KURUKSHETRA UNIVERSITY, KURUKSHETRA
B.Sc..B.Ed.- 1st SEMESTER SYLLABI AS PER CBCS PATTERN

**B. Sc. B. Ed. (CBCS) Semester- I**

**GROUP A: ABILITY ENHANCEMENT COMPULSORY COURSES (AECC)**

**Semester I**

**AEC1(I): LANGUAGE SKILLS (HINDI)-I**

Time: 3 Hours | Max. Marks: 100
Credit- 4 | Theory: 80, Internal: 20

NOTE FOR PAPER SETTER FOR THEORY EXAMINATION

i) Paper setter will set 9 questions in all, out of which students will be required to attempt 5 questions.

ii) Q.No. 1 will be compulsory and will carry 16 marks. There will be atleast 4 short-answer type questions selected from the entire syllabus.

iii) Two long answer type questions will be set from each of the four units, out of which the students will be required to attempt one question from each unit. Long-answer type questions will carry 16 marks each.

iv) All questions will carry equal marks.

Objectives:

- To enable the students to acquire basic skills in functional language.
- To develop independent reading skills and reading for appreciating literary works.
- To internalize grammar rules so as to facilitate fluency in speech and writing.
- To develop functional and creative skills in language.
- To develop values of liberalism and an insight into the cultural heritage of the region which remains embodied in the literary output of the region.

**COURSE CONTENTS**

**Unit I: History of Language and Literature-1**

Hindi Bhasha aur Sahitya ka Itihas [Aarmbha se Lekar 1857 Tak]

**Unit II: Short Story-1 [Pre-Independence Literature]**

Swatantratapurva Hindi Kahani Ka Vikas

1. Chandradhar Sharma Guleri- Usne Kaha Tha
2. Jayshankar Prasad- Puraskar
3. Premchand- Panch Parmeshwar
4. Jainendra- Ek Raat

**Unit III: Short Story-2 [Post-Independence Literature]**

Swatantrayottar Hindi Kahani Ka Vikas

1. Mohan Rakesh- Uski Roti

2. Kamleshwar- Dilli Mein ek Maut
3. Phanishwar Nath Renu- Teesari Kasam
4. Bhism Sahani- Cheef ki Dawat

**Unit IV: Communication skills**

Group Discussion [Samooh Charcha]

Introduction – Definition – Characteristics – Types of Discussion –Round table, Symposium, Lecture forum etc. – Relevance of Group Discussion – Exercises.

Reference:


1. Hindi Sahitya Ka Itihas: Ramchandra Shukla Rajkamal Prakashan,Delhi
2. Hindi Sahitya Ka Itihas: Dr Nagendra, Mayoor Paperbacks, Delhi
3. Hindi Sahitya Ki Bhoomika: Hajari Prasad Divedi Rajkamal Prakashan,Delhi
4. Hindi Sahitya Ka Adikaal: Hajari Prasad Divedi Rajkamal Prakashan,Delhi
5. Hindi Sahitya Ka Udbhav Aur Vikas:Hajari Prasad Divedi Rajkamal Prakashan,Delhi
6. Hindi Sahitya Ka Ateet: Viswanath Prasad Mishra, Rajkamal Prakashan,Delhi
7. Bhakti Aandolan Aur Bhaktikavya: Shivkumar Mishra,Lokbharti Prakashan, Delhi
8. Bhakti Aandolan aur Surdaska Kavya: Maneger Panday, Vani Prakashan, Delhi
9. Bhakti Ke Aayam: Dr P Jayraaman, Vani Prakashan, Delhi
10. Bhartiya Bhakti Sahitya: Dr Rajmal Bora, Vani Prakashan, Delhi
11. Bhaktikavya ka Samajdarshan: Dr Premshankar, Vani Prakashan, Delhi
12. Hindi Sahitya Ka Sanchhipt Itihas: Nanddulare Bajpayee, Swaraj Prakashan, Delhi
13. Hindi Sahitya ka Sanchhipt Itivritt: Shivkumar Mishra, Vani Prakashan, Delhi
14. Hindi Kahani- Antarang Pahchan: Dr Ramdars Mishra, Vani Prakashan, Delhi
15. Hindi Kahani-Sanrachana aur Samvedana: Dr Rachna Saah, Vani Prakashan, Delhi
16. Galp Ka Yatharth-Kathaloochan ke Aayam: Suvas Kumar, Vani Prakashan, Delhi
17. Hindi Ka Gadyaparva: Namvar Singh, Rajkamal Prakashan,Delhi
18. Sahitya ki Pahchan: Namvar Singh, Rajkamal Prakashan,Delhi
19. Katha Vivechan aur Gadyashilp: Ramvilas Sharma, Vani Prakashan, Delhi
20. Kahani Anubhav aur Abhivyakti: Rajendra Yadav, Vani Prakashan, Delhi


Suggested Activities:

In the internal class during the different activities the performance of the student will be assessed by the teacher. Test, assignments and small projects works may be given .

**GROUP A: ABILITY ENHANCEMENT COMPULSORY COURSES (AECC)**

**Semester I**

**AEC1(I): LANGUAGE SKILLS (ENGLISH) –I**

Time: 3 Hours Max. Marks: 100

Credit- 4 Theory: 80, Internal: 20

NOTE FOR PAPER SETTER FOR THEORY EXAMINATION

i) Paper setter will set 9 questions in all, out of which students will be required to attempt 5 questions.

ii) Q.No. 1 will be compulsory and will carry 16 marks. There will be atleast 4 short-answer type questions selected from the entire syllabus.

iii) Two long answer type questions will be set from each of the four units, out of which the students will be required to attempt one question from each unit. Long-answer type questions will carry 16 marks each.

iv) All questions will carry equal marks.

Objectives:

Students develop proficiency in English which equips them to:

- understand the demands of audience, subject, situation and purpose and the use of language for effective communication.
- analyse language in context to gain an understanding of grammar, vocabulary, spelling, punctuation and speech.
- examine authentic literary and non-literary texts and develop insight and appreciation.
- gain an understanding of study and reference skills.
- plan, draft, edit and present a piece of writing.

