# COMMISSONERATE OF COLLEGIATE EDUCATION,

# GOVT. DEGREE COLLEGE

## RAJAMPET, KADAPA. Dt.

(Affiliated to Yogi Vemana University, Kadapa.)

## TEACHING PLAN

ACADEMIC YEAR 2023 -2024

**Name of the Department** : ZOOLOGY

**NAME OF THE LECTURER** : B. SUJATHA

**Course / Group** : BZC (EM)

**Subject / Page** : ZOOLOGY

| Sl.No. | Subject | Paper | Page No. |
|---|---|---|---|
| 1 | 6 B - Live stock Management-I | VI B | 01 to 05 |
| 2 | Introduction to Applied biology | I zoology | 07 to 11 |
| 3 | Animal physiology, Cellular Metabolism | IV paper | 13 to 17 |
| 4 | Cell & Molecular biology & Embryology | SEM-II IV | 19 to 23 |

## Teaching Plan / Lesson No. 1

| | |
|---|---|
| Name of the Topic | Live stock Census |
| Hours required | 6 |
| Learning Objectives | Knowledge<br>Application |
| Previous knowledge to be reminded | Vocational course |
| Examples / Illustrations | cattles, buffaloes, goats, sheeps |
| Additional inputs | Visit a local dairy cattle farm |
| Teaching Aids used | PPT, BB |
| References cited | Dairy animals teset book |
| Student Activity Planned after the teaching | Exotic cattles chart prepared |
| Activity planned outside the class room, if any | Examples of indigenous cattle |
| Any other activity | Live stock census in goats |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Live stock census, Breeds of Dairy cattle, Buffaloes and goats<br>Indigenous, Exotic and crossbreed cattle breeds any three. |

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## Teaching Plan / Lesson No. 2

| | |
|---|---|
| Name of the Topic | Anatomy of udder |
| Hours required | 6 |
| Learning Objectives | Knowledge<br>Application |
| Previous knowledge to be reminded | Dairy technology |
| Examples / Illustrations | cow, buffaloes |
| Additional inputs | local dairy farm |
| Teaching Aids used | PPT, BBT |
| References cited | Dairy animals books |
| Student Activity Planned after the teaching | Development of udder chart prepared |
| Activity planned outside the class room, if any | lactogenesis functions |
| Any other activity | Udder Anatomy chart prepared |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Anatomy of udder<br>Development of udder<br>lactogenesis and Galactopoises<br>Let down of milk. |

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## Teaching Plan / Lesson No. 3

| | |
|---|---|
| Name of the Topic | Artificial Insemination |
| Hours required | 6 |
| Learning Objectives | Knowledge<br>Understanding |
| Previous knowledge to be reminded | Dairy technology |
| Examples / Illustrations | cattle, buffaloes |
| Additional inputs | To visit a goshala at Tirupathi |
| Teaching Aids used | PPT, BBT |
| References cited | Dairy books |
| Student Activity Planned after the teaching | Oestrous cycle chart prepared |
| Activity planned outside the class room, if any | Artificial insemination functions |
| Any other activity | Pregancy diagnosis in cattle |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Artificial insemination, Oestrous cycle<br>symptoms of heat in cows and buffaloes<br>Conception, Multiovulation, cloning<br>Pregnancy diagnosis in cattle<br>Embryo transfer techniques |

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## Teaching Plan / Lesson No. 4

| | |
|---|---|
| Name of the Topic | Dairy cattle |
| Hours required | 6 |
| Learning Objectives | Knowledge<br>Application |
| Previous knowledge to be reminded | Dairy technology |
| Examples / Illustrations | cattle, buffaloes |
| Additional inputs | To visit a local goat farm |
| Teaching Aids used | PPT, BBT |
| References cited | Dairy books |
| Student Activity Planned after the teaching | Economic importance of dairy cattle |
| Activity planned outside the class room, if any | Selection of dairy animals |
| Any other activity | Uses of dairy animals |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Economic traits of dairy cattle<br>Methods of selection of dairy animals. |

B. Raj

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## Teaching Plan / Lesson No. 05

| | |
|---|---|
| Name of the Topic | Dairy cattle Breeding |
| Hours required | 6 |
| Learning Objectives | Knowledge<br>Application |
| Previous knowledge to be reminded | Dairy technology |
| Examples / Illustrations | cattle, buffaloes |
| Additional inputs | Visit a goshala at tirupathi |
| Teaching Aids used | PPT, BBT |
| References cited | Dairy books |
| Student Activity Planned after the teaching | Grading system in cattles |
| Activity planned outside the class room, if any | Breeding system in buffaloes |
| Any other activity | Cross breed examples |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Systems of dairy cattle breeding<br>Subbreeding, Inbreeding, out breeding, Cross breeding, Grading up<br>Breeding systems |

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## Teaching Plan / Lesson No. 6

| | |
|---|---|
| Name of the Topic | Essentials of Microbiology & Immunology |
| Hours required | 6 |
| Learning Objectives | Knowledge<br>Application |
| Previous knowledge to be reminded | 9r. Inter |
| Examples / Illustrations | E.coli, Microorganisms. |
| Additional inputs | Collected immunity increase Products |
| Teaching Aids used | PPT, BBT |
| References cited | I year text book |
| Student Activity Planned after the teaching | Scientist photos collected by students |
| Activity planned outside the class room, if any | Agriculture application identified |
| Any other activity | Organs of immune System diagram |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>History and major milestons of Microbiology.<br>Contributions of Edward Jenner, louis paster, Robert Koch and Joseph lister. |

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Groups of Micro organisms

structure and characteristics of Bacteria, Fungi, Archaea and virus

Application of micro organisms in

Food, Agriculture, Environment and history

Immune system - Immunity types of immunity cells and organs of immune system

## Teaching Plan / Lesson No. 7

| | |
|---|---|
| Name of the Topic | Essentials of Biochemistry |
| Hours required | 6 |
| Learning Objectives | Knowledge<br>Understanding |
| Previous knowledge to be reminded | Jr and Sr Inter |
| Examples / Illustrations | Glucose, waxes, serine, lysine |
| Additional inputs | To identify sugar test in human body |
| Teaching Aids used | PPT, BBT |
| References cited | Saras, Academic Text book |
| Student Activity Planned after the teaching | List prepared Essential and non-essential amino acids |
| Activity planned outside the class room, if any | Draw the DNA structure in chart |
| Any other activity | Difference between Anabolism and catabolism |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Biomolecules I - Carbohydrates, Lipids<br>Biomolecules II - Amino acids & Protein<br>Biomolecules III - Nucleic acids DNA & RNA<br>Basic metabolism - Anabolism and catabolism |

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## Teaching Plan / Lesson No. 8

| | |
|---|---|
| Name of the Topic | Essentials of Biotechnology |
| Hours required | 8 |
| Learning Objectives | Knowledge<br>Application Analyzing |
| Previous knowledge to be reminded | Sr. Inter |
| Examples / Illustrations | E. coli, Trans. fish and sheep |
| Additional inputs | Visit a local biotechnology labs |
| Teaching Aids used | PPT, BBT |
| References cited | Saras, text book |
| Student Activity Planned after the teaching | Applications of Biotechnology |
| Activity planned outside the class room, if any | cloning vectors chart prepared |
| Any other activity | Stress tolerent plant examples |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>History, scope and significance of biotechnology.<br>Applications of biotechnology in plant Animal, Industrial and pharmaceutical Sciences. |

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Environmental Biotechnology - Bioremediation and Biofuels, Biofertilizers and Biopesticides

Genetic Engineering - Gene manipulation using restriction enzymes and cloning vectors, physical, chemical and biological methods of gene transfer

Transgenic plants - Stress tolerant plants (biotic stress - BT cotton, abiotic stress - Salt tolerance) Transgenic

Transgenic Animals - Animal and disease models.

## Teaching Plan / Lesson No. 9

| | |
|---|---|
| Name of the Topic | Analytical Tools and techniques in biology Applications |
| Hours required | 3 |
| Learning Objectives | Knowledge<br>Understanding |
| Previous knowledge to be reminded | Dr Lutes |
| Examples / Illustrations | Human , E coli |
| Additional inputs | Visit a local hospital in ELISA Test |
| Teaching Aids used | PPT , BBT |
| References cited | Sarvas text book |
| Student Activity Planned after the teaching | PCR Application uses wrote in chart |
| Activity planned outside the class room, if any | procedure of ELISA |
| Any other activity | Monoclonal Antibodies uses |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Applications in forensics - PCR and DNA fingerprinting<br>Immunological techniques - Immunoblotting and Elisa<br>Monoclonal Antibodies |

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## Teaching Plan / Lesson No. 10

| | |
|---|---|
| Name of the Topic | Biostatistics and Bioinformatics |
| Hours required | 8 |
| Learning Objectives | Knowledge<br>Application<br>Evaluation, Analyzing |
| Previous knowledge to be reminded | Sr. Inter |
| Examples / Illustrations | Humans, Population, |
| Additional inputs | Visit a local area population data collected |
| Teaching Aids used | PPT, BBT |
| References cited | saras, text book |
| Student Activity Planned after the teaching | Statistical formulas prepared chart |
| Activity planned outside the class room, if any | Protein 3D Structure chart prepared |
| Any other activity | Uses of NCBI, EBI, Gene bank |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Data collection and sampling.<br>Measures of Central tendency<br>Mean, Median, Mode<br>Measures of dispersion - range, standard deviation and variance, Probability and |

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tests of significance

Introduction, Genomics, proteomics, types of Biological data, biological databases - NCBI, GBI, gene bank, Protein 3D structures, sequence alignment. Accessing Nucleic Acid and protein databases, NCBI Genome Workbench.

