MARKS DISTRIBUTION OF B.Sc.-B.Ed. FOUR YEARS INTEGRATED COURSE

B.Sc.-B.Ed. VI SEM (CORE COURSE)

Section	Paper	Subject	Total Marks	External Marks Max	External Marks Min	Exam Pattern	Internal Marks Max	Internal Marks Min	Marks Distribution	Remark
Foundation part	F-1	Moral Values & Language-I	75	50	20		25	10		
	F-2	Basics of Computer & Information Technology	75	50	20		25	10		
Science part	S-1	Any three subject from given list	100	75	30		25	10		COLLEGE SEND THIS MARKS DIRECTLY TO UNIVERSITY
	S-2		100	75	30		25	10		
	S-3	Phy, Chem., Botony, Zoology, Maths ***Subject specified in the scheme by board of studies will only be considered**	100	75	30	Written Exam by University	25	10		
		*Note: in case of mathematics, theory	150	125	50		25	10		
	PC-II	Pedagogy of School subject Part II Physics/Chemistry	100	75	30		25	10	Attendance(5 marks) 1st test(5 marks) 2nd test(5marks) Assignment(10marks)	
		Total	650							

PRACTICALS

SCIENCE PART	PS-1/2/3	According to selection of subject in S-1, S-2 & S-3	50 each			Practical Exam by external Appointed by University			Practical Examiners and Internal (who teaches subject) send this marks after Practical exam with total 50 marks
		TOTAL	100/150						
		Theory total	650						
		Practical total	150						
		Total	800						
Education Part	EPC IV	Language across the curriculum Part II	50	35			15		

9.12.2021 9.12.21

VI Sem

change Four Year Integrated course B.Sc. B.Ed. (2018-22) onward

(2018-22)

Department of Higher Education, Govt. of M.P.
Under Graduate Semester wise Syllabus
As recommended by Central Board of Studies and approved by the Governor of M.P.

उच्च शिक्षा विभाग, म.प्र. शासन
स्नातक कक्षाओं के लिए सेमेस्टर अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा म.प्र. के राज्यपाल द्वारा अनुमोदित

w.e.f. Session 2016-17

Class	:	B.A./B.Sc./B.Com./B.H.Sc.III Year
Semester	:	VI
Subject	:	Foundation Course (आधार पाठ्यक्रम)
Paper	:	I
Title of Paper	:	नैतिक मूल्य और भाषा (Moral Values & Language)
Compulsory/ Optional	:	Compulsory
Max. Marks	:	85 (Moral Education- 15, Hindi- 35, English- 35)

Particulars

Part - A

Unit – 1	नैतिक मूल्य 1. सत्य के साथ मेरे प्रयोग (महात्मा गांधी की आत्मकथा का संक्षिप्त संस्करण)	15
Unit – 2	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 का लोक साहित्य (संकलित) 5. पत्र लेखन – प्रारूपण, टिप्पण, आदेश, परिपत्र, ज्ञापन, अनुस्मारक (संकलित)	17
Unit- 3	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 की चित्रकला, मूर्तिकला एवं स्थापत्य कला (संकलित) 5. हिन्दी की शब्द सम्पदा (संकलित)	18

Part - B

Unit- 4	**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- 5	**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 (सीसीई) हेतु पृथक से 15 (5+5+5) अंक निर्धारित है।

21.1.21

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डो. वन्दना चव्हाण

21/1/21

21/1/21

Department of Higher Education, Government of M.P.
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With effect from: **Session 2016-17**

Class	–	**B.A./B.Sc./B.Com./B.H.Sc.**
Subject	–	**Foundation Course**
Paper	–	**Paper - II**
Paper Title	–	**Basics of Computer & Information Technology - II**
Semester	–	**Sixth (VI)**

Max. Marks: 35

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 formats.*

Unit-II: PowerPoint-II

- Idea of SmartArt graphics, inserting text/data using SmartArt, Converting old style presentation into new style through SmartArt.
- 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.

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 & 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, *etc.*); 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.

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.

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25/11/2020

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Class	-	**B.A./B.Sc./B.Com./B.H.Sc.**
Subject	-	**Foundation Course**
Paper	-	**Paper-II (Basics of Computer & Information Technology – II)**
Semester	-	**Sixth (VI)**

Note: No separate external practical examination will be conducted.

Topics to be covered under practical for CCE

Max. Marks: 15

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 & template 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.*

(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.

(c) Internet & Email:

- Understanding of a dial-up/broadband connection.
- Opening new e-mail account (Gmail, Yahoo, Rediffmail, *etc*).
- Understanding of e-mail structure.
- 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.

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Class	–	बी.ए./बी.एस-सी./बी.कॉम./बी.एच.एस-सी.
Subject	–	आधार पाठ्यक्रम
Paper	–	द्वितीय
Paper Title	–	कंप्यूटर के मूल तत्व एवं सूचना प्रौद्योगिकी - द्वितीय
Semester	–	षष्ठ (VI)

अधिकतम अंक — 35

इकाई-I: माइक्रोसॉफ्ट पॉवरपॉइंट-I

- स्लाइड मास्टर और टेम्पलेट का उपयोग करते हुए विभिन्न थीम्स और वैरिएंटस् में प्रस्तुति बनाना.
- **स्लाइड के साथ कार्य करना:** नई-स्लाइड बनाना, मूव करना, प्रतिलिपि बनाना, डिलीट करना, डुप्लीकेट बनाना, स्लाइड ले-आउट, प्रेजेंटेशन व्यूज.
- **फोर्मेट मेनू:** फ़ॉन्ट, पैराग्राफ, ड्राइंग और संपादन.
- **प्रस्तुति का मुद्रण:** स्लाइड्स, नोट्स पेजेस, हैंडआउट्स और रूपरेखा की प्रिंटिंग.
- विभिन्न फ़ाइल स्वरूपों में प्रस्तुति का सुरक्षण.

इकाई-II: माइक्रोसॉफ्ट पॉवरपॉइंट-II

- स्मार्ट-आर्ट ग्राफ़िक्स, 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 को 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 रीहर्स-टाइमिंग.

इकाई-III: 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.
- **वर्कशीट में कार्य:** वर्कशीट में डाटा (सामान्य, नंबर, करन्सी, डेट, टाइम, टेक्स्ट, एकाउंटिंग, इत्यादि) प्रविष्ट करना; वर्कशीट का नाम बदलना, प्रतिलिपि बनाना, प्रविष्ट करना, हटाना तथा रक्षित करना.
- **पंक्ति और स्तम्भ के साथ कार्य** (डालना, हटाना, पेस्ट करना, आकार बदलना और छुपाना), सेल और सेल फॉमेटिंग, रेंज की अवधारणा.
- **चार्ट:** विभिन्न प्रकार के चार्ट्स बनाना और उनका संपादन करना; ट्रेंड-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.

