KURUKSHETRA UNIVERSITY, KURUKSHETRA

B.Sc..B.Ed.- 2nd SEMESTER SYLLABI AS PER CBCS PATTERN

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

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

**Semester II**

**AEC1(II): LANGUAGE SKILLS (HINDI)**

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 internalise 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-2**

Aadhunik Hindi Sahitya ka Itihas [1857 Se Lekar Ab Tak]

**Unit II : Modern Poetry-1 [Pre-Independence Literature]**

Swatantratapurva Hindi Kavita Ka Vikas

1. Maithilisaran Gupt- Nar Ho Na Nirash Karo Man ko
2. Jayshankar Prasad- Himadri Tung Sring Se Prabudh Sudhha Bharti
3. Suryakant Tripathi Nirala- Joohi ki Kali
4. Sumitranandan Pant- Drut Jharo Jagat Ke Jirn Patra
5. Mahadevi Verma-MaiNeer Bhari Dhukh Ki Badli,

**Unit III : Modern Poetry-2 [Post-Independence Literature]**

Swatantrayottar Hindi Kavita Ka Vikas

1. Gajanan Madhav Muktibodh- Bhool Galti,
2. Kedarnath Agrawal- Chandra Gahna Se Lautati Ber
3. Raghveer Sahay- Aapki Hansi
4. Nagarjun- Aakal Aur Uske Bad
5. Kedarnath Singh- Aakal Me Saras

**Unit IV : Communication skills Conversation [Varta]:**

Characteristics – Definition – Styles of conversation – Higher order skills- Telephonic conversation, Role Play, – Models, etc. – Exercises.

References:


1. Hindi Sahitya Ka Itihas: Ramchandra Sukla, Vani Prakashan, Delhi
2. Hindi Sahitya ka Aadikal: Hajari Prasad Divedi, Vani Prakashan, Delhi
3. Hindi Sahitya Ka Itihas: Dr Nagendra , Mayoor Paperbacks, Delhi
4. Hindi Sahitya Ka Sanchhipt Itihas: Nanddulare Bajpayee, Swaraj Prakashan, Delhi
5. Hindi Sahitya Ka Dusara Itihas: Bacchan Singh, Vani Prakashan, Delhi
6. Aadhunik Hindi Sahitya ka Itihas: Bacchan Singh, Lokbharti Prakashan, Delhi
7. Hindi Sahitya ka Sanchhipt Itivritt: Shivkumar Mishra, Vani Prakashan, Delhi
8. Hindi Sahitya ka Sanchhipt Itihas:Viswanath Tirpathi, Orient Longman, Delhi
9. Sawtantrayotar Hindi Sahitya Ka Itihas: Dr Laxmisagar Vasney, Delhi
10. Hindi Sahitya Aur Samvedana Ka Vikas: Ramswaroop Chaturvedi, Lokbharti Prakashan
11. Bhasha, Yugbodh aur Kavita: Dr Ramvilas Sharma, Vani Prakashan, Delhi
12. Kavita ka Vartmaan: Dr P Ravi, Vani Prakashan, Delhi
13. Hindi Kvaya ka Itihas: Ramswaroop Chaturvedi, Lokbharti Prakashan, Delhi
14. Kavita ki Zameen aur Zameen ki Kavita: Namvar Singh, Rajkamal Prakashan, Delhi
15. Nayee Kavita aur Astitvawad: Ramvilas Sharma, Rajkamal Prakashan,Delhi
16. Chhayavad: Namvar Singh, Rajkamal Prakashan, Delhi
17. Kavita ke Naye Pratiman: Namvar Singh Raajkamal Prakashan, Delhi
18. Hindi Kavita ka Atit aur Vartmaan: Maneger Panday, Vani Prakashan, Delhi
19. Hindi Kavita Ki Tisari Dhara: Mukesh Manas, Swaraj Prakashan, Delhi
20. Effective Communication Skills, by Omkar N Kour
21. Prayojanmoolak Hindi- Madhav Sontakke, Rajkamal Prakashan Samooh, Delhi
22. Prayojanmoolak Hindi ki Nayee Bhoomika- Kailash Nath Panday, Rajkamal Prakashan Samooh, Delhi
23. http://www.hindisamay.com


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 II**

**AEC1(II): LANGUAGE SKILLS (ENGLISH)-II**

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 CONTENT**

**Unit I: Descriptive Grammar**

Function of Auxiliaries; Modals; Question form
Clauses: Noun Clause; Reported Speech and Change of Voice.

**Unit II: Development of Language Competence**

To be based on the use of multiple texts which address issues of multiculturalism, gender, racism and texts which relate with current issues and contemporary trends.

Short stories, comic strips, cartoons and animations (both print and non-print media) to be used. Speeches of famous persons, diaries, travelogues can also be used.

**Unit III: Writing for Functional Purposes**

Letter-writing (Professional / Personal)

**Unit III: Creative Skills in Writing**

Writing dialogues, poems and essays

**Unit IV: Basic Phonetics**

Sounds of English language, intonation and transcription using IPA.