## Teaching Plan / Lesson No. 1

| | |
|---|---|
| Name of the Topic | Animal physiology - 1 |
| Hours required | 12 |
| Learning Objectives | Knowledge<br>Understanding |
| Previous knowledge to be reminded | By Enter |
| Examples / Illustrations | Human, Rat |
| Additional inputs | To visit local laboratory testing |
| Teaching Aids used | BBT, chart, PPT |
| References cited | Saras, text book |
| Student Activity Planned after the teaching | To observe digestion organ in chart |
| Activity planned outside the class room, if any | cellular transpiration |
| Any other activity | Heart Diagram |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Animal physiology - 1<br>process of digestion and Assimilation<br>Respiration - pulmonary ventilation<br>Transport of oxygen and CO2<br>circulation - structure & function |

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## Teaching Plan / Lesson No. 2

| | |
|---|---|
| Name of the Topic | Animal physiology II |
| Hours required | 1 |
| Learning Objectives | Knowledge<br>Application |
| Previous knowledge to be reminded | Structure |
| Examples / Illustrations | Human, Rat |
| Additional inputs | Visit a gynecologist Doctor, Internet, audio |
| Teaching Aids used | LCD, Chart, PPT |
| References cited | Books, Academy |
| Student Activity Planned after the teaching | Draw the nervous |
| Activity planned outside the class room, if any | To identify Hormones and their role |
| Any other activity | Active learning method |
| Topic Synopsis (Continue on the reverse side if needed) | Animal physiology II<br>Nerve impulse transmission, Resting membrane potential, origin and propagation of action potentials, myelinated and non myelinated nerve fibres |

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## Teaching Plan / Lesson No. 2

| | |
|---|---|
| Name of the Topic | Animal physiology - II |
| Hours required | 12 |
| Learning Objectives | Knowledge<br>Application |
| Previous knowledge to be reminded | Sr. Inter |
| Examples / Illustrations | Human . Rat |
| Additional inputs | Visit a gyncologist doctor in local area |
| Teaching Aids used | BBT, chart, PPT |
| References cited | Saras , Academy |
| Student Activity Planned after the teaching | Draw the sarcomere |
| Activity planned outside the class room, if any | To identify Hormones and structure |
| Any other activity | Active & Resting potential |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Animal physiology - II<br>Nerve impulse transmission - Resting membrane potential, origin and propagation of action potentials along myelinated and non myelinated nerve fibres |

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## Teaching Plan / Lesson No. 3

| | |
|---|---|
| Name of the Topic | Cellular Metabolism - I (Biomolecules) |
| Hours required | 12 |
| Learning Objectives | Knowledge<br>Understanding |
| Previous knowledge to be reminded | 3r. Inter |
| Examples / Illustrations | Human |
| Additional inputs | Test the lipids laboratory |
| Teaching Aids used | BBT, PPT, Chart |
| References cited | Saras, Academy |
| Student Activity Planned after the teaching | Types of Amino Acids |
| Activity planned outside the class room, if any | Zwitter ion diagram |
| Any other activity | Mechanism of Enzymes |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Biomolecules - I<br>carbohydrates - classification of carbohydrates, structure of glucose<br>proteins - classification of proteins, General properties of Amino Acids |

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## Teaching Plan / Lesson No. 4

| | |
|---|---|
| Name of the Topic | cellular Metabolism - II |
| Hours required | 12 |
| Learning Objectives | Knowledge<br>Application |
| Previous knowledge to be reminded | 8r. Inter |
| Examples / Illustrations | Human, Rat |
| Additional inputs | Sugar test in laboratory in local |
| Teaching Aids used | BBT, PPT, chart |
| References cited | Savas, Academy text book |
| Student Activity Planned after the teaching | chart by Kreb's cycle |
| Activity planned outside the class room, if any | lipid metabolism |
| Any other activity | Draw the Urea cycle |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Cellular metabolism - II<br>carbohydrate Metabolism - Glycolysis, Kreb's cycle, Electron transport chain<br>Glycogen metabolism.<br>Gluconeogenesis |

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## Teaching Plan / Lesson No. 5

| | |
|---|---|
| Name of the Topic | Embryology |
| Hours required | 12 |
| Learning Objectives | Knowledge<br>Understanding |
| Previous knowledge to be reminded | Gr. 9th |
| Examples / Illustrations | Human |
| Additional inputs | Eggs collected |
| Teaching Aids used | BBT, PPT, chart |
| References cited | Sarvas, text book |
| Student Activity Planned after the teaching | chart cleavages - types |
| Activity planned outside the class room, if any | placenta types chart prepared |
| Any other activity | germ layers diagram |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Embryology<br>Gametogenesis<br>Fertilization<br>Types of Eggs<br>Types of cleavages |

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## Teaching Plan / Lesson No. 6

| | |
|---|---|
| Name of the Topic | Cell biology - I |
| Hours required | 12 |
| Learning Objectives | Knowledge<br>Understanding |
| Previous knowledge to be reminded | 9r. Inter |
| Examples / Illustrations | Human, bacteria |
| Additional inputs | Animal cell observed Microscope |
| Teaching Aids used | BBT, PPT, chart |
| References cited | Saras, Academy |
| Student Activity Planned after the teaching | Animal cell Model |
| Activity planned outside the class room, if any | Fluid Mosaic Model |
| Any other activity | Viroid Structure |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Cell biology - I<br>Definition, History, prokaryotic and Eukaryotic cells, Virus, Viroids, Mycoplasma<br>Electron Microscopic structure of Animal cell |

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## Teaching Plan / Lesson No. 7

| | |
|---|---|
| Name of the Topic | Cell biology - II |
| Hours required | 1> |
| Learning Objectives | Knowledge<br>Understanding |
| Previous knowledge to be reminded | Sr Inter |
| Examples / Illustrations | Human, |
| Additional inputs | chromosome structure diagram |
| Teaching Aids used | PPT, BBT, chart |
| References cited | Saras, text book |
| Student Activity Planned after the teaching | Diagram of Ribosomes |
| Activity planned outside the class room, if any | Mitochondria structure |
| Any other activity | Diagram of Nucleus |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Cell biology - II<br>Structure and functions of Golgi complex and Endoplasmic Reticulum structure & and function of Lysosomes and Ribosomes |

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## Teaching Plan / Lesson No. 8

| | |
|---|---|
| Name of the Topic | cell biology - III |
| Hours required | 12 |
| Learning Objectives | Knowledge<br>Understanding |
| Previous knowledge to be reminded | Sr Std. |
| Examples / Illustrations | Human. |
| Additional inputs | cancer treatment and prevention methods |
| Teaching Aids used | BBT, PPT, chart |
| References cited | text book |
| Student Activity Planned after the teaching | Meiosis - stages diagram |
| Activity planned outside the class room, if any | Apoptosis cells |
| Any other activity | ETC, Kreb's cycle |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>cell biology - III<br>cell division - Mitosis, Meiosis<br>cell cycle - stages, check points - regulation<br>Abnormal cell growth - Cancer - apoptosis |

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## Teaching Plan / Lesson No. 9

| | |
|---|---|
| Name of the Topic | Molecular Biology - I |
| Hours required | 12 |
| Learning Objectives | Knowledge, Understanding |
| Previous knowledge to be reminded | Gr. 9th |
| Examples / Illustrations | Human, Rat |
| Additional inputs | DNA Structure |
| Teaching Aids used | BBT, PPT, chart |
| References cited | Text book |
| Student Activity Planned after the Teaching | Semi Conservative Diagram |
| Activity planned outside the class room, if any | Translation Diagram |
| Any other activity | Transcription Diagram |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Molecular Biology - I<br>Central dogma of Molecular biology<br>Basic concepts of - DNA replication - Overview (Semi - conservative mechanism, Semi - discontinuous mode, Original |

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propagation of replication fork

Transcription in prokaryotes - Initiation, Elongation and Termination,

post-transcriptional modifications (basics)

Translation - Initiation, Elongation and Termination.

**Teaching Plan / Lesson No. 10**

| | |
|---|---|
| Name of the Topic | Molecular Biology - II |
| Hours required | 12 |
| Learning Objectives | Knowledge<br>Understanding |
| Previous knowledge to be reminded | Br. Tutor |
| Examples / Illustrations | Human |
| Additional inputs | To visit local Hospital laboratory |
| Teaching Aids used | BBT, PPT, chart |
| References cited | Text book |
| Student Activity Planned after the teaching | carbohydrates - biological importance |
| Activity planned outside the class room, if any | Types of Amino Acids |
| Any other activity | Fatty acids properties |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Molecular Biology - II<br>Gene Expression in Prokaryotes,<br>Gene Expression in Eukaryotes<br>Biomolecules - carbohydrates, proteins - Amino Acids and lipids |

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# COMMISSONERATE OF COLLEGIATE EDUCATION,

# GOVT. DEGREE COLLEGE

**RAJAMPET, KADAPA Dt.**

**(Affiliated to Yogivemana University, Kadapa)**

## TEACHING PLAN

ACADEMIC YEAR 2023 - 2024.