इकाई-IV: इंटरनेट एवं वेब सेवाएं

इंटरनेट: वर्ल्ड-वाइड-वेब, डायलअप कनेक्टिविटी, लीज्ड लाइन, व्ही.सेट, ब्रॉडबैंड, वाय-फाई, यूआरएल, डोमेन नेम, वेब-ब्राउज़र (इंटरनेट एक्स्प्लोरर, फायरफॉक्स, गूगल क्रोम, ऑपेरा, यूसी ब्राउज़र, इत्यादि); सर्च इंजन (गूगल, बिंग, Ask, इत्यादि); **वेबसाइट:** स्थैतिक व गतिकीय; पोर्टल और वेबसाइट में अंतर.

इमेल: खाता खोलना, मेल को भेजना एवं प्राप्त करना, कॉन्टेक्ट्स एवं फ़ोल्डर्स को मैनेज करना.

नेटवर्किंग के मूल तत्व: नेटवर्क के प्रकार (LAN, WAN, MAN); नेटवर्क टोपोलॉजी (स्टार, रिंग, बस, हाइब्रिड).

क्लाउड कंप्यूटिंग व ऑफिस वेब एप्स और मोबाइल कंप्यूटिंग व मोबाइल एप्स का प्राथमिक ज्ञान.

इकाई-V: साइबर शिष्टाचार, सुरक्षा और गोपनीयता

इमेल, इंटरनेट एवं सोशल नेटवर्किंग शिष्टाचार.

वायरस और एंटीवायरस के प्रकार.

कंप्यूटर सुरक्षा के मुद्दे और फायरवाल व एंटीवायरस के माध्यम से सुरक्षा.

साइबर नीतियाँ, बौद्धिक सम्पदा अधिकार (आई.पी.आर), कॉपीराइट का उल्लंघन और निवारण.

सुरक्षित तरीके से ऑनलाइन लेन-देन का निष्पादन करना.

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25/11/2020

21/1/21 21/1/21 21.1.21 21.1.21

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Class	:	बी.ए./बी.एस-सी./बी.कॉम./बी.एच.एस-सी.
Subject	:	आधार पाठ्यक्रम
Semester	:	षष्ट (VI)
Paper	:	द्वितीय (कंप्यूटर के मूल तत्व एवं सूचना प्रौद्योगिकी - द्वितीय)

टीप: कोई बाह्य प्रायोगिक परीक्षा आयोजित नहीं की जावेगी |

सी.सी.ई. के लिए प्रायोगिक कार्य के अंतर्गत सम्मिलित किये जाने विषय-बिंदु

Max. Marks: 15

प्रत्येक बैच हेतु प्रति सप्ताह 2 घंटे का प्रयोगशाला समय आवंटित किया जाना है |

(a) एम.एस. एक्सेल:

- एम.एस. एक्सेल की विशेषताएँ: ऑफिस बटन, कस्टमाइज रिबन, क्विक एक्सेस टूलबार।
- ब्लैंक 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 फॉरकास्टिंग का चार्ट में उपयोग।
- डाटा: सोर्टिंग एवं फ़िल्टर.
- फंक्शन: SUM, TOTAL, COUNT, AVERAGE, MAX, MIN, ROUND, IF, *etc.*

(b) एम.एस. पॉवरपॉइंट:

- एम.एस. पॉवरपॉइंट की विशेषताएँ: ऑफिस बटन, कस्टमाइज रिबन, क्विक एक्सेस टूलबार।
- स्लाइड बनाना, स्लाइड लेआउट की फॉर्मेटिंग, स्लाइड शो एवं स्लाइड सोर्टर, नयी स्लाइड डालना, स्लाइड नंबर, डेट, टाइम, चार्ट, स्लाइड फॉर्मेटिंग।
- ट्रांजीशन और एनीमेशन का प्रस्तुति में उपयोग।
- स्लाइड शो का सेटअप करना; रीहर्स-टाइमिंग का उपयोग.

(c) 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 फ़ोल्डर्स का प्रबंधन करना.
- ई-मेल भेजना एवं प्राप्त करना (संलग्नक को डाउनलोड / अपलोड करना).
- ई-मेल, स्काईप, स्काईड्राइव एवं क्लाउड द्वारा फाइल, इमेज तथा विडियो का आदान-प्रदान.
- मोबाइल / स्मार्टफ़ोन द्वारा ई-मेल खाते का सुरक्षित रूप से संचालन करना.
- इंटरनेट पर किसी टेक्सट को ढूढ़ने के लिए सामान्य एवं उच्च स्तरीय खोज, सही खोज के लिए फ़िल्टर का उपयोग करना. **********

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Department of Higher Education, Govt. of M.P.
Under Graduate Semester wise Syllabus
as recommended by Central Board of Studies and approved by the Governor of M.P.
with effect from Session 2016-2017

Class: B.Sc.
Max. Marks: 85 + (CCE) 15 = 100
Semester: VI
Subject: Physics
Title of Paper: SOLID STATE PHYSICS AND DEVICES

Unit-I: SOLID STATE PHYSICS-1

15 Lectures

Crystal Structure and bonding: Crystalline and amorphous 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. Ionic, covalent, metallic, van der Waals and hydrogen bonding. Band theory of solids. Periodic potential and Bloch theorem. Kronig-Penny model (Qualitative).

Unit-II: SOLID STATE PHYSICS-2

15 Lectures

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 ferromagnetism and ferromagnetic domains. Discussion of BH hysteresis.

Unit-III: SEMICONDUCTOR DEVICES-1

15 Lectures

Electronic devices: Types of Semiconductors (**p** and **n**). Formation of Energy Bands, 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

15 Lectures

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. Feedback 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.

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Unit-V: NANO MATERIALS

15 Lectures

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 properties of bulk and nano materials (qualitative description). Naturally occurring nano crystals. Applications of nanomaterials.