References:


1. Chan. et al. (1997) Professional Writing Skills, San Anselma, CA
2. Fiderer, A. (1994) Teaching Writing: A Workshop Approach. Scholastic.
3. Block, C.C. (1997). Teaching the Language Arts, 2nd Ed. Allyn and Bacon
4. Mckay. et al. (1995). The Communication Skills Book, 2 nd Ed. New Harbinger Publications.
5. Merrriam, E. (1964). It Doesn't Always Have to Rhyme. Atheneum.
6. Hyland, Ken (2004) Second Language Writing. University of Michigan Press.
7. Graves,D (1992). Explore Poetry: The reading /writing teacher's companion. Heinemann
8. Stone Douglas (1999). Difficult conversations: How to discuss what Matters Most, New York.:Penguin Books.
9. Gabor Don (2001). How to start a Conversation and Make Friends, New York: Fireside.

**GROUP A: ABILITY ENHANCEMENT COMPULSORY COURSES (AECC)**
**Semester II**
**AEC2(II): INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN EDUCATION-II**

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

- Explain the process and stages of instructional design.
- Design anddevelopteachnologyintegratedlearningexperiencesusing ICT tools.
- Explain the different pedagogical approaches of ICT integration in education.
- Develop skills in using various e-learning tools and technologies.
- Plan, develop, and use multimedia based learning content using open source authoring software.
- Create and use Open Educational Resources under different CC licenses.
- Use various online and offline ICT tools for assessment.
- Appreciate the scope of ICT for improving the personal productivity and professional competencies.
- Explain the emerging trends in information and communication technology.

**Course Contents**

**Unit I: Instructional Design and E-content**

- Instructional Design – concept, principles, models and stages of instructional design.
- Basic Understanding of Audio-Visual Studio
- Basic Photography Aesthetics

- Types of Camera and Microphones
- Multi Camera Setup
- Various Formats of Video and Audio
- Shot Division/ Types of Shot Sizes and their impact on narrative/ continuity
- Genres in Video Communication
- Steps in the Video Production
- Multimedia tools- Audio editing, video editing, screen casting, graphic editing, and basics of animation, and creating interactive media.
- Designing, developing and using Massive Open Online Courses (MOOCs).

**Unit II: ICT and Pedagogy**

- Approaches to integrating ICT in teaching and learning.
- Techno pedagogical content knowledge (TPCK).E-learning: concept, types, characteristics, advantages and limitations. E-learning tools and technologies, Learning Management Systems (LMS).
- Flipped classrooms: meaning and possibilities.
- Web quest and virtual field trips: concept, process, and use in the classroom.Subject specific ICT tools for creating and facilitating learning.Designing technology integrated authentic learning designs and experiences.
- ICI integrated Unit plan – Web 2.0 for creating constructivist learning environment.
- Assistive technology for special needs and inclusion: tools and processes, ICT and Universal design for Learning (UDL).
- ICT for Assessment: Online and offline assessment tools – rubrics, e-portfolio, survey tools, puzzle makers, test generators, reflective journal, question bank.

**Unit III: Designing and Developing E-Content**

- Learning theories – implications for instructional design
- E-learning courseware (e-content) design
- Identifying and organizing course content: need analysis(learner, content, task), learning objectives, course sequence.
- Designing instructional media, evaluation, and delivery strategies.
- Creating interactive content – story board, courseware outline, interactivity and interface.
- Courseware delivery and evaluation.
- Reusable learning objects (RLO)– meaning, types and characteristics, RLO repositories, metadata and standards.

- E-content authoring tools- open source and proprietary alternatives.
- Open Educational Resources – Meaning and importance, various OER initiatives, creative common licensing.

**Unit IV: ICT for Educational Management and Professional Development**

- ICT for personal management: email, task, events, diary, networking.
- ICT for educational administration: scheduling, record keeping, student information, electronic grade book, connecting with parents and community, Library Automation.
- ICT for professional development: tools and opportunities.
- Electronic teaching portfolio- concept, types, tools, portfolio as a reflective tool for professional development.
- Self-directed professional development: role of ICT.
- Teacher networks and community of practice, web conferencing- tools and techniques.
- Technology and design based research and its pedagogical implications for professional development.
- Emerging Trends in ICT and its educational implications: augmented reality, 3D printing, learning analytics, digital games, artificial intelligence.

**Sessional activities:**

- LMS experience- hands on various features of LMS – the ICT course may be provided through LMS.
- Enrolling and completing some MOOC courses of interest.
- Creating resources for flipped classroom and practicing flipped learning in school.
- Evaluating OER resources. Creating and sharing OER materials- may be in NROER.
- Developing technology integrated unit/lesson plan and trying out this in the school.
- Hands on experience on subject specific software tools like geogebra.
- Evaluation of RLO repositories and creating RLO and uploading to repositories.
- A critical study of some e-learning courses and enrolling and completing some free e-learning courses.
- Developing a multimedia e-content for a topic using eXe Learning.
- Creating screen cast video of a lesson.
- Creating a podcast using audacity and sharing it on podcasting site.