**COURSE CONTENTS**

**Unit I: Descriptive Grammar**

1. Tenses:

a) Simple Present: Habitual action, General truths, Future time, Verbs of state, Verbs of perception, Verbs of sensation, Narration, Use of simple present for demonstration and commentaries, Present perfect, present perfect continuous, Present continuous also indicative of future action.

b) Simple past: Past time reference, Present time reference, Future time reference, Past continuous, Past perfect, past, perfect continuous

**Unit II: Skills in Communication**

1. Negotiating a point of view – learning to talk persuasively so as to get across one's perspective.

2. Debating on an issue – agreeing / disagreeing.

**Unit III: Study and Reference Skills**

Note making; Note- taking; Summary writing.
Comprehension Skills
Extracts from literary, scientific and educational journals.

**Unit IV: Skills of Communication**

Advanced Writing Skills, writing advertisement copy; Writing a project proposal and Writing Resume, sending an application.
Listening effectively; Talking about one self (likes, dislikes, interests, beliefs, personality traits, ambitions); Expressing an opinion about personal belief on a current issue. (Ability to speak fluently for 3-4 minutes. Focus would be on organized, logical, sequential presentation of thought through spontaneous speech).

Suggested Activities:

- Politeness competitions- students with partners take turns in using a given number of utterances for negotiation / requests/complaints/small talk.
- Students introduce themselves though using symbols/ metaphors.
- Students collect newspaper/magazine cuttings on topical and/ or cultural issues of interest-write and share their opinion with peers.

References:


· Block, C.C. (1997). Teaching the Language Arts, 2nd Ed. Allyn and Bacon
· Mckay. et al. (1995). The Communication Skills Book, 2nd Ed. New Harbinger Publications.
· Hornby,A.S.(2001).Oxford Advanced Learner's Dictionary, OUP
· Thomsan,A.J. & Martinet.(2002).A Practical English Grammar.OUP

**GROUP A: ABILITY ENHANCEMENT COMPULSORY COURSES (AECC)**

**Semester I**

**AEC2(I): INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN EDUCATION-I**

Time: 3 Hours Max. Marks: 100

Credits- 4 Theory: 60, Internal: 20, Practical :20

NOTE FOR PAPER SETTER FOR THEORY EXAMINATION

i) Paper setter will set 9 questions in all, out of which students will be required to attempt 5 questions.

ii) Q.No. 1 will be compulsory and will carry 12 marks. There will be atleast 4 short-answer type questions selected from the entire syllabus.

iii) Two long answer type questions will be set from each of the four units, out of which the students will be required to attempt one question from each unit. Long-answer type questions will carry 12 marks each.

iv) All questions will carry equal marks.

**Objectives of the course:**

On completion of the course the students will be able to:

- Appreciate the historical development of various educational media.
- Identify and demonstrate an understanding of the main components of the computer hardware in use.
- Differentiate various operating system and explain main functions of the system and application software environment.
- Use a word processor, spread sheet, drawing and presentation software to produce various teaching learning resources for educational use.
- Use internet technologies efficiently to access remote information, communicate and collaborate with others.
- Model collaborative knowledge construction using various web 2.0 tools and technologies.
- Understand the social, economic, security and ethical issues associated with the use of ICT.

**Course Contents**

**Unit I: Learning and Technology**

- How technology enhance learning: basic theories of communication, system theory and learning theory
- Historical account of the development of various educational media (audio, video, print, storage, display, projection)
- Communication process and role of technology in communication

- Information and Communication Technology: Meaning, nature and advantages
- Media literacy and digital literacy – need and importance
- Digital divide and enhancing access
- National ICT policies, curriculum, schemes and programmes
- Cyber security: privacy, hacking, virus, spy ware, misuse, abuse, antivirus, firewall, and safe and ethical practices

**Unit II: Fundamentals of Information and Communication Technology**

- Computer hardware fundamentals (anatomy, input devices, output devices, storage devices, display devices)
- Computer Network-LAN, WAN. Internet – concept and architecture ; Locating internet resources – browsing, navigating, searching, selecting, evaluating, saving and bookmarking
- Licenses – software license, document license, fare use and piracy
- File formats and conversion, utility tools
- Cloud computing: meaning, types, and advantages

**Unit III: Computer Software**

- Digitalization, software –meaning and types
- Source and binary code. Proprietary software, Open Source software, shareware and freeware- concept, philosophy, types, and advantages.
- Operating systems –meaning, types –Windows, Linux, Macintosh – Navigating the desktop, control panel, file manager, explorer, and accessories
- Software as Service – Online software tools and applications and their educational use
- Managing the ICT infrastructure: software installation, troubleshooting of hardware, seeking and providing help, storage and backup, updating and upgrading software

**Unit IV: Application Software**

- Application software- meaning and types
- Word processing, spreadsheet, presentation: Features and educational applications (Unicode)
- Drawing tools – diagrams, concept maps, timelines, flow charts:educational applications of these tools
- Web 2.0 technology and tools: meaning characteristics and types
- Social networking and social book marking – educational applications
- Blog and micro blog – reflective journaling and other educational applications
- Wiki – collaborative authoring and projects
- Instant messaging and its educational applications
- Online forums/discussion groups and chats: educational applications
- Social media sharing – video, presentations, audio (podcasts), graphics, and text
- Web 2.0 tools for creating, sharing, collaborating, and networking

**Sessional activities:**

- Hands on experience in setting up a desktop PC and working with various input devices, output devices, storage devices, and display devices
- Practicing word processing using Indian language software
- Practice in installing various system and application software
- Using word processor, spread sheet, and presentation software to produce various teaching learning resources and sharing it online
- Locating internet resources – navigating, searching, selecting, saving and evaluating (use standard internet evaluation criteria)
- Creating social bookmarking account and creating social bookmarking of internet resources using any social bookmarking tools (diigo,delicious,stumbleupon)
- Creating digital concept maps, flow charts, timelines for a particular content using online and offline tools
- Creating account in teachertube/slideshare and sharing your video/presentation. View and comment on others contributions
- Creating account in wikispace/wikipedia/mediawiki and adding/editing content
- Developing an educational blog in www.blogger.com, www.wordpress.com, or www.edublog.com
- Review of national ICT policy and curriculum