References:

1 Introduction to Solid State Physics, C. Kittel, VIIIth 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

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Semester: VI
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Title of Paper: SOLID STATE PHYSICS AND DEVICES

इकाई–1

15 Lectures

ठोस अवस्था भौतिकी

क्रिस्टलीय, संरचना एवं आबंधनः क्रिस्टलीय व अक्रिस्टलीय ठोस, स्थानांतरण सममिति, जालक व आधार, इकाई सेल, व्युत्क्रम जालक, जालकों के मौलिक प्रकार (ब्रेवाइस लेटिस), मिलर सूचकांक, जालक तल। सरल घनाकार, फलक केन्द्रित घनाकार, अन्तः केन्द्रित घनाकार लेटिसेस। लॉवे व ब्रेग का समीकरण, X-किरणों से क्रिस्टल की संरचना ज्ञात करना, X-किरण स्पेक्ट्रममापी। आयनिक, सह–संयोजक, धात्विक वॉण्डरवाल एवं हायड्रोजन बंधन। ठोस पदार्थो के लिए बैण्ड सिद्धांत, आवर्ती विभव एवं ब्लॉच प्रमेय। क्रोनिंग–पैनी मॉडल (गुणात्मक विवेचना)।

इकाई–2

15 Lectures

जालक संरचना एवं गुण

विशिष्ट उष्मा का ड्यूलोंग–पेटिट, आइन्सटीन व डिबाई सिद्धांत, प्रत्यास्थ एवं परमाण्विक बल नियतांक। एक परमाण्विक व द्विपरमाण्विक कड़ी (Chain) का गतिक समीकरण, प्रकाशीय व ध्वनिकी विधाएँ, विद्युतीय प्रतिरोधकता, इलेक्ट्रॉन की विशिष्ट उष्मा, वाइडमेन–फ्रेंज नियम। हॉल प्रभाव, चुम्बकीय क्षेत्र में पदार्थों की अनुक्रिया। प्रति, अनु एवं लौह चुम्बकीय पदार्थ। प्रति एवं अनु चुम्बकीय डोमेन्स का चिरसम्मत सिद्धांत। क्यूरी का नियम, लौह चुम्बकत्व एवं लौह चुम्बकीय डोमेन्स के लिए Weiss का सिद्धांत। B-H शैथिल्यता की विवेचना।

इकाई–3

15 Lectures

अर्धचालक युक्तियां–1

ऊर्जा बैण्डों का बनना, ऊर्जा स्तर का डायग्राम, अर्धचालक के प्रकार (p व n), चालकता और गतिशीलता, संधि का बनना, p-n संधि, डायोड में रोधिका विभव का बनना, अग्र व पश्च अभिनति डायोड में धारा प्रवाह (पुनः संयोजन), अनुगमन वेग व अनुगमन वेग की संतृप्तता, रोधिका विभव के गणितीय समीकरण की व्युत्पत्ति, रोधिका चौड़ाई, एकल p-n संधि। डायोड (भौतिकीय विवेचना), धारा–विभव अभिलाक्षणिक (एक–दो अनुप्रयोग), द्वि–टर्मीनल युक्ति, दिष्टकरण, जेनर डायोड, फोटो डायोड, प्रकाश उत्सर्जक डायोड, सोलर सेल, त्रि–टर्मीनल युक्ति, संधि क्षेत्र प्रभाव ट्रांजिस्टर (JFET), द्वि–संधि युक्तियाँ, p-n-p व n-p-n ट्रांजिस्टर, धारा–प्रवाह की भौतिकीय प्रक्रिया, ट्रांजिस्टर के अभिलाक्षणिक वक्र।

इकाई–4

15 Lectures

अर्धचालक युक्तियां–2

प्रवर्धक (द्वि–ध्रुव संधि ट्रांजिस्टर) CB, CE व CC विधा, एकल स्टेज (चरण) CE प्रर्वधक (अभिनन व स्थायीकरण परिपथ), Q बिन्दु समतुल्य परिपथ, निवेशी व निर्गत प्रतिबाधा, विभव एवं धारा लाभ।

वर्ग A, B, C प्रवर्धक (परिभाषा), RC युग्मित प्रवर्धक (आवृत्ति अनुक्रिया वक्र), वर्ग–B पुश–पुल प्रवर्धक, पुर्ननिवेशन प्रवर्धक, विभव एवं धारा, पुर्ननिवेशन, निवेशी प्रतिबाधा पर ऋणात्मक विभव, श्रेणी फीडबेक, निर्गमन प्रतिबाधा एवं लाभ। स्थायित्व, विकृति व शोर, दोलित्र का सिद्धांत तथा बार्क–हाउसन का प्रतिबन्ध, कॉलपिट दोलित्र, RC कला विस्थापी दौलित्र, आयाम, आवृति एवं कला माडुलेशन एवं संसूचक की मूल अवधारणा।

युनिट–5

15 Lectures

नैनो पदार्थ

नैनों संरचनाएं: नैनो टेक्नॉलाजी की प्रस्तावना, संरचना, आकार निर्भर गुण। 3D, 2D, 1D, 0D नैनो सरंचना प्रदार्थ एवं उनकी अवस्थाओं का घनत्व, सतह एवं अंतराफलक प्रभाव, क्वांटम आकार प्रभाव का प्रतिरूपण, नैनो कणों का संश्लेषण–नीचे से ऊपर (बॉटम अप) और ऊपर से नीचे (टॉप डाउन) विधियॉं, वेट रसायनिक विधि, नैनो लिथोग्राफी (नैनो मुद्रण), धातु एवं अर्द्ध चालकों के नैनो पदार्थ (गुणात्मक विवरण), विस्तृत (Bulk) और नैनो पदार्थों की संरचना एवं गुणों में अन्तर (गुणात्मक विवरण), प्राकृतिक रूप में पाये जाने वाले नैनो क्रिस्टल। नैनो पदार्थों के अनुप्रयोग।

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Department of Higher Education, Government of Madhya Pradesh

Under Graduate (UG) Semester-wise Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.

(w.e.f. session 2016-2017)

उच्च शिक्षा विभाग, मध्यप्रदेश शासन

स्नातक कक्षाओं के लिए सेमेस्टर अनुसार एकल प्रश्नपत्र प्रणाली का पाठ्यक्रम केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा मध्यप्रदेश के राज्यपाल द्वारा अनुमोदित

(शैक्षणिक सत्र 2016-2017 से लागू)

Class: B.Sc.

Semester : VI

Subject : **Physics**

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex–Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Experiments:

1. Characteristic of a transistor.
2. Characteristic of a tunnel diode.
3. Hysteresis curve a transformer core.
4. Hall probe method for measurement of resistivity.
5. Specific resistance and energy gap of a semiconductor.
6. Study of regulated power supply.
7. Study of RC coupled amplifiers
8. Analysis of a given band spectrum.
9. Study of crystal faces.
10. Characteristics of Zener diode.
11. Charging and discharging of capacitor.