- Shooting, editing, producing and sharing of videos segment on any educational topic.
- Creating a simple 2D animation using pencil or Tupi.
- Creating and editing various graphics.
- Planning and creating digital rubrics for any topic.
- Organize web conferencing using Skype.
- Review of ICT labs (plans and equipments/resources) in school from internet.
- Interview of computer hardware engineer/ICT specialist regarding Hardware planning, evaluation, maintenance and up gradation.
- Developing an electronic assessment portfolio.
- Developing an electronic teaching portfolio.
- Readings on emerging ICT trends in education.
- Using FOSS tools for timetabling, grade sheet.

**Suggested Readings:**


1. Athanassios Jimoyiannis (Editor) (2011). Research on e-Learning and ICT in Education. Springer: USA
2. Costantino, P.M., DeLorenzo,M.N., Kobrinski,E.J. (2006).Developing a professional teaching portfolio: a guide for success. Pearson
3. Christopher Moersch(2009). Beyond Hardware-Using Existing Technology to promote Higher-Level thinking. Viva Books: New Delhi.
4. David Moursund (2009).Project Based Learning- Using Information Technology-Second Edition. Viva Books: New Delhi.
5. Howard Pitler, Elizabeth R. Hubbell, and Matt Kuhn.(2012)Using Technology with Classroom Instruction That Works, 2nd Edition. ASCD:Denver
6. Liz Arney (2015)Go Blended!: A Handbook for Blending Technology in Schools
7. M. D. Roblyer, Aaron H. Doering (2012). Integrating Educational Technology into Teaching (6th Edition)
8. Mohit K (2003). Design and implementation of Web-enabled Teaching Tools : IRM Press, UK.
9. Pradeep Kumar (2011). Web Resources in Pedagogy . Apple Academics: Oakville.
10. Sonny Magana, Robert J. Marzano (2013).Enhancing the Art & Science of Teaching With Technology (Classroom Strategies)

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

**Semester II**

**Core Course1(II): PHYSICS: MATHEMATICAL BACKGROUND, PROPERTIES OF MATTER AND ELECTROMAGNETIC WAVES**

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 students will be able to:

- Acquaint with the key concepts of mathematical background, properties of matter and electromagnetic waves.
- Apply the concepts in various real life situations.

- Solve the problems based on mathematical background, properties of matter and electromagnetic waves.
- Apply the theory in execution of practicals.

**Course-Contents**

**Unit: I**

**Scalars and Vectors:** dot products, triple vector product, gradient of scalar field and its geometrical interpretation, divergence and curl of a vector field, line, surface and volume integral, Flux of a vector field, Gauss divergence theorem, Green's theorem and Stoke's theorem. Functions of two and three variables, Partial derivatives, geometrical interpretation of total differential of a function of two and three variables, Higher order derivatives and their applications.

**Unit: II**

Elasticity, Small deformations, Young's modulus, bulk modulus and modulus of rigidity for anisotropic solid, Poisson's ratio, relation among elastic constants,Theory of bending of beams and cantilever, Torsion of a cylinder, Bending moments and Shearing forces.

**Unit: III**

Kinematics of moving fluids, Equation of continuity, Euler's equation, Bernoulli's theorem, viscous fluids,Streamline and turbulent flow, Poiseuill's law, Capillary flow, Reynold's number, Stoke's law, Surface tension and surface energy, molecular interpretation of surface tension, Pressure on a curved liquid surface, wetting.

**Unit: IV**

Faraday's law (it's integral and differential form), Energy in a static magnetic field, Measurement of self-inductance by Rayleigh's method, Maxwell's displacement current, Maxwell's equations, Electromagnetic field and Energy density.

Plane electromagnetic wave in vacuum, Pointing vector, Reflection and Refraction at a plane boundary of dielectrics, Polarization by Reflection and total internal Reflection, Faraday effect, Wave in conducting medium, Reflection and Refraction by the ionosphere.

**Suggested Readings:**


1. Haliday and Resnik, Physics-VI Ed.
2. D.J Griffith "Introduction to electrodynamics", (Prentice Hall of India A.M parties, Electomagnetic field.
3. V.V Sarvate, Electromagnetic field and Waves , (Wiley Eastern Ltd., New Delhi)
4. S.N Ghosh, Electromagnetic theory and wave propagation, (Narosa Publishing House.)
5. D.S. Mathur, Mechanics, (S. Chand Publishing)
6. R.K. Shukla, AnchalSrivastava, Mechanics, (New Age International Publishers)


**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.**

1. To determine Young's modulus by bending of beam.
2. To determine Y, η and σ by Searle's method.
3. To determine dispersive power of prism.
4. To determine modulus of rigidity of material of wire using Maxwell's needle.
5. To determine modulus of rigidity by static vertical method.
6. To determine modulus of rigidity by static horizontal method.
7. To study the characteristics of transistor and determine and common base and common emitter configuration.
8. To determine the frequency of AC Mains.
9. To study the frequency response and phase relationship of A.C. in a R.C. series circuit.

