration and reproduction. Interaction of root with microbes.
	जड़ तंत्र : जड़ का शीर्ष, विभज्योतक, प्राथमिक एवं द्वितीय ऊतकों का विभेदन एवं उनके कार्य एकबीजपत्री वं द्विबीजपत्री जड़ की आन्तरिक संरचना, जड़ में द्वितीयक बृद्धि के आकारिकीय रुपान्तरण : संचयन, श्वसन एवं प्रजनन। सूक्ष्म जीवों के साथ जड़ की पारस्परिक क्रिया।
Unit-II	**The Shoot system:** Shoot apical meristem and histological organization, Anatomy of Monocot and Dicot Stem: Vascular cambium and its functions, Secondary growth in stem: Characteristics of growth rings: Sapwood and Heart wood, Secondary Phloem, Cork Cambium and Periderm.
	प्ररोह तंत्र : प्ररोह शीर्षस्थ विभज्योजक एवं ऊतकीय संगठन, एकबीजपत्री एवं द्विबीजपत्री के तने की आन्तरिक संरचना, – संवहन एधा एवं उसके कार्य तने में द्वितीयक बृद्धि वलय की विशेषताऐं : रसदारु एवं कठोरदारु द्वितीयक फ्लोएम, कार्क कैम्बियम एवं परिचर्म।
Unit-III	**The Leaf system:** Origin and Development of leaf. Diversity in size, shape and arrangement. Internal structure of Dicot and Monocot leaf. Adaptations to photosynthesis and water stress, Senescence and abscission.
	पत्ती तंत्र : उत्पत्ति एवं विकास, प्रमाप, आकार एवं विन्यास में विविधताएं, एकबीजपत्री एवं द्विबीजपत्री पर्ण की आंतरिक संरचना, प्रकाश संश्लेषण एवं जलीय प्रतिबल का अनुकूलन, जीर्णता एवं विलगन।
Unit-IV	**Embryology:** Concept of flower as a modified shoot. Structure of Anther, Microsporogenesis and Male Gametophyte. Structure of Pistil, Ovules, Megasporogenesis and Development of Female Gametophyte (Embryo Sac) and its types. Pollination — Mechanism and Agencies of Pollination, Pollen Pistil interactions and Self incompatibility.
	भ्रुणिकी : पुष्प एक रुपांतरित प्ररोह की अवधारणा। परागकोष की संरचना, लघुबीजाणुजनन एवं नर युग्मकोद.भिद.। स्त्रीकेसर की संरचना, बीजाण्ड, गुरुबीजाणुजनन, मादा युग्मकोद.भिद. का विकास (भ्रुण कोष) एवं प्रकार। परागण – परागण की प्रक्रिया वं एजेन्सी, पराग स्त्रीकेसर की पारस्परिक क्रिया एवं स्व अनिषेच्यता।
Unit-V	**Embryology:** Double Fertilization and triple fusion. Development and types of endosperm and its morphological nature, Development of Embryo in Monocot and Dicot. Fruit development and maturation. Seed structure and dispersal. Mode of Vegetative Propagation.
	भ्रुणिकी : द्विनिषेचन एवं त्रिसंयोजन। भ्रूणपोष का विकास, प्रकार एवं इसकी आकारिकीय प्रकृति। एकबीजपत्रीय एवं द्विबीजपत्रीय भ्रूण का विकास। फल का परिवर्धन एवं परिपक्वता, बीज की संरचना एवं प्रकीर्णन। कायिक प्रवर्धन के प्रकार।

SUGGESTED READINGS:-

1. Gangulee, H.C., Das, K. S. And Dutta. C. 2607. College Botany Voll I, New Central Book Agency (P) Ltd. Kolkata, 7000
2. Hywood, V.H. & Moore, D.M. (eds.) 1984. Current concepts in plant taxonomy. Acedemic press London.
3. Jones, S.B. Jr. and Luchsinger. A.E. 1986. Plant taxonomy (III edition) Mc Graw Hill Book Co. New York.
4. Maheshwari, P.1978. Plant Embryolesy.
5. Pandey, B. P. 2010. A Text book of Botany- Angiosperms, S. Chand & Company Ltd. Ramnagar, New Delhi- 115055.
6. Radford, A.E. 1986. Fundamentals of Plant Systematics. Harper and Row, New York.
7. Shrivastava and Das. Modern text book of Botany. Vol-III & IV
8. Singh, V., Pande P.C. and Jain. D. K. Structure & Development in Angiosperms. Rastogi Publication, Meerut.

SECOND YEAR
SEMESTER-III
Subject: Zoology
Title of Paper : Cell Biology and Developmental Biology

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	1. History of Cell Biology. 2. Cell Theory, Prokaryotic and eukaryotic Cells. 3. Microscopy: Principle and application of Compound microscope & Electron microscope. 4. Structure and transport across the plasma membrane. 5. Extra nuclear organization of cell.
Unit-II	1. Nuclear organization of cell. 2. Nucleo cytoplasmic interactions. 3. Amitosis, mitosis and meosis. 4. Cell death : Necrosis and Apoptosis
Unit-III	1. Spermatogenesis 2. Oogenesis 3. Fertilization 4. Parthenogenesis 5. Patterns of cleavage.
Unit-IV	1. Frog and Chick embryology upto the formation of three germinal layers. 2. Fate map construction in frog and chick. 3. Gastrulation in Frog and chick up to the formation of germinal layers.
Unit-V	1. Concept of competence 2. Determination and differentiation 3. Extra embryonic membranes in chick 4. Concept of regeneration 5. Stem cells.

Suggested Books:-

Textbook of cell Biology – De Robins
Textbook of cell Biology – Karp
Textbook of cell Biology – Alberts El. Al.
Textbook of cell Biology – Cooper
Cell & Molecular Biology – P K Gupta
Principles of Genetics, Gardener El Al
Principles of Genetics, Klug & Cummings
Principles of Genetics, P K Gupta
Evolution, Dodson

SECOND YEAR
SEMESTER-III
Subject: Chemistry
Title of Paper : Inorganic Chemistry

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**A. Arenes and Aromaticity**: Structure of benzene, molecular formula and Kekule structure. Stability and carbon-carbon bond lengths of benzene, resonance structure. MO picture. Aromaticity, the Huckel rule. Aromatic electrophilic substitution, General pattern of the mechanism-Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel-Crafts reaction and energy profile diagram **B. Aryl Halides:** Methods of formation and reactions: of aryl halides, Mechanism of nucleophilic aromatic substitution, synthesis and uses of DDT, BHC and Freon.
	अ. एरीन्स एवं ऐरोमेटिसिटी – बेन्जीन की संचरना, अणुसूत्र एवं केकुल संरचना। बेन्जीन का स्थायित्व एवं कार्बन–कार्बन बंध लम्बाई, अनुनाद संरचना आणविक कक्षण चित्र। ऐरोमैटिकता, हकल का नियम, ऐरोमैटिक इलेक्ट्रान स्नेही, प्रतिस्थापन–अभिक्रिया की क्रियाविधि। नाइट्रीकरण, हैलोजनीकरण, सल्फोनीकरण, मरक्यूरीकरण एवं फ्रीडलक्राफ्ट अभिक्रिया विधि, ऊर्जा प्रोफाइल चित्र। ब. एरिल हैलाइडस – एरिल हेलाइड के बनाने की विधियाँ एवं उनकी अभिक्रियाएं, नाभिक स्नेही ऐरोमेटिक प्रतिस्थापन की क्रियाविधि, डीडीटी, बीएचसी एवं फ्रीऑन का संश्लेषण एवं उपयोग।
Unit-II	**A. Alcohols:** Classification and nomenclature. 1. **Monohydric alcohols:** nomenclature, methods of formation by reduction of aldehydes, ketones, carboxylic acid, and esters, acidic nature, reactions of alcohols. 2. **Dihydric Alcohols:** Nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [$Pb(OAc)_4$, and HIO_4] and pinacol-pinacolone rearrangement. 3. **Trihydric alcohols** : nomenclature and methods of formation, chemical reaction of glycerol. **B. Phenols:** Nomenclature, structure and methods of formation, acidic Character. Comparative acidic strength of alcohols and phenols, stabilization of Phenoxide ion by resonance, acylation and carboxylation Mechanisms of Fries rearrangements, Gatterman synthesis, Hauben-Hoesch reaction, Lederer-Manasse reaction and Riemer-Tiemann reaction.
	अ. अल्कोहल : वर्गीकरण एवं नामकरण। 1. मोनोहाड्रिक अल्कोहल : नामकरण, एल्डिहाइड, कीटोन, कार्बोक्सिलिक अम्ल एवं एस्टरों के अपचयन से बनाने की विधियाँ अम्लीय प्रकृति की अभिक्रियायें। 2. डाइहाइड्रिक अल्कोहल : नामकरणण निर्माण विधि, विसिनल ग्लाइकॉल की रासायनिक अभिक्रियायें, ऑक्सीकरण विदलन [$Pb(OAc)_4$, and HIO_4] पिनाकोल एवं पिनाकोलॉन पुनर्विन्यास। 3. ट्राइहाइड्रिक अल्कोहल : नामकरण, ग्लिसरॉल का निर्माण एवं रासायनिक अभिक्रियायें। ब. फीनॉल : नामकरण, संरचना एवं विरचन की विधियाँ, अम्लीय स्वभाव, फीनॉल तथा अल्कोहल की तुलनात्मक अम्लीयता, फिनॉक्साइड आयन का अनुनाद स्थायित्व, ऐसिलीकरण एवं कार्बोक्सिलीकरण, फ्राईस पुनर्विन्यास, गाटरमैन संश्लेषण हाउबेन–हॉश अभिक्रिया, लैडरर–मारसे अभिक्रिया एवं राइमर–टीमान अभिक्रिया क्रियाविधि सहित।
Unit-III	A. **Chemistry of elements of I transition series**: Characteristics properties of d-block elements. Properties of the elements of the first transition series, their binary, compounds such as carbides oxides and sulphides. Complexes illustrating relative Stability of their oxidation states, coordination number and geometry. B. **Chemistry of elements of II and III transition series**: General characteristics comparative study of II and III transition series with 3d-analogues respect to ionic radii, oxidation states. Magnets behavior, spectral properties and stereochemistry.

	तत्वों के गुण, द्विअंगी यौगिक जैसे – कार्बाइड, ऑक्साइड एवं सल्फाइड। संकुल यौगिकों के द्वारा ऑक्सीकरण अवस्था का आपेक्षिक स्थायित्व, उपसहसंयोजन अंक एवं ज्यामिति। ब. द्वितीय एवं तृतीय संक्रमण श्रेणी के तत्वों का रसायन : सामान्य गुण, द्वितीय एवं तृतीय संक्रमण श्रेणी के तत्वों के मुख्य गुणों की 3d श्रेणी के तत्वों से तुलना – आयनिक त्रिज्या, ऑक्सीकरण अवस्था, चुम्बकीय व्यवहार, स्पेक्ट्रल गुण एवं त्रिविग रसायन।
Unit-IV	**A Coordination Compounds:** TUPAC Nomenclature, Isomerism EAN Concept, Chelates, VBT of transition metal complexes, its limitations. Crystal field theory, Crystal Field Stabilization Inergy, spectro chemical series, limitations of CFT, **b. Thermochemistry:** Standard State, standard enthalpy of formation: Hess's Law of heat summation and its application. Heat of reaction at constant pressure and at constant volume. Enthalpy of neutralization. **Second Law of Thermodynamics:** Need for the law, Different statements of the law, Carnot cycle and its efficiency. Carnot theorem. Thermodynamic scale of temperature.
	अ. उप–सहसंयोजक यौगिक : संकुल यौगिकों का आई.यू.पी.ए.सी. नामकरण, संकुल यौगिकों में समावयवता, प्रभावी परमाणु संख्या अवधारणा, कीलेट यौगिक संक्रमण धातु संकुलों का संयोजकता बंध सिद्धांत एवं इसकी सीमाऐं। जालक क्षेत्र सिद्धांत, जालक क्षेत्र स्थायित्व ऊर्जा, स्पेक्ट्रो रसायन श्रंखला, जालक क्षेत्र सिद्धांत की सीमाऐं। ब. ऊष्मा रसायन : प्रामाणिक अवस्था, प्रामाणिक सम्भवन की एन्थैल्पी, हेस का ऊष्मा संकलन का नियम एवं इसके अनुप्रयोग, स्थिर आयतन और स्थिर दाब पर अभिक्रिया की ऊष्मा या एन्थेल्पी, उदासीनीकरण की एन्थैल्पी। ऊष्मागतिकी की द्वितीय नियम : नियम की आवश्कयता, नियम के विभिन्न कथन, कार्नो चक्र, इसकी दक्षता एवं कार्नो प्रमेय, तापमान का ऊष्मागतिकी पैमाना।
Unit-V	**A. Thermodynamics :** Concept of entropy: entropy as a State function, entropy as a function of P & T, entropy change in physical change, Clausius inequality, entropy as criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases. **B. Third Law of Thermodynamics:** Nernst heat theorem, Statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data, Gibbs and Helmholtz functions, Gibbs. function (G) and Helmholtz, function (A) as a thermodynamic quantities, A and G as a criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change, relative variation of G&A with P, V & T. **C. Buffers:** Mechanism of buffer action, Henderson-Hazel equation, Hydrolysis of salts.
	अ. ऊष्मागतिकी : एण्ट्रॉपी की अवधारणा : एण्ट्रॉपी–अवस्था फलन के रुप में, एण्ट्रोपी T तथा P के अवस्था फलन के रुप में, भौतिक परिवर्तन में एण्ट्रापी परिवर्तन, क्लॉसियस असमता, एण्ट्रॉपी ऊष्मागतिक साम्य और स्वतः प्रवर्तिता की कसौटी के रुप में आदर्श गैसों में एण्ट्रॉपी परिवर्तन एवं गैसों को मिलाने की एण्ट्रॉपी। ब. ऊष्मागतिकी का तृतीय नियम : नर्नस्ट ऊष्मा प्रमेय कथन तथा अवशिष्ट एण्ट्रॉपी की अवधारणा, ऊष्माधारिता आँकड़ों से परम एण्ट्रॉपी का निर्धारण या परिकलन, गिब्बज. तथा हेल्महोल्ट.स फलन, गिब्बज. फलन (G) तथा (A) हेल्महोल्ट.ज फलन, फलन ऊष्मागतिक राशियों के रुप में A तथा G ऊष्मागतिक साम्य और स्वतः प्रवर्तित की कसौटी के रुप में, एण्ट्रॉपी परिवर्तन की तुलना में इनके लाग G एवं A का P एव के सापेक्ष परिवर्तन। स. बफर्स : बफर क्रिया की क्रियाविधि, हेण्डरसन–हेजल समीकरण, लवणों का जल अपघटन।