Department of Higher Education, Govt. of M.P.
B.Sc. Under Graduate Semester wise Syllabus
As recommended by Central Board of Studies and approved by the Governor of M.P.
उच्च शिक्षा विभाग, म.प्र. शासन
बी.एससी. स्नातक कक्षाओं के लिए पाठ्यक्रम
केन्द्रीय अध्ययन मंडल द्वारा अनुशंसित तथा म.प्र. के राज्यपाल द्वारा अनुमोदित
Session / सत्र – 2016–17 से लागू

Class		B.Sc.
Semester		VI
Subject	(English)	Chemistry
	हिन्दी	रसायन शास्त्र
Paper		-
Max. Marks		85 + CCE (सतत् समग्र मूल्यांकन) 15

Unit		Syllabus	Periods
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, end 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 unsaturated oils, Saponification value, iodine value, acid value.	18 Lectures
		अ. ऐमीनो अम्ल : वर्गीकरण, संरचना, ऐमीनों अम्लों में त्रिविम रसायन, अम्ल–क्षारक व्यवहार, समविभव बिन्दु, α– ऐमीनो अम्लों में विरचन की सामान्य विधियां एवं गुण। प्रोटीन तथा पेप्टाइड्स, पेप्टाइड बंध का परिचय, अंत्य समूह विश्लेषण, प्रोटीन का वर्गीकरण, गुण तथा संरचना (प्राथमिक, द्वितीयक एवं तृतीयक) ब. न्यूक्लिक अम्ल : न्यूक्लिक अम्ल का परिचय; न्यूक्लिक अम्लों के अवयव, राइबोन्यूक्लिओसाइड्स एवं राइबोन्यूक्लिओटाइड्स, डीएनए 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. Organometallic Chemistry:** Synthesis; structure and bonding in metal carbonyl complexes, metal olefin complexes and metal alkyne complexes. Oxidative addition reactions. **B. Organometallic Compounds:** Organomagnesium Compound - Grignard Reagent and Organolithium Compounds, methods of preparation, structure and synthetic applications.	18 Lectures

		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 यौगिक, 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 transition metal complexes:** Spectroscopic ground and excited states, types of electronic transitions, selection rules for d-d transitions, Orgel-energy level diagram for d^1 to d^9 states. **C. Water Analysis:** Hardness, types of hardness, acidity and alkalinity, BOD, COD and DO.	18 Lectures
		अ. संक्रमण धातु संकुलों के चुम्बकीय गुण : चुम्बकीय आघूर्ण (केवल चक्रण तथा L-S युग्मन) चुम्बकीय आघूर्ण में कक्षीय योगदान। ब. संक्रमण धातु संकुलों का इलेक्ट्रॉनिक स्पेक्ट्रा : स्पेक्ट्रोस्कोपिक मूल एवं उत्तेजित अवस्थाऐं, इलेक्ट्रॉनिक संक्रमण के प्रकार, d-d 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, rotational 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.	18 Lectures
		अ. अवरक्त स्पेक्ट्रम :बॉर्न ओपनहेमर सन्निकटन का कथन, द्विपरमाणविक अणुओं का घूर्णन स्पेक्ट्रम, 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 घूर्णन एवं शुद्ध कंपन रमन स्पेक्ट्रा, वरण नियम तथा रमन स्पेक्ट्रमिकी के अनुप्रयोग।	

UNIT V		**A. NMR Spectroscopy** Principle and Instrumentation, NMR active nucleus, chemical shift, 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.	18 Lectures
		अ. **नाभिकीय चुम्बकीय अनुनाद स्पेक्ट्रमिकी** : सिद्धांत तथा उपकरण, नाभिकीय चुम्बकीय अनुनाद सक्रिय नाभिक, रासायनिक विस्थापन, स्पिन–स्पिन युग्मन, इथेनॉल तथा इथेनल के स्पेक्ट्रम। ब. **पृष्ठ रसायन तथा उत्प्रेरण** : ठोस अधिशोषकों पर गैसों तथा द्रवों का अधिशोषण, फ्रेण्डलिच तथा लेंगम्योर अधिशोषण समतापी प्रक्रम, पृष्ठ क्षेत्र का निर्धारण, विषमांगी उत्प्रेरण के लक्षण एवं क्रियाविधि।	

Department of Higher Education, Govt. of M.P.
B.Sc. Under Graduate Semester wise Syllabus
List of Books recommended by Central Board of Studies
as approved by Governor of M.P.

उच्च शिक्षा विभाग, म.प्र. शासन
बी.एससी. स्नातक कक्षाओं के लिए पाठ्यक्रम के लिए केन्द्रीय अध्ययन मंडल द्वारा
अनुशंसित एवं म.प्र. के राज्यपाल द्वारा अनुमोदित पुस्तकों की सूची

Recommended Books	1. Physical Chemistry-Puri, Sharma and Pathania, Vikas Publications, New Delhi 2. Physical Chemistry -G.M. Barrow, International Student Edition, McGraw Hill. 3. The Elements of Physical Chemistry, P.W. Atkins, Oxford University Press 4. Physical Chemistry, R.A. Alberty, Wiley Eastern Ltd. 5. Physical Chemistry Through problems, S.K. Dogra and S. Dogra, Wiley Eastern 6. Organic Chemistry, Morrison and Boyd, Prentice Hall. 7. Organic Chemistry, L.G. Wade Jr. Prentice Hall 8. Fundamentals of Organic Chemistry Solomons, John Wiley. 9. Organic Chemistry, Vol. I, IL IIL S.M. Mukherji, S.P. Singh and R.P. Kapoor, 10. Organic Chemistry, F.A. Carey, McGraw-Hill Inc. 11. Introduction to Organic Chemistry, Streitwiesser, Heathcock and Kosover, Macmillan. 12. Vogel's Qualitative & quantitative Analysis Vol- 1, 2, 3, ELBS. 13. Advanced Organic chemistry, I. L. Finar, ELBS. 14. Basic Concepts of Analytical chemistry, S M Khopker, New Age International Publishers. 15. Analytical Chemistry, R.M. Verma, CBS Publication. 16. Analytical Chemistry, Skoog & West, Wiley International. 17. Essentials of Physical Chemistry, B.S. Bahl, Arun Bahl & G.D. Tuli, S. Chand & Company Ltd. 18. Atomic structure and Molecular spectroscopy, Manas Chanda, New Age International Publishers. 19. Molecular Spectroscopy, Sukumar, MJP Publishers. 20. Organic Chemistry, Mac Murrey, Pearson Education. 21. Inorganic Chemistry – J.D. Lee, John Wiley 22. Inorganic Chemistry – Cotton and Wilkinson, John Wiley 23. Inorganic Chemistry – Huheey, Harper Collins Pub. USA 24. Inorganic Polymer – G.R. Chhatwal, Himalaya Pub.House 25. मध्य प्रदेश हिन्दी ग्रन्थ अकादमी भोपाल द्वारा प्रकाशित रसायन विज्ञान की पाठ्यपुस्तक। 26. मध्य प्रदेश हिन्दी ग्रन्थ अकादमी भोपाल द्वारा प्रकाशित प्रायोगिक रसायन की पाठ्यपुस्तक।