**Suggested Readings:**


1. Andrew A Kling(2010). Web 2.0 (Technology 360). Lucent Books: New Delhi
2. Andrew M. St. Laurent. (2004). Understanding Open Source and Free Software Licensing. Oreilly: Cambridge
3. Bharihok Deepak. (2000). Fundamentals of Information Technology. Pentagon Press: New Delhi
4. Crumlish Christian (1999). The Internet No Experience Required. BPB Publications: New Delhi
5. Evant, M: The International Encyclopedia of Educational Technology.
6. Gwen Solomon, Lynne Schrum. (2014). Web 2.0 How-to for Educators, Second Edition. ISTE
7. James, K.L. (2003). The Internet: A User's Guide. Prentice Hall of India Pvt. Ltd: New Delhi
8. Jean-Eric Pelet (2014). E-Learning 2.0 Technologies and Web Applications in Higher Education (Advances in Higher Education and Professional Development (Ahepd)). Idea Group: U.S.
9. Mishra, S. (Ed.) (2009). STRIDE Hand Book 08: E-learning. IGNOU: New Delhi.Available at http://webserver.ignou.ac.in/institute/STRIDE_Hb8_webCD/STRIDE_Hb8_index.html
10. Sarkar, S.K. & Gupta, A.K.(1998). Elements of Computer Science. S. Chand & Company: New Delhi

**GROUP C: CORE COURSE (CC)**

**Semester I**

**Core Course1(I): PHYSICS: RELATIVITY, MECHANICS, OSCILLATIONS AND ACOUSTICS**

Time: 3 Hours Max. Marks: 100

Credit- 4 Theory: 60, Internal: 20, Practical: 20

NOTE FOR PAPER SETTER FOR THEORY EXAMINATION

i) Paper setter will set 9 questions in all, out of which students will be required to attempt 5 questions.

ii) Q.No. 1 will be compulsory and will carry 12 marks. There will be atleast 4 short-answer type questions selected from the entire syllabus.

iii) Two long answer type questions will be set from each of the four units, out of which the students will be required to attempt one question from each unit. Long-answer type questions will carry 12 marks each.

iv) All questions will carry equal marks.

**Objectives:** The student teacher will be able to:

- Acquaint with the key concepts of special theory of relativity, mechanics, oscillations and acoustics.
- Appreciate the applications of the concepts in real life situations.
- Solve the problems based on special theory of relativity, mechanics, oscillations and acoustics.
- Apply the theory in execution of practicals.

## COURSE CONTENTS

**UNIT I:**

**Relativity:** Reference systems, inertial and non-inertial frames, Galilean transformation, Galilean invariance and conservation laws, propagation of light, Michelson – Morley experiment. Postulates of the special theory of relativity, Lorentz transformations, length contraction, time dilation, velocity addition theorem, variation of mass with velocity, mass-energy equivalence, particle with a zero rest mass.

**UnitII:**

**Mechanics:** Motion under central force, Kepler's laws, Gravitational law and field, Potential due to a spherical body, Gauss and Poisson equations for gravitational potential, gravitational self-energy, Rigid body motion, Rotational motion, Moment of inertia and their products, principal moments and axes, Euler's equations. System of particles, centre of mass, equation of motion, single stage and multistage rocket, energy and momentum conservation, concepts of elastic and inelastic collisions.

**UnitIII:**

**Oscillations:** Potential well and periodic oscillations, cases of harmonic oscillations, different equations and its solutions, Kinetic and potential energy, Simple Harmonic oscillations in – Spring and mass system, Simple and compound pendulum, Torsional pendulum, Bifilar oscillations, Helmholtz resonator, LC circuits, Vibration of a magnet, Oscillation of two masses connected by a spring, Superposition of two mutually perpendicular simple harmonic vibrations of same frequency, Lissajou's figures.

**UnitIV:**

**Coupled Oscillations & Acoustics:** Two coupled oscillators, normal modes, N-coupled oscillators, damped harmonic oscillators, Power dissipation, Quality factor, Driven harmonic oscillator, Transient and steady state, Power absorption, Resonance in system with many degrees of freedom.

**Acoustics:** Noise and Music, The human ear and its responses, limits of human audibility, intensity and loudness, bel and decibel, the musical scale, temperament and musical instruments, Production and detection of ultrasonic and infrasonic waves and applications,

Transducers and their characteristics, recording and reproduction of sounds, various systems, measurements of frequency, waveform, intensity and velocity, acoustics of halls, reverberation period, Sabine's formula.

**Suggested Readings:**


1. Robert Resnick, Introduction to special relativity (Wiley India Pvt. Ltd., 2006)
2. Charles Kittel, Berkeley Physics Course vol.-1, Mechanics (McGraw-Hill, 1966)
3. R P Feynman, R B Ligton and M Sands, The Feynman Lectures on Physics, vol-1(Narosa Publishing House)
4. N K Bajaj, The Physics of Waves and Oscillations (Tata McGraw-Hill Pub. Com. Ltd., 2006)
5. R S Gambir, Mechanics (CBS Publishers and Distributors, New Delhi)
6. S Garg, C K Ghosh, S Gupta, Oscillations and Waves (PHI Learning Pvt. Ltd., 2009)
7. R K Ghosh, The Mathematics of Waves and Vibrations, (Mc Milan, 1976)
8. Frank S Crawford Jr., Berkely Physics Course: Vol.4, Waves (McGraw Hill book company, 1968)
9. I G Main, Vibrations and Waves (Cambridge University Press, 1986)
10. H J Pain, The Physics of Vibrations and Waves (John Wiley & Sons Ltd., 2006)

**Practicals**

| Distribution of Marks for End Semester Practical Examination | |
|---|---|
| **Activity** | **Marks** |
| Experiments | 10 |
| Viva Voce | 5 |
| Record | 5 |
| **Total Marks** | **20** |

**All the following experiments are to be done. Few more experiments may be set at the institutional level.**

**Course Outline:**

1. To study the variation of power transfer to different loads by a DC source and verify maximum power transfer theorem. (Plotting of the graph).
2. Conversion of a Galvanometer into a ammeter (Range 1A).
3. Conversion of a Galvanometer into a Voltmeter (Range 1V).
4. To study the random decay and determine the decay constant using the statistical board.
5. To determine internal resistance of Lechlanche Cell using a Voltmeter
6. To study the characteristics of a semiconductor junction diode and to determine forward and reverse resistances
7. To determine the band gap using a PN junction diode.
8. To study the normal modes of oscillators of system of coupled oscillator and to study the effect of coupling mass on the frequency of normal modes
9. To study the effect of damping on motion of a simple pendulum and determine damping constant for simple pendulum as damped harmonic oscillation.