## GROUP C: CORE COURSE (CC)

### Semester II

### Core Course2(II): CHEMISTRY: PHYSICAL CHEMISTRY

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 acquire basic knowledge to students teachers about Mathematical concepts and learn the basic concepts of nuclear radioactivity and Nuclear reactions.
- To enhance the understanding of students in concepts related to Liquid, Colloidal states & Structure of Ionic solids, Behaviour of Gases, concepts in

thermodynamics, different thermodynamic quantities such as heat and work and how are they measured, related or transformed from one to the other.

**Course Contents**

**Unit I: Mathematical concepts and Nuclear Chemistry**

- **Mathematical Concepts**: Logarithmic relations, curve sketching, linear graphs and calculation of slopes, differentiation of functions like $k_x$, $e^x$,$x^n$, sin x, log x; maxima and minima, partial differentiation and reciprocity relations, Integration of some useful/relevant functions; permutations and combinations, Factorials, Probability.
- **Nuclear Chemistry:** Radioactive decay – decay law, disintegration constant, half-life and average life, alpha and beta disintegration reactions, group displacement law, nuclear reactions fission, fusion, artificial radioactivity, applications of radioactivity, nuclear power, carbon dating, biological effects of various types of radiations, nuclear chemistry for peace, Nuclear chemistry in Medicine and diagnostic techniques.

**Unit II : Liquid, Colloidal states & Structure of Ionic solids**

- **Liquid State:** Intermolecular forces, structure of liquids (a qualitative description).Structural differences between solids, liquids and gases, Liquid crystals: Difference between liquid crystal, solid and liquid, Classification, structure of nematic and cholestric phases, Thermography and seven segment cells.
- **Colloidal States:** Definition of colloids, classification of colloids, Solids in liquids (sols): properties – kinetic, optical and electrical; stability of colloids, protective action, Hardy-Schulze law, gold number. Liquids in liquids (emulsions): types of emulsions, preparation, Emulsifier, Liquids in solids (gels): classification, preparation and properties, inhibition, general application of colloids, colloidal electrolytes.
- **Structure of Ionic solids**: Definition of space lattice, unit cell; Laws of crystallography – (i) Law of constancy of interfacial angles, (ii) Law of rationality of indices (iii) Law of symmetry, Symmetry elements in crystals. X-ray diffraction by crystals, Derivation of Bragg's equation, Determination of crystal structure of NaCl, KCl and CsCl (Laue's method and powder method).

**Unit III : Behaviour of Gases**

- **Gaseous States:** Postulates of kinetic theory of gases, deviation from ideal behaviour, Vander Waals' equation of state;
- **Critical Phenomena**: PV isotherms of real gases, continuity of states, the isotherms of van der Waals equation, relationship between critical constants and Van der Waals' constants, the law of corresponding states, reduced equation of state.
- **Molecular Velocities**: Root mean square, average and most probable velocities, Qualitative discussion of the Maxwell's distribution of molecular velocities,

collision number, mean free path and collision diameter, Liquification of gases (based on Joule – Thomson effect).

**Unit IV : Thermodynamics**

- *First Law of Thermodynamics*: Statement, definition of internal energy and enthalpy.Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law-Joule-Thomson coefficient and inversion temperature. Calculation of w, q, dU, &dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process, temperature dependence of enthalpy, Kirchhoff's equation.
- *Second law of thermodynamics*: Need for the law, different statements of the law. Carnot cycle and its efficiency, Carnot theorem. Thermodynamic scale of temperature. Concept of entropy: entropy as a state function, entropy as a function of V & T, entropy as a function of P & T, entropy change in physical change, Clausius inequality, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.
- *Third law of thermodynamics*: Nernst heat theorem, statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data. Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities, A &G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G with A with P, V and T.

**Suggested Readings:**


1. Engel, Physical Chemistry, Pearson Publications.
2. Mary Anne White, Physical Properties of Materials, Taylor & Francis second edition.
3. D N Bajpai, Advanced Physical Chemistry, S. Chand Publishing
4. S Lewis and D Gladstone, Elements of Physical Chemistry, Macmillan.
5. Peter Atkins Julio de Paula, The elements of Physical Chemistry, Oxford University Press.


**Practical**

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

**1. Colloids**

- To prepare arsenious sulphide sol and compare the precipitating power of mono - , bi- and trivalent anions.

**2. Viscosity**

- To determine the percentage composition of a given mixture (non interacting systems) by viscosity method.

- To determine the percentage composition of a given binary mixture by viscosity method (acetone & ethyl methyl ketone)

**3. Surface Tension**

- To determine the surface tension of amyl alcohol in water at different concentrations and calculate the excess of these solutions.
- To determine the percentage composition of a given surface tension binary mixture by surface tension method (acetone &ethyl methyl ketone).

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

**Semester II**

**Core Course3(II): ZOOLOGY: 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 in respect of vertebrates – their organizational hierarchies and complexities, the evolutionary trends in external morphology and

comparative studies of internal structures; identification and classification with examples; to enable them to understand various modes of adaptations in animals.