Suggested Books:

Malik Madan & Tuli, Mordern Inorganic Chemistry, S Chand and Compony

Donglas, Bodie, E., Concepts and Models of inorganic Chemistry

Malik Madan & Tuli, Advance Inorganic Chemistry, S Chand and Compony

Soni P L , Textbook of Inorganic Chemistry, S Chand and Compony

Manku G S, Theoritical Principles of Inorganic Chemistry, Tata McGrawhill Publising House,New Delhi

SECOND YEAR
SEMESTER-III
Subject: Mathematics
Title of Paper : Real Analysis, Differential Equation, Abstract Algebra

Max. Marks - 150
External Marks -125
Internal Marks – 25

Particulars

Unit	Syllabus
Unit-I	Definition of a sequence, Theorems on limits of sequences, Bounded and monotonic sequences, Cauchy's convergence criterion, Series of non-negative terms, Comparison test, Cauchy's integral test, Ratio test, Raabe's test, logarithmic test, Leibnitz's theorem, Absolute and conditional convergence.
	अनुक्रम की परिभाषा, अनुक्रमों की सीमाओं पर प्रमेय, परिबद्ध एवं एकदिष्ट अनुक्रम, कॉशी के अभिसरण का मापदंड, अऋणात्मक पदों की श्रेणी, तुलना परीक्षण, कॉशी का समाकल परीक्षण, अनुपात परीक्षण, रॉबी का परीक्षण, लघुगणकीय परीक्षण, लिबनीज को प्रमेय, निरपेक्ष एवं सापेक्ष अभिसरण।
Unit-II	Series Solution of Differential Equations-Power series Method, Bessel's Equation ,Bessel's function and its properties, recurrence and generating relations, Legendre's Equation, Legendre's function and its properties, recurrence and generating relations.
	अवकल समीकरणों की श्रेणी हल, घात–श्रेणी विधि, बेसल का समीकरण, बेसल का फलन एवं उसके गुणधर्म, पुनरागमन एवं जनक संबंध, लीजेन्डर का समीकरण लीजेन्डर का फलन एवं उसके गुणधर्म, पुनरागमन एवं जनक संबंध।
Unit-III	Laplace transformations, Linearity of the Laplace transformation, Existence theorem of Laplace transforms, Laplace transforms of derivatives and integrals, Shifting theorem, Differentiation and integration of transforms, Inverse Laplace transforms, Convolution theorem, Applications of Laplace transformation in solving linear differential equations with constant coefficients.
	लाप्लास रुपांतरण, लाप्लास रुपांतरणों की लांबिकता, लाप्लास रुपांतरणों का अस्तित्व प्रमेय, अवकलों एवं समाकलों के लाप्लास रुपांतरण, स्थानांतरण प्रमेय, रुपांतरणों का अवकलन एवं समाकलन, प्रतिलोम लाप्लास रुपांतरण, सवलन प्रमेय, अचर गुणांकों वाले रैखिक अवकल समीकरणों को हल करने में लाप्लास रुपांतरणों का अनुप्रयोग।
Unit-IV	Definition and basic properties of group, Order of an element of a group Subgroups, Algebra of subgroups, Cyclic groups and their simple properties, Coset decomposition and related theorems, Lagrange's theorem and its consequences
	समूह की परिभाषा एवं मूलभूत गुणधर्म, समूह के अवयव की कोटि, उपसमूह, उपसमूहों का बीजगणित। चक्रीय समूह एवं उनके साधारण गुणधर्म सह समुच्चय विभाजन एवं संबंधित प्रमेय, लेग्रांजे प्रमेय एवं उसके निगमन।
Unit-V	Normal sub group, Quotient groups. homomorphism and isomorphism of groups, Kernel of homomorphism of groups, fundamental theorem of homomorphism of groups, Permutation groups (even and odd permutations), Alternating groups An, Cayley's theorem.
	प्रसामान्य उपसमूह, विभाग समूह, समूहों की समकारिता एवं तुल्यकारिता, समकारिता की अष्टि, समूहों की समकारिता का मूलभूत प्रमेय, क्रमयच समूह (सम एवं विषम क्रमचय) एकांतर समूह A_n कैली का प्रमेय।

Dr. Vivek Bapat
Dean- Education, Jiwaji University Gwalior.

Dr. Vinod Singh Bhadoria
Chairman - Board of Studies (Education) Page 1 | 2

1. R.R. Goldberg, Real Analysis, I.B.H. Publishing Co, New Delhi, 1970.
2. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd. Allahabad.
3. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & sons, 1999
4. N. Herstein — Topics in Algebra, Wiley Eastern Ltd. New Delhi 1977.
5. Sharma and Gupta-Integral Transform, Pragati Prakashan Meerut
6. म. प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

Reference Books: .

1. T.M. Apostol Mathematical Analysis Narosa Publishing House New Delhi 1985.
2. Murray R.Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co. New York.
3. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
4. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd. New Delhi.
5. P.B. Bhattacharya, $.K. Jain and S.R.N agpaul, Basic Abstract Aigebra, Wiley Eastern, New Delhi, 1997. .
6. I.S. Luther and LB. S. Passi, Alegebra Voi- I, U, Narosa Publishing House.

SECOND YEAR
SEMESTER-III
Subject: Physics
Title of Paper : Optics

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**Geometrical Optics** **Reflection and refraction:** Fermat's Principle, Refraction at a Spherical surface, Aplanatic points and its applications, Lens formula, Combination of thin lenses and equivalent focal length. **Optical instruments:** Dispersion and dispersive power, chromatic aberration and achromatic combination different types of aberration (qualitative) and their remedy. Need for multiple lenses in eyepieces, Ramsden and Huygens eye-piece.
Unit-II	**Interference of light** The principle of superposition, two slit interference, coherence requirement for the sources, optical path retardations, Lateral shift of fringes, Rayleigh refractometer and other applications. Localised fringes, thin films, interference by a film with two non-parallel reflecting surfaces, Newton's rings. Haidinger fringes (Fringes of equal inclination), Michelson interferometer, its application for precision determination of wavelength, wavelength difference and the width of spectral lines. Intensity distribution in multiple beam interference, Fabry-Perot interferometer and Etalon.
Unit-III	**Diffraction** **Fresnel diffraction:** Fresnel' s theory of half period zone, diffraction at Straight edge, rectilinear propagation. **Fraunhoffer diffraction:** Diffraction at a slit, phasor diagram and integral calculus methods. Diffraction at a circular aperture and a circular disc, Rayleigh criterion of resolution of images. Resolving power of telescope and microscope. Outline of phase contrast microscopy. **Diffraction Grating:** Diffraction at N-parallel slits, Intensity distribution, Plane diffraction grating, Concave grating and its mountings. Resolving power of a grating and comparison with resolving power of prism and of a Fabry Parot etalon.
Unit-IV	**Polarisation** Transverse nature of light waves. Polarization of electromagnetic (em) waves, Plane polarised light - production and analysis. Description of Linear, circular and elliptical polarisation. Propagation of em waves in anisotropic media uniaxial and biaxial crystals, symmetric nature of dielectric tensor. Double retraction. Hygen's principle, Ordinary and extraordinary refractive indices. Fresnel's formula light propagation in uniaxial crystal, Nicol prism, Production of circular and elliptically polarized light, Babinet compensator and applications, Optical rotation. Optical rotation in liquids and its measurement through Polarimeter.
Unit-V	**Lasers and Photo Sensors** A brief history of lasers. Characteristics of laser light. Einstein prediction, Relationship between Einstein's coefficients (qualitative discussion only), Pumping schemes, Resonators, Ruby laser, He-Ne laser. Applications of lasers, Principle of Holography. Light Sensors: Photodiodes, Phototransistors, and Photomultipliers,

1. Fundamentals of Optics: F.A. Jenkins and H.E. White, 1976, McGraw-Hull.
2. Principles of Optics: B.K. Mathur, 1995, Gopal Printing.
3. Fundamentals of Optics: H.R. Gulati and D.R. Khanna, 1991, S.Chand Publication.
4. University Physics: F.W. Sears, M.W. Zemansky and H.D. Young, 13/e, 1986. Addison-Wesley.
5. Optics: Ajoy Ghatak, McGraw Hill Publications.
6. Principles of Optics: Max Born and Wolf, Pregmon Press. ,

References Books (for Unit-V only):

1. An introduction to Lasers — Theory and Applications: M. N. Avadhanalu, S. Chand and Co, Ltd.
2. Solid State Physics: P.K. Palanisamy, Scitech Publications (India) Pvt, Ltd.
3. Principles of Laser : Orazio Svelto, Plenum Press, NewYork
4. Instrument measurement and Analysis: B.C. Narka and K.K. Chaudhary, TataMcGraw Hull Publishing Company 16" reprint Chapter-1.

SECOND YEAR
SEMESTER-IV
Subject: Mathematics

Title of Paper : Abstract Algebra, Advanced Calculus, Partial Differential Equations, Complex Analysis

Max. Marks - 150
External Marks -125
Internal Marks – 25

Particulars

Unit	Syllabus
Unit-I	Group automorphisms, inner automorphism, Group of automorphisus. Conjugacy relation and centraliser, Normaliser, Counting principle and the class equation of a finite group, Cauchy's theorem for finite abelian groups and non- abelian groups.
	स्मूल स्वकारिता (स्वसमरुपता), आंतर स्वकारिता, स्वकारिताओं का समूह, संयुग्मता संबंध एवं केन्द्रीयकारक, प्रसामान्यक, गणना सिद्धात एवं परिमित समूह का वर्ग समीकरण। परिमित आबेली एवं अन–आबेली समूहों के लिये कौशी प्रमेय।
Unit-II	Introduction to rings, subrings integral domains and fields simple properties and examples, ring homomorphism, ideals and quotient rings.
	वलय, उपवलय, पूर्णांकीय प्रांत एवं क्षेत्र का परिचय सरल गुणधर्म एवं उदाहरण, वलय समाकारिता, गुणजावली एवं विभाग वलय।
Unit-III	Maxima, Minima and saddle points of functions of two variables, Improper integrals and their convergence. Comparison test, Abel's and Dirichlet's, Beta and Game functions
	दो चरो के फलनों का उच्चिष्ठ, निम्निष्ठ एवं सेडल बिन्दु विषम समाफल एवं उनका अभिसरण, तुलना परीक्षण, आबेल एवं डिरिक्ले का परीक्षण, बीटा एवं गामा फलन।
Unit-IV	Pantial Differential equations of the first order, La; orange's solution, Some special types of equations which can be solved easily by methods other than general methods, Charpit's general method of solution, Partial differential equations of second and higher orders, Homogeneous and non- Homogencous equations with constant coefficients, Partial differential equations reducible to equations with constant coefficients,
	प्रथम कोटि के आंशिक अवकल समीकरण, लेग्रांजे का हल, कुछ विशिष्ट प्रकार के समीकरण जिन्हे व्यापक विधि के अलावा सरल विधि के हल किया जा सके, हल के लिए चारपित की व्यापक विधि, द्वितीय एवं उच्चतर कोटि के आंशिक अवकल समीकरण, अचर गुणांको के समघातीय एवं असमघातीय समीकरण, आंशिक अवकल समीकरण जो अचर गुणाकों वाले समीकरणों में परिवर्तनीय है।
Unit-V	Continuity and differentiability of Complex functions, analytical function, Cauchy Riemann equation, Harmonic function, Mobius transformations, fixed-points, Cross ratio.
	सम्मिश्र फलनों का सांतत्य एवं अवकलनीयता। वैश्लेषिक फलन, कौशी रीमान समीकरण, प्रसांवादी फलन, मोबियस रुपांतरण, स्थिर बिन्दु तिर्यक अनुपात।