**Name of the Department** : Botany

**NAME OF THE LECTURER** : S. Bhaskar Rao.

**Course / Group** : B.Sc, & BCCS - Botany major.

**Subject / Pape** : Botany

| Sl.No. | Subject | Paper | Page No. |
|---|---|---|---|
| 1 | Anatomy, and embryology of Angiosperms | III | |
| 2 | Non-vascular Plants | II | |
| 3 | Cell Biology, Genetics, Plant breeding | IV | |
| 4 | | | |

III Anatomy, Embryology & Angiosperm and Ecology. Biodiversity

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | organisation of Apical meristem. |
| Hours required | 2. |
| Learning Objectives | To know the theories of Apical meristem Tunica – carpus theory and Histogen theory |
| Previous knowledge to be reminded | To recollect previous knowledge. |
| Examples/Illustrations | Stem tip |
| Additional inputs | |
| Teaching Aids used | B.B. |
| References cited | plant Anatomy. Fahn A (1990 |
| Student Activity planned after the teaching | Seminar - |
| Activity planned outside the Class room, if any | Assignment. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Histogen theory :- Hanstein proposed this theory.<br>It consist of 3 zones<br>① Dermatogen — Epidermis<br>② Periblem — cortex<br>③ Plerome. — Stele. |

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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Tissue System. |
| Hours required | 3 |
| Learning Objectives | To known the Epidermis tissue system. ground tissue system and vascular tissue system. |
| Previous knowledge to be reminded | To Recollect previous knowledge. |
| Examples/Illustrations | Epidermal tissue system, Ground tissue system and vascular tissue system |
| Additional inputs | |
| Teaching Aids used | B.B and ppt. |
| References cited | Esau.K (1971) Anatomy of Seed plants. |
| Student Activity planned after the teaching | Seminar |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | preparation of charts. |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Epidermal tissue system:<br>The Epidermal tissue system develops from protoderm Layer (primary meristem Layer) the epidermal tissue tissue system consist of the Epidermis, stomata, cuticle and the Epidermal epidermal appendages like root hair and trichom (Stem hair) |

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**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Anamalous Secondary Growths. |
| Hours required | 2. |
| Learning Objectives | To Known the Anomalous Secondary Growths of the Boerhaavia and Dracaena Stem. |
| Previous knowledge to be reminded | To recollect previous knowledge. |
| Examples/Illustrations | Boerhavia, Dracaena |
| Additional inputs | Nyctous Stem. |
| Teaching Aids used | B.B and PPt. |
| References cited | Fahn. A (1990). Plant anatomy. |
| Student Activity planned after the teaching | Seminar |
| Activity planned outside the Class room, if any | chart Preparation. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Boerhaavia Stem:- The primary structure of the stem can be distinguished into ① Epidermis ② General cortex and Endoderm, pericycle, vascular bundle and pith.<br>Anomalous Growths of Stems:-<br>The Boerhaavia of the cambium remai The abnormal secondary growths from Normal cambium. |

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**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Wood Structure. |
| Hours required | 3 |
| Learning Objectives | To know the Wood Structure of Teak, Rose wood, and Red Sanders. |
| Previous knowledge to be reminded | To Recollect the previous knowledge. |
| Examples/Illustrations | Teak. Red sandals. Rose wood. |
| Additional inputs | |
| Teaching Aids used | Blackboard. PPt. |
| References cited | Plant anatomy. Fahn. A (1990) |
| Student Activity planned after the teaching | Seminar and Question and Answer |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed)<br>Teak:<br>Botanical name: Tectona grandis<br>Family: Lamiaceae.<br>It is a large deciduous tree that occurs in mixed hardwood forest Teak is Golden in colour and has Smoky grain and texture. |

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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Structure of anther and microsporogenesis |
| Hours required | 2. |
| Learning Objectives | To known the structure anther and microsporogenetis and pollen development |
| Previous knowledge to be reminded | To Recollect previous knowledge. |
| Examples/Illustrations | |
| Additional inputs | / |
| Teaching Aids used | Black Board. Ppt. |
| References cited | Anontroductions to embryolos of Angiospen Maheshwari |
| Student Activity planned after the teaching | Seminar. |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>T-S of Anther:<br>The T-S of anther shows the following<br>(1) Epidermis<br>(2) Endothecium<br>(3) middle layer<br>(4) Tapetum. |

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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Structure of anther, Microsporogenesis. |
| Hours required | 2 |
| Learning Objectives | To know the Structure of the anther and Microsporogenesis |
| Previous knowledge to be reminded | To recollect previous knowledge |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | Black board, ppt. |
| References cited | Introduction to Angiosperm Embryology |
| Student Activity Planned after the teaching | Seminar |
| Activity planned outside the class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed)<br>Structure of anther: ① Epidermis ② Endodermis ③ Middle layer ④ Tapetum.<br>Tapetum Types<br>① Amoeboid tapetum<br>② Secretary tapetum. |

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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Structure of ovule, megasporogenesis |
| Hours required | 3. |
| Learning Objectives | To know the structure of ovule. Megasporogenesis, monosporic, bisporic tetrasporic embryo sac. |
| Previous knowledge to be reminded | To recollect the previous knowledge. |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | Black board - PPt |
| References cited | Introduction to Angiosperm Embryology |
| Student Activity Planned after the teaching | Seminar |
| Activity planned outside the class room, if any | Assignment |
| Any other activity | Chart preparation |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Structure of ovule (or) megasporangium.<br>Based on integuments ovules are<br>types (1) Ategmic ovules<br>(2) Unitegmic ovules<br>(3) Bitegmic ovules. |

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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Endosperm, Dicot embryo development |
| Hours required | 3 |
| Learning Objectives | To know Endosperms types and Haustoria and Development of dicot embryo |
| Previous knowledge to be reminded | To recollect the previous knowledge |
| Examples / Illustrations | Crotalaria, Grevellea, Mecadonia Endosperms. |
| Additional inputs | |
| Teaching Aids used | Black board . PPt |
| References cited | The Text Book. Angiosperm Embryology |
| Student Activity Planned after the teaching | Seminar |
| Activity planned outside the class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* Endosperm provides food material to the growing embryo as well as seedling. In angiosperms endosperm classified into 3 types ① Nuclear ② cellular and ③ Helobial Endosperm. |

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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Branches of Biology, Ecology, Structural component of ecosystem |
| Hours required | (2) |
| Learning Objectives | To know the Branches of Ecology. Structural component of ecosystem |
| Previous knowledge to be reminded | To recollect previous knowledge. |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | B.B and Seminar |
| References cited | Plant ecology : N S Subramony |
| Student Activity Planned after the teaching | Seminar |
| Activity planned outside the class room, if any | Assignment |
| Any other activity | — |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Branches of Ecology<br>(1) Habitat ecology<br>(2) population ecology<br>(3) community ecology<br>(5) Ecosystem ecology |

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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Soil |
| Hours required | 3 |
| Learning Objectives | To known the Soil profile, Soil complex |
| Previous knowledge to be reminded | To recollect the poevious knowledge. |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | Blackboard - Ppt. |
| References cited | Fendamental Ecology. Eugene P Pardey. |
| Student Activity Planned after the teaching | Seminar |
| Activity planned outside the class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Soil profile :- There are 4 horizons in soil profile<br>① A — Horizon ② B — zone<br>③ C — zone ④ D - zone |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Light and temperature |
| Hours required | (2) |
| Learning Objectives | To knowtake climatic factor effect on the ecosystem - |
| Previous knowledge to be reminded | To recollect the previous knowledge. |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | Black board - PPt |
| References cited | Pandey - Plant Ecology Text Book |
| Student Activity Planned after the teaching | Questions.. |
| Activity planned outside the class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Light :<br>Effect of light on plants<br>(1) Photosynthesis<br>(2) Chlorophyll synthesis<br>(3) Chlorophyll arrangement |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Plant Succession |
| Hours required | 3 |
| Learning Objectives | To know the types of Plant Successions. |
| Previous knowledge to be reminded | To recollect previous Knowledge |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | B-B. |
| References cited | Pandey. Plant Ecology TEXT BOOK |
| Student Activity Planned after the teaching | Seminar |
| Activity planned outside the class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Xerosere:<br>Succession occurs in drought & dry habitats called Xerosere. It is of two types<br>① Psammoser ② Lithosere. |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Population Ecology |
| Hours required | 4 |
| Learning Objectives | To know the Population Ecology. |
| Previous knowledge to be reminded | To recollect previous knowledge |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | B.B. |
| References cited | The Text of Plant Ecology Pandey |
| Student Activity Planned after the teaching | Seminal |
| Activity planned outside the class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Demographic characters of population ecology<br>① Density ② Natality ③ Mortality & Age distribution ④ Age Pyramids<br>— population growth & growth curve<br>— population expansion |

Signature of the Lecturer

# Teaching Plan/Lesson No.

| | |
|---|---|
| Name of the Topic | Radioactivity |
| Hours required | 2 |
| Learning Objectives | To Learn the Radioactivity |
| Previous knowledge to be reminded | To Recollect Atomic Structure. |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | OHP PPT |
| References cited | Physics Textbook |
| Student Activity Planned after the teaching | Seminar |
| Activity planned outside the class room, if any | Assignment |
| Any other activity | |
| Your Remarks | Students are interested in knowing more about the topic. Hence it can be taught in more depth & detailing. (1) Practical Class (2) Industrial Visit (3) Scientific Society |

Signature of the Faculty

IV Cell Biology, Genetic and plant breedin

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Prokaryotic VS Eukaryotic cell, Animal VS Plant cel<br>~~A brief account on Ultra-Structure of Plant~~ |
| Hours required | 3. |
| Learning Objectives | To know the prokaryotic cell and Eukaryotic ce and ultra structure of plant cell. |
| Previous knowledge to be reminded | TO Recollects the previous Knowledge. |
| Examples/Illustrations | plant cell and Animal cell |
| Additional inputs | Ultra Structure of Animal cell<br>~~College Botany Vol III - B.P P~~ |
| Teaching Aids used | B.B and ppt |
| References cited | college Botany Vol III B.P Pandey. |
| Student Activity planned after the teaching | Seminar |
| Activity planned outside the Class room, if any | Assignment. |
| Any other activity | Preparation ~~Any~~ plant cell — charts |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>cell theory - cells are Basic Units of all living organisms. cells are Units of life and all life come from prexexisting life. |