**Course Contents**

**UNIT: I**

An outline classification of chordates up to orders but up to subclasses only in case of proto-chordate groups and mammals.

Comparative anatomy of vertebrates from an evolutionary point of view of the following:-

(i) Integument including structure and development of placoid scales, feathers and hair.

(ii) Heart and aortic arches.

(iii) Kidney and associated urinogenital ducts

Habit and habitat, reproduction (excluding development) and affinities to following types:-

a) Hemichordate: *Banlanoglossus*

b) Urocohordata:*Herdmania,* ascidian tadpole larva and its metamorphosis.

c) Cephalochordata: *Amphioxus*

**Unit: II**

Habit, habitat, of the following types:

a)Agnatha: Petromyzon (affinities with other vertebrate groups), affinities of Cyclostomates.

b) Pisces: *Scoliodon* (Digestive system, respiratory system, blood vascular system, urinogenital system, nervous system (central and peripheral) including sense organ)

c) Scales and fins of fishes.

**Unit: III**

Habit, habitat, structure (morphology, digestive system, respiratory system, blood vascular system, nervous system and urinogenital system of the following types:-

a) Amphibia *: Hoplobatrachus tigerinus*

b) Reptilia*: Sara hardwickii*

c) Venomous and non-venomous snakes, poison apparatus and biting mechanism. First aid of snake bite.

d) Parental care in Amphibia.

**Unit: IV**

Habit, habitat, structure, morophology, digestive system, respiratory system, blood vascular system, nervous system and urinogenital system of the following types:-

a) Aves: *Columba*

b) Mammalia: *Rabbit*.

c) Origin of birds, migration & flight adaptation of birds.

**Suggested Readings:**

1. Modern Textbook of Zoology: Vertebrate by R.L. Kotpal – Rastogi Publication, Merrut, 3rd Edition,2008

2. A Textbook of Zoology Vol. II by Parkar and Hasswel – (MacMillan)
3. A Textbook of Zoology Vol. II by R.D. Vidyarthi – (S. Chand & Co. Delhi)
4. Life of Vertebrates by J. Z. Young – (Oxford University Press)
5. The Vertebrates by A.S. Romer – (vakils, Ferrer& Simons, Bombay)
6. Elements of Chordate Anatomy by Weichert – (McGraw Hill)
7. The Birds by R.L. Kotpal (4th Edition) – Rastogi Publications, 2008
8. Bird Migration by D.R. Griffin – (Doubleday, Garden city, USA)
9. The Book of Indian birds by salim Ali.
10. Fish and Fisheries by K. Pandey and J.P. Shukla (2nd Edition) (Rastogi Publication, 2008)
11. Indian Fishes by Qureshi – (Brij Brothers., Bhopal)
12. Comparative anatomy of the vertebrates by George C Kent- 3rd Saint Louis: The C.V. Mosby Co 1973
13. 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 Voce | 5 |
| Record | 5 |
| **Total Marks** | **20** |

**Course Content:**

1. Study of Museum specimen with respect to levels and patterns of organization, biosystematics, biodiversity, adaptations, development stages, population dynamics, ecological implications etc.

*a)* **Hemichordata**: *Balanoglossus.*
*b)* **Urochordata**: *Herdmania, Pyrosoma.*
*c)* **Cephalochordata**: *Amphioxus.*
*d)* **Cyclostomata**:*Petromyzon, Myxine.*
*e)* **Pisces**: *Scoliodon, Sphyrna, Torpedo, Pristis, Trygon, Lepidosteus, Clarias, Ophiocephalus, Anabas, Exocoetus, Hippocampus, Tetradon, Protopterus.*
*f)* **Amphibia:** *Icthyophis, Necturus, Proteus, Ambystoma, Axolotl larva, Triturus. Amphiuma, Alytes, Bufo.*

g) **Reptilia:** *Testudo, Trionyx, Sphenodon,Hemidactylus, Draco, Calotes, Chamaeleon, Varanus, Heloderma, Typhlops, Eryx, Hydrophis, Viper, Bungarus, Naja, Alligator;* Identification of Venomous and Non-venomous Snakes.

h) **Aves:** *Pavo, Columba, Psitacula, Passer, Corvus, Archaeopteryx.*

i) **Mammals:** *Ornithorhynchus, Echidna, Macropus, Loris, Manis, Rattus*.

2. **Study of Permanent Slides:**

a) ***Balanoglossus****:* T.S. of proboscis, collar region and trunk

b) ***Amphioxus****:* T.S. or oral hood, pharynx.

c) **Mammals**: T.S. of skin, stomach, duodenum, ileum, liver, Pancreas, spleen, lungs, kidney, Testis, Ovary.

3. **Osteology:**

a) Study of skull bone of Frog, *Varanus*, Bird and Rabbit.

b) Study of vertebral of Frog. *Varanus*, Bird and Rabbit.

c) Study of girdles, forelimb and hind limb bones of Frog, *Varanus*, Bird and Rabbit.