Text Books :

1. I.N. Sneddon, Elemets of partial Differential equations Me graw Hill, Co, 1988
2. Shanti Narayan, Theory of Functions of a Complex Variable. S. Chand & Co., New Delhi.
3. I.N. Herstein Topics in Algebra, Wiley Eastern Ltd. New Delhi, 1977.
4. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co., New York
5. म. प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

SECOND YEAR
SEMESTER-IV
Subject: Physics
Title of Paper : Electrostatics, magnetostatics and Electrodynamics

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**Electrostatics** Coulombs law in vacuum expressed in vector forms, calculations of electric field E for simple distributions of charge at rest, dipole and quadruple fields. Work done on a charge in an electrostatic field expressed as a line integral, conservative nature of the electrostatic field. Relation between electric field & electric potential ($E = -\nabla V$), torque on a dipole in a uniform electric field and its energy, flux of the electric field, Gauss's Jaw and Its application for finding E for symmetric charge distributions, Gaussian pillbox, fields at a surface of a conductor, screening of E field by a conductor. Capacitors, electrostatic field energy, force per unit area of the surface of a conductor man electric field, conducting sphere in a uniform electric field, charge in front of a grounded infinite conductor. Dielectrics, parallel plate capacitor with a dielectric, dielectric constant, polarization and polarization vector P, relation between displacement vector D, E and P. Molecular interpretation of Claussius-Mossotti equation, boundary conditions satisfied by E and D at the interface between two homogenous dielectrics, illustration through a simple example.
	स्थिरविद्युतिकी निर्वात में कूलम्ब का नियम – रादिश के रुप में विद्युत क्षेत्र E की स्थित आवेश के सरल द्विध्रुव व चतुध्रुव आधूर्ण वितरण हेतु गणना। स्थिर विद्युत क्षेत्र में किसी आवेश पर किया गया काय एवं उसे रेखिक समाकलन रुप में लिखना, स्थिर विद्युत क्षेत्र की संरक्षी प्रकृति। विद्युत क्षेत्र और विभव में संबंध ($E = -\nabla V$), एक समान विद्युतीय क्षेत्र में द्विध्रुव का आधूर्ण व इसकी ऊर्जा। विद्युत क्षेत्र का फलक्स, गॉस का नियम व इसका सममित आवेश वितरण हेतु E के परिपालन में उपयोग। गॉसियन पीलाबाक्स, चालक की सतह पर क्षेत्र, चालक द्वारा E क्षेत्र की स्क्रीनिंग। संधारित्र स्थित विद्युत क्षेत्र ऊर्जा, किसी विद्युत क्षेत्र में रखे चालक की सतह के इकाई क्षेत्रफल पर ऊर्जा, समरुप विद्युत क्षेत्र में गोलकार चालक, किसी पृथ्वीकृत अनन्त चालक के सम्मुख बिन्दु पर आवेश। पराविद्युत, पराविद्युत की उपस्थिति में समानांतर प्लेट संधारित, परावैद्युतांक, ध्रुवण व ध्रुवण सदिस P, विस्थापन सदिस D, P एवं E में संबंध, क्लासियस–मोसाटी समीकरण की आणविक व्याख्या, दो समांगी माध्यमों की सतह पर E व D सदिश द्वा सीमांत शर्तों का संतुष्टीकरण, उदाहरण द्वारा व्याख्या।
Unit-II	**Magnetostatics** Force on a moving charge, Lorentz force equation and definition of B, force on a straight conductor carrying Current in a uniform magnetic field, torque on a current loop, Magnetic dipole moment, angular momentum and gyromagnetic ratio, Biot and Savart's law, calculation of H for simple geometrical situations such as Solenoid, Anchor ring, Ampere's Law, $\nabla \times B = \mu_0 J$, $\nabla . B = 0$. Field due to a magnetic dipole, free and bound currents, magnetization vector (M), relationship between B, H and M. Derivation of the relation $\nabla \times M = J$ for non-uniform magnetization.
	स्थित चुम्बकत्व किसी गतिमान आवेश पर बल, लारेंज बल समीकरण एवं B की परिभाषा, सीधे धारावाही चालक को चुम्बकीय क्षेत्र में रखने पर बल, धारा लूपर बल आधूर्ण, चुम्बकीय बल आधूर्ण, कोणीय संवेग व जाइरोमैग्नेटिक अनुपात, बायोट–सेवार्ट का नियम, ज्यामितीय परिस्थितियों में H की गणना (परनलिका एवं एंकर वलय), एम्पीयर का परिपर्थीय नियम, $\nabla \times B = \mu_0 J$ व $\nabla . B = 0$, चुम्बकीय द्विध्रुव द्वारा बद्ध व मुक्त धाराएँ, चुम्बकन सदिश (M); B, H एव M में संबंध, असमरुप से चुम्बकित पदार्थ हेतु $\nabla \times M = J$ का निगमन।

Dr. Vivek Bapat
Dean- Education, Jiwaji University Gwalior.

Dr. Vinod Singh Bhadoria
Chirman – Board of Studies (Education)

	Current Electricity: Steady current, current density J, non-steady currents and continuity equation, Kirchoff's laws and analysis of multiloop circuits, growth and decay of current in LR and CR circuits, decay constants, LCR circuits. AC circuits, complex numbers and their applications in solving AC circuits problems, complex impedance and reactance, series and parallel resonance. Q-factor, power consumed by an A.C. circuit, power factor, Y and Δ networks and transmission of electric power. **Bioelectricity:** Electricity observed in living systems, Origin of bioelectricity, Sodium and potassium transport, Resting potential and action potential, Nernst's equation, Conduction velocity, Origin of compound action potential, Neuron structure and function, An axon as cable, Membrane resistance and capacitance.
	विद्युत धारा व बायो इलेक्ट्रीसिटी स्थाई धारा, धारा घनत्व J, अस्थाई धारा सामीकरण एवं सांतत्य, किरचॉफ के नियम व मल्टीलूप परिपथ विश्लेषण, LR व CR परिपथ में धारा की वृद्धि व क्षय, क्षय–नियतांक, LCR परिपथ। AC परिपथ सम्मिश्र संख्याएं और उनके अनुप्रयोग द्वारा AC परिपक्ष में सम्मिश्र प्रतिबाधा, रीएक्टेंस, श्रेणी एवं सामानांतर अनुनाद को हल करना। Q गुणांक AC परिपथ द्वारा शक्ति का उपयोग, शक्ति गुणांक, Y एवं Δ नेटवर्क व विद्युत शक्ति का प्रेषण। जैव विद्युत – जैविक निकायों में विद्युत का अवलोकन, जैव विद्युत की उत्पत्ति, सोडियम और पोटेशियम परिवहन, स्थिर विभव एवं क्रियात्मक विभव, नर्नस्ट समीकरण, चालक वेग, यौगिक क्रिया विभव की उत्पत्ति, तंत्रिका कोशिका का रचना एवं कार्य, केबल के रुप में एक्सॉन, झिल्ली विभव एव धारिता।
Unit-IV	**Motion of Charged Particles in Electric and Magnetic Fields** (Note. The emphasis here should be on the mechanical aspects and not on the details of the apparatus mentioned which are indicated as applications of principles involved.) E as an accelerating field, electron gun discharge tube linear accelerator. E as deflecting field -CRO Sensitivity of CRO. Transverse B field: 180^0 deflection, Mass spectrograph and velocity selector, Curvatures of tracks for energy determination tor nuclear particles: Principle and working of Cyclotron. Mutually perpendicular and parallel E & B fields; Positive ray parabolas, Discovery of isotopes, Elements of Mass Spectrographs, Principle of magnetic focusing (lenses).
	विद्युत व चुम्बकीय क्षेत्र में अविशित कणों की गति (यहाँ उपकरणों के वर्णन की अपेक्षा उनके यांत्रिकीय पक्ष पर अधिक ध्यान दिया जाना चाहिए।) त्वरण क्षेत्र के रुप में E, इलेक्ट्रान गन, विर्सजन नलिका, रेखीय त्वरक, R विक्षेपक क्षेत्र के रुप में CRO, CRO की सग्राहिता। अनुप्रस्थ B क्षत्र, 180^0 विचलन, द्रव्यमान स्पेक्ट्रोग्राफ या वेग रिलेक्टर, नाभिकीय कणों के संसूचन हेतु कणों के पथों की वक्रता, साइक्लोट्रॉन, (ऊर्जा मापन) का सिद्धांत व कार्य पद्धति, समानांतर व लम्बवल E व B क्षेत्र, घन–किरण के परवलय, आइसोटोप की खोज, द्रव्यमान स्पेक्ट्रोग्राफ के मूल तत्व, चुम्बकीय फोकस का सिद्धांत (लैंस)।
Unit-V	**Electrodynamics** Electromagnetic induction, Faraday's Laws, Electromotive force, Integral and differential forms of Faraday's laws, Self and mutual inductance, Transformers, Energy in a static magnetic field, Maxwell's displacement current, Derivations of Maxwell's equations, Electromagnetic field energy density. Poynting vector, Electromagnetic wave equation, Plane electromagnetic waves in vacuum and dielectric media, Reflection at a plane boundary of dielectrics, Fresnel's Laws, Polarization by reflection and total Internal reflection, Waves in a conducting medium, Reflection and refraction by the ionesphere.
	विद्युत गतिकी विद्युत चुम्बकीय प्रेरण, फेराडे के नियम, विद्युत बाहक बल, फेराडे नियम के अवकलन व समाकलन रुप, स्वः व अन्योन्य प्रेरण, ट्रान्सफार्मर, स्थिर विद्युत क्षेत्र में ऊर्जा, मेक्सबैल की विस्थापन धारा घनत्व की संकल्पना, मैक्सबेल की समीकरणों की स्थापना, विद्युत चुम्बकीय क्षेत्र का ऊजा घनत्व। पॉयंटिक सदिश, विद्युत चुम्बकीय तरंग समीकरण, निर्वात एवं परावैद्युत माध्यम में समतल विद्युत चुम्बकीय तरंग, परावैद्युत की समतल सतह से परावर्तन, फ्रेनेल के नियम, परावर्तन से ध्रुवण व पूर्ण आंतरिक परावर्तन, चालक माध्यम में तरंग, आयनमण्डल के द्वारा परावर्तन व अपवर्तन।

References:

1. Introdaction to Electrodynamics: David J. Griffiths, 4th Edition, Printice Hall.
2. Classical Electrodynamics: Jhon David Jackson, Jhon Wiley & Sons.
3. Electrodynamics: Emi Cossor & Bassin Lorraine, Asabi Shimbunsha Cublishine Ltd.
4. From Neuron to Brain: Kuffler and Nicholas, Sinaver Associaies, Inc Pup Sunderlana, Masschuetts (Reference for topics of Bioeleciricity)

SECOND YEAR
SEMESTER-IV
Subject: Chemistry
Title of Paper :

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	A. **Phase equilibrium:** statement and the meaning of terms: phase, component and the degree of freedom, thermodynamic derivation of the Gibbs phase rule, one component system: water, CO^2 and S system, two component system: solid-liquid equilibria, simple eutectic system: B_4-Cd; Pb- Ag system, Desilverisation of lead B. **Solid solution:** Systems in which Compound formation with congruent melting point (Zn-Mg) and incongruent melting point (NaCl-H_2O) and ($CuSO_4$-H_2O) system, Freezing Mixtures acetone-dry ice. C. **Liquid-** Liquid mixtures: Ideal liquid mixtures, Raoult's and Henry's lay: Non-ideal system, azeotrops: HCl-H_2O end ethanol Water system. D. **Partial miscible liquids :** Phenol-water, trimethylamine, water and nicotine-water system. Lower and upper consolute temperature. Immiscible Liquids, steam distillation, Nernst distribution low: thermodynamic derivation, applications.
	अ. प्रावस्था साम्य – कथन एवं विभिन्न पदों का अर्थ, प्रावस्था, घटक तथा स्वतंत्रता की कोटि, गिब्ज प्रावस्था नियम का ऊष्मागतिक व्युत्पन्न, एक घटक तंत्र–जल तंत्र CO^2 तंत्र एवं सल्फर तंत्र, दो घटक, तंत्र–ठोस–द्रव्य साम्य, सरल गलन क्रांतिक तंत्र–बिस्मथ–कैडमियम तंत्र, सीसा–चाँदी तंत्र, शीरो का विरजतीकरण। ब. ठोस विलयन – तंत्र जिनमें सर्वांगसम गलनांक वाले यौगिक बनते है, (Zn-Mg) तथा जिसमें असर्वांगमस गलनांक वाले यौगिक बनते है (NaCl-H_2O)एव ($CuSO_4$-H_2O) तंत्र हिम मिश्रण–एसिटोन–शुल्क बर्फ। स. द्रव्य–द्रव्य मिश्रण – आदर्श द्रव्य मिश्रण, राउल्ट एवं हेनरी का नियम, अनादर्श तंत्र, स्थिर क्वथनाकी मिश्रण : HCl-H_2O तथा एथिल एल्कोहल–जल। द. आंशिक मिश्रणीय द्रव्य – फीनॉल–जल, ट्राइमेथिल, ऐमीन–जल एवं निकोटिन–जल तंत्र, निम्न तथा उच्च संविलेय–संविलयन तापक्रम, अमिश्रणीय द्रव्य, भाप आसवन, नर्नस्ट का वितरण नियम : ऊष्मागतिक व्युत्पन्न, अनुप्रयोग।
Unit-II	**Electrochemistry** A. **Electrical transport:** conduction in metals and in electrolyte Solutions, specific conductance and equivalent conductance : Variation of specific conductance and equivalent conductance with dilution, Migration of ions and Kohlrausch-law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes. Ostwald's dilution law, its uses and limitations. Debye-Huckel Onsager's equation for - strong electrolytes (elementary treatment only). Transport number: Definition and determination by Hittorf method and moving boundary method. B. **Types of reversible electrodes:** Gas metal ion, Metal-meal ion metal-insoluble salt anion and redox electrodes. Electrode reactions, Nernst equation, derivation of cell EMF and single electrode potential, standard hydrogen — electrode- reference electrodes-standard electrode, standard electrode potential. EMF of a cell and its measurements, computation of cell EMF calculation of thermodynamic quantities of cell reaction (ΔG, ΔH K). Solubility product and activity coefficient, potentiometric and conductometric titration. Definition of pH and pK, determination of pH using hydrogen, quinhydrone and glass electrodes by potentiometri methods.