उच्च शिक्षा विभाग, म.प्र. शासन

बी.एससी / बी.ए. कक्षाओं के लिये एकल प्रश्नपत्र प्रणाली सेमेस्टर के अनुसार पाठ्यक्रम

केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

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

Single Paper System Semester wise syllabus

B.Sc./ B.A. VI Semester

Recommended by central Board of studies

Name of the Paper	Theory (M.M.)	Minimum Passing Marks in Theory	C.C.E. (M.M.)	Minimum Passing Marks in C.C.E.	Practical MM	Minimum Passing Marks	Total
Real Analysis, Discrete Mathematics and Optionals	125	42	25	8	---	---	150

Note: There will be three sections in the question paper. All questions from each section will be compulsory.

Section –A (20 marks.) will contain 10 objective type questions, two from each unit, with the weightage of 2 marks.

Section –B (35 marks.) will contain 5 short answer type questions (each having internal choice), one from each unit having 7 marks.

Section –C (70 marks.) will contain 5 long answer type questions (each having internal choice), one from each unit, having 14 marks.

There should be 12 teaching periods per week for Mathematics like other Science Subject

(6 Period Theory + 6 Period Practical)

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

उच्च शिक्षा विभाग, म.प्र. शासन

बी.एससी. / बी.ए. कक्षाओं के लिये एकल प्रश्नपत्र प्रणाली सेमेस्टर के अनुसार पाठ्यक्रम

केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

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

B.Sc./ B.A. Single Paper System Semester wise syllabus

Recommended by central Board of studies

सत्र / Session : 2016-17

Max. Marks / अधिकतम अंक	:	125
Class/ कक्षा	:	B.Sc. /B.A.
Semester/ सेमेस्टर	:	VI
Subject / विषय	:	Mathematics
Title / शीर्षक	:	Real Analysis, Discrete Mathematics and Optionals
Compulsory / अनिवार्य या Optional /वैकल्पिक	:	Compulsory/Optional

: Particulars/ विवरण :

Unit-1	Riemann integral, Algebra of Riemann integrable functions, Integrability of continuous and monotonic functions, The fundamental theorem of integral calculus, Mean value theorems of integral calculus
इकाई–1	रीमान समाकल, रीमान समाकलनीय फलनों का बीज गणित, सतत एवं एकदिष्ट फलनों की समाकलनीयता, समाकलन का मूलभूत प्रमेय, समाकलनों के माध्यमान प्रमेय।
Unit-2	Definition and examples of metric spaces, Neighbourhoods, Limit points, Interior points, Open and closed sets, Closure and interior, Boundary points, 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.
इकाई–2	दूरीक समष्टि की परिभाषा एवं उदाहरण, सामीप्य, सीमा बिन्दु, अंतः बिन्दु, विवृत्त एवं संवृत समुच्चय, संवरणक एवं अभ्यंतर, परिसीमा बिन्दु, दूरीक समष्टि की उप समष्टि, कौशी अनुक्रम, पूर्णता, केन्टर का सर्वनिष्ठ प्रमेय, संकुचन सिद्धांत, पूर्ण क्रमित क्षेत्र के रूप में वास्तविक संख्यायें,

21.01.21

	सतत फलन की परिभाषा एवं उसके उदाहरण।
Unit-3	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.
इकाई–3	तर्क का बीज गणित, पुनरूक्तियों तथा विरोध का पुनरावलोकन, तार्किक तुल्यता, साध्यों का बीजगणित, प्रमात्रीकारक: आस्तित्व प्रमात्रीकारक एवं सर्व प्रमात्रीकारक, बूलीय बीजगणित एवं उसके गुणधर्म, डी–मार्गन नियम, वैद्युत परिपथों का बीजगणित एवं उनके अनुप्रयोग।
Unit-4	Boolean Function, Disjunction and Conjunction Normal Forms, Bools Expansion Theorem. Binary Relations, Equivalence Relations, Partitions and Partial Order Relation.
इकाई–4	बूलीय फलन, वियोजनीय एवं संयोजनीय प्रसामान्य रूप, बूल का प्रसार प्रमेय द्विचर संबध, तुल्यता संबध, विभाजन एवं आंशिक क्रम संबधं।
Optional **This unit should be different from the main subject/paper studied during Semester I to Semester VI.**	
Graph Theory	
Unit-5	Graphs, Multigraphs, Weighted Graphs, Paths and Circuits, Shortest Paths: Dijkstra's Algorithm, Matrix Representation of Graph: Incidence and Adjacency Matrix, Trees and its simple properties.
इकाई–5	ग्राफ, बहुग्राफ, भारित ग्राफ, पथ एवं परिपथ, लघुतम पथ : डाइजक्स्त्रा एल्गोरिथम, ग्राफ का आव्यूह निरूपण: इन्सीडेंस एवं एडजेसेन्सी आव्यूह, वृक्ष एवं उसके सामान्य गुणधर्म।
Or/ अथवा	
Elementary Statistics	
Unit-5	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 sum and product of random variables, Moment generating functions, Theoretical distribution: Binomial, Poisson distributions and their properties and uses.