4. Dissections and / or its demonstration through Charts / Models / Video / CD / digital alternatives etc and / or preparation of working models of the different system of the following animals.

a) ***Scoliodon****:* Afferent branchial systems, efferent branchial system, cranial nerves and internal ear.

b) **Frog**: Digestive, system, Urino-genital system

5. **Permanent /Temporary preparation of the following-:**

a) Scales: Placoid, Cycloid

b) Blood film of any vertebrate

c) Filoplumes of birds

d) Thigh muscles of frog

6. **Microtomy**: Fixing, block making, section cutting, staining, mounting and submission of slides.

**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. Live Zoology Project Report.

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

**Semester II**

**Core Course1(II): BOTANY: DIVERSITY OF CRYPTOGAMS**

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:

- Understand the structure, classification and life history of Bryophyta

andPteridophyta.

- Understand the Geological time scale and the importance offossils.
- Understand the evolutionary trends amongPteridophytes.

**Course contents**

**Unit I: Bryophyta**

- General characters, distribution, structure, reproduction, alternation of generations.
- Classification and economic importance.
- Origin and affinities of bryophytes.
- Study of morphology, anatomy and reproduction in-
  - Hepaticopsida:*Marchantia*
  - Anthocerotopsida :*Anthoceros*
  - Bryopsida : *Funaria*

**Unit II: Palaeobotany**

- General account of geological time scale, types of fossils, fossilization process, radioactive carbon dating, and importance offossils.
- Study of *Rhynia, Calamites* and *Glossopteris.*

**Unit III: Pteridophyta**

- General characters, distribution, reproduction, life cycle andclassification.
- Study of morphology, anatomy and reproduction in -
  - Psilopsida:*Psilotum*
  - Lycopsida: *Lycopodium, Selaginella*

**Unit IV: Morphology, Anatomy and Reproduction**

- Study of morphology, anatomy and reproduction in -
  - Sphenopsida :*Equisetum*
  - Pteropsida :*Pteris, Marsilea*
- Evolution of steles inPteridophytes
- Origin and significance of heterospory and seedhabit.

**Suggested Readings:**


1. Smith.G.M.,1971,CryptogamicBotanyVol.II,TMHPublishingHouse,NewDelhi.
2. Sporne, K.R., 1974, Morphology of Pteridophytes, Hutchinson & Co.,London.
3. Rashid, A. An Introduction toPteridophyta.
4. Pandey, Mishra & Trivedi, 2007, A Textbook of Botany Vol.II, Rastogi Publications, Meerut.
5. Singh,V., P.C.Pande & D.K.Jain 2006, A Textbook of Botany, Rastogi Publications, Meerut.
6. Singh V., P.D.Pande & D.K.Jain 2005, Diversity and Systematics of Seed plants, Rastogi Publications,Meerut.
7. Parihar, N.S.,Bryophyta.
8. Parihar, N.S., Introduction to Embryophyta Vol.IIPteridophyta.
9. Vashishta, P.C.1982, Peridophyta, S.Chand & Co. Ltd., NewDelhi.
10. Gangulee H.C., Kar and Ashok Kumar,1982, College Botany Vol.II, Central Book Agency,Calcutta.

11. Anrold, Introduction to Palaeobotany, McGraw Hill,London.

**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 content:**

- Study of the morphology, anatomy and reproductive structures of genera included in Bryophyta andPteridophyta by making micro preparations and observation of permanent slides.

**Group C: Core Course (CC)**

**Semester II**

**Core Course 3(II): MATHEMATICS: DIFFERENTIAL EQUATIONS**

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 the course students will be able to understand the principles and techniques of Differential Equations in problem solving.

**Course Contents**

**Unit-I**

Linear equations and equations reducible to linear form. Exact differential equations, integrating factors, first order andhigher degree equations solvable, for x, y, p. Clairaut's form and singular solutions, Geometric meaning of a differential equation, orthogonal trajectories, linear differential equations with constant coefficients, homogeneous linear ordinary differential equations.

**Unit: II**

Ordinary simultaneous differential equations, total differential equations. Linear differential equations of second order, transformation of the equation by changing dependent independent variable, method of variation of parameters.

**Unit: III**

Series solution of differential equations, power series method, Bessel, Legendre and hyper geometric equations, Bessel, Legendre and hyper geometric functions and their elementary properties.

**Unit: IV**

Partial differential equations of the first order, Lagrange's solution, some special type of equations which can be solved easily by methods other than the general method, Charpit general method of solution.

**Suggested Readings:**


1. Differential Equations Vol I:J.L. Bansal and H.S. Dhami, JPH, 2004.
2. Ordinary and Partial Differential Equations: M.D. Raisinghania and R.S. Aggarwal, S. Chand & Company, New Delhi, 2ndedition 1983.
3. Theory and problems of Differential equations: Frank Ayres, McGraw-Hill Book Company, Singapore, 1stedition 1972.
4. An Introduction to Ordinary Differential Equations, Dover Books on Mathematics: E. Coddington (1990) Dover
5. Differential Equations and Dynamical Systems: L. Perko (2010) Springer
6. Theory of Ordinary Differential Equations: Codington and Levinson (1987) Tata McGrawHill.