	अ. विद्युतीय परिवहन – धातुओं और विद्युत अपघटन के विलचनों के चालन, विशिष्ट चालकता तथा तुल्यांकी चालकता, विशिष्ट चालकता एवं तुल्यांकी चालकता पर तनुका का प्रभाव, आयनों का अभिगमन तथा कोलरॉश नियम, आरहीनियस का विद्युत अपघटनी वियोजन सिद्धांत एवं इसकी सीमाऐं, प्रबल एवं दुर्बल विद्युत अपघट.न, ओस्टवाल्ड का तनुका नियम, उपयोग तथा इसकी सीमायें, प्रबल विद्युत अपघट.यों के लिए डिबार्ड–ह्यूकल–ओंसगर समीकरण (केवल प्राथमिक परिवय), अभिगनांक, परिभाषा हिटार्फ एवं गतिगान सीमा विधि द्वारा इसका निर्धारण। ब. उत्क्रमणीय इलेक्ट्रोड के प्रकार –
Unit-III	A. **Aldehydes and Ketones** - Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes and ketones from acid chlorides, synthesis of aldehydes and ketones using 1.3 dithianes, synthesis of ketones from nitriles and from carboxylic acids. Physical properties. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on Benzoin, Aldol Perkin and Knovenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction, Mannich reaction, use of acetals as protecting soup, Oxidation of aldehydes. Baeyer-villiger Oxidation of ketones, Cannizaro reaction. Meerwein Pondroff-Verley, Clemmesen, Wolf Kishner, $LiAlH_4$ and $NaBH_4$ reduction. B. **Carboxylic acids**: Nomenclature structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Preparation of Carboxylic, reaction of carboxylic acids. Hell Volhard Zelinsky reaction. Synthesis of acid chlorides ester and amides reduction of carboxylic acids, mechanism of decarboxylation.
	अ. ऐल्डिहाइड.स एवं कीटोन्स – नामकरण तथा कार्बोनिल समूह की संरचना, ऐल्डिहाइड.स एवं कीटोन्स बनाने की विधियाँ, एसिड क्लोराइड, 1.3–डाइथायेन, नाइट्राइल एवं कार्बोक्सिलिक अम्ल के विशेष संदर्भ में, भौतिक गुण, कार्बोलिन समूह की नाभिकरनेही योगात्मक अभिक्रियाओं की क्रियाविधि–बेन्जाइन, ऐल्डोल संघनन, पर्किन एवं नोवेनजल संघनन की प्रमुखता देते हुए, ऐल्डिहाइड.स एवं कीटोन्स की अमोनिया एवं उसके व्युत्पन्नों के साथ संघनन क्रियाऐं, विटिग, मानिश अभिक्रिया, एसिटल का रक्षात्मक समूह के रुप में प्रयोग, ऐल्डिहाइड.स का ऑक्सीकरण, कीटोन्स का बेयर विलिगर ऑक्सीकरण, केनिजारों अभिक्रिया, मीरवीन–पोण्डॉर्फ–वर्ले, क्लेमेन्सन, वुल्फ किश्नर अपचयन $LiAlH_4$ तथा $NaBH_4$ अपचयन। ब. कार्बोक्सिलिक अम्ल – नामकरण, संरचना एवं आबंधन, भौतिक गुण, कार्बोक्सिलिक अम्लों की अम्लीयता, अम्ल की प्रबलता पर प्रतिस्थापियों का प्रभाव, कार्बोक्सिलिक अम्लों का विरचन, रासायनिक अभिक्रियाएँ, हैल–वोल्हार्ड–जैलिन्सकी अभिक्रिया, ऐसिड क्लोराइडों, एस्टर एवं एमाइड का संश्लेषण, कार्बोक्सिलिक अम्लों का अपचयन विकार्बोक्सिलीकरण की क्रियाविधि।
Unit-IV	A. **Carboxylic acids derivatives:** structure and nomenclature of acid chlorides, esters amides and acid anhydrides. Physical properties Interconversion of acid derivative by nucleophilic acyl substitution, preparation of carboxylic acid derivatives. Chemical reactions Mechanism of esterification and hydrolysis (acidic and basic). B. **Coordination Chemistry:** MOT (molecular orbital theory) diagram for tetrahedral, square planar and octahedral complexes. C. **Green Chemistry:** Principles, 12 tenets, their description with examples
	अ. कार्बोक्सिलिक अम्ल व्युत्पन्न – अम्ल क्लोराइड, एस्टर, एमाइड तथा अम्ल एनहाइड्राइड की संरचना तथा नामकरण, भौतिक गुण, अम्ल व्युत्पन्नों का नाभिकरनेही ऐसिल प्रतिस्थापन द्वारा अंतरपरिवर्तन, कार्बोक्सिलक अम्ल व्युत्पन्न बनाने के विधियाँ, रासायनिक अभिक्रियाएँ, एस्टरीकरण एवंज ल अपघटन (अम्लीय एवं क्षारीय) की क्रियाविधि। ब. उपसहसंयोजन रसायन – आणविक कक्षक सिद्धांत, चतुष्फलकीय वर्गसमतलीय तथा अष्टफलकीय संकुलों के लिए आणविक कक्षक आरेख। स. हरित रसायन – परिचय, 12 अवधारणाऐं एवं उनका उदाहरण सहित वर्णन।
Unit-V	A. **Chemistry of Lanthanides:** Electronic Structure, oxidation States, ionic radii and lanthanide contraction, complex formation, occurrence and isolation of lanthanide Compounds. B. **Chemistry of Actinides:** General features and Chemistry of actinides, chemistry of separation of Np. Pu and Am from U. Similarities between the later actindies and later lanthanides.
	अ. लैन्थेनाइड तत्वों की रसायन – इलेक्ट्रॉनिक संरचना, ऑक्सीकरण अवस्था, आयनिक, त्रिज्या तथा लैन्थेनाइडों संकुचन, संकुल निर्माण, लैन्थेनाइडों की प्राप्ति एवं पृथक्करण। ब. एक्टिनाइड तत्वों का रसायन – ऐक्टिनाइड के सामान्य गुण एवं रसायन, U से Np. Pu तथा Am के पृथक्करण के रसायन, पश्च ऐक्टिनाइड एवं पश्च लैन्थेनाइडों में समानताऐं।

SECOND YEAR
SEMESTER-IV
Subject: Botany
Title of Paper : Plant Ecology, Biodiversity and Phytogeography

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**Ecosystems**: Structure and types, Biotic and Abiotic components, Trophic levels, Food chain, Food web, Ecological pyramids, Energy flow; Biogeochemical cycles: Concept, Gaseous and Sedimentary cycles, Carbon, Nitrogen, Phosphorus and Sulfur cycle.
	पारिस्थितिक तंत्र – संरचना एवं प्रकार, जैविक एवं अजैविक घटक, घोषी स्तर, खाद्यश्रंखला, खाद्यजाल, पारिस्थितिक पिरामिड, ऊर्जा प्रवाह, जैवभू रासायनिक चक्र, अवधारणा, गैसीय तथा अवसादीय चक्र, कार्बन नाइट्रोजन फासफोरस चक्र।
Unit-II	**Ecological adaptations:** Morphological, Anatomical and Physiological responses Water adaptation (Hydrophytes and Xerophytes Temperature adaptation (Thermoperiodism and Vernalization), Light adaptation(Heliophytes and Sciophytes), Plant Succession: causes, trends and processes, Types of succession - Hydrosere and Xerosere.
	पारिस्थितिक अनुकूलन – आकारिकी, आंतरिकी तथा कार्यिकी अनुक्रिया, जल अनुकूलन (जलोद. भिद. तथा मरुद.भिद) तापक्रम अनुकूलन (तापकालिता एवं वसंतीकरण) प्रकाश अनुकूलन (प्रकाशरागी तथा छायारागी), पादप अनुक्रम : कारण, प्रवृति एवं प्रक्रिया, अनुक्रमण के प्रकार हाइड्रोसियर (जलीय अनुक्रमण) जीरोसियर (शुष्क अनुक्रमण)
Unit-III	**Population Ecology:** Distribution patterns, Density, Natality, Mortality, Growth curves, Ecotypes and Ecads; Community Ecology: Frequency, Density, Abundance, Cover and Life forms. Biodiversity: Basic concept, definition, Importance, Biodiversity of India, Hotspots, in situ and ex situ conservation. Biosphere reserves, Sancturies and National parks of Madhya Pradesh. Endangered and Threatended species, red data book.
	जनसंख्या पारिस्थितिकी – वितरण प्रणाली, घनत्व, जन्मदर, मृत्युदर, बृद्धिवक्र, इकोटाइप एवं इक्रेड.स, समुदाय पारिस्थितिकी : आवृत्ति, घनत्व बहुलता, आच्छादन एवं जीवनरुप/जैवविविधता – आधारभूत परिकल्पना, परिभाषा, महत्व, भारत की जैवविविधता, तप्तस्थल स्वस्थाने तथा बाह.य स्थाने संरक्षण। जैव मण्डल संचयत, म. प्र. के अभयारण एवं राष्ट्रीय उद्यान, विलुप्तप्राय तथा खतरे में पड़ी प्रजातियों, रेड डाटाबुक।
Unit-IV	**Soil**: Physico-chemical properties, Soil formation. Development, of Soil Profile, Soil classification, Soil composition, Soil factors: Pollution: Definition, Types & Causes; Global warming, Climate change and Ozone hole.
	मृदा – भौतिक–रासायनिक गुण मृदा निर्माण, मृदा परिच्छेदिका का विकास, मृदा कारक मृदा का वर्गीकरण, मृदा संगठन प्रदूषण, प्रकार एवं कारण, वैश्विक तपन, जलवायु परिवर्तन एवं आजोन छिद्र।
Unit-V	**Phytogeography**: Phytogeographical regions of India. Vegetation types of Madhya Pradesh Natural resources - definition and classification. Conservation and management of natural resources. Land resources management. Water and Wet land resource management.
	पादप भौगोलिकी – भारत के पादप भौगोलिक क्षेत्र, म. प्र. के वानस्पतिक प्रकार। प्राकृतिक स्त्रोत– प्राकृतिक स्रोतो की परिभाषा एवं वर्गीकरण, प्रबंधन एवं संरक्षण। भू–स्त्रोत प्रबंधन। जल आर्द्रभूमि स्त्रोत प्रबंधन।

SUGGESTED READINGS:-

1. Banarjee S, 1998. Bio diversity conservation- Agrobotamica, Bikaner
2. Kumar, U.K. 2006. Bio diversity principles and conservation. Agrobios, Jodhpur.
3. Odum. E.P. 5th ed. 2004 Fundamentals of Ecology. Natraj Publisher, Dehradun.
4. Puri, G.S. 1960, Indian Forest Ecology.
5. Sharma. P.D. 7th ed. 1998. Ecology and Environment, Restogi Publication, Shvaji Road Meerut.
6. Shukla. R.S. & Chandel, P.S. 2006. A Text book of Plant Ecorogy.