इकाई–5	प्रायिकता, सतत प्रायिकता, प्रायिकता घनत्व फलन तथा उनके अनुपयोग (सतत प्रायिकता बंटन के लिये माध्य, बहुलक,माध्यिका तथा मानक विचलन ज्ञात करने के लिये) गणितीय प्रत्याशा, यादृच्छिक चरों के योग एवं गुणन की प्रत्याशा, आघूर्ण जनक फलन, सैद्धांतिक बंटनः द्विपद, पॉयज़न बंटन तथा उसके गुणधर्म एवं उपयोग ।
Or/ अथवा	
PRINCIPLES OF COMPUTER SCIENCE	
Unit-5	Data Storage of bits Ram 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, Anthmetic/Logic Instruction. Computer-Peripheral Communication. Operation System : The Evolution of Operating System. (Dos, Window) Operating System Architecture. Coordinating the Machine's Activities. Other Architectures.
इकाई–5	बीटों का डेडास्टोरेज , रेम स्मृति। वृहद भण्डारण की कटू कृत सूचना। बायनरी सिस्टम। पूर्णांक, भिन्नाक का भण्डारण, संचारण त्रुटियां डाटा मेन्यूपूलेशन – सेन्ट्रल प्रोसेसिंग यूनिट, भण्डारित प्रोग्राम अभिधारणा। प्रोग्राम का संचालन। गणितीय/तार्किक निर्देश। कम्प्यूटर–सह उपकरण (पेरीफेरल्स) के मध्य संचार। ऑपरेटिंग सिस्टमः का उद्भव (Dos, Window) आपरेटिंग सिस्टम आर्किटेक्चर कम्प्यूटर मशीन की गतिविधियों का समन्वयन। अन्य आर्किटेक्चर।
Or/ अथवा	
MATHEMATICAL MODELING	
Unit-5	The process of Applied Mathematics. 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.
इकाई–5	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, एक्सापोनेंशियल एवं लॉजिस्टिक पापूलेशन 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, I
4. C.L. Liu,Elements of Discrete Mathematics, (Second Edition), McGraw Hill, 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. Choudhary, 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. RK. Jain and S.K. Kaushik, An introduction to Real Analysis, S. 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

1. Graph Theory

Text Book:

1. Narsingh Deo : Graph Theory, McGraw Hill.

2.म.प्र हिन्दी ग्रंथ अकादमी की पुस्तकें ।

2.Elementary Statistics

Text Book:

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

References Book:

1. Fundamentals of Mathematical Statistics, Kapooor and Gupta

3.Principles of Computer Science

Text Book:

1. J. Glen Brokkshear, Computer Science: An Overview, Addition- Wesley.
2. Stanley B. Lippman, Josee Jojoie. C++ Primer)3rd Edition), Addision- Wesley

Total at least ten practicals

3. म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

4. Mathemetical Modeling

Text Book:

1. Kapoor, J.N. : Mathematical models in Biology and Medicine. EWP (1985)
2. SAXENA V.P. : Bio-Mathematical an introduction, M.P. Hindu Growth Aradamy 1993
3. Martin Braun C.S. Coleman, DA Drew (Eds.) Differential Equation Models.
4. Steven J.B. Lucas W.P., Straffin B.D. (Eds.) Political and Related Models, Vol. 2
5. म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

Reference Book:

1. Cullen Linen Models in Biology.
2. Rubinoe, SI : Introduction yo Mathematical Biology. John Wiley and Sons 1975.

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Department of Higher Education, Govt. of M.P.
Under Graduate Semester wise Syllabus
as recommended by Central Board of Studies and approved by the Governor of M.P.
उच्च शिक्षा विभाग, म.प्र. शासन
स्नातक कक्षाओं के लिये सेमेस्टर अनुसार पाठ्यक्रम
केंद्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा म.प्र. के राज्यपाल द्वारा अनुमोदित
Session (सत्र) 2016–2017

Class / कक्षा	:	B. Sc.
Semester / सेमेस्टर	:	VI semester
Subject / विषय	:	Botany
Title of Subject Group	:	Cell Biology,Genetics and Biotechnology
विषय समूह का शीर्षक	:	कोशिका जैविकी, अनुवांशिकी एवं जैवप्रौद्योगिकी
Max. Marks अधिकतम अंक	:	85+15 CCE =100

Particulars / विवरण

Unit-1	**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, द्विस्तरीय लिपिड संरचना कोशिका भित्ति के कार्य। कोशिकाअंगकों की संरचना एवं कार्य : केन्द्रक, हरित लवक, माइटोकॉण्ड्रिया,गॉल्जीकाय, अंतःद्रव्यी जालिका, परऑक्सीसोम्स एवं रिक्तिकाएँ ।
Unit-2	**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 संगठन: आकारिकी एवं कार्य सेन्ट्रोमियर एवं टीलोमियर। विशेष प्रकार के क्रोमोसोम्स, समसूत्री एवं अर्धसूत्री विभाजन। गुणसूत्र संरचना में विभिन्नताएँ : 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-3	**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: मेण्डलवाद : प्रभाविता, पृथ्क्करण एवं स्वतंत्र अपव्यूहन के नियम, सहलग्नता विश्लेषण , जीन की अनयोन्य क्रियाएँ। कोशिका द्रवीय वंशागति उत्परिवर्तन, प्राकृतिक, प्रेरित उत्परिवर्तन, स्थानान्तरणशील अवयव। डी.एन.ए. क्षति एवं सुधार।
Unit-4	**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. जीन: जीन की संरचना, आनुवांशिक कोड , आनुवांशिक सूचना का स्थानान्तरण, अनुलेखन, अनुवाद, प्रोटीन संश्लेषण, ट्रांसफर आर.एन.ए., राइबोसोम्स । प्रोकैरियोट्स एवं यूकैरियोटस में जीन अभिव्यक्ति का नियमन।

Unit-5	**Biotechnology**: Functional definition; basic aspects of plant tissue culture; cellular totipotency, 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. **जैव प्रौद्योगिकी** : कार्यात्मक परिभाषा, पादप उतक संवर्धन के आधारभूत तत्व, कोशीय टोटीपोटेंसी, विभेदीकरण एवं मार्फोजेनेसिस, एग्रोबैक्टीरियम की जैविकी, जीन डिलिवरी के वाहक तथा मार्कर जीन, जैव प्रोद्योगिकी की कृषि में प्रमुख उपलब्धियॉं। **अनुवांशिक अभियांत्रिकी** : पुनर्योजक डी. एन. ए. तकनीकी के औजार एवं तकनीक, क्लोनल वाहक, जीनोमिक तथा सी.डी.एन.ए. लाइब्रेरी, ट्रान्सपोजेबल तत्त्व, जीन मैपिंग तथा गुणसूत्र वॉकिंग ।

Suggested Books :

1. Alberts B.D. Lewis, J.Raff, 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 edition) Harper Collins College pub. New York USA.
4. P.K. Gupta Genetics Rastogi Pub. Meerut.
5. Sinha & Sinha Cytogenetics & Plant Breeding Vikas Pub.

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Practical Work

Objectives

i) To impart understanding of internal cell structures and their organization.
ii) To develop the skills for the preparation of smear for study of cell division.
iii) To develop the skills for the understanding of mendel's law.
iv) To impart the skills of isolation of DNA.
v) To familiarize the students with the technique of micro propagation and isolation of protoplast.