**GROUP C: CORE COURSE (CC)**

**Semester I**

**Core Course2(I): CHEMISTRY: INORGANIC CHEMISTRY**

Time: 3 Hours Max. Marks: 100

Credits- 4 Theory: 60, Internal: 20, Practical: 20

NOTE FOR PAPER SETTER FOR THEORY EXAMINATION

i) Paper setter will set 9 questions in all, out of which students will be required to attempt 5 questions.

ii) Q.No. 1 will be compulsory and will carry 12 marks. There will be atleast 4 short-answer type questions selected from the entire syllabus.

iii) Two long answer type questions will be set from each of the four units, out of which the students will be required to attempt one question from each unit. Long-answer type questions will carry 12 marks each.

iv) All questions will carry equal marks.

**Objectives:**

- To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.
- To acquire basic knowledge to students teachers about atomic structure, periodic properties, Chemical Bonding and Ionic solids, Understanding the chemistry of s- and p-block elements, the fundamentals of the chemistry of the main group elements, and important real world applications of many of these species and Acids and Bases and solvent system.
- Students will be able to describe the fundamentals of acid/base chemistry, including pH calculations, buffer behaviours.

**COURSE CONTENTS**

**Unit I: Atomic Structure and Periodic trends**

**Atomic Structure**: Idea of de-Broglie matter waves, Heisenberg uncertainty principle, atomic orbitals, Schrödinger wave equation, significance of $\Psi$ and $\Psi^2$, quantum numbers, radial and angular wave functions and probability distribution curves, shapes of s, p, d and f orbitals. Aufbau and Pauli exclusion principles, Hund's multiplicity rule, effective nuclear charge.

- **Periodic Properties**
  Atomic and Ionic radii, Ionization energy, electron affinity and electronegativity-methods of determination or evaluation, trends in periodic table and applications in predicting and expecting the chemical behaviour.

**Unit II: Chemical Bonding and Ionic solids**

- **Structure and Bonding**: Covalent Bond -Valence bond theory and its limitations, directional characteristics of covalent bond, various types of hybridization and shapes of simple inorganic molecules and ions, valence shell electron pair repulsion (VSEPR) theory with special reference to $NH_3$, $H_3O^+$, $SF_4$, $ClF_3$, $ICl_2^-$ and $H_2O$, MO theory, homonuclear and heteronuclear (CO and NO) diatomic molecules, multicenter bonding in electron deficient molecules such as Boranes, bond strength and bond energy, percentage ionic character from dipole moment and electro-negativity difference.
- **Ionic solids** – Ionic structures, radius ratio effect and coordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy and Born-Haber cycle, solvation energy and solubility of ionic solids, polarizing power and polarisability of ions, Fajan's rule, Metallic bond-free electron, valence bond and band theories.
- **Weak Interactions**- Hydrogen bonding, Van der Waals' forces.

**Unit III: Chemistry of sand p block elements**

- **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 aryls.
- **p-Block Elements**: Comparative study (including diagonal relationship) of groups 13-17 elements, compounds like hydrides, oxides, oxy acids and halides of group 13-16, hydrides of boron-diborane and higher boranes, borazine, borohydrides, fullerenes, carbides, fluorocarbons, silicates (structural principle), tetrasulphur tetra nitride, basic properties of halogens, interhalogens and polyhalides.
- **Chemistry of Noble Gases**: Chemical properties of the noble gases, chemistry of xenon, structure and bonding in xenon compounds.

**Unit IV: Acids and Bases and solvent system**

- **Theories of Acids and Bases**: Arrhenius, Bronsted-Lowry, Lux-Flood, solvent system and Lewis concept of acids and bases. Solvent system of acids and bases with special reference to liquid Ammonia, liquid $BrF_3$
- **Concept of Hard and Soft Acids and Bases (HSAB):** Classification of acids and bases as hard and soft, Pearson's HSAB concept, acid-base strength and hardness and softness, Symbiosis, theoretical basis of hardness and softness, electro negativity.
- **Solvent Systems:** Physical properties of a solvent, types of solvents and their general characteristics, reactions in non-aqueous solvents with reference to liquid $NH_3$ and liquid $SO_2$.

**Suggested Readings:**


1. Lee, J.D. Concise Inorganic Chemistry, ELBS.
2. Douglas, B.E. and Mc Daniel, D.H., Concepts & Models of Inorganic Chemistry
3. Day, M.C. and Selbin, J. Theoretical Inorganic Chemistry, ACS Publications.
4. Shriver and Atkins Inorganic Chemistry, W. H. Freeman and Company

5. James Huheey, Inorganic chemistry: Principles of Structure and Reactivity, Pearson Education India
6. B.N. Figgis, J.E Huheey, P.W. Atkins Inorganic Chemistry, Pearson Education
7. Duward Shriver, Inorganic Chemistry, W. H. Freeman
8. Gary Wulfsberg, Inorganic Chemistry, University Science Books
9. A. R. West, Solid State Chemistry and its Applications, Wiley

**Practical**

| **Distribution of Marks for End Semester Practical Examination** | |
|---|---|
| **Activity** | **Marks** |
| Experiments | 10 |
| Viva Voce | 5 |
| Record | 5 |
| **Total Marks** | **20** |

**Course Outline:**

1. **Inorganic Chemistry:**
   Semi micro analysis: Detection of the presence of three cations and three anions (including interfering) in a given mixture qualitatively.
2. **Quantitative Analysis: Volumetric Analysis**
   - **a.** Determination of acetic acid in commercial vinegar using NaOH.
   - **b.** Determination of alkali content – antacid tablet using HCl.
   - **c.** Estimation of calcium content in chalk as calcium oxalate by permanganometry.
   - **d.** Estimation of ferrous and ferric by dichromate method.
   - **e.** Estimation of copper using thiosulphate.

**GROUP C: CORE COURSE (CC)**

**Semester I**

**Core Course3(I): ZOOLOGY: NON-CHORDATA**

Time: 3 Hours Max. Marks: 100

Credit- 4 Theory: 60, Internal: 20, Practical: 20

NOTE FOR PAPER SETTER FOR THEORY EXAMINATION

i) Paper setter will set 9 questions in all, out of which students will be required to attempt 5 questions.

ii) Q.No. 1 will be compulsory and will carry 12 marks. There will be atleast 4 short-answer type questions selected from the entire syllabus.

iii) Two long answer type questions will be set from each of the four units, out of which the students will be required to attempt one question from each unit. Long-answer type questions will carry 12 marks each.

iv) All questions will carry equal marks.

**Objectives:** To enable students to understand invertebrates, the organizational hierarchies and complexities, the evolutionary trends in external morphology and internal structure; identification and classification with examples, to enable them to understand various modes of adaptations in animals.