SECOND YEAR
SEMESTER-IV
Subject: Zoology
Title of Paper : Genetics

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**Heredity & Variation, Gene and Genetic Material** 1. Chromosome: The Physical basis of heredity and transmitters of heredity. 2. Types of chromosomes: Lampbrush, salivary gland and Beta Chromosomes. 3. Nucleocytoplasmic interactions : Ultra structure of nucleus, nucleolus, Role of nucleus and nucleolus in nucleocyteplasmic interactions including Synthesis & Export of RNA, transport of proteins 4. Heredity and Variation: Sources of variation, Genotype. phenotype and environmental variations (elementary idea) • Mendel's laws of heredity • Kinds of variations • Genetic basis of variation. 5. a) Chemistry of Gene ; Nucleic Acids and their structure. b) Concept of DNA replication. c) Nucleosome (Solenoid model), d) Split genes, overlapping genes and Pseudo genes. e) Genetic Cade.
Unit-II	Linkage and Chromosomal Aberrations 1. Gene Linkage: Kinds and Theories of linkage, significance of linkage. 2. Crossing over: Types and mechanism. 3. Theories of sex determination. 4. Sex linked inheritance (Haemophilia, Colour blindness)
Unit-III	Cytoplasmic Inheritance, Gene Expression and Regulation 1. Cytoplasmic inheritance: Maternal effect on limnea (Shell Coiling), Kappa particles in Paramecium. 2. Transcription in Prokaryotes and Eukaryotes 3. Translation in Eukaryotes 4. Gene Expression: Regulation of protein synthesis, transcription in Prokaryotes and Eukaryotes, 5. Gene Expression: Lac operon model
Unit-IV	Mutation and Applied Genetics 1. Mutation 2. Structural and numerical changes in chromosomes, 3. Causes of mutation. 4. Mutagens- classification, Types & effects.
Unit-V	**Human Genetics & Genetic Engineering** 1. Human chromosomes, Elementary idea of Human Genome Project 2. Common genetic diseases in man (Autosomal syndromes, sex chromosome syndromes, diseases due to mutation-Sickle cell anaemia, Albinism & Alkaptonuria. 3. Multiple factors and blood groups. 4. Techniques used in recombinant DNA technology. Construction of Chimeric DNA, Elementary idea of plasmids & vectors. 5. Gene cloning and Polymerase Chain Reaction (PCR), Gel Electrophoresis, Northern & Southern Blotting. 6. Gene therapy. 7. DNA finger printing.

THIRD YEAR
SEMESTER-V
Subject: Physics
Title of Paper : Quantum Mechanics and Spectroscopy

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**QUANTUM MECHANICS-1** **Particles and Waves:** Photoelectric effect. Black body radiation. Compton effect. De Broglie hypothesis. Wave particle duality. Davisson-Germer experiment. Wave packets. Concept of phase and group velocity. Two slit experiment with electrons. Probability. Wave amplitude and wave functions. Heisenberg's uncertainty principle with illustrations. Basic postulates and formalism of Schrodinger's equation. Eigenvalues. Probabilistic interpretation of wave function. Equation of continuity. Probability current density. Boundary conditions on the wave function. Normalization of wave function.
Unit-II	**QUANTUM MECHANICS-2** **Time Independent Schrodinger equation:** One dimensional potential well and barrier. Boundary conditions. Bound and unbound states. Reflection and transmission coefficients for a rectangular barrier in one dimension. Explanation of alpha decay. Quantum phenomenon of tunneling. Free particle in one-dimensional box, eigen functions and eigen values of a free particle. One-dimensional simple harmonic oscillator, energy eigenvalues from Hermite differential Equation, wave function for ground state. Particle in a spherically symmetric potential. Rigid rotator. Orbital angular momentum, azimuthal quantum numbers and space quantization. Radial solutions and principle quantum number. Hydrogen atom.
Unit-III	**ATOMIC SPECTROSCOPY** **Atoms in electric and magnetic fields:** Quantum numbers, Bohr model and selection rules. Stern-Gerlach experiment. Spin as an intrinsic quantum number. Incompatibility of spin with classical ideas. Orbital angular momentum. Fine structure. Total angular momentum. Pauli exclusion principle. Many particles in one dimensional box. Symmetric and anti-symmetric wave functions. Atomic shell model. Spectral notations for atomic states. Spin-orbit coupling, Vector model L-S and J-J coupling, Doublet structure of alkali spectra. Zeeman effect. Continuous and characteristic X-rays. Mossley's law.
Unit-IV	**MOLECULAR SPECTROSCOPY** **Spectra:** Various types of spectra. Rotational spectra. Intensity of spectral lines and determination of bond distance of diatomic molecules. Isotope effect. Vibrational energies of diatomic molecules. Zero point energy. Anharmonicity. Morse potential. Raman effect, Rotational Raman spectra and Vibrational Raman spectra. Stokes and anti-Stokes lines and their intensity difference. Electronic spectra. Born-Oppenheimer approximation. Frank-Condon principle, singlet and triplet states. Fluorescence and phosphorescence.
Unit-V	**NUCLEAR PHYSICS** Interaction of charged particles and neutrons with matter, working of nuclear detectors, G-M counter, proportional counter, Scintillation counter, Cloud chamber. Basic properties of nucleus: Shape, Size, Mass and Charge of the nucleus. Stability of the nucleus and Binding energy. Alpha particle spectra — velocity and energy of alpha particles. Geiger-Nuttal law. Nature of beta ray spectra. The neutrino. Energy levels and decay schemes. Positron emission and electron capture. Selection rules. Beta absorption and range of beta particles. Kurie plot. Nuclear reactions, pair production. Q-values and threshold of nuclear reactions. Nuclear reaction cross-sections. Examples of different types of reactions and their characteristics. Compound nucleus, Bohr's postulate of compound nuclear reaction, Semi empirical mass formula, Shell model, Liquid drop model, Nuclear fission and fusion (concepts).

Dr. Vivek Bapat
Dean- Education, Jiwaji University Gwalior.

Dr. Vinod Singh Bhadoria
Chirman – Board of Studies (Education)

1. Quantum Mechanics: V. Devanathan, Narosa Publishing House, New Delhi, 2005.
2. Quantum Mechanics: B. H. Bransden, Pearson Education, Singapore, 2005.
3. Quantum Mechanics: Concepts and Applications, Nouredine Zettili, Jacksonville State University, Jacksonville, USA, John Wiley and Sons, Ltd, 2009.
4. Introductory Quantum Mechanics & Speciroscopy: K.M. Jain, South Asian Publications.
5. Physics of Atoms & molecules: B.H. Bransden & C_}. Joachaim, Pearson Eaucaticn, Singapore, 2003
6. Fundamentals of Molecular spectroscopy: C.M. Banwell & M. McCash, McGraw Hill (U.K. edition)

THIRD YEAR
SEMESTER-V
Subject: Chemistry
Title of Paper :

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**Organic Compounds of Nitrogen:** preparation, properties and chemical reactions of nitroalkanes and nitroarenes. Mechanism of nucleophilic substitution in nitroarenes and their reduction in acidic neutral and alkaline media, picric acids. **Halonitroarenes:** structure and nomenclature, and their activity. Amines structure, and nomenclature, physical properties and stereochemistry, separation of mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Amine salts as phase transfer catalysts. Preparation of aikyl and aryl amines (reduction of nitro compounds, nitriles), reductive amination of aldehydic and ketonic compounds, Gabriel - phthalamide reaction, Hoffmann bromamide reaction, Reaction of amines, electrophilic aromatic substitution in aryl amines, reaction of amines with nitrous acid synthetic transformation of aryl diazonium salts, azo coupling.
	नाइट्रोजन के कार्बनिक यौगिक : नाइट्रोऐल्कन व नाइट्रो एरीन बनाने की विधियां, गुण एवं रासायनिक क्रियाऐं, नाइट्रो एरीन में नाभिक स्नेही प्रतिस्थापन अगिक्रिया की क्रियाविधि तथा उनके अम्लीय, क्षारीय, उदासीन माध्यम मे अपचयन, पिक्रिक अम्ल। हैलोनाइट्रोएरीन : क्रियाशीलता, संरचना एवं नामकरण। एमीन की संरचना एवं नामकरण, गौतिक गुण एवं त्रिविम रसायन। प्राथमिक, द्वितीयक एवं तृतीयक एमीन के मिश्रण का पृथक्करण। एमीन की क्षारकता को प्रभावित करने वाली संरचनात्मक विशेषताएं। एमीन लवण प्रावस्था स्थानांतरण उत्प्रेरकों के रुप में एल्किल एवं एरिल एमीन बनाने की विधियां (नाइट्राइल एवं नाइट्रो यौगिकों का अपचयन), ऐल्डिहाइडों एंव कीटोनी यौगिकों का अपचयनात्मक एमीनीकरण, गेब्रिल–थैलेमाइड अभिक्रिया, हॉफमैन ब्रोमेमाइड अभिक्रिया, एमीन्स की अभिक्रियाऐं, एरिल एमीन में इलेक्ट्रॉन स्नेही, ऐरोमेटिक प्रतिस्थापन, एमीन्स की नाइट्रस अम्ल के साथ अभिक्रिया, एरिल डाइएजोनियम लवण की संश्लेषणात्मक रुपांतरण, एजो युग्मन।
Unit-II	**Carbohydrates-I** Classification and nomenclature, monosaccharide, mechanism of osazone formation, chain lengthening and chain shortening of aldoses, epimerization, configuration of monosaccharide, erythro, threo diasterioisomers. Formation of glycosides, ethers and esters, determination of ring size of monosaccharide, cyclic Structure of D(+) glucose, mechanism of mutarotation. Structure of ribose and deoxyribose. **Carbohydrates-II** An introduction to glycosidic linkages in di and polysaccharides. Reducing and non-reducing sugars.
	कार्बोहाइड्रेट I : वर्गीकरण तथा नामकरण, मोनोसैकेराइड, आसाजोन के विरचन की क्रियाविधि, ऐल्डोस में श्रृंखला आरोहण व श्रृंखला अवरोहण, एपीमरीकरण, मोनोसैकेराइडों का अभिविन्यास, थ्रियो एवं एरिथ्रो अप्रतिबिम्बी त्रिविम समावयवी, ग्लाइकोसाइड, ईथर व एस्टर का विरचन, मोनोसैकराइड की चक्रीय माप का निर्धारण D (+) ग्लूकोस की चक्रीय संरचना, परिवर्ती घूर्णन की क्रियाविधि, राइबोस तथा डिऑक्सीराइबोस की संरचना। कार्बोहाइड्रेट II : डाइसैकेराइड एवं पॉलिसैकेराइड में ग्लाइकोसिडीक बंध का परिचय, अपचायक एवं अनअपचायक शर्करा।
Unit-III	**(a) Photochemistry:** Electromagnetic radiation, range of different regions of the spectrum, different expression units for energy, wavelength and frequercy Interaction of radiation with matter, difference between thermal and photochemical process. Laws of photochemistry — Grotthus-Draper law, Stark-Einstein law, Beer-Lambert law. Electronic transitions,

	(b) UV Spectroscopy: Electronic excitation, elementary idea of instrument used. Application to organic molecules. Woodward-Fieser rule for determining λ_{max} of enes, polyenes and α, β- unsaturated carbonyl compounds.
	अ. प्रकाश रसायन : विद्युत चुम्बकीय विकिरण, विकिरण के विभिन्न क्षेत्रों की परास, ऊर्जा, तरंग दैर्ध्य एवं आवृत्ति को व्यक्त करने के लिए विभिन्न इकाइयाँ, पदार्थ तथा विकिरणों की पारस्परिक क्रिया, ऊष्मीय तथा प्रकाश रासायनिक अभिक्रियाओं में अंतर, प्रकाश रसायन के नियम, ग्रोथस–ड्रेपर नियम, स्टार्क–आइन्स्टाइन नियम, बीयर–लेम्बर्ट नियम, इलेक्ट्रॉनिक उपकरण, उत्तेजित अवस्था में घटित होने वाले विभिन्न प्रक्रमों को दर्शाने वाला जेबलोन्स्की आरेख क्वाण्टम लब्धि। ब. पराबैंगनी स्पेक्ट्रमिकी : इलेक्ट्रोनिक उत्तेजन, प्रयुक्त उपकरण के संबंध में प्रारंभिक जानकारी, कार्बनिक यौगिकों की संरचना ज्ञान करने के अनुप्रयोग, ईन, पॉलीईन तथा α, β असंतृप्त कार्बोनिक यौगिकों के λ_{max} के निर्धारण के लिए वुडवर्ड–फिशर नियम।
Unit-IV	**Bioinorganic Chemistry - I** Essential and trace elements in biological processes, metalloporphyrins with special reference to haemoglobin and myoglobin, Biological role of alkali and alkaline earth metal ions with special reference to Ca^2. **Bioinorganic Chemistry - II** Role of metal ions in biological process, nitrogen fixation, oxygen-uptake proteins, cytochromes and ferredoxins.
	जैव–अकार्बनिक रसायन I : जैविक प्रक्रियाओं में आवश्यक एवं सूक्ष्म तत्व, धातु पॉरफाइरिन्स–हीमोग्लोबिन एवं मायोग्लोबिन के विशेष संदर्भ में, क्षार तथा क्षारीय मृदा धातु आयनों की जैविक भूमिका Ca^2 के विशेष संदर्भ में। जैव–अकार्बनिक रसायन II : जैविक प्रक्रियाओं में धातु आयनों की भूमिका, नाइट्रोजन स्थिरीकरण, ऑक्सीजन ग्राही प्रोटीन्स, सायटोक्रोम तथा फेरेडॉक्सिन्स।
Unit-V	**Hard and Soft Acids and Bases (HSAB)** Classification of acids and bases as hard and soft, Pearson's HSAB concept, symbiosis. **Analytical Chemistry:** Errors, their classification, minimization of errors, precision and accuracy, gravimetric estimation - concept, method and precautions, gravimetric estimation of barium and copper. **Inorganic Polymers:** Introduction and scope of inorganic polymers, special characteristics, classification and their applications. Structure and nature of bonding in Silicones and triphosphonitrilic chloride.
	कठोर एवं मृदु अम्ल एवं क्षार : अम्लों एवं क्षारों का कठोर एवं मृदु के रुप में वर्गीकरण, पीयरसन की कठोर एवं मृदु अम्ल एवं क्षार की धारणा सहजीविता। विश्लेषणात्मक रसायन : त्रुटियां, उनका वर्गीकरण एवं न्यूनीकरण, यथार्थता एवं परिशुद्धता। भारात्मक आंकलन – धारणा, विधि एवं सावधानियाँ, बेरियम तथा कॉपर का भारात्मक आकलन। अकार्बनिक बहुलक : परिचय एवं क्षेत्र, विशेष लाक्षणिक गुण, वर्गीकरण तथा अनुप्रयोग। सिलिकॉन तथा ट्रायफास्फोनाइट्रिलिक क्लोराइड यौगिकों की संरचना तथा बंध की प्रकृति।

Suggested Reading:

Bahi Ann and Bahi BS, A Textbook of Organic Chemistry, S Chand & Co. Ltd. New Delhi
Finar I L, Organic Chemistry, Vol I, ELBS Ltd
Morission RT, & Boyd R N Organic Chemistry, PHI Ltd.
Chatwal G R, & Anand S K, Spectroscopy, S Chand & Co. Ltd.
Sharma Y R, Elementry Organic Spectroscopy, S Chand & Co. Ltd.