Semester-VI
Scheme of practical examination

Marks:50

Time: 4 Hrs

Exercise Based on cell division (Mitosis/Meiosis)	10
Exercise Based on Genetic problem	5
Study of Cell and Cell inclusions	5
Exercise based on Biotechnology	5
Spotting (1-5)	10
Viva – Voce	5
Sessional	10
Total	50

Mandal 21.01.21

K. Patra 21/1/21

21/1/21

21.1.21

21.1.21

Department of Higher Education, Govt. of M.P.
Under Graduate Semester wise Syllabus
as recommended by Central Board of Studies in Zoology
उच्च शिक्षा विभाग, म.प्र. शासन
स्नातक कक्षाओं के लिये सेमेस्टर अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल प्राणीशास्त्र द्वारा अनुशंसित

Class / कक्षा	B.Sc.
Semester / सेमेस्टर	VI 2016-17
Subject / विषय	Zoology (प्राणीशास्त्र)
Title of Paper	Ecology and Applied Zoology
Max. Marks:	85

Unit-I **Concept of Ecology :**

1. Abiotic and biotic factors
2. Energy flow in ecosystem : Food chain and Food web
3. Biogeochemical 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 to forests.

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 mori*, 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 plant.
4. Common pests: Stored grains: *Sitophilus oryzae and Tribolium Castanaeum*, Vegetable pest: *Piers brassicae and Dacus cucurbitae*.
5. Biological control of insect pests.

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Department of Higher Education, Govt. of M.P.
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उच्च शिक्षा विभाग, म.प्र. शासन
स्नातक कक्षाओं के लिये समेस्टर अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल प्राणीशास्त्र द्वारा अनुशंसित

Class / कक्षा	:	**B.Sc.**
Semester / समेस्टर VI	:	**Practical**
Subject / विषय	:	**Zoology** (प्राणीशास्त्र)

1. Study of fresh water, marine and terrestrial fauna
2. Water analysis- Dissolved Oxygen, Chloride, pH, hardness, turbidity, temperature
3. Pond ecosystem
4. Wild life: Endangered and threatened species
5. Study of specimen related to micro and mega evolution: Commensalism, symbiosis, mimicry, parasitism, colouration, etc.
6. Study of various fossils: Limulus, Latimera, Dinosaurs, Archaeopterux
7. Models of ecosystem
8. Study of life cycles of animals of economic importance
9. Study of planktons
10. Study of pests

Distribution of Marks

Time 3 hours **Maximum Marks: 50**

	Marks Allotted
1. Physicochemical analysis of water bodies	10
2. Excercise based on applied zoology (life cycles)	05
3. Excercise based on museum keeping techniques	05
4. Spotting	16
5. Models of ecosystem	04
6. Viva	05
7. Recrd	05
Total	50

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Physics(D)

Objectives: Upon completion of the course, the student teacher will be abl to:

1) Understand the nature, scope and importance of Physics with special reference to secondary school content.
2) Understand the aims and objectives of teaching Physics.
3) State the specific behavioral changes under each objective.
4) Understand and make use of different approaches & methods of teaching Physics.
5) Prepare objective based lesson plans and use them in their internship.
6) Understand and employ several teaching techniques helpful to develop scientific attitude and scientific method.
7) Plan, use and maintain the Physics laboratory systematically.
8) Understand the principles of text-book construction.

9) Understand the importance of appropriate instructional materials (hardwares and softwares) in teaching Physics and use them by preparing/selecting them in their practice teaching.

10) Understand the importance of principles of curriculum construction in the organisation of Physics contact.

11) Get mastery in Physics content and imbibe the special qualities of Physics teacher.

12) Prepare and use different tools of evaluation to assess the achievements of students in Physics.

13) Develop professionally by attending lectures of professional interest, reading journals, and magazines and enroll as members of professional organisation.

14) Organise co-curricular activities in science i.e. seminars, field trips, exhibitions discussions etc through the science club.

15) Apply the knowledge of Physics to develop scientific thinking and scientific out look.

16) Develop skills in analyzing the content in terms of concepts and in learning experiences.

17) Construct and administer unit test, conduct experiments improves teaching aids.

CONTENT

Unit 1: Meaning, Nature and Impact of Physics

- Concept of science - Science as process and science as a product;
- 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 2: Aims and Objectives of Teaching Physics

Aims of teaching Physics in Secondary school:

- Personal development aim,
- Learner's academic and process skills development aim,
- Disciplinary aim and Cultural aim
- 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 3: 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 Illustration, Advantages and disadvantages.
- Laboratory Method- Meaning, uses with Illustration, Advantages and disadvantages.
- Guided Discovery Method - Meaning, uses with Illustration, Advantages and disadvantages.
- Biographical Method-Meaning, uses with Illustration, Advantages and disadvantages.
- Individual Instruction Techniques and Active Learning Strategies.
- Concept Mapping: Its use for summarizing a unit and evaluating students understanding

Unit 4: Instructional Design, Resources and Teaching Aid for teaching Physics:

- Lesson Planning-Meaning, Steps, Importance and Format of Lesson Pla 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)
  I Charts;
  ii Models;
  iii OHP transparencies;
  iv Filmstrips;
  v slides;
  vi Video tapes;
  vii Films;
  viii Educational C.D.'s
- Mass Media –
  - Television (T.V.);
  - Radio - Meaning and importance.
- Community Resources and Self learning materials –
  - Meaning and importance.
- Physics Library;
- Importance & organizing of Physics library;
- Sections of science library;
- Choice of book for science library.
- Evaluation and measurement

Assignments(any one):

1. Preparing Power Point slides for any selected unit in 8th and 9th class physics.
2. Preparing a set of (OHP) transparancies.
3. Slides for a selected Unit in 10th std. Physics.

Practicum:

1. Writing of Instructional objectives & behavioral specification on a selected unit.

2. Preaparing improvised apparatus in physics.
3. Preparing a lesson plan on any topic in physics using any innovative Method / Model of Teaching.
4. Development an achievement test / Diagnostic test.