**COURSE CONTENTS**

**Unit: I**

- General principles of taxonomy and classification. Outline classification of Protozoa up to order.
- General Structural organization of *Amoeba, Euglena and Plasmodium*.
- Habit and habitat, structure, nutrition, osmoregulation and reproduction in *Paramecium*
- Locomotion in Protozoans- pseudopodial, ciliary and flagellar.
- Nutrition in Protozoa
- Reproduction in Protozoa.

**Unit: II**

- Outline classification of Porifera and Coelenterata up to order.
- Habit, habitat and general account of internal structure& reproduction in*Sycon*
- Canal system and skeleton in Sponges
- Habit, habitat, morphology, internal structure, nutrition and reproduction in *Obelia*
- Polymorphism in coelenterates, coral reefs
- Outline classification of Platyhelminthes and Aschelminthes up to order.

- Habit and habitat, reproduction and life–cycle of *Fasciola*, and *Ascaris*
- Parasitic adaptations in Helminthes

**Unit: III**

- Outline classification of Annelida and Arthropoda up to order.
- Habit and habitat, structure, nutrition, respiration, circulation, excretion, nervous system and reproduction of
  - *(i) Hirudinaria*
  - *(ii) Palaemon*
- *Peripatus*: structure and affinities
- Mouth parts and feeding habits of Insects.

**Unit: IV**

Outline classification of Mollusca and Echinodermata up to order

- Habit and habitat, structure, nutrition, respiration, blood vascular system, excretion, nervous system and reproduction of *Pila*
- Torsion in Gastropoda
- Habit and habitat, structure, nutrition, respiration, blood vascular system, excretion, nervous system and reproduction of *Asterias*
- Larval forms of Echinoderms.

**Suggested Readings:**


1. Modem Textbook of Zoology Invertebrates by R.L. Kotpal –(Rastogi Publication , Meerut 10th Revised Edition )
2. Invertebrate Zoology series (Protozoa of Echinnodermata) by R.L. Kotpal - – (Rastogi Publication , Meerut)
3. Invertebrate Zoology by E.L. Jordan and P.S. Verma – S. Chand & Co., Delhi
4. Invertebrate Zoology by J.K. Dhami and P.S. Dhami – S. Chand & Co., Delhi
5. A textbook of Invertebrate Zoology by S.N. Prasad – (KitabMahal, Allahabad)
6. Life of Invertebrate Zoology by Russel and Hunter – (Macmillan)
7. Invertebrate Zoology by R.D. Barnes :- (W.B. Saunders, Philadelphia)
8. A manual of Zoology Vol. I by EkambernathaAyyar (Vishwnathan,Madras)
9. The invertebrate series of L.H. Hyman – ( McGraw Hill)
10. A student's textbook of Zoology by Adma Sedgwick VoI .I, II & III (Central Book Depot, Allahabad)
11. A textbook of Zoology VoI. I by Parkar and Haswell – (Macmillan)
12. Lower non chordate, Dr VS Pawar, Hindi Edition, College book centre, Chaura Rasta, Jaipur
13. Higher non Chordate, Dr VS Pawar, Hindi Edition, College book centre , Chaura Rasta, Jaipur
14. Animal taxonomy and evolution, Dr VS Pawar, Hindi Edition, College book centre, Chaura Rasta, Jaipur

**Practicals**

| Distribution of Marks for End Semester Practical Examination | |
|---|---|
| **Activity** | **Marks** |
| Experiments | 10 |
| Viva voice | 5 |
| Record | 5 |
| **Total Marks** | **20** |

**Course Outline:**

- Study of Microscopes: Simple and compound microscope, working mechanism and maintenance, use of Micro-image projection system.
- Study of museum specimens with respect to levels and patterns of organization biosystematics, biodiversity, adaptations, development stages, population dynamics, ecological implications:
- **Porifera***: Sycon, Spongilla, Euplectella, Leucosolenia, Hylonema , Hippospongia, Euspongia;*
- **Coeleterata***: Hydra, Tubularia, Millepora, Physalia, Porpita, Vellela, Aurelia, Tubipora, Alcyonium, Metridium, Pennatula, Grantia, Fungia, Gorgonia.*
- **Helminthes***: Fasciola, Taeniasolium, Planaria, Ascaris, Ancyclostoma;*
- **Annelida**:*Nereis, Heteroneresis, Aphrodite, Chaetoptrus, Arenicola, Pheretima, Hirudinaria*
- **Arthropoda**:*Palaemon, Eupagurus, Scolopendra, Apis, Peripatus.*
- **Mollusca**: *Chiton, Pila, Aplysia, Helix, Dentalium, Mytilus, Pinctada, Unio, Sepia, Loligo Octopus:*
- **Echinodermata**:*Antedon, Holothuria, Cucumaria, Astropecten, Asterias, Echinus*
- Study of Permanent slides*Paramecium*, *Paramecium* in Conjugation, *Paramecium* binary fission, *Euglena*, *Vorticella*, *Sycon* L.S., *Sycon* T.S. , *Hydra* L.S., *Hydra* T.S, Cercaria larva, Metacercaria, Miracidium larva, Sporocyst larva, Redia larva , *Ascaris* male and female T.S. , T.S. through pharynx region, Gizzard and intestinal region of Earthworm, T.S. through buccal cavity of *Hirudinaria*, Zoea, Metazoea, Nauplius, Mysis, T.S. of gill of Unio. T.S. of the shell & mantle of *Unio*,Glochidium larva of *Unio*.
- Dissections and/or its demonstration through Charts/Models/Video/CD/digital alternative etc and/or preparation of working models of the different systems of the following animals.
- Earthworm: Alimentary canal, Nervous system and Reproductive system.
- Leech Alimentary canal
- Cockoach : Mouthparts Digestive system, nervous system
- Prawn : Nervous system

- Pila : Nervous system
- Microsopic preparation or their observation of the following.
  *Paramecium,Englena,*Sponge spicules, gemmules, *Obelia,Hydra,*parapodium of *Nereis*, statocyst of Prawn, mouth parts of *Cockroach,* radula of *Pila*, gill of *Unio*.
- Culture of *Paramecium, Euglena* and *Amoeba.*

**Note:**

- Use of animals for dissection is subject to the conditions that these are not banned under the Wildlife Protection Act or any other legislation.
- Students are required to submit the following during examination:

a) One assignment on the instrument/ technique about its principle, working, precautions and applications; and /or reagents / solutions preparation.

b) Report on study of animals from their natural habitat from their local surroundings or Vermicompost etc.