THIRD YEAR
SEMESTER-V
Subject: Zoology
Title of Paper : Animal Physiology and Biochemistry

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**Nutrition, Metabolism to** 1. Physiology of digestion in mammals 2. Protein Metabolism: Deamination, Decarboxylation. Transamination of amino acids, and Ornithine cycle. 3. Carbohydrate metabolism- Glycogenesis, Glycogenolysis, glycolysis, The Citric acid cycle Gluconeogenesis. 4. Lipid Metabolism-Beta oxidation of fatty acids.
Unit-II	**Respiration Excretion and Immune System** 1. Mechanism and of respiration in mamunals(transport of gases, chloride shift).. 2. Physiology of Excretion- urea and urine formation in mammals 3. Innate and acquired immunity, immune cells and lymphyed system, immune response: cellular and humoral
Unit-III	**Regulatory Mechanisms and Enzymes** 1. Thermoregulation. 2. Definition and nomenclature of enzymes, Classification of enzymes. 3. Mechanism of enzyme action. 4. Vitamins and Co-enzymes
Unit-IV	**Neuromuscular Co- ordination** 1. Introduction to functional anatomy of human brain 2. Types of neurons and glial cells 3. Theory of muscle contraction and its biochemistry. 4. Physiology of nerve impulse conduction.
Unit-V	**Endocrine system and Reproductive system** 1. Structure and functions of Pituitary Gland. 2. Structure and functions of Thyroid Gland. 3. Structure and functions of Adrenal Gland. 4. Structure and functions of Parathyroid, Thymus and Islets of langerhan's. 5. Physiology of Male reproductive organ and female reproductive organ.

Refereed Books:-

Biochemistry – Camphell
Biochemistry – Harper
Biochemistry – Nelson and Cox
Animal Physiology – Eckert and fremann
General and Comparative Physiology – William S Hoor
Comparative Anatomy – prisser
Animal Physiology – Chatarjee

THIRD YEAR
SEMESTER-V
Subject: Botany
Title of Paper : Plant Physiology and Biochemistry

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**Plant Water Relations:** Properties of water, Importance of water in plant life, Diffusion, Osmosis & Osmotic relation to plant cell. Water Absorption, Ascent of Sap. Transpiration: Structure & Physiology of Stomata, Mechanism of Transpiration, Factors affecting the rate of transpiration.
	पादप जन संबंध : जल के गुण, पादप जीवन में जल का महत्व, विसरण, परासरण तथा पादप कोशिका के परासरण संबंध, जल अवशोषण, रसारोहण। वाष्णोत्सर्जन : रंध्र की संरचना एवं कार्यिकी, वाष्पोत्सार्जन की क्रियाविधि, वाष्पोत्सर्जन को प्रभावित करने वाले कारक।
Unit-II	**Plant Nutrition:** Mineral nutrition, Hydroponics, Absorption of mineral Nutrients, Translocation of organic solutes. . **Biomolecules:** Structure Classification and functions of Carbohydrates, Amino Acids, Proteins and Lipids.
	पादप पोषण :– खनिज पोषण, जल संवर्धन, खनिज लवणों का अवशोषण, कार्बनिक विलेय का स्थानांतरण, जैविक अणु, कार्बोहाइड्रेट, अमीनो अम्ल, प्रोटीन और लिपिड की संरचना, वर्गीकरण और कार्य।
Unit-III	**Photosynthesis:** Chloroplast, Photosynthetic pigments, Red drop, Emerson' effect, Concept of two Photosystems, Light reaction, Dark reaction - Calvin cycle, Hatch & Slack cycle, CAM cycle, Factors affecting rate of photosynthesis & Photorespiration.
	प्रकाश संश्लेषण :– क्लोरोप्लास्ट, प्रकाश संश्लेषीय वर्णक, रेड ड्राप तथा इमरसमन प्रभाव, दो प्रकाश तंत्र की अवधारणा, प्रकाश अभिक्रिया, अंधकार अभिक्रिया, केलविन चक्र, हेच एवं स्केल चक्र, सी. ए. एम. चक्र, प्रकाश संश्लेषण को प्रभावित करने वाले कारक का प्रकाशीय श्वसन।
Unit-IV	**Respiration:** Mitochondria, aerobic and anaerobic respiration, Respiratory coefficient, mechanism of respiration - Glycolysis, Kreb's cycle, Pentose Phosphate Pathway, Electron transport system, Factors affecting rate of respiration. Redox potential and theories of ATP synthesis.
	श्वसन :– माइटोकॉन्ड्रिा, आक्सी एवं अनाक्सी श्वसन, गुणांक, श्वसन की क्रियाविधि– ग्लाइकोलिसिस, क्रेब चक्र, पेन्टोस फास्फेट मार्ग, इलेक्ट्रान अभिगमन तंत्र, श्वसन की दर को प्रभावित करने वाले कारक, आक्सीकरण – अपचयन विभव, ए.टी.पी. संश्लेषण के सिद्धांत।
Unit-V	**Enzymology:** Classification, nomenclature and characteristics of Enzymes, Concept of holoenzyme, apoenzyme, cg-enzyime and co-factors. Mode & mechanism of enzyme action, Factors affecting enzyime activity. **Plant Harmones:** Discover, Structure mode of action and role of Auxins, Gibberellins, Cytokinin, Abscissic acid and Ethylene.
	एंजाइमोलॉजी :– विकरो का वर्गीकरण नामकरण एवं अभिलाक्षणिक गुण, होलोएन्जाइम, एपोएन्जाइम, कोएन्जाइम एवं कोफेक्टर्स की अवधारणा, एन्जाइम की कार्यप्रणाली एवं क्रियाविधि, एंजाइम क्रिया को प्रभावित करने वाले कारक। पादप हार्मोन :– आक्जिन, जिब्बरेलिन, सायटोकायनिन, एब्सीसिक अम्ल एवं इथीलीन की खोज संरचना, कार्य प्रणाली एवं भूमिका।

SUGGESTED READINGS:-

1. David. L. N. and Michael. M. C. 2000, Lehninger's Principle of Biochemistry, Macmillan worth Pub. New York. USE
2. Gangulee, H.C.,Das, K.S. Datta C., and Sen S., 2007, College Botany Voll. I New Central Book Agency (P) Ltd. Kelkata 700009
3. Hopkins, W.G. 1995. Introduction of Plant Physiology Pub. John wiley and Sons New York.
4. Jain. V.K. 1974. Fundamentels of Plant Physiology, S.. Chand & Company.
5. Pandey, B. P. 2010. A Text book of Botany.- Angiesperms, S. Chand & Company Ltd. Ramnagar, New Delhi-110055
6. Taiz & Zeiger, E. 1998. Plant Physiology Sinauer associates, Inc. Pub. Massachusetts U.S.A.

Dr. Vivek Bapat
Dean, Education, Jiwaji University, Gwalior

Dr. Vinod Singh Bhadoria
Chirman – Board of Studies (Education)

THIRD YEAR
SEMESTER-V
Subject: Mathematics
Title of Paper : Linear Algebra, Numerical Analysis

Max. Marks - 150
External Marks -125
Internal Marks – 25

Note: Scientific Calculator will be allowed in the examination of this paper.

Particulars

Unit	Syllabus
Unit-I	Definition and examples of vector spaces, subspaces, Sum and direct sum of subspaces, Linear span, Linear dependence, independence and their basic properties, Basis, Finite dimensional vector spaces, Existence theorem for basis, Invariance of the number of elements of a basis set, Dimension, Dimension of sums of vector subspaces.
	सदिश समष्टि की परिभाषा एवं उदाहरण, उपसमष्टि, उपसमष्टियों का योग एवं सीधा योग, रैखिक विस्तृति, रैखिक आश्रितता, स्वतंत्रता एवं उनके मूल गुणधर्म, आधार, परिमित विमीत सदिश, समष्टियाँ, आधार का अस्तित्व प्रमेय, आधार समुच्चय में अवयवों की संख्या को अपरिवर्तनशीलता, विमा, सदिश उपसमष्टियों के योग की विमा।
Unit-II	Linear transformations and their representation as matrices, The algebra of linear transformations, The rank- nullity theorem, Eigen values and eigen vectors of a linear transformation, Diagonalisation, Quotient Space and its dimension.
	रैखिय रुपांतरण एवं उनका आव्यूह निरुपण, रैखिक रुपांतरणों का बीज गणित, जाति शून्यता प्रमेय, रैखिक रुपांतरणों के आयगन मान एवं आयगन सदिश, विकर्णीकरण, विभाग समष्टि एवं उसकी विमा।
Unit-III	Approximations, Errors and its types, Solution of Equations: Bisection, Secant, Regula Falsi, Newton- Raphson Method and their order of convergence, Roots of second degree Polynomials, Interpolation: Lagrange interpolation, Divided Differences, Interpolation formulae using Differences and derivations of Interpolation formula.
	सन्निकटन, त्रुटियाँ एवं उसके प्रकार, समीकरणों के हल: द्विभाजन, सीकेन्ट, रन्युला, फाल्सी तथा न्युटन–रॉप्सन विधि एवं उसकी अभिबिन्दुता की कोटि, द्वितीय घात बहुपदों के मूल। अर्न्तवशन: लग्रांजे अर्न्तवशन, विभाजित अन्तर, अन्तर के उपयोग से अर्न्तवशन सूत्र एवं अर्न्तवशन सूत्रों की उत्पत्ति।
Unit-IV	Linear Equations: Direct Methods for Solving Systems of Linear Equations, Gauss elimination, Gauss Jordan Method, LU Decomposition, Cholesky Decomposition, iterative Methods: Jacobi Method, Gauss - Seidel Method, Relaxation Method, Methods Based on Numerical Differentiation.
	रैखिय समीकरण : रैखित समीकरणों के निकाय को हल करने की प्रत्यक्ष विधियाँ, गाउस विलोपन, गाउस जार्डन विधि, एल यू. वियोजन, चोलेरकी वियोजनद्ध, पुनरावृती विधियाँ, जेकोबी विधि, गाउस सिडेल विधि, रिलेक्सोशन विधि, संख्यात्मक अवकलन पर आधारित विधियाँ।
Unit-V	Ordinary Differential Equations: Euler Method. Eulers Modified Method, Single-step Methods, Runge-Kutta's Method. Multi-step Methods, Milne Method, Numerical Quadrature, Newton-Cote's Formulae, Gauss Quadrature Formulae, Methods Based on Numerical Integration with their derivation.
	साधारण अवकल समीकरण : आयलर विधि, आयलर संशोधित विधि, एकल चरण विधि, रुंग–कुटटा विधि, बहुचरण विधि, मिलने विधि, संख्यात्मक क्षेत्रकलन, न्युटन कोट.स सूत्र, गाउस क्षेत्रकलन सूत्रण संख्यात्मक समाकलन पर आधारित विधियाँ एवं उनकी उत्पत्ति।

Text Books :

1. K. Hoffman and R. Kunze, Linear Algebra, 2nd Edition. Prentice Hall Englewood Cliffs, New Jersey.1971,
2. C E Frooerg. Introduction to N umerical Analysis, (Second Edition L Addison-Wesley - 1979
3. MK Jain, S.R.K. Jyengar, R. K. Jain. Numerical Methods Problems and Solutions, New Age International (P)Ltd. 1996.