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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | [illegible] |
| Hours required | [illegible] |
| Learning Objectives | [illegible] |
| Previous knowledge to be reminded | [illegible] |
| Examples/Illustrations | |
| Additional inputs | |
| Teaching Aids used | [illegible] |
| References cited | [illegible] |
| Student Activity planned after the teaching | [illegible] |
| Activity planned outside the Class room, if any | [illegible] |
| Any other activity | [illegible] |
| Topic Synopsis | (Continue on the reverse side if needed) [illegible] |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Polymorphic cell organelles Plastids |
| Hours required | 2. |
| Learning Objectives | To know the different types of plastids and functions of plastids. |
| Previous knowledge to be reminded | To recollect previous knowledge. |
| Examples/Illustrations | Lysosome, Mitochondria, Golgi complex Endoplasmic reticulum, Vacuoles, Vesicle centrosome. |
| Additional inputs | Leucoplast and chromoplasts. |
| Teaching Aids used | BB. and PPT. |
| References cited | Cell Biology. S.C Rastogi (2008) |
| Student Activity planned after the teaching | Seminars |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | — |
| Topic Synopsis | (Continue on the reverse side if needed)<br>Polymorphic cell organelles are organelles that can take on multiple shapes and functions.<br>① Lysosome<br>② mitochondria<br>③ Golgi complex<br>④ plastids. |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | ultra Structure of chloroplast |
| Hours required | 2. |
| Learning Objectives | To know the ultra structure of Chloroplasts. and functions of Chloroplast. |
| Previous knowledge to be reminded | To Recollect previous knowledge. |
| Examples/Illustrations | Chloroplast. |
| Additional inputs | Role of chloroplast in photosynthesis. |
| Teaching Aids used | BB and ppt. |
| References cited | Cell Biology - S.C Rastogi |
| Student Activity planned after the teaching | Seminar |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | — |
| Topic Synopsis | (Continue on the reverse side if needed) Chloroplast are organelles in plant cells that are responsible for photosynthesis. They have a complex structure that includes a double membrane, a third internal membrane, and several compartments |

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Structure of plastid DNA. |
| Hours required | 1 |
| Learning Objectives | To Known the Structure of plastid DNA. |
| Previous knowledge to be reminded | To Recollect previous knowledge. |
| Examples/Illustrations | plastid DNA. |
| Additional inputs | mitochondrial DNA. |
| Teaching Aids used | B.B |
| References cited | Cell Biology SC Rastogi (2008) |
| Student Activity planned after the teaching | seminar |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* The DNA of the chloroplast is double stranded, circular and range in size from 120 to 169 Kb. |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Prokaryotic v Eukaryotic Chromosomes, morphology of Eukaryotic Chromosomes. |
| Hours required | 2. |
| Learning Objectives | To known the prokaryotic and eukaryotic chromosomes and morphology of Eukaryotic chromosomes. |
| Previous knowledge to be reminded | To recollect previous of knowledge of chromosomes. |
| Examples/Illustrations | Prokaryotic chromosomes and Eukaryotic chromosomes |
| Additional inputs | Different types of chromosomes. |
| Teaching Aids used | BB and PPt. |
| References cited | Cell and Molecular Biology. P.K. Gupta 2008 |
| Student Activity planned after the teaching | Seminar |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* The main difference between the structure of prokaryotic and Eukaryotic chromosomes is the number of chromosome their shape, and their location with in the cell. |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Euchromatin and Heterochromatin & Karyotype |
| Hours required | 2 periods (1 hr) |
| Learning Objectives | To know the Euchromatin and Hetero-chromatin and Karyotypes and Idiograms. |
| Previous knowledge to be reminded | To Recollect previous knowledge |
| Examples/Illustrations | Telomeric DNA, Barr Body. |
| Additional inputs | |
| Teaching Aids used | B-B and PPt |
| References cited | Cell and Molecular Biology. PK-Gupta 2009 |
| Student Activity planned after the teaching | Seminar |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed) Euchromatin and heterochromatin are two types of Chromatin which is a combination of DNA, Protein and Nucleic acid that controls cell division and plays a role in the structure of the Nucleus. |

Signature of the Lecturer

| | |
|---|---|
| Name of the Topic | Basic concepts of Functional components of Electrical and Electronic Circuits |
| Hours required | Two |
| Learning Objectives | To know the Functional components |
| Previous knowledge to the students | To Recollect the general knowledge |
| Examples/Illustrations | Amplifier, Filters, Transistor, Diodes, Resistor, Inductor, Capacitor, Switches |
| Additional Inputs | — |
| Teaching Aids used | BB & PPT |
| References used | Class and Inter-Learning Dr. Sudha Rao |
| Activity/Home assignment after the teaching | Quizzes |
| Activity planned inside the Class room, if any | Assignment |
| Any other activity | |
| Topic Outcomes | Outcomes of the session (Topic)<br>Able to Recall basic components of electronics including transistor and Practical applications |

Signature of Staff

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Brief account of chromosomal abberations Structural and Numerical changes |
| Hours required | (2) |
| Learning Objectives | To know the chromosomal abberation |
| Previous knowledge to be reminded | TO recollect the previous knowledge. |
| Examples/Illustrations | Aneuploidy, Triploidy, Tetraploidy. Deletion, Addition, Translocation, Inversion |
| Additional inputs | — |
| Teaching Aids used | B.B. & PPT |
| References cited | Cell and Molecular Biology. P.K. Gupta (2002) |
| Student Activity planned after the teaching | Seminar |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* There are several types of chromosomal abberration including Numerical and Structural abnormalities. |

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | organisation of DNA in Chromosome (Solenoid and Nucleosome Model). |
| Hours required | 2 |
| Learning Objectives | To know about Solenoid and Nucleosome models of chromosomal DNA. |
| Previous knowledge to be reminded | To recollect the previous knowledge. |
| Examples/Illustrations | Solenoid chromosomal and nucleosomal model DNA models. |
| Additional Inputs | |
| Teaching Aids used | B.B. & PPT. |
| References cited | Cell and molecular Biology - DK Gupta & Gupta |
| Student Activity planned after the teaching | Seminar |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed)<br>Solenoid type chromosomal DNA:<br>The solenoid defines the packing of DNA as 30nm fibre of chromatin and results from the helical winding of at least five nucleosome strands. |

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Mendel's Laws of Inheritance, Incomplete dominance and Co-dominance. Multiple allelism. |
| Hours required | 1+ |
| Learning Objectives | To know about Incomplete dominance and co-dominance, multiple allelism |
| Previous knowledge to be reminded | To recollect the previous knowledge of mendels Laws of Inheritence. |
| Examples/Illustrations | Incomplete Dominance, Co-Dominance and multiple allelism. |
| Additional inputs | |
| Teaching Aids used | B.B and ppt. |
| References cited | Genetics. B.D Singh (2005) |
| Student Activity planned after the teaching | Seminar |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Incomplete Dominance:- Incomplete Dominance is a form of Gene interaction in which both alleles of a gene at a locus are partially expressed often resulting in an intermediate or different phenotype. It is also known as partial Dominance. Eg. Rose the alleles for red colour is Dominance over allels of White colour |

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Complementary, Supplementary and Duplicate gene interactions |
| Hours required | 3 |
| Learning Objectives | TO known about the complementary, Supplementary and Duplicate gene interactions. |
| Previous knowledge to be reminded | TO recollect previous knowledge about gene interactions. |
| Examples/Illustrations | Sweet pea plant. Wheat. |
| Additional inputs | |
| Teaching Aids used | B.B + PPT |
| References cited | Cell & Molecular Biology. PK Gupta 2002 |
| Student Activity planned after the teaching | Seminar and Group Discussion |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Complement gene interactions: -<br>complementary gene interaction is a type of gene interaction where two or more gene work together to create a new trait or phenotype, that is different from the effect of each gene individually.<br>: complementary gene help control the colour of the flower in Sweet Pea plant. |

*Signature of the Lecturer*

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | A Brief account & linkage and crossing over Chromosomal maping → point and 3- point test cr |
| Hours required | 2 |
| Learning Objectives | To known about linkage and crossing over. |
| Previous knowledge to be reminded | To Recollect previous knowledge |
| Examples/Illustrations | Chromosomal mapping - 2-point and 3-point test cross. |
| Additional inputs | |
| Teaching Aids used | B.B. |
| References cited | Cell and molecular Biology. P.K Gupta 2005 |
| Student Activity planned after the teaching | Group discussion |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* Linkage and Crossing over are two process that affect genes on the same chromosome in different ways. (1) 2-point Test cross (2) 3-point test cross |

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Concept of material inheritance (Correns Experiment on (Mirabilis) : Mitochondrial DNA |
| Hours required | 2. |
| Learning Objectives | To knowns Material Inheritence. and mitochondrial DNA |
| Previous knowledge to be reminded | To recollect previous knowledge |
| Examples/Illustrations | Mirabilis Jalapa |
| Additional inputs | |
| Teaching Aids used | BB and ppt |
| References cited | Cell and molecular Biology. DK Gupta 2002 |
| Student Activity planned after the teaching | Seminar |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | — |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Carl Correan used the four clock plant Mirabilis Jalapa. to study cytoplasmic Inheritance and non-Mendalian Inheritence pattern.<br>① cytoplasmic inherited<br>② non-Mendellian Inheritene<br>③ mitochondrial DNA |