**GROUP C: CORE COURSE (CC)**
**Semester I**
**Core Course1(I): BOTANY: DIVERSITY OF MICROBES AND LOWER PLANTS**

Time: 3 Hours Max. Marks: 100
Credit- 4 Theory: 60, Internal: 20, Practical: 20

NOTE FOR PAPER SETTER FOR THEORY EXAMINATION

i) Paper setter will set 9 questions in all, out of which students will be required to attempt 5 questions.

ii) Q.No. 1 will be compulsory and will carry 12 marks. There will be atleast 4 short-answer type questions selected from the entire syllabus.

iii) Two long answer type questions will be set from each of the four units, out of which the students will be required to attempt one question from each unit. Long-answer type questions will carry 12 marks each.

iv) All questions will carry equal marks.

**Objectives:** After completion of this course the student teachers will be able to:

- Understanding diversity that exists in microorganisms.
- Understand the morphology, organization, structure, and reproduction in microbes.
- Appreciate the role and significance of microbes in human welfare and environment.
- Study the symptoms of selected diseases caused by microbes.

## COURSE CONTENTS

**Unit I: Viruses and Bacteria**

- Structure, multiplication, transmission and disease symptoms of viruses
- Structure and economic importance of Mycoplasma
- Bacteria – structure, nutrition, reproduction and economic importance. Gram's staining
- General account and economic importance of Cyanobacteria. Study of *Spirulina, Nostoc* and *Oscillatoria.*

**Unit II: Algae**

- General account of occurrence, structure, thallus organization, reproduction, economic importance and classification (classification of Fritsch).
  - Study of the structure, reproduction and life-cycle of the following:
  - Chlorophyceae: *Chlamydomonas, Volvox*, *Oedogonium,*
  - Phaeophyceae: *Sargassum*
  - Rhodhophyceae: *Polysiphonia, Batrachospermum*
  - Bacillariophyceae: General account, structure and reproduction of diatom, economic importance.

**Unit III: Fungi**

- General characters, thallus organization, reproduction, economic importance and classification (Alexopoulos and Mims).
- Study of structure, reproduction, life-cycle and phytopathology and/or economic importance of the following:
  - Myxomycetes -*Stemonitis*
  - Phycomycetes –*Albugo, Phytophthora*
  - Ascomycetes – Yeast, *Penicillium*

**Unit IV: Lichens**

- Study of structure, reproduction, life-cycle, phytopathology and economic importance of the following:
  - Basidiomycetes – *Puccinia, Agaricus,*
  - Deuteromycetes – *Cercospora, Colletotrichum, Alternaria*
- Lichens – General characters, distribution, types, structure, reproduction, economic and ecologicalimportance.

**Suggested Readings:**


1. Smith, G.M.,1971, Cryptogamic Botany Vol.I, Algae & Fungi, TMH Publishing Co., NewDelhi.
2. Sharma,O.P.,1992,TextbookofThallophytes,TMHPublishingHouse,NewDelhi.
3. Pandey, B.P., A Text book of Algae, Sultan Chand & Co., NewDelhi.
4. Sharma, P.D. 2005, The Fungi, Rastogi Publications,Meerut.
5. Singh, V., P.C.Pande & D.K.Jain, 2007, Diversity of Microbes and Cryptogams, Rastogi Publications,Meerut.
6. Singh.V.P.C.Pande & D.K.Jain, 2006. A Text book of Botany, Rastogi Publications, Meerut.
7. Kumar, H.D., A Textbook ofAlgae.
8. Alexopoulos.C.J. IntroductoryMycology.
9. Dubey H.D. A Text book of Fungi, Bacteria andViruses.
10. Chopra, A Class book of Fungi, S.Nagin & Co.,Jullandar.

**Practicals**

| Distribution of Marks for End Semester Practical Examination | |
|---|---|
| **Activity** | **Marks** |
| Experiments | 10 |
| Viva Voce | 5 |
| Record | 5 |
| **Total Marks** | **20** |

**Course Outline:**

- Gram staining of bacteria.
- Identification, Observation and Section cutting of diseased material infected by Fungi, Bacteria, Viruses and Mycoplasma.
- Study of the genera included in theory syllabus of Algae and Fungi by making temporary micro preparations and observation of permanent slides.
- Study of crustose, foliose & fruticose Lichens.

**GROUP C: CORE COURSE (CC)**
**Semester I**
**Core Course 3(I): MATHEMATICS: CALCULUS**

Time: 3 Hours | Max. Marks: 100
Credit- 4 | Theory: 80, Internal: 20

NOTE FOR PAPER SETTER FOR THEORY EXAMINATION

i) Paper setter will set 9 questions in all, out of which students will be required to attempt 5 questions.

ii) Q.No. 1 will be compulsory and will carry 16 marks. There will be atleast 4 short-answer type questions selected from the entire syllabus.

iii) Two long answer type questions will be set from each of the four units, out of which the students will be required to attempt one question from each unit. Long-answer type questions will carry 16 marks each.

iv) All questions will carry equal marks.

**Objectives**: At the end of course, learner will be able to:

(i) Apply concepts of differentiation in single variable and several variables.
(ii) Apply concept of definite integral in finding area between curves, length of curve, surface area, volume of solid of revolutions including applications of double and triple integral.
(iii) Apply concepts of Vector calculus i.e; Vector functions, Vector fields, directional derivatives, gradient, divergence and curl of Vector, line integrals and surface integrals.

## COURSE CONTENTS

**Unit I:**

Tangents and Normal, sub tangent and subnormal (Cartesian and polar forms), Derivative of an arc (Cartesian and polar), pedal equations, curvature, Asymptotes, multiple points, curve tracing (Cartesian, parametric and polar), Envelops and Evolutes.

**Unit II:**

Functions of several variables, Partial differentiation with Euler's theorem and its applications, total derivative, change of variables (polar to Cartesian and vice-versa), concept of tangent plane and normal to a surface, maxima and minima of two variables including method of undetermined multipliers.

**Unit III:**

Applications of definite integral: Area between two curves, Polar coordinates, Cylindrical and Spherical coordinates, Graphs of polar coordinates, Area between

two curves when their equations are given in polar coordinates, Length of a curve, Surface area, Area of surface of revolution, method of Lagrange multipliers. Double integral, Volumes and Areas. Change of variable in a double integral, special case: Polar coordinates, Triple integral, Applications. Change of variables in a triple integral.