Reference Book:-

1. E. Balaguruswamy- Numerical Method Tata Mc Graw_ Hill Pub.Com. New Yark
2. K.B. Datta. Matrix and Linear Algebra, Prentice hall of India Pvt Ltd., New Delhi, 2000.
3. S.K. Jain, A. Gunawardena & P.B. Bhattacharya. Basic Linear Algebra with MATLAB Key college Publishing (Springer-Verlag) 2001
4. S. Kumarsaran, Lmear Algebra, A Geometric Approach Prentice - Hall of India, 2000

THIRD YEAR
SEMESTER-VI
Subject: Physics
Title of Paper : Solid State Physics and Devices

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**SOLID STATE PHYSICS-1** **Crystal Structure and bonding:** Crystalline and amarphous solids. Translational symmetry. Lattice and basis. Unit cell. Reciprocal lattice. Fundamental types of lattices (Bravias Lattice). Miller indices Lattice planes. Simple cubic. Face centered cubic. Body centered cubic lattices. Laue and Bragg's equations. Determination of crystal structure with x-rays, X-ray spectrometer. Lonic, covalent, metallic, van der Waals and hydrogen bonding. Band theory of solids. Periodic potential and Bloch theorem. Kronig-Penny mode (Qualitative),
Unit-II	**SOLID STATE FHYSICS-2** **Lattice structure and properties:** Dulong Petit, Einstein and Debye theories of specific heats of solids. Elastic and atomic force constants. Dynamics of a chain of similar atoms and chain of two types of atoms. Optical and acoustic modes. Electrical resistivity. Specific heat of electron. Wiedemann-Franz law. Hall effect. Response of substances in magnetic field, dia-para and ferromagnetic materials. Classical Langevin theory of dia and paramagnetic domains. Curie's law. Weiss' theory of ferromagnetic domains discussion of hysteresis.
Unit-III	SEMICONDUCTOR DEVICES-1 **Electronic devices:** Types of Semiconductors (p and n Formation of Energy levels, energy level diagram. Conductivity and mobility. Junction formation, Barrier formation in p-n junction diode. Current flow mechanism in forward and reverse biased diode (recombination), drift and saturation of drift velocity. Derivation of mathematical equations for barrier potential, barrier width. Single p-n junction device (physical explanation, current voltage characteristics and one or two applications). Two terminal devices, Rectification. Zener diode. Photo diode. Light emitting diode. Solar cell. Three terminal devices, Junction field effect transistor (JFET), Two junction devices. transistors as p-n-p and n-p-n. Physical mechanism of current flow. Characteristics of transistor.
Unit-IV	**SEMICONDUCTOR DEVICES-2** Amplifiers (only bipolar junction transistor} CB, CE and CC configurations. Single stage CE amplifier (biasing and stabilization circuits), Q-point, equivalent circuit, input impedance, Output, impedance, voltage and current gain. Class A, B, C amplifiers (definitions) RC coupled amplifiers (frequency response). Class B push-pull amplifier amplifiers Voltage feedback and current feedback. Effect of negative voltage series feedback on Input impedance. Output impedance and gain. Stability, distortion and noise principle of an Oscillator, Barkhausen criterion, Colpitts, RC phase shift oscillators. Basic concepts of amplitude, frequency and phase modulations and demodulation.

Dr. Vivek Bapat
Dean- Education, Jiwaji University Gwalior.

Dr. Vinod Singh Bhadoria
Chairman, Board of Studies (Education), Dr. [illegible]

	Nanostructures: Introduction to nanotechnology, structure and size dependent properties. 3D, 2D, 1D, 0D nanostructure materials and their density of States, Surface and Interface effects. Modelling of quantum size effect. Synthesis of nanoparticles- Bottom Up and Top down approach, Wet Chemical Method. Nanolithography. Metal and semiconducting nanomaterials. Essential differences in structural and propertics of bulk and nano materials (qualitative description). Naturally occurring nano crystals. Applications of nanomaterials.

References:

1. introduction to Solid State Physics, C. Kittel, VIIth Edition, John Wiley and Sons, New York, 2005
2. Intermediate Quantum theory of Crystalline Solids, A. O. E. Animalu, Prentice-Hall of India private Limited, New Delhi 1977
3. Solid State Physics, N. W. Ashcroft, and N.D. Mermin, Harcourt Asia (P} Ltd. 2001
4. The Physics and Chemistry of Nanosolids: Frank J. Owens, and Charles P. Poole Jr. Wiley Inter Science, 2008
5. Physics of Low Dimensional Semiconductors: An introduction; J.H. Davies, Cambridge University Press, U.K., 1998

Dr. Vivek Bapat
Dean- Education, Jiwaji University Gwalior.

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Chirman - Board of Studies (Education) Deptt. 132

THIRD YEAR
SEMESTER-VI
Subject: Zoology
Title of Paper: Ecology and Applied Zoology

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	Concept of Ecology 1. Abiotic and biotic factors 2. Energy flow in ecosystem : Food chain and Food web 3. Biogeochemicai cycle : Co^2 N and P 4. Population Concept — Characteristics of population. Factors affecting Population growth, Pollution indicators,
Unit-II	Habitat Ecology 1. Fresh water , marine and terrestrial habitat 2. Ecological division of India. 3. Biodiversity : Natural resources and their conservation with special reference
Unit-III	Man and Environment 1. Wild life conservation (Laws, National Parks and Sanctuaries of MP) 2. Endangered species of India. 3. Types of pollution : Air, water, soil, thermal and noise pollution. 4. Urbanisation and effect of human population on environment.
Unit-IV	Aquaculture 1. Prawn culture: Culture of fresh water prawn, methods of prawn fishing, preservation and processing of prawns. 2. Pearl culture and pear industry. 3. Frog culture: Breeding and selection. 4. Major carp culture : Management of ponds , preservation and processing of fishes. 5. Maintenance of Aquarium.
Unit-V	Economic Entomology 1. Sericulture: Species of silkworm, life history of Bombyx muri, Sericulture Industry in India. 2. Apiculture — Life cycle of the species methods of bee Keeping, products of bees, enemies of bees. 3. Lac culture: Lifecycle, and association with the host peat. 4. Common pests: Stored grains: Sitophilus oryzae and Tribolium Castanacum, Vegetable pest. Piers brassicae and Dacus cucurbitae. 5. Biological control of insect pests,

THIRD YEAR
SEMESTER-VI
Subject: Biology
Title of Paper : Linear Algebra, Numerical Analysis

Max. Marks - 100
External Marks -85
Internal Marks – 15

Note: Scientific Calculator will be allowed in the examination of this paper.

Particulars

Unit	Syllabus
Unit-I	The cell envelops and cell organelles : plasma membrane lipid bilayer structure, functions of the cell wall. Structure and function of cell organelles Nucleus Chloroplast, Mitochondrion, Golgibodies, ER, Peroxisome and Vacuole.
	कोशिका आवरण एवं कोशिकांग : प्लाज्मा झिल्ली, द्विस्तरीत लिपिड संरचना कोशिका भित्ति के कार्य। कोशिकाअंगको की संरचना एवं कार्य : केन्द्रक, हरित लवक, माइटोकॉण्ड्रिया गॉल्जीकाय अतः द्रव्यी जालिका, परऑक्सीसोम्स एवं रिक्तिकाऐं।
Unit-II	Chromosomal organization: Structure and functions of Chromosome, centromere and telomere special types of chromosomes, Mitosis and Meiosis. Variations in Chromosome structure: Deletion, Duplication, Translocation and Inversion; Variation in chromosome number, Euploidy, Aneuploidy, DNA the genetic material, DNA structure and replication. Nucleosome model.
	गुणसूत्र सगठंन : आकारिकी एवं कार्य सेन्ट्रोमियर एवं टीलोमियर। विशेष प्रकार के क्रोमोसोम्स,. समसूत्री एवं अर्धसूत्री विभाजन। गुणसूत्र संख्या में विभिन्नताऐं : विलोपन, द्विगुणन, स्थानान्तरण, एवं प्रतिलोमीकरण। गुणसूत्र संख्या में विभिन्नताएँ। यूप्लायडी एन्यूप्लॉयडी। डी.एन.ए. : आनुवांशिक पदार्थ। डी.एन.ए. की संरचना एवं पुनरावृत्ति। न्यूक्लियोसोम माडल।
Unit-III	Genetic inheritance: Mendelism: laws of dominance, segregation and independent assortment, Linkage analysis; Interactions of genes. Cytoplasmic inheritance Mutations: spontaneous and induced: Transposable elements: DNA damage and repair.
	आनुवांशिक वंशागति मण्डलवाद : प्रभाविता, पृथ्क्करण एवं स्वतंत्र अपव्यूहन के नियम, सहलग्नता विश्लेषण, जीन की अनयोग्य क्रियाएँ। कोशिका द्रवीय वंशागति उत्परिवर्तन, प्राकृतिक, प्रेरित उत्परिवर्तन, स्थानान्तरणशील अवयव। डी.एन.ए. क्षति एवं सुधार।
Unit-IV	Gene: Structure of gene, genetic code, transfer of genetic information; Transcription, translation, protein syntesis, tRNA and ribosomes. Regulation of gene expression in prokaryotes and eukaryotes.
	जीनः जीन की संरचना, आनुवांशिक कोड, आनुवांशिक सूचना का स्थानान्तरण, अनुलेखन, अनुवाद, प्रोटीन संश्लेषण, ट्रांसफर आर.एन.ए. राइबोसाम्स। प्रोकैरियोट.स एंव यूकैरियोट.स में जीन अभिव्यक्ति का नियमन।
Unit-V	Biotechnology: Functional definition; basic aspects of plant tissue culture; cellular totepotency, differentiation and morphogenesis biology of Agrobacterium, vectors for gene delivery and marker genes. Important achievements of biotechnology in agriculture. Genetic engineering: Tools and techniques of recombinant DNA technology; cloning vectors; genomic and cDNA library; transposable elements. Gene mapping and chromosome walking,

Dr. Vivek Bapat
Dean- Education, Jiwaji University Gwalior.

Dr. Vinod Singh Bhadoria
Chairman, Board of Studies (Biology)

	टोटीपोटेंसी, विभेदीकरण एवं मार्फोजेनेसिस, एग्रोबैक्टीरियम की जैविकी, जीन डिलिवरी के वाहक तथा मार्कर जीन, जैव प्रौद्योगिकी की कृषि में प्रमुख उपलब्धियाँ। अनुवांशिक अभियांत्रिकी : पुनर्योजक डी.एन.ए. तकनीकी के औजार एवं तकनीक, क्लोनल वाहक, जीनोमिक तथा सी.डी.एन.ए. लाइब्रेरी, ट्रान्सपोजेबल तत्व, जीन मैपिंग तथा गुणसूत्र वाकिंग।

Suggested Books :

1. Alberts B.D. Lewis, J Raft, M. Rubers, K. and Watson I.D. 1999 molecular Biology of Cell Garland Pub. Co. Inc. New York, U.S.A,
2. P.K. Gupta. 1999 A text Book of Cell and Molecular Biology, Rastogi Pub. Meerut India.
3. Kleinsmith L.J. and Molecular Biology (2nd editton) Harper Collins College pub. New York USA,
4. P.K. Gupta Genetics Rastogi Pub. Meerut,
5. Sinha & Sinha Cytogenetics & Plant Breeding Vikas Pub.

B.Sc-B.Ed. INTEGRATED PROGRAMME

THIRD YEAR

SEMESTER-VI

Subject: Mathematics

Title of Paper: Real Analysis, Discrete Mathematics and Optionals

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	Riemann integral, Algebra of Ricmann integrable functions, Integrability of continuous and monotonic functions, The fundamental theorem of integral calculus, Mean value theorems of integral calculus.
	रीमान समाकल, रीमान समाकलनीय फलनों का बीच गणित, सतत एवं एकदिष्ट फलनों की समाकलनीयता, समाकलन का मूलगूत प्रमेय, समाकलनों के माध्यमान प्रमेय।
Unit-II	Definition and examples of metric Spaces, Neighbourhoods, Limit points, Interior points, Open wad closed sets, Closure and interior, Boundary ports, Subspace of a metric space, Cauchy sequences, Completeness, Cantor's intersection theorem, Contraction principle, Real numbers as a complete ordered field, Definition of Continuous functions and its illustrations.
	दूरीक समष्टि की परिभाषा एवं उदाहरण, सामीप्य, सीमा बिन्दु, अंतः बिन्दु, विवृत्त एवं संवृत समुच्चय, संवरणक एवं अग्यंतर, परिसीमा बिन्दु, दूरीक समष्टि की उप समष्टि, कौशी अनुक्रम, पूर्णता, केन्टर का सर्वनिष्ठ प्रमेय, संकुचन सिद्धांत, पूर्ण क्रमित क्षेत्र के रुप में वास्तविक संख्यायें सतत फलन की परिभाषा एवं उसके उदाहरण।
Unit-III	Algebra of Logic — tautologies and Contradictions, logical equivalence, Algebra of propositions. Quantifiers: Universal and Existential Quantifiers. Boolean Algebra and its properties. Demorgan's law, Algebra of electric circuits and its applications.
	तर्क का बीज गणित, पुनरुक्तियों तथा विरोध का पुनरावलोकन, तार्किक तुल्यता, साध्यों का बीजगणित, प्रमात्रीकारक, आस्तित्व प्रमात्रीकारक एवं सर्व प्रमात्रीकारक, बूलीक बीजगणित एवं उसके गुणधर्म, डी–मार्गन नियम, वैद्युत परिपथों का बीजगणित एवं उनके अनुप्रयोग।
Unit-IV	Boolean Function. Disjunction and Conjunction Norma: Forms. Bools Expansion Theorem. Binary Relations, Equivalence Relations, Partitions and Partial Order Relation.
	बूलीन फलन, वियोजनीय एवं संयोजनीय प्रसामान्य रुप, बूल का प्रसार प्रमेय, द्विचर संबंध, तुल्यता संबंध, विभाजन एवं आंशिक क्रम संबंध।