**GROUP E: PROFESSIONAL EDUCATION COURSES (PEC)**

**I: Perspectives in Education (PE)**

**Semester II**

**PECG 102: CHILDHOOD AND GROWING UP**

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:

- Situate individual development in a socio-cultural context.
- Develop an understanding about the impact/influence of socio-cultural context in shaping human development, especially with respect to the Indian context.
- Acquire theoretical perspectives and develop an understanding of dimensions and stages of human development and developmental tasks.
- Understand a range of cognitive skills and affective processes in human learners.
- Become aware of different contexts of learning and situate schools as a special environment for learning.
- Reflect on their own implicit understanding of the nature and kinds of learning.
- Gain an understanding of different theoretical perspectives on learning with a focus on cognitive views of learning as well as social– constructivist theories.
- Explore the possibilities of an understanding of processes in human cognition and meaning–making them as basis for designing learning environments and experiences at school.
- Appreciate the critical role of learner's based on differences and contexts in making meanings, and hence draw out implications for schools and teachers.

**Course Contents**

**Unit I: Learner as a Developing Individual and individual differences among learners**

- Developmental Influences: Development as a resultant of interactions between individual potential (innate, acquired) and external environment (physical, socio-cultural, economic and technological).
- Nature and nurture, continuity and discontinuity and growth and maturation issues.
- The understanding of cognitive and affective processes influencing the development of the learner and their applications in classroom teaching.
- Dimensions of differences in psychological attributes—cognitive abilities, interest, aptitude, creativity, personality, values.
- Understanding learners from multiple intelligence perspective with a focus on Gardner's theory of multiple intelligence. Differences in learners based on predominant 'learning styles'.

**Unit II: Development and Learning**

- Meaning and principles of development, relationship between development and learning.
- Dimensions of individual development: physical, cognitive, language, emotional, social and moral, their interrelationships and implications for teachers (relevant ideas of Piaget, Erikson and Kohlberg).
- Stages of development—developmental tasks with focus on processes growth and development across various stages from infancy to post adolescence (special emphasis on concerns of adolescence).

**Unit III: Theoretical Perspectives on Learning**

- Perspectives on human learning: Behaviourist (conditioning paradigm in brief), Cognitivist and Social Cognitivist (Bandura), Information-Processing view, Humanist, Social-Constructivist Social Cognitive Learning (drawing selectively on the ideas of Skinner, Piaget, Rogers, Vygotsky).
  (i) Concepts and principles of each perspective and their applicability in different learning situations
  (ii) Relevance and applicability of various theories of learning for different kinds of learning situations
  (iii) Role of learner in various learning situations, as seen in different theoretical perspectives
  (iv) Role of teacher in teaching- learning situations: a) transmitter of knowledge, b) model, c) facilitator, d) negotiator, e) co- learner. (The focus is on building understanding of different psychological perspectives of learning and helping student teachers to learn to apply them in different learning situations).

**Unit IV: Learning in 'Constructivist' Perspective**

- Distinctions between learning as 'construction of knowledge' and learning as 'transmission and reception of knowledge'.
- Social-Constructivist perspective (also Bruner and Ausubel's perspective) and applications of Vygotky's ideas in teaching.
- Understanding processes that facilitate 'construction of knowledge':
  (i) Experiential learning and reflection
  (ii) Social mediation
  (iii) Cognitive negotiability
  (iv) Situated learning and cognitive apprenticeship
  (v) Meta-cognition.
- Creating facilitative learning environment.
- Teachers' attitudes, expectations– enhancing motivation, Achievement motivation, positive emotions, self-efficacy, collaborative and self-regulated learning. (The focus is on learning as a constructive rather than a reproductive process. The learner- centered orientation has implications for understanding learning as contextual and self-regulated process and following suitable classroom practices).

**Modes of Learning Engagement:** Modes of learning engagement will include:

- Reflective Written Assignments
- Lecture-cum-discussion
- Study of selected readings and discussions around overviews
- Anecdotes, experiential and reflective writings.
- Audio-visual clips of learning situations and interactions, analysis and discussion in small groups as well as large group
- Group presentations of key themes and concepts
- Exemplars of 'constructivist' learning situations, Case studies, their analysis and discussion

- Close observation of learners (students) in learning situations at school, as well as in other contexts; making field notes
- Interpretation, analysis and discussion of observations
- Assignments based on the above

**Practicum/ Tutorials:**

- Reflective Written Assignments
- Field observation notes
- Analysis of a learning situation and case study, using theoretical perspectives
- Administration of any one standardized tests (Intelligence/aptitude/attitude/creativity) and preparation of psychological assessment report.
- Prepare a critical report on implications of any one theory for learning – Piaget, Erickson and Bandura.
- Select a child with learning problem (refer 5.5) and carry out academic assessment in any one subject, identify the remedial measures and prepare a report.
- Preparation of learners' profile based on cognitive and non-cognitive characteristics to depict inter and intra individual differences.
- Project work