**Unit IV:**

Continuity and differentiability of vector functions, unit tangent vector, Vector fields, Directional derivatives, Gradient, Divergence and Curl of a vector field, Line integrals, Surface integrals, Green's Theorem, Gauss divergence theorem, Stokes' Theorem.

**Suggested Readings:**


1. Advanced Engineering Mathematics: E. Kreyszig, 9th ed., Wiley Eastern, 2011.
2. Engineering Mathematics: Ram Babu, Pearson, India, 2010.
3. Calculus Vol. 1 and 2: T.M. Apostol (2007) Wiley
4. Calculus: M. Spivak (2006) Cambridge
5. Calculus: J. Stewart (2012) Cengage Learning
6. Calculus and AnalyticGeometry: G.B. Thomas, R. Finney (1995) Addison-Wesley.

**GROUP E: PROFESSIONAL EDUCATION COURSES (PEC)**
**I: Perspectives in Education (PE)**
**Semester I**
**PEBE 101: BASICS IN EDUCATION**

Time: 3 Hours Max. Marks: 100
Credit- 4 Theory: 80, Internal: 20

NOTE FOR PAPER SETTER FOR THEORY EXAMINATION

i) Paper setter will set 9 questions in all, out of which students will be required to attempt 5 questions.

ii) Q.No. 1 will be compulsory and will carry 16 marks. There will be atleast 4 short-answer type questions selected from the entire syllabus.

iii) Two long answer type questions will be set from each of the four units, out of which the students will be required to attempt one question from each unit. Long-answer type questions will carry 16 marks each.

iv) All questions will carry equal marks.

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

- Understand and analyze educational concepts, their premises and contexts that are unique to education.
- Understand the nature and purpose of education with reference to school knowledge.
- Learn to avail opportunity for interactive and reflective modes of learning.
- Understand the concepts of teacher and learner's autonomy.
- Become aware of importance to values and value formation process in education.

**COURSE CONTENTS**

**Unit I: Education: Nature, Purpose and Process**

- Meaning, Nature, Purpose and Importance of Education: Education as a purpose of development (individual, social and harmonious).
- Education as an intentional (intellectual and self- critical) and unintentional.
- Agencies of education: Family, Society and Institute.
- Processes and Modes of Education: Education is a natural and social process. Education as an ability to question.and imagine alternatives. Education in schools and its linkage with outside school experience.

**Unit II: Knowledge and Knowing**

- Concept, Meaning and Nature of Knowledge and Knowing.

- Differentiate between information, knowledge, belief and truth.
- Knowing Process: Different ways of knowing, Knowledge construction, Process of Construction of Knowledge. Relative roles of knower and known in knowledge transmission and construction, Limitations of knowing, role of culture in knowing.
- Facets of knowledge: Different facets of knowledge and relationship, such as: local and universal, concrete and abstract, theoretical and practical, contextual and textual, school and out of school with an emphasis on understanding special attributes of school knowledge.
- Reflection on knowledge in the form of curriculum, syllabus and textbooks.

**Unit III: Autonomy of Teacher and Learner**

- Autonomy of teacher- why, what and to what extent. Difference between autonomy and freedom. Teacher's autonomy and its importance in enriching learning environment. Relationship between autonomy and accountability. Hindering factors that affect teacher's autonomy.
- Autonomy of learner- why, what and to what extent, Restrains on learners in schools. Learning without burden, Joyful, collaborative and cooperative learning. Individual autonomy and collective responsibility of teacher and learner.

**Unit IV: Education and Values**

- Concept and nature of values- Relative and absolute. Education with reference to human rights and values. Values prevalent in Indian Constitution and society. Education is a normative endeavor.
- Process of value formations in schools and out of schools and its impact on learners' value perspective. Role of education in transmission of values in society. School system to nurture a culture of peace.

**Modes of Learning Engagement:**

- The Course is visualized to be conducted through group discussion, self- study and reflection.
- The study of themes in each unit will be done through a range of activities such as: initiation of the dialogue within the group, organizing study groups, organizing discussion in small groups, or planning for short presentations.
- The sub-themes organized as units of the course, can be discussed by student teachers (using their own experiences and common-sense understanding, to begin with).
- Teacher educators will be present and participate in the plenary discussions as 'facilitators'.

**Practicum/Tutorials:**

Some activities for practicum are listed below.

- Individual self-study of a text/ article, with theme questions in mind
- Group study of a text/ article on a given theme
- Observational studies and activities: it may be worthwhile to carry out observations in the field, record what is observed and use the information while discussing with either teacher educator or peers.

- Observation with a purpose to reflect on knowledge preservation, transmission/construction and generation in oral, written, and technological traditions.
- Observation of schools, teachers, student activities in a school context.
- The student- teachers will maintain a portfolio of observations and notes on discussions; these will be submitted periodically to the faculty for appraisal and feedback.

**Suggested Readings:**


1. Agrawal, A. (1995). Dismantling the Divide between Indigenous and Scientific Knowledge: Development and Change. 26:413-39
2. Ant Weiler, C. (1998). Low Knowledge and Local Knowing: An Anthropological Analysis of Contested "Cultural Products" in the Context of Development. Anthropos. 93:46-94.
3. Chomsky, N. (1986). Knowledge of Language. New York. Prager.
4. Datta, D.M. (1972). Six ways of Knowing. Calcultta. Calcutta University Press,
5. Dewey, John (1997). Experience and Education, Touchstone, New York.
6. Krishna Murthy, J. (1947). On Education, New Delhi. Orient Longman.
7. Kumar Krishna (1996). Learning From Conflict, New Delhi: Orient Longman.
8. Peters, R.S. (1967). The Concept of Education, UK: Routledge.
9. Margaret, K.T. (1999). The open Classroom, New Delhi. Orient Longman.
10. Prema Clarke (2001). Teaching & Learning: The Culture of pedagogy, New Delhi: Sage Publication.
11. Steven H. Cahn. (1970). The Philosophical Foundation of Education, New York. Harper & Row Publishers.
12. Sykes, Marjorie. (1988). The Story of Nai Taleem. Wardha. Nai Taleem Samiti.