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | watson and crick model of DNA. Brief account on DNA Replication. |
| Hours required | 2. |
| Learning Objectives | To known about Watson and Crick model of DNA and DNA Replication |
| Previous knowledge to be reminded | To recollect the previous knowledge |
| Examples/Illustrations | DNA, |
| Additional inputs | |
| Teaching Aids used | B.B and PPT |
| References cited | Cell and molecular Biology P.K. Gupta (2002) |
| Student Activity planned after the teaching | Seminar. |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed)<br>Watson and crick models of DNA is a Double-standard helix that describe the structure of DNA.<br>① DNA structure<br>② Replication of DNA |

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Brief account on Transcription, types and functions of RNA. |
| Hours required | 2. |
| Learning Objectives | To know about types of RNA and transcription |
| Previous knowledge to be reminded | To recollect previous knowledge. |
| Examples/Illustrations | RNA types. |
| Additional inputs | |
| Teaching Aids used | B.B and PPt. |
| References cited | Cell & Molecular Biology P.K. Gupta |
| Student Activity planned after the teaching | Seminar |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Transcription :- The process by which a cell makes an RNA copy of a pieces of DNA. The RNA copy called mRNA carries the genetic information needed to make protein in a cell. It carries the information from the DNA in the nucleus of the cell to the cytoplasm where protein are made. |

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Gene concept and Genetic code and Translation. |
| Hours required | 2. 3. |
| Learning Objectives | To Know about Concept of Gene and Genetic code and Translocation. |
| Previous knowledge to be reminded | To recollect Previous Knowledge. |
| Examples/Illustrations | Gene concept, Genetic code and Translocation |
| Additional Inputs | |
| Teaching Aids used | B.B. and PPt |
| References cited | Cell Biology Sc. Rastogi |
| Student Activity planned after the teaching | Seminar. Question and Answer |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed)<br>Gene concept:- the gene is considered the basic units of inheritance. Genes are passed from parent to offspring and contain the information needed to specify physical and Biological traits. Most genes code for specific proteins or Segment of Protein which have different function within the body. |

Signature of the Lecturer

Non-Vascular plants

**Teaching Plan / Lesson No.**

| | |
|---|---|
| **Name of the Topic** | General characters of Algal, occurence, distribution, cell Structure, Pigment, flagella and R-f-nder |
| **Hours required** | (4) |
| **Learning Objectives** | To known about the character of Algal. and Distribution, cell Structure, pigment and flagella of Algal |
| **Previous knowledge to be reminded** | To recollect poevious knowledge. |
| **Examples/Illustrations** | Algae |
| **Additional inputs** | |
| **Teaching Aids used** | B.B and PPT |
| **References cited** | B.P- Pandey College Botany |
| **Student Activity planned after the teaching** | Seminar |
| **Activity planned outside the Class room, if any** | Assignment |
| **Any other activity** | |
| **Topic Synopsis** | *(Continue on the reverse side if needed)*<br>General characteristics of Algal<br>① Algae are photosynthetic Eukaryotic pigments<br>② They are commonly found in aquatic environments including fresh water, marine, and brackish water<br>③ They are either motile or non-motile. |

**Signature of the Lecturer**

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Classification of Algae by F.E. Fritsch |
| Hours required | 2 |
| Learning Objectives | To Known the F.E Fritsch of the classification of Algae. |
| Previous knowledge to be reminded | To Recollect previous Knowledge. |
| Examples/Illustrations | Chlorophyceae, Phaeophyceae, Xanthophyceae Rhodophyceae. |
| Additional inputs | |
| Teaching Aids used | BB & PPt. |
| References cited | B.P. Pandey college Botany |
| Student Activity planned after the teaching | Question and Answer |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* F.E. Fritsch classified Algae into 11 classes based on the characteristics of their Pigments Flagella, and reserve food material. There are 11 classes in F.E. Fritsch classification |

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Thallus organization and life cycles of Algae. |
| Hours required | 2. |
| Learning Objectives | To known the thallus organization and life cycle of Algae. |
| Previous knowledge to be reminded | To recollect previous knowledge. |
| Examples/Illustrations | Haploid cycle, Diploid life cycle Haplo-Diplointic life cycle. |
| Additional inputs | |
| Teaching Aids used | B.B. ppt. |
| References cited | B.P. Pandey. college Botany |
| Student Activity planned after the teaching | Group Discussion |
| Activity planned outside the Class room, if any | Assignment. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Life cycle of Algae<br>Haplointic life cycle:- In the Haplointic life cycle the plant body is called gametophyte (haploid) in contact, the sporophyte (Diploid) stage is Exclusively represented by zygote. |

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Economical and Economical importance of Algae |
| Hours required | 2 |
| Learning Objectives | To know the about Economic importance of Algae. |
| Previous knowledge to be reminded | To recollect previous knowledge. |
| Examples/Illustrations | Diatoms. |
| Additional inputs | |
| Teaching Aids used | BB and PPt |
| References cited | B.P Pandey. College Botany |
| Student Activity planned after the teaching | Seminal |
| Activity planned outside the Class room, if any | — |
| Any other activity | — |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Algae are photoautotrophic that can prepare their own food and they produce O2 during photosynthesis Algae are ubiquitous majority of Algae are abundant stagnant water |

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Occurence, Structure Reproduction and life cycle of Spirogyra. |
| Hours required | 2 |
| Learning Objectives | To known the structure, Reproduction and life cycle of Spirophyte. |
| Previous knowledge to be reminded | To recollect the previous knowledge |
| Examples/Illustrations | Spirogyra species. |
| Additional inputs | |
| Teaching Aids used | Ppt. B.B |
| References cited | B.P. Pandey college Botany |
| Student Activity planned after the teaching | Seminal |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* Spirogyra, a green algae found in fresh water, has a haplontic life cycle with three type of reproduction: Vegetative Asexual and Sexual. Spirogyra commonly known as "water silk or pond silk". They have a filamentous, and unbranched, vegetative structure |

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| **Name of the Topic** | Occurence, Structure, reproduction and life cycle of Ectocarpus. |
| **Hours required** | 2. |
| **Learning Objectives** | To known about structure, reproduction and life cycle of Ectocarpus. |
| **Previous knowledge to be reminded** | To recollect previous knowledge. |
| **Examples/Illustrations** | Ectocarpus. |
| **Additional inputs** | |
| **Teaching Aids used** | B.B & PPt. |
| **References cited** | College Botany. B.P Pandey (2013) |
| **Student Activity planned after the teaching** | Seminar |
| **Activity planned outside the Class room, if any** | Assignment |
| **Any other activity** | |
| **Topic Synopsis** | *(Continue on the reverse side if needed)*<br>Ectocarpus:<br>Thallus: The thallus is sparingly to profusely branched, the cells are uniseriate, joined end to end in row in some some species the old portion of the main branches are corticated by layer of descending rhizoidal branches. |

***Signature of the Lecturer***

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Occurence, Structure, reproduction and life cycle of Vaucheria. |
| Hours required | 2. |
| Learning Objectives | To discuss the about Vaucheria structure reproduction and life cycle. |
| Previous knowledge to be reminded | To recollect previous knowledge. |
| Examples/Illustrations | |
| Additional inputs | |
| Teaching Aids used | B.B. PPT |
| References cited | College Botany. B.P. Pandey (2013) |
| Student Activity planned after the teaching | Seminar |
| Activity planned outside the Class room, if any | Assignment |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Thallus :- The plant body of Vaucheria is filamentous, branched, coenocytic and siphonaceous thallus. they are mostly aseptate in structure |

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| **Name of the Topic** | occurence, structure, reproduction and life cycle of polysiphonia |
| **Hours required** | 3. |
| **Learning Objectives** | To known the about polysiphonia structure, reproduction, and life cycle. |
| **Previous knowledge to be reminded** | To recollect Previous knowledge. |
| **Examples/Illustrations** | Polysiphonia |
| **Additional inputs** | |
| **Teaching Aids used** | B.B and ppt. |
| **References cited** | College Botany. B.P. Pandey (2013) |
| **Student Activity planned after the teaching** | Seminar. |
| **Activity planned outside the Class room, if any** | Assignment. |
| **Any other activity** | |
| **Topic Synopsis** | *(Continue on the reverse side if needed)*<br>Thallus: Thallus composed of upright axes and a tightly, Intricately entangled stolon<br>(2) corticated thallus with 4 pericentral cells<br>(3) thick and setaceous thalli in the mature stage.<br>(4) Non-septate adventitious Rhizoids<br>(5) sharply pointed ultimate branchlet |

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| **Name of the Topic** | A Brief account of Bacillariophyceae |
| **Hours required** | 1 |
| **Learning Objectives** | To known about Bacillariophyceae |
| **Previous knowledge to be reminded** | To recollect previous knowledge. |
| **Examples/Illustrations** | Bacillariophyceae Diatoms. |
| **Additional inputs** | |
| **Teaching Aids used** | B.B and PPt |
| **References cited** | College Botany B.P. Pandey (2013) |
| **Student Activity planned after the teaching** | Seminar |
| **Activity planned outside the Class room, if any** | Assignment. |
| **Any other activity** | |
| **Topic Synopsis** | *(Continue on the reverse side if needed)*<br>Bacillariophyceae also known as diatoms.<br>Imp characteristics.<br>① some characteristics of diatoms<br>① cell wall<br>② shape<br>③ pigment<br>④ Reproduction<br>⑤ movement |