**Suggested Readings:**


1. Ambron, S.R. (1981). Child Development. New York. Holt Rinehart & Winston.
2. Atkinson, Richard C. et.al. (1983). Introduction to Psychology. New York. Harcourt Brace Johanovich Inc.
3. Benjafield, J.G. (1992). Cognition. Prentice Hall, Englewood Cliffs.
4. Blackie, J. (1971). How Children Learn in J.C. Stone and F.W. Schneider (eds.) New York. Readings in the Foundations of Education, Vol II, Cromwell.
5. Brown, J.S., Collins, A and Dugrid, P (1989). Situated Cognition and the Culture of Learning, Educational Researcher: 32-42.
6. Dececco. (1970). Italy. Psychology & Learning and Instruction Educational Psychology Prentice.
7. Flavell, J.H. (1963). The Developmental Psychology of Jean Piaget, New York. Van No strand.
8. Gange, R. M. (1985). The Conditions of Learning and Theory of Instruction (4th edition). New York. Holt, Rinehart and Winston.
9. Gardner, H. (1999). The disciplined mind what all students should understand. New York. Simon & Schuster.
10. Gardner, Howard (1989). Frames of Mind. New York. The Theory of Multiple Intelligences, Basic Books.
11. Gardner, Howard (1991). The Unschooled Mind. New York. Basic Books.
12. Hurlock, E.B. (1964). Child Development. New York. Mcgraw Hill Book Co.
13. Phillippe Aives. (1962). Centuries of Childhood. A Sociology of Family Life. New York. Knops.

14. Wolfolk (1987). Educational Psychology. Prentice Hall Eaglewood Cliff.
15. Srivastava, A.K. (1998). Child Development. The Indian Perspective. New Delhi. NCERT.
16. Sibia, A. (2006). Life at Mirambika. New Delhi. NCERT.
17. Chauhan S. S. (2002). Advanced Education Psychology. Delhi. Vikas Publication.
18. Woolfolk, A.E. (2009). Educational Psychology (11th Edition) (My Education Lab Series) Prentice Hall.
19. Wertsch, J.V. (1985). Vygotsky and the Social Formation of Mind. Harvard University Press.
20. Chauhan, S.S. (1990). Advanced Educational Psychology. New Delhi. Vikas Publication House.
21. Sharma R.A. (1996). Fundamentals of Educational Psychology. Meerut. Lal Book Depot.

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

**Semester II**

**WEAP 102: WORK EDUCATION (AGRICULTURE PRACTICE)-II**

Time: 1.5 Hours Max. Marks: 50

Credit- 3 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

**Course Contents**

**Unit I: Identification**

- Seeds of common crops.
- Seeds of common vegetables.
- Important weeds.
- Manures commonly used.
- Fertilizers commonly used.

**Unit II: Seeds and Seedlings**

- Characteristics of a good seed for sowing.
- Calculation of germination percentage of seeds.
- Planting seeds and transplanting seedling.
- Raising seedlings in a nursery
- Study about green-house.

**Unit III: Ornamental gardening**

- Identification of different summer flowers.
- Identification of different winter flowers.
- Identification of common hedge and creeper plants.
- Preparation and maintenance of rockeries and borders.
- Preparation and maintenance of borders through hedge and flower plantation.

**Horticulture Practices**

- Agro forestry and related concepts
- Potting and repotting practices.
- Practices related to production of important flowering plants.
- Collection of different types of seeds.
- Preparation of a project.

**Unit IV: General Field practices**

- Earthing.
- Planting.
- Hoeing.
- Weeding.
- Watering of plants.

**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).

**Practicals**

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
- Mustard
- Gram
- Rose etc.

(b) **Agricultural Processes:**

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

## GROUP F: SKILL ENHANCEMENT COURSES (SEC)

### Semester II

### WEEE 102: WORK EDUCATION (ELECTRICITY & ELECTRONICS)-II

Time: 1.5 Hours | Max. Marks: 50

Credit- 3 | 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-

- 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.

**Course Contents**

**Unit I: Lamps**

Understanding the working of CFL tubes, Incandescent lamp, arc lamp, sodium vapor lamp, neon lamp, fluorescent lamp, use of choke and starter

**Unit II: Transformer**

Construction of Transformers, recognition of primary and secondary winding, knowledge of step-up and step-down transformer, use of transformers.

**Unit III: Electrical Appliances**

Understanding the working of Electrical appliances such as Refrigerator, Air conditioners etc, making Resistance and Capacitance boxes, use of testing board and extension boards for laboratory.

**Unit IV: Transistor**

Recognition of emitter, base and collector in a transistor, characteristics of transistor, transistor action, Amplification by transistor, Basic idea of integrated circuits, FET – recognition of drain, source and gate terminals, FET and its characteristics, testing of transistor and FET, LCD.

**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

**Practicals**

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