**GROUP F: SKILL ENHANCEMENT COURSES (SEC)**

**Semester I**

**WEAP 101: WORK EDUCATION (AGRICULTURE PRACTICE)-I**

Time: 1.5 Hours Max. Marks: 50

Credit- 4 Theory: 40, Internal: 10

NOTE FOR PAPER SETTER FOR THEORY EXAMINATION

i) Paper setter will set 9 questions in all, out of which students will be required to attempt 5 questions.

ii) Q.No. 1 will be compulsory and will carry 8 marks. There will be atleast 4 short-answer type questions selected from the entire syllabus.

iii) Two long answer type questions will be set from each of the four units, out of which the students will be required to attempt one question from each unit. Long-answer type questions will carry 8 marks each.

iv) All questions will carry equal marks.

**Objectives of the Course:** On completion of the course, the student teacher will be able to-

- Identify seeds of common crops and vegetables.
- Recognise manures and fertilizers used commonly.
- Understand characteristics of seeds and seedling.
- Identify different summer and winter flowers.
- Acquire skills to horticulture practices.
- Inculcate healthy values related to work culture

**Modes of Learning Engagement:** Hands on experiences, Activity based learning, Experimentation, Interactive engagement, Group work, Peer learning, Project work.

## COURSE CONTENTS

**Unit I:**

**Agriculture:** Meaning, definition, scope, history, branches and objectives.

**Unit II:**

**Soil Science:** Definition of pedology, soil management, soil erosion, soil conservation practices; structure of soil, soil profile; soil fertility and productivity, essential plant nutrients. Fertilizers and manures including bio-fertilizers. Identification of manures and fertilizers.

**Unit III:**

**Irrigation:** Definition, method of irrigation, systems of irrigation, drainage, irrigation pattern of India.

**Horticulture:** Definition, branches of horticulture, layout of orchards, propagation by seeds and by vegetative means; Pot filling technique; Planning, planting and maintaining lawn; Practice related to landscaping.

**Unit IV:**

**Agricultural practices:** Preparation of land, selection of seeds, watering, thinning, hoeing and weeding, harvesting of crop, identification of important agricultural tools, trees and crop plants. Minor project preparation on agriculture.

**Suggested Readings:**


1. Jitendra Singh, Basic Horticulture (Kalyani Publishers, New Delhi, 2012).
2. Dr. Jaiveer Sing, Plant Propagation & Nursery Husbandry (Rama Publishing House, Meerut, 2002).
3. Dr. Rajveer Singh & Dr. O.P. Rajput, Principles of Agronomy, Scientific Crop Production (Kushal Publications and Distributors, Varanasi, 2008).
4. Dr. K.N. Dubey, Fruit Production in India (Rama Publishing House, Meerut, 2008).


**PRACTICAL**

**Practicum:** All the following experiments are to be done. Few more experiments may be set at the institutional level.

(a) **Identification of agronomy of following crops:**

- Wheat
- Bajra
- Maize
- Rose etc.

(b) **Agricultural Processes:**

- Irrigation
- Training and Pruning
- Hoeing and Weeding
- Seed Bed preparation
- Nursery Management.

**GROUP F: SKILL ENHANCEMENT COURSES (SEC)**

**Semester I**

**WEEE 101: WORK EDUCATION (ELECTRICITY & ELECTRONICS)-I**

Time: 1.5 Hours | Max. Marks: 50

Credit- 4 | Theory: 40, Internal: 10

NOTE FOR PAPER SETTER FOR THEORY EXAMINATION

i) Paper setter will set 9 questions in all, out of which students will be required to attempt 5 questions.

ii) Q.No. 1 will be compulsory and will carry 8 marks. There will be atleast 4 short-answer type questions selected from the entire syllabus.

iii) Two long answer type questions will be set from each of the four units, out of which the students will be required to attempt one question from each unit. Long-answer type questions will carry 8 marks each.

iv) All questions will carry equal marks.

**Objectives of the Course:** on completion of the course, the students will be able to-

- Recognize and use different tools/materials/instruments.
- Read the sketch/drawing of the job/project.
- Develop the skills for making simple projects/models.
- Acquire skill to assemble/prepare simple electric circuits.
- Acquire skill to use electronic components.
- Identify faults in electronic components.
- Develop the ability in repairing simple instruments used at secondary level.
- Inculcate healthy values related to work culture.

**Modes of Learning Engagement:**

**Constructivist Approach:** Hands on Experience, Activity used Learning, Experimentation Interactive Engagement, Group work, Peer Learning, Project Work

## COURSE CONTENTS

**Unit I:**

**Symbols, Tools and Soldering:** Precautions used for making any electrical connection, Identification of conductors & insulators. Symbols for electrical components, knowledge of electrical accessories and their rating.

Tools used for making any electrical connection, their sizes and use.

Hand soldering, Soldering alloy, soldering flux and de-soldering pump. Practice of hand soldering.

**Unit II:**

**Wires, Wirings and connections of lamps:** Different types of wire, use of SWG, Different types of wiring such as: Batten wiring, CTS wiring, casing capping wiring, Cleat and conduit wiring. Their advantage and disadvantage on each other. Series

and parallel connections of lamps (up to four lamps). Staircase wiring of one, two and three lamps, Go-down wiring, connection for fan.

**Unit III:**

**Electrical Components and Appliances:** Color coding in resistor and Capacitor, use of resistor and capacitor in electrical appliances,

**Understanding the working of electrical appliances:** Electric iron, room heater, Immersion heater, geyser, Electric bell, emergency light

**Unit IV:**

**Electronic Components and Their Use:** Semiconductor materials, Semiconductor diode, Diode testing, Zener diode, LED, Photo diode, Solar cell, Rectification by diodes, Voltage multiplication by diodes.

**Suggested Readings:**


1. Electrician - I Year- Trade Theory Published by National Instructional Media Institute, Chennai re-print 2007
2. Electrician - II Year- Trade Theory Published by national Instructional Media Institute Chennai re-print 2007
3. Electrical Machinery Published by Krishna Publisher Delhi Author P.S. Bhimbhara re-print 2007
4. N.N. Bhargava, D.C Kulshrestha and S.C Gupta, Basic Electronics and Liner Circuits. Tata Mc. Graw Hills Ltd. New Delhi(2000)
5. B.L. Theraja, Basic Electronics, S.Chand New Delhi, (2005)


**Practical**

All the following experiments are to be done. Few more experiments may be set at the institutional level.

Preparation of Projects/Models based on the following **(Only Suggestive)**-

1. Clap switch
2. IR Remote switch (fan, tube light)
3. Remote operated musical bell
4. Alarm for luggage security
5. Mobile cell-phone charger using cell
6. Power supply failure alarm
7. Blown fuse indicator
8. Rectifier
9. Voltage Multiplier
10. Transistor Amplifier