**Signature of the Lecturer**

**Teaching Plan / Lesson No.**

| | |
|---|---|
| **Name of the Topic** | Culture and cultivation of Chlorella: |
| **Hours required** | 1 |
| **Learning Objectives** | To know about- Culture and cultivation of Chlorella: |
| **Previous knowledge to be reminded** | To recollect previous knowledge: |
| **Examples/Illustrations** | Chlorella |
| **Additional Inputs** | |
| **Teaching Aids used** | B.B & PPt |
| **References cited** | B.College Botany B.P Pandey (Vol 1) |
| **Student Activity planned after the teaching** | Seminar |
| **Activity planned outside the Class room, if any** | Assignment |
| **Any other activity** | Visit to culture area |
| **Topic Synopsis** | *(Continue on the reverse side if needed)*<br>Chlorella culture — Step by Step Process<br>Step I :- Nutrition Chlorella Seeds are grown in Lab<br>Step II : Collected Seedling are cultivated in fermentation equipment.<br>Step III :- The grown seedling are taken to outerdoor cultivation tanks for maximum growth. |

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**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | General characteristics of fungi, and Ainsworth (1973) classification. |
| Hours required | 2. |
| Learning Objectives | To known about general characteristics of fungi and classification. |
| Previous knowledge to be reminded | To Recollect previous knowledge. |
| Examples/Illustrations | Classes of fungi. |
| Additional inputs | — |
| Teaching Aids used | B.B. |
| References cited | Introduction mycology. C.T. Alexopoulus |
| Student Activity planned after the teaching | Seminar Question and Answer |
| Activity planned outside the Class room, if any | Assignment. |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed)<br>General characteristics of fungi.<br>Cell structure: - Eukaryotic cell organism cell walls made up of chitin,<br>Nutrition: - Heterotrophic.<br>Reproduction: - Asexually, or sexually and some species can do both |

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# COMMISSONERATE OF COLLEGIATE EDUCATION,

# GOVT. DEGREE COLLEGE

## RAJAMPET, KADAPA. Dt.

(Affiliated to Yogi Vemana University, Kadapa.)

## TEACHING PLAN

ACADEMIC YEAR 2023 -2024

Name of the Department : PHYSICS

NAME OF THE LECTURER : S. Mahaboob Basha

Course / Group : MPCs - Sem V

Subject / Page : Applications of Electrical and Electronics P-6c

| Sl.No | Subject | Paper | Page No |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Introduction to passive elements : Resistance, Active elements - Resistor type, color code. |
| Hours required | |
| Learning Objectives | Knowledge, understanding, application |
| Previous knowledge to be reminded | Resistors, Color coding |
| Examples / Illustrations | Resistor, type |
| Additional inputs | |
| Teaching Aids used | Resistors |
| References cited | |
| Student Activity Planned after the teaching | Resistor - values by using color coding |
| Activity planned outside the class room, if any | Types of resistors, diagram Practice |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Introduction to passive - Active elements<br>1. Active Elements:<br>Produce energy to another circuit in the form of voltage / current<br>control current diode<br>used in current/voltage control applications<br>Ex: Transistor, [illegible], logic gate |

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tunnel diode, Zener diode

Passive elements :- - Can't supply energy to any circuit
- not capable of control current on their own
- used for energy storage, discharge, oscillations, filters, phase shifting applications

Eg :- Resistors, Capacitors, Inductors

Types of resistors :- 1. fixable resistors
2. Carbon resistors
3. Wound resistors.

Color coding :-

| color | - | Coding | - | tolerance |
|---|---|---|---|---|
| Black | - | 0 | - | |
| Brown | - | 1 | - | ± 1 % |
| Red | - | 2 | - | ± 2 % |
| orange | - | 3 | - | ± 0.5 % |
| yellow | - | 4 | - | |
| Green | - | 5 | - | |
| Blue | - | 6 | - | ± 0.25 % |
| violet | - | 7 | - | ± 0.1 % |
| Grey | - | 8 | - | ± 0.05 % |
| White | - | 9 | - | ± 5 % |
| Gold | - | - | - | ± 10 % |
| Silver | - | - | - | |

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Application of resistors - capacitor types color coding |
| Hours required | 2 |
| Learning Objectives | Knowledge, understanding, application |
| Previous knowledge to be reminded | resistor, capacitor |
| Examples / Illustrations | types of capacitors |
| Additional inputs | |
| Teaching Aids used | capacitors |
| References cited | |
| Student Activity Planned after the teaching | Capacitor value by using color coding |
| Activity planned outside the class room, if any | types of capacitor, diagram practice |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Application of Resistors:-<br>1. Fixable resistors used in motors Power Supply<br>2 - Controls in real Currents<br>3. Safe guard the equipment + blow out in event of short circuit. |

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## types of capacitors:

Acc. to Structure

1. fixed capacitor
2. Variable capacitors
3. trimmer capacitor

A/c polarisation

1. Polarised
2. unpolarised

1. ceramic capacitors
2. film capacitors
3. power film capacitors
4. Electrolytic capacitor
5. paper capacitor

Color coding same as that of resistors.

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Application of resistor as heating element – ~~Capacitor in motor (fan), Power supply~~ |
| Hours required | 1 |
| Learning Objectives | Knowledge, understanding |
| Previous knowledge to be reminded | resistor, capacitor |
| Examples / Illustrations | fan |
| Additional inputs | |
| Teaching Aids used | fan, heater |
| References cited | |
| Student Activity Planned after the teaching | to learn the applications of resistor |
| Activity planned outside the class room, if any | —do— |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Application of resistor as heating element:<br>Resistor can produce convective heat means it heat up surrounding air, liquid<br>Ex :- hair drier, immersive heater |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Energy stored in a capacitor, types of Inductors, application of Inductors |
| Hours required | 2 |
| Learning Objectives | Knowledge, Understanding |
| Previous knowledge to be reminded | capacitor, Inductor |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | capacitor, Inductors |
| References cited | |
| Student Activity Planned after the teaching | Practice the eqns. for Energy stored in a capacitor |
| Activity planned outside the class room, if any | — |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Energy stored in a capacitor:<br>P.d. across a capacitor $v = \frac{q}{c}$<br>$dw = v\,dq$<br>$= \frac{q}{c}dq$<br>$w = \int dw = \int \frac{q}{c}dq$ |

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$$W = \int \frac{q}{C} dq$$

$$= \frac{1}{C} \frac{q^2}{2}$$

$$= \frac{1}{q} \frac{V_C^2 t}{2}$$

$$= \frac{1}{2} C V^2$$

## Types of Inductors:

1. Iron-core Inductor
2. Toroidal Inductor
3. Laminated core Inductor
4. Powdered Iron core Inductor

## Applications of Inductors:

Inductors are used in

1. Tuning circuits
2. Sensors
3. store energy in a device
4. Induction motors
5. Transformers
6. filters, chokes
7. relays

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Application of choke in a four radio tuning circuit. |
| Hours required | 2 |
| Learning Objectives | Knowledge, Understanding |
| Previous knowledge to be reminded | Inductor (choke) |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | choke (Inductor) |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Radio tuning circuit: with the help of Inductor tuning circuit can select desired frequency.<br>fan: choke (Inductors) are used to control the speed of motor |

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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | 11 Power Source : types of Power Source types of batteries, rechargeable batteries |
| Hours required | |
| Learning Objectives | Knowledge, Understanding |
| Previous knowledge to be reminded | Battery, chargeable not chargeable |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | Chargeable / not chargeable batteries |
| References cited | |
| Student Activity Planned after the teaching | To collect some rechargeable batteries |
| Activity planned outside the class room, if any | Asked the students to collect a few rechargeable batteries if possible |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Power sources : 1. Ac Power Source<br>2. DC Power Sources<br>1. Ac Power Sources : In Ac Power Sources current is flow of charge changes direction periodically, voltage level also reverses along with current.<br>Ex: Ac Power delivered to houses, offices, building |

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D.C POWER SOURCES : In this current flows in one dirn, but change its dirn

It is unidirectional

Ex: cell phones
Ele. Vehicles
Flat Screen T.V's

Types of batteries : 1. Primary batteries (Non rechargeable)

Ex: dry batteries

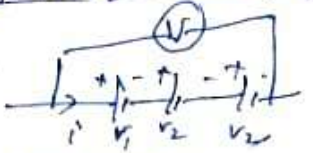
2. : secondary batteries (rechargeable batteries)

Ex. used in

1. Mobiles
2. Laptops
3. Ele. Vehicles

Li-ion,
Ni-metal Hydride
Lead-acid batteries

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Series / Parallel combination of Batteries |
| Hours required | 2 |
| Learning Objectives | Knowledge, understanding, application |
| Previous knowledge to be reminded | Parallel and series combination of cells |
| Examples / Illustrations | Batteries in Four Wheelers |
| Additional inputs | |
| Teaching Aids used | Battery in the inverter circuit |
| References cited | |
| Student Activity Planned after the teaching | Asked the students to see the batteries in the inverter circuit in the house |
| Activity planned outside the class room, if any | —do— |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* Series, Parallel combination of Batteries<br>Series<br>  <br>$V = V_1 + V_2 + V_3$ $i$ = current |

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## Teaching Plan / Lesson No.