References:

- Ahmed, Shaikti R. (1983) Management of Laboratory Science Programme: Report of Orientation Programme in Educational Planning and Administration, New Delhi; NIEPA Mimeo.
- 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.
- Carin/Sund Teaching Science Through Discovery; C.E. Merrill Publishing Co. Londan.
- Cleaveland J. M. (1964) Physics C.E. Merrill Publishing Co., Ohio.
- Craig (1958) Science for the Elementary School Teacher; Ginn & Co., New York
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- Gupta S. K. (1983) Technology of Science Education, Vikas Publishing House, Pvt. Ltd., New Delhi.
- Gupta S. K. (1985) Physics Teaching in Secondary Schools, Sterling Publishers, Pvt. Ltd., New Delhi.
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- Kalara R. M. (1981), Innovation in Science Teaching; Prakashan Kendra, Lucknow.
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- Nagel E. (1961) The Structure of Science, Harcourt Brace and World Inc., New York

- Nair C. P.S., (1971) Teaching Science in Our Schools. S. Chand & Co., New Delhi.
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- Siddiqi N. N. & Siddiqi M.N. (1994) Teaching of Science Today and Tomorrow,Doaba House, Delhi - 110 006.
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- The Importance of Art Activities for Science Teaching : A Hand Book forTeacher (1984) Published by Centre for Cultural Resources and Training, Bahawalpur House, New Delhi.
- UNESCO (1985) Teaching School Chemistry, Sterling Publishers Pvt. Ltd., New Delhi.
- UNESCO,(1978) New UNESCO Source Book's 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

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Chemistry(E)

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

1. Understand the nature, scope and importance of Chemistry with special reference to secondary school content.
2. Understand the aims and objectives of teaching Chemistry.
3. State the specific behavioral changes under each objective.
4. Understand and make use of different approaches & methods of teaching Chemistry.
5. Prepare objective based lesson plans and use them in their internship.
6. Understand and employ several teaching techniques helpful to develop scientific attitude and scientific method.
7. Plan, use and maintain the Chemistry laboratory systematically.
8. Understand the principles of text-book construction.

9. Understand the importance of appropriate instructional materials (hardwares and softwares) in teaching Chemistry and use them by preparing/selecting them in their practice teaching.

10. Understand the importance of principles of curriculum construction in the organisation of Chemistry contact.

11. Get mastery in Chemistry content and imbibe the special qualities of Chemistry teacher.

12. Prepare and use different tools of evaluation to assess the achievements of students in Chemistry.

13. Develop professionally by attending lectures of professional interest, reading journals, and magazines and enroll as members of professional organisation

14. Organise co-curricular activities in science i.e. seminars, field trips, exhibitions discussions etc through the science club.

15. Apply the knowledge of Chemistry to develop scientific thinking and scientific out look.

16. Develop skills in analyzing the content in terms of concepts and in learning experiences.
17. Construct and administer unit test, conduct experiments improves teaching aids

Content

Unit 1: Meaning, Nature and Impact of Chemistry

1. Concept of science - Science as process and science as a product;

2. Nature and Scope of Chemistry

3. Impact of Science and Technology on modern living.

4. Scientific Attitude - Meaning definition and importance.

5. Qualities of a person who possesses scientific attitude.

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

Unit 2: Aims and Objectives of Teaching Chemistry

Aims of teaching Chemistry in Secondary school:

1. Personal development aim,
2. Learner's academic and process skills development aim,
3. Disciplinary aim and
4. Cultural aim.

Objectives of teaching Chemistry:

1. Bases for formulation of objectives
2. Objectives of teaching Chemistry at Secondary level; (To be Discussed keeping in view of the objectives of teaching Chemistry enunciated in the Chemistry syllabi of secondary school of M.P.); Instructional objectives of teaching Chemistry and stating them in observable behavioral changes ; i) Knowledge ii) Understanding, iii) Application, iv) Skill, v) Attitude, vi) Interest, vii) Appreciation.

Unit 3: Approaches and Methods of Teaching Chemistry

1. Enquiry Approach -Meaning, Uses with Illustrations, Advantages and disadvantages.
2. Inductive Approach-Meaning, Uses with Illustrations, Advantages and disadvantages.
3. Deductive Approach-Meaning, Uses with Illustrations, Advantages and disadvantages.
4. Problem Solving Approach- Meaning, Uses with Illustrations, Steps, Advantages and disadvantages.
5. Demonstration Method- Meaning, uses, Advantages and disadvantages.
6. Lectures-Cum-Demonstration Method- Meaning, uses with Illustration, Advantages and disadvantages.
7. Laboratory Method- Meaning, uses with Illustration, Advantages and disadvantages.
8. Guided Discovery Method - Meaning, uses with Illustration, Advantages and disadvantages.
9. Biographical Method-Meaning, uses with Illustration, Advantages and disadvantages.
10. Individual Instruction Techniques and Active Learning Strategies.

11 Concept Mapping: Its use for summarizing a unit and evaluating students understanding

Unit 4 : Instructional Design, Resources and Teaching Aid for teaching Chemistry:

1. Lesson Planning-Meaning, Steps, Importance and Format of Lesson Plan according to active learning strategies.
2. Unit Plan-Meaning, Steps, Importance and Format of Lesson Plan
3. Resource Unit-Meaning, Steps, Importance and Format of Lesson Plan
4. **Audio-Visual Aids** (Preparation and Use)
   - I Charts;
   - ii Models;
   - iii OHP transparencies;
   - iv Filmstrips;
   - v slides;
   - vi Video tapes;
   - vii Films;
   - viii Educational C.D.'s

5. **Mass Media** –
   - i Television (T.V.);
   - ii Radio - Meaning and importance.

6. Community Resources and Self learning materials –
   - iii Meaning and importance.

7. Chemistry Library;
8. Importance & organizing of Chemistry library;
9. Sections of science library;
10. Choice of book for science library.

Assignments (Any One):

1. Preparing power point sides for any selected unit in 8^{th} and 9^{th} class Chemistry.
2. Preparing a set of (OHP) transparencies.
3. Slides for a selected Unit in 10^{th} std. Chemistry.

Practicum:

1. Writing of Instructional objectives & behavioral specifications on a selected Unit.
2. Preparing improved apparatus in Chemistry.
3. Preparing a lesson Plan on any topic in Chemistry using any innovative Method / Model of Teaching.
4. Developing an Achievement test / Diagmostic Test.

Unit 4 A: Evaluation in Chemistry

Difference between Measurement, Assessment and Evaluation, Characteristics of good Measurement, Diagnostic Test and Remedial Teaching, Criterion Referenced Testing and Norm Referenced Testing, Development and Standardization of Achievement Test in Chemistry

References:

- Ahmed, Shaikti R. (1983) *Management of Laboratory Science Programme: Report of Orientation Programme in Educational Planning and Administration*, New Delhi; NIEPA Mimeo.
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