Optional

This unit should be different from the main subject/paper studied during Semester I to Semester VI

	Graph Theory
Unit-V	Graphs, Multigraphs Weighted Graphs, Paths and Circuits, Shortest Paths: Dijkstra's Algorithin, Matrix Representation of Graph: Incidence and Adjacency Matrix, Trees and its simple Properties.
	ग्राफ, बहुग्राफ, भारित ग्राफ, पथ एवं परिपक्ष ग्राफ, लघुतम पथः डाइजकस्त्रा एल्गोरिथम, ग्राफ का आव्यूह निरुपण, इन्सीडेंस एवं एडजेसेन्सी आव्यूह, वृक्ष एवं उसके सामान्य गुणधर्म।
	Or/अथवा
	Elementary Statistics
Unit-V	Probability Continuous probability, probability density function and its applications (for finding the mean, mode, median and standard deviation of various continuous probability distributions) Mathematical expectation, expectation of sun and product of random variables, Moment generating functions, Theoretical distribution. Binomial, Poisson distributions and their properties and uses.
	प्रायिकता, सतत प्रायिकता, प्रायिकता घनत्व फलन तथा उनके अनुपयोग (सतत प्रायिकता बंटन, के लिये माध्य, बहुलक, माध्यिका तथा मानक विचलन ज्ञान करने के लिये) गणितीय प्रत्याशा,

	..... तथा उसके गुणधर्म एवं उपयोग।
	Or/अथवा
	PRINCIPLES OF COMPUTER SCIENCE
Unit-V	Date Storage of bits Rema Memory. Mass storage. Coding Information of Storage. The Binary System Storing integers fractions, communication errors. Data Manipulation — The Central Processing Unit The Store Program concept. Programme Execution, Anthinetic/Logic Instruction. Computer-Peripheral Communication. Operation System: The Evolution of Operating System. (Dos, Window) Operating System: Architecture. Coordinating the Machine's Activities, Other Architectwres.
	बीटों का डेडास्टोरेज, रेम स्मृति। वृहद भण्डारण की कटू कृत सूचना। बायनरी सिस्टम। पूर्णांक, भिन्नाक का भण्डार, संचारण डाटा मेन्यूपूलेशन – सेन्ट्रल प्रोसेसिंग यूनिट, भण्डारित प्रोग्राम अभिधारणा। प्रोग्राम का संचालन। गणितीय/तार्किक निर्देश। कम्प्यूटर–राह उपकरण (पेरीफेरल्स के मध्य संचार)। ऑपरेटिंग सिस्टम का उद्भव (Dos, Window) ऑपरेटिंग सिस्टम, आर्किटेक्चर कम्प्यूटर मशीन की गतिविधियाँ का समन्वयन। अन्य आर्किटेक्चर।
	Or/अथवा
	MATHEMATICAL MODELING
Unit-V	The process of Applied M athematics. Setting up first order differential equations, Qualitative solution sketching. Stability of solutions. Difference and differential equation models of growth and decay. Single species population model, Exponential and logistic population models.
	प्रयुक्त गणित की विधि। प्रथम कोटि अवकल समीकरण की स्थापना। गुणात्मक हल चित्रण। हलो का स्थायित्व। अंतर एवं अवकल समीकरण मॉडल विकास एवं श्रय। एकल एपाइसेस पॉपूलेशन मॉडल, एक्सापोनेशियम एवं लॉजिस्टिक पॉपूलेशन मॉडल्स।

Text Books :

1. R.R. Goldberg, Real Analysis, Oxford & IBH Publishing Co, New Delhi, 1970
2. G.F. Simmons, Introduction to Topology and Modem Analysis. McGraw-Hill, 1963
3. T.M Apostol, Mathematical Analysis. Norosa Publishing House. New Delhi
4. C.L. Lin, Elements of Discrete Mathematics, (Second Edition), McGraw Hull, International Edition, Computer Science scries 1986.
5. म. प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

Reference Books:

1. T.M Apostol, Mathematical Analysis. Norosa Publishing House. New Delhi, 1985
2. S. Lang. Undergraduate Analysis. Springer-Veriag, New York, 1983
3. D. Somasundaram and B. Cheudhary, A first Course in Mathematical Analysis Narosa Publishing House, New Delhi 1997
4. Shanti Narayan, A Course of Mathematical Analysis. S. Chand & Co. Delhi.
5. R.K. Jain and S.K. Kaushik. An introduction to Real Analysis, 8. Chand & Co. New Delhi 2000
6. P.K. Jain and K. Ahmed Metric Spaces, Narosa Publishing House, New Delhi, 1996
7. S. Lang, Undergraduate Analysis, Springer-Verlag, New York 1983
8. E.T. Copson, Metric Spaces, Cambridge University Press, 1968
9. S. Lang. Undergraduate Analysis, Springer-Veriag, New York, 1983

Optional Papers

A. Graph Theory

Test Book

1. Narsing Deo, Graph Theory, McGraw Hill
2. हिन्दी ग्रंथ अकादमी की पुस्तकें।

B. Elementary Statistics

Text Book:

1. Statistics by M. Ray
2. Mathematical Statistics by J.N Kapoor, H.C Saxena (S. Chand)
3. हिन्दी ग्रंथ अकादमी की पुस्तकें।

References Book:

1. Fondamentals of Mathematical Statisucs, Kapooor and Gupta

THIRD YEAR
SEMESTER-VI
Subject: Chemistry
Title of Paper :

Max. Marks - 100
External Marks -85
Internal Marks – 15

Particulars

Unit	Syllabus
Unit-I	**A. Amino acids:** Classification, structure, stereochemistry of amino acids, acid base behaviour, isoelectric point, general methods of preparation and properties of α-amino acids proteins and peptides. Introduction to peptides linkage and group analysis, classification, properties and structure of (proteins (primary, secondary and tertiary) **B. Nucleic acids:** Introduction of nucleic acids and Constituents of nucleic acid, Ribonucleosides Ribonucleotides, double helical structure of DNA. **C. Elementary idea of Fats, Oils & Detergents:** Natural fats edible and industrial oils of vegetable origin, common fatty acids glycerides, hydrogenation of unseturated oils Saponification value, iocine value, and value.
	अ. ऐमीनो अम्ल – वर्गीकरण, संरचना, ऐमीनों अम्लों में त्रिविम रसायन, अम्ल–क्षारक व्यवहार, समविभव बिन्दु, α –ऐमिनों अम्लों में विरचन की सामान्य विधियाँ एवं गुण। प्रोटीन तथा पेप्टाइड्स, पेप्टाइड बंध का परिचय, अत्य समूह विश्लेषण, प्रोटीन का वर्गीकरण, गुण तथा संरचना (प्राथमिक, द्वितीयक तथा तृतीयक) ब. न्यूक्लिक अम्ल – न्यूक्लिक अम्ल का परिचय, न्यूक्लिक अम्लों के अवयव, राइबोन्यूक्लिओसाइड्स एवं राइबोन्यूक्लिओटाइड्स, डी.एन.ए. की द्विकुण्डलित संरचना। स. वसा, तेल एवं अपमार्जक का प्रारम्भिक परिचय – प्राकृतिक वसा, वानस्पतिक उत्पत्ति के खाद्य और औद्योगिक तेल, सामान्य वसीय अम्ल, ग्लिसराइड, असंतृप्त तेलों का हाइड्रोजनीकरण, साबुनीकरण मान, आयोडीन मान, अम्ल मान।
Unit-II	**A. Organontetallic Chemistry:** Synthesis stricture and bonding in metal carbonyl complexes, metal olefin complexes and metal alkyne complexes. Oxidative addition reactions. **B. Organon etallic Compounds:** Organomagnesium Compound - Grignard Reagent and Organolithium Compounds methods of preparation, structure and synithetic applications.
	अ. कार्ब–धात्विक रसायन – धातु कार्बोनिल, संकुलों का विरचन, संरचना एवं बंधन, धातु ओलेफिन तथा एल्काइन संकुल। ऑक्सीकारक योगात्मक अभिक्रियाऐं। ब. कार्ब–धात्विक यौगिक – कार्बमैग्नीशियम यौगिक–ग्रिगनार्ड अभिकर्मक एवं कार्बलिथियम यौगि, विरचन, संरचना, सांश्लेषिक अनुप्रयोग।
Unit-III	**A Magnetic properties of transition metal complexes** magnetic moment (spin only and with L-S coupling) orbital contribution magnetic moment. **B. Electronic spectra of iransition metal complexes** Spectroscopic ground and excited states, types of electronic transitions, selection rules for d-d transitions, Orgel-energy devel diagram for d^1 to d^9 states. **C. Water Analysis:** Hardness, types of hardness, acidity and| alkalinity, BOD, COD and DO.
	अ. संक्रमण धातु संकुलों के चुम्बकीय गुण – चुम्बकीय आघूर्ण (केवल चक्रण तथा युग्मन) चुम्बकीय आघूर्ण में कक्षीय योगदान। ब. संक्रमण धातु संकुलों का इलेक्ट्रॉनिक स्पेक्ट्रा – स्पेक्ट्रोस्किापिक मूल एवं उत्तेजित अवस्थाऐं, इलेक्ट्रॉनिक संक्रमण के लिए वरण नियम, d^1 से d^9 अवस्थाओं के लिए ऑर्गेल ऊर्जा आरेख। स. जल विश्लेषण – जल की कठोरता और इसके प्रकार, जल की अम्लीयता एवं क्षारीयता, बी. ओ.डी., सी.ओ.डी., तथा डी.ओ.।
Unit-IV	A. Infrared spectroscopy: Statement of the Born-Oppenheimer approximation, rolational spectrum of diatomic molecules. Energy levels of a rigid rotator, -

	selection rule, intensity of absorption bands, Maxwell-Boltzmann distribution and population of energy levels. B. Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, intensity and qualitative relation of force constant and bond energies, degree of freedom and modes of vibration, vibrational frequencies of different functional groups. C. Raman Spectroscopy: concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules. Selection rules, application of Raman Spectrum.
	अ. अवरक्त स्पेक्ट्रम – बॉर्न ओपनहेमर सन्निकटन का कथन, द्विपरमाणविक अणुओं का घुर्णन स्पेक्टम, दृढ़ घूर्णक के ऊर्जा स्तर, वरण नियम, अवशोषण की तीव्रता, मैक्सवेल बोल्ट्जमेन वितरण तथा ऊर्जा स्तरों की समष्टि। ब. सरल आवर्ती दोलित्र के ऊर्जा स्तर, वरण नियम, विशुद्ध कंपन स्पेक्ट्रम, तीव्रता, बल नियतांक एवं बंध ऊर्जा में गुणात्मक संबंध, स्वतंत्रता की कोटि तथा कंपन की विभिन्न विधाएँ, विभिन्न क्रियात्मक समूहों की कंपन आवृत्तियाँ। स. रमन स्पेक्ट्रमिकी – ध्रुवणता की धारणा, द्विपरमाणविक अणुओं के शुद्ध घुर्णन एवं कंपन रमन स्पेक्ट्रा, वरण तथा रमन स्पेक्ट्रमिकी के अनुप्रयोग।
Unit-V	A. NMR Spectroscopy Principle and instrumentation, NMR outlive nucleus. chemical shit, spin-spin coupling, spectrum of ethanol and ethanal. B. Surface Phenomena and Catalysis: adsorption of gases and liquids on solid adsorbent. Freundlich and Langmuir adsorption isotherms, determination of surface area, characteristics and mechanism of heterogeneous catalysis.
	अ. नाभिकीय चुम्बकीय अनुनाद स्पेक्ट्रमिकी – सिद्धान्त तथा उपकरण, नाभिकीय चुम्बकीय अनुनाद सक्रिय नाभिक, रासायनिक विस्थापन, स्पिन–स्पिन युग्मन, इथेनॉल तथा इथेनल के स्पेक्ट्रेम। ब. पृष्ठ रसायन तथा उत्प्रेरण – ठोस अधिशोषकों पर गैसों तथा द्रवों का अधिशोषण, फ्रेण्डलिच तथा लेंगम्योर अधिशोषण समतापी उपक्रम, पृष्ठ क्षेत्र का निर्धारण, विषमांगी उत्प्रेरण के लक्षण एवं क्रियाविधि।

Suggested Reading:-

Cotton F A, G Wilkenson G and Gaus P L, Basic Inorganic Chemistry, John Wiley and Sons. New York
Lee J D. Concise Inorganic Chemistry, ELBS
Sharpe A G, Inorganic Chemistry, ELBS
Malik, Madan & Tuli, Modern Inorganic Chemistry