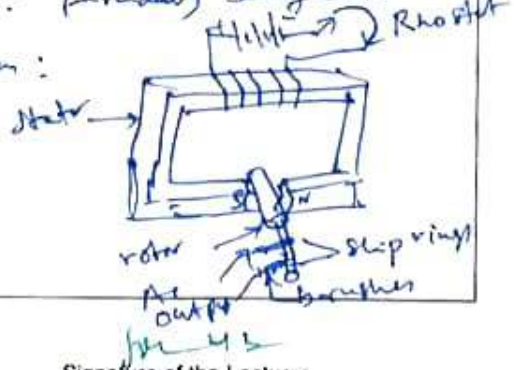
| | |
|---|---|
| Name of the Topic | Const. current/voltage sources, applications of comps used in computers. |
| Hours required | 2 |
| Learning Objectives | Knowledge, understanding |
| Previous knowledge to be reminded | Stabilizer, regulators |
| Examples / Illustrations | Stabilizer |
| Additional inputs | |
| Teaching Aids used | Stabilizer |
| References cited | |
| Student Activity Planned after the teaching | asked to see the stabilizer connected to T.V, Refrigerator |
| Activity planned outside the class room, if any | — do — |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Const. Current Source: It is a Power source provides a const. current to load even despite change in load resistance<br>Const. Voltage source: which maintains const. voltage level during operation<br>regulators of current variations as well as variations in load resistance |

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SMPS - Switch mode Power Supply is an electronic circuit converting Power using switching devices that turn on and off at high frequencies

They are also storage Components Just like Inductor, capacitor

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | 1L A/c current : AC Power Source generation, construction, working |
| Hours required | 2 |
| Learning Objectives | Knowledge, understanding |
| Previous knowledge to be reminded | Faradays Laws of EMI |
| Examples / Illustrations | Transformer |
| Additional inputs | |
| Teaching Aids used | Screen the fig in graph |
| References cited | |
| Student Activity Planned after the teaching | Learn the faradays Laws of Induction<br>Learn to draw the fig of AC Generator |
| Activity planned outside the class room, if any | Learn the construction and working as well as Principle of AC Generator |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Principle : Faradays Laws of EMI<br>Construction :<br>  |

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Working: Flux linkage of the armature varies continually as it revolves between poles of magnet on an axis ⊥r to the magnetic field.

An electric current travels to the galvanometer, slip rings, brushes as a consequence. Galvanometer changes its value from one to another.

It shows that an AC is relied.

Fleming Right Hand rule can be used to determine the direction of induced current

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Transformers : Construction & working |
| Hours required | 1 |
| Learning Objectives | Knowledge, Understanding |
| Previous knowledge to be reminded | transformers |
| Examples / Illustrations | transformers |
| Additional inputs | |
| Teaching Aids used | transformers (strydom) |
| References cited | |
| Student Activity Planned after the teaching | Asked the students to learn the PPt and diagram of transformers |
| Activity planned outside the class room, if any | — do — |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* Principle : Mutual Induction bet. (Faraday Laws of EMI) two coils wound on some core magnetic flux generated in Primary coil induces emf in Secondary coil and thereby Electrical Energy is transformed from Primary to Secondary |

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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Single phase motor working principle application |
| Hours required | 2 |
| Learning Objectives | Knowledge, understanding |
| Previous knowledge to be reminded | Washing machine |
| Examples / Illustrations | Vaccum cleaner, blower, washing machine |
| Additional inputs | |
| Teaching Aids used | shown the fig. of the above examples |
| References cited | |
| Student Activity Planned after the teaching | asked the students to observe the washing machine, vaccum cleaner etc |
| Activity planned outside the class room, if any | — do — |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* Single phase induction motor is a simple in construction, cheap in cost. reliable and easy to repair and maintain Due to all these advantages this is used vaccum cleaner, blower washing machine, centrifugal pumps |

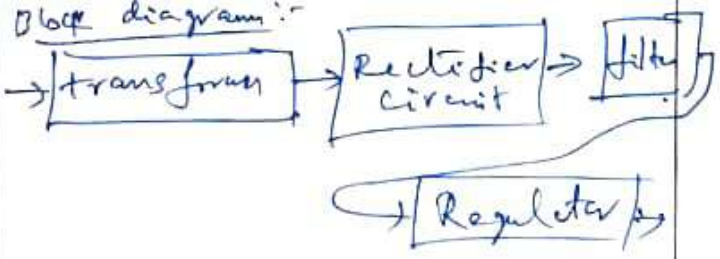
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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Single phase Motor working principle application |
| Hours required | 2 |
| Learning Objectives | Knowledge, understanding |
| Previous knowledge to be reminded | Washing machine |
| Examples / Illustrations | Vacuum cleaner, blower, washing machine |
| Additional inputs | |
| Teaching Aids used | shown the fig. of the above examples |
| References cited | |
| Student Activity Planned after the teaching | asked the students to observe the washing machine, vacuum cleaner etc |
| Activity planned outside the class room, if any | — do — |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* Single phase induction motor is a simple in construction, cheap in cost. flexible and easy to repair and maintain Due to all these advantages this is used vacuum cleaner, blower washing machine, centrifugal pumps |

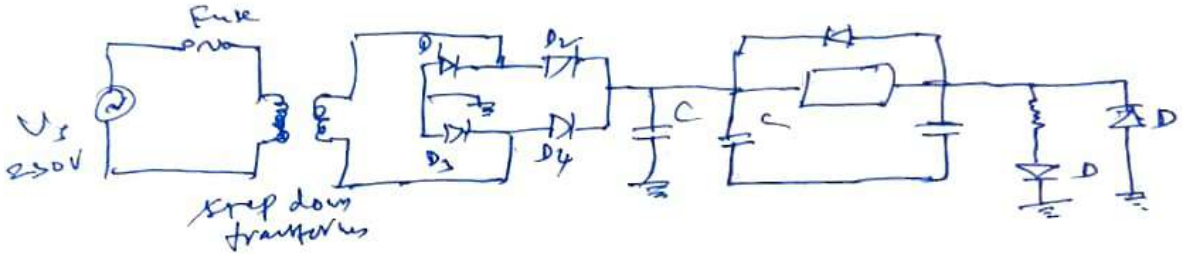
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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Power supplies : DC regulated Power supply (5V) |
| Hours required | 2 |
| Learning Objectives | knowledge, understanding |
| Previous knowledge to be reminded | rectifier circuit |
| Examples / Illustrations | Circuit of regulated power supply |
| Additional inputs | |
| Teaching Aids used | Rectifier circuit |
| References cited | asked to students to construct a 5V any 9V etc regulated Power supply |
| Student Activity Planned after the teaching | ——do—— |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* Block diagram :-   |

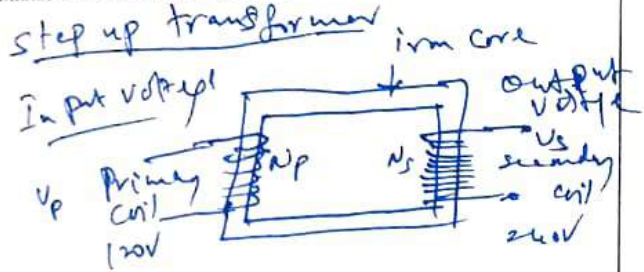
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Circuit diagram of '5V' DC Power supply



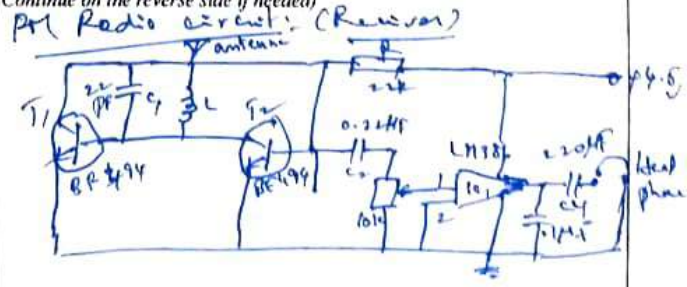
## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Design of step up (or step down transformer (Problems) |
| Hours required | 2 |
| Learning Objectives | Knowledge, Leadership, Application etc. |
| Previous knowledge to be reminded | transformers (step down) |
| Examples / Illustrations | step down transformer |
| Additional inputs | |
| Teaching Aids used | Step down transformer |
| References cited | |
| Student Activity Planned after the teaching | Asked to construct a step down transformer |
| Activity planned outside the class room, if any | —do— |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* |




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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | FM Radio circuit using LCR Series resonance circuit - checking output voltage of the circuit by Multimeter. |
| Hours required | 2 |
| Learning Objectives | Knowledge, understanding, applicat |
| Previous knowledge to be reminded | LCR series resonance circuit |
| Examples / Illustrations | LCR series circuit |
| Additional inputs | |
| Teaching Aids used | LCR series circuit |
| References cited | |
| Student Activity Planned after the teaching | Practice the FM Radio circuit Check the voltage by multimeter. |
| Activity planned outside the class room, if any | — do — |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* FM Radio circuit: (Receiver)   |

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Measure Voltage of battery eliminator by a multimeter

1. Power off the eliminator which under Test
2. Plug the black ground Probe lead into COM Socket on the meter
3. plug the Red +ve Probe lead into the socket marked 'V'
4. Turn the dial to Select AC or DC and range 20 V or 200V
5. Multimeter should connect in Parallel in a circuit to measure the voltage
6. Power up the circuit or eliminator
7. Take the readings on LCD display

| | |
|---|---|
| Name of the Topic | पुरस्कार |
| Hours required | 3 |
| Learning Objectives | देशभक्ति |
| Previous knowledge to be remined | देशभक्ति से सम्बंधित कहानियां |
| Exzmples/Illustrations | निजी जीवन के उदाहरण |
| Additional inputs | Youtube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | चन्द्रगुप्त जैसे उपन्यास जयशंकर प्रसाद जी कृत |
| Student activity planned after teaching | लघु प्रशों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | पुरस्कार :<br>मधुलिका पात्र के दवारा देशभक्ति को व्यक्तिगत स्वार्थ से ऊपर का दर्जा दिया है | प्रेम के लिए आत्मसम्पर्पण करके मधुलिका को विद्रोह कलंक से बचाना एक अद्वितीय संघटन है | |
| | |
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| | |
|---|---|
| Name of the Topic | मुक्तिधन |
| Hours required | 3 |
| Learning Objectives | दिल से साफ रहने से हर बंदा खुदा बनकर सहायता करता है |
| Previous knowledge to be remined | ईदगाह प्रेमचंद की ही कहानी जो बच्चे दसवी कक्षा में पढ़े थे | |
| Exmples/Illustrations | छात्रों के खुद की जिंदगियों से निकलवाना |
| Additional inputs | Youtube |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | मानसरोवर |
| Student activity planned after teaching | लघु प्रशों के उत्तर |
| Activity planned outside the class room | निबंध के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | मुक्तिधन कहानीकार प्रेमचंद जी है | प्रेमचंद ३०० से ज्यादा कहानियां लिखे थे | प्रस्तुत कहानी में दादूदयाल और रहमान पात्रों के दवारा इंसानियत का एक आदर्श रूप प्रस्तुत किया | |
| | |
| SIGNATURE OF THE LECTURER | |
| | |

| | |
|---|---|
| Name of the Topic | बिंदा |
| Hours required | 3 |
| Learning Objectives | एक बदनसीब लड़की की कहानी |
| Previous knowledge to be remined | मलाला यूसूफ जाय |
| Exzmples/Illustrations | निज जिंदगी के कई उदहारण |
| Additional inputs | Youtube, ppt |
| Teaching aids used | पाठ्यपूस्तक, श्यामपट, खड़िया |
| References cited | महाभारत , रामायण महाग्रन्थ |
| Student activity planned after teaching | लघ् प्रशों के उत्तर |
| Activity planned outside the class room | निबंध के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | सच्ची वीरता :<br>सच्ची वीरता पाठ का प्रमुख उद्देश्य जो बलवान होते है वे ही वीर नहीं कहलाते है बल्कि जो अच्छे कार्य के लिए समाज हित के लिए काम करे वो ही सच्चे वीर कहलाते है | |
| | |
| SIGNATURE OF THE LECTURER | |

| | |
|---|---|
| Name of the Topic | मित्रता |
| Hours required | 3 |
| Learning Objectives | मित्र को चूनते समय आवश्यक जानकारी |
| Previous knowledge to be remined | मित्रता की आवश्यकता |
| Exzmples/Illustrations | कर्ण और दुर्योधन की मित्रता के बारे में , राम लक्ष्मण की मित्रता के बारे में वर्णन |
| Additional inputs | विद्यार्थियों के खुद का जीवन से उदाहरण प्रस्तुत किया गया है \| |
| Teaching aids used | पाठ्यपूस्तक, श्यामपट, खड़िया |
| References cited | महाभारत , रामायण महाग्रन्थ |
| Student activity planned after teaching | लघू प्रशों के उत्तर |
| Acgtivity planned outside the class room | निबंध के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | मित्रता: लेखक का परिचय : शुक्ल जी का जन्म उत्तर प्रदेश १८८४ में हुआ था \| आप गंभीर व्यक्तित्ववाले थे \|<br>सारांश: प्रस्तुत निबंध में मित्रता क्या है, मित्र का कर्तव्य क्या है, प्रमुख रूप से दर्शाया गया है \|<br>विशेष: सच्चा मित्र पथप्रदर्शक होता है \| |
| | |
| SIGNATURE OF THE LECTURER | |

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|---|---|
| Name of the Topic | साहित्य की महत्ता |
| Hours required | 3 |
| Learning Objectives | साहित्य और समाज का संबंध |
| Previous knowledge to be remined | सभ्यता और संस्कृति के बारे में |
| Exzmples/Illustrations | प्राचीन धार्मिक ग्रंथों के बारे में |
| Additional inputs | रामायण और महाभारत के बारे में |
| Teaching aids used | पाठ्यपूस्तक, श्यामपट, खड़िया |
| References cited | महाभारत , रामायण महाग्रन्थ |
| Student activity planned after teaching | लघ् प्रशों के उत्तर |
| Activity planned outside the class room | निबंध के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | साहित्य की महत्ता<br>निबंधकार का परिचय : खड़ीबोली हिंदी को परिमार्जित करने में महावीर प्रसाद द्विवेदी का योगदान महत्वपूर्ण है | उन्होंने २० वर्षों तक सरस्वती पत्रिका की सेवा की | |
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| SIGNATURE OF THE LECTURER | |

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| Name of the Topic | आवेदन पत्र |
| Hours required | 3 |
| Learning Objectives | किसी पद के लिए पत्र , कार्यालय सम्बन्धी कोई पत्र |
| Previous knowledge to be remined | व्यक्तिगत पत्रों के सहारे जानकारी देना |
| Examples/Illustrations | निजी जीवन के उदाहरण |
| Additional inputs | Youtube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | |
| Student activity planned after teaching | लघु प्रशों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | |
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| SIGNATURE OF THE LECTURER | |

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|---|---|
| Name of the Topic | आवेदन पत्र |
| Hours required | 3 |
| Learning Objectives | किसी पद के लिए पत्र , कार्यालय सम्बन्धी कोई पत्र |
| Previous knowledge to be remined | व्यक्तिगत पत्रों के सहारे जानकारी देना |
| Examples/Illustrations | निजी जीवन के उदाहरण |
| Additional inputs | Youtube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | |
| Student activity planned after teaching | लघु प्रशों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | |
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| SIGNATURE OF THE LECTURER | |

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| Name of the Topic | कारक |
| Hours required | 3 |
| Learning Objectives | कारक कितने प्रकार के है \| वाक्यों में कारक का प्रयोग कैसे होता है |
| Previous knowledge to be remined | तेल्गु भाषा के विभक्तियों की जानकारी |
| Examples/Illustrations | निजी जीवन के उदाहरण |
| Additional inputs | Youtube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | कामता प्रसाद गुरु जी का व्याकरण, किशोरीदास वाजपेयी का व्याकरण |
| Student activity planned after teaching | लघु प्रशों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | और वह पढ़ गई :<br>इस कहानी के कहानीकार श्रीमती कुसुमावियोगी जी है \| प्रस्तुत कहानी के द्वारा स्थिर चित्त से कैसे एक लड़की अपनी लक्ष्य को पा लेती है दिखाया गया \| यह एक अद्भुत प्रेरणात्मक कहानी है \| |
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| SIGNATURE OF THE LECTURER | |

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| Name of the Topic | वचन |
| Hours required | 5 |
| Learning Objectives | एक और अनेक शब्दों का वाक्यों का प्रयोग |
| Previous knowledge to be remined | वचन की जानकारी वे जरूर रखते है| पूनस्मरण के द्वारा |
| Examples/Illustrations | हिंदी में भिन्न प्रकार होते है| हरेक का उचित उदाहरण प्रस्तुत किया जाएगा | |
| Additional inputs | Youtube ppt |
| Teaching aids used | पाठ्यपूस्तक, श्यामपट, खड़िया |
| References cited | कामता प्रसाद गुरु जी का व्याकरण, किशोरीदास वाजपेयी का व्याकरण |
| Student activity planned after teaching | लघ् प्रशों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | वचन दो प्रकार के होते है \| एक वचन, दो वचन<br>स्त्री लिंग का एक उदहारण :<br>चिड़िया : चिड़ियाँ<br>पुल्लिंग में वचन का बदलना<br>पक्षी – पक्षी , घर – घर, पेड़ – पेड़ |
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| SIGNATURE OF THE LECTURER | |

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| Name of the Topic | लिंग |
| Hours required | 3 |
| Learning Objectives | स्त्री लिंग और पुल्लिंग की जानकारी देना |
| Previous knowledge to be remined | लिंग निर्धारण तेलुगु भाषा से तुलना के द्वारा |
| Examples/Illustrations | निजी जीवन के उदाहरण |
| Additional inputs | Youtube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | कामता प्रसाद गुरु जी का व्याकरण, किशोरीदास वाजपेयी का व्याकरण |
| Student activity planned after teaching | लघु प्रशों के उत्तर |
| Activity planned outside the class room | सामने दिखने वाले हर किसी वस्तु की लिंग जानकारी कराना |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | लिंग : हिंदी में केवल पुल्लिंग स्त्रीलिंग होते है\| हिंदी में लिंग निर्धारण कष्टदायक है \| लिंग निर्धारण रूप और अर्थ के अनुसार होता है \| लिंग के अनुसार क्रिया का रूप रहती है \| ने प्रत्यय में कर्म के अनुसार क्रिया का रूप निश्चित होता है \| |
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| SIGNATURE OF THE LECTURER | |

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|---|---|
| Name of the Topic | कार्यालयीन शब्दावली |
| Hours required | 3 |
| Learning Objectives | छात्रों में कार्यालय सम्बन्धी शब्दों की अवगाहना हेत् |
| Previous knowledge to be remined | पहले छात्रों के द्वारा सम्बंधित शब्दों को जो तेलुगु और हिंदी में एक होते है उन पर discussion करना |
| Additional inputs | Youtube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | मोत्री सत्यन्नारायाणा कृत प्रयोजनमूलक हिंदी |
| Student activity planned after teaching | लघ् प्रश्नों के उत्तर |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | कार्यालयों में उपयोग करने वाले शब्दों की जानकारी देना है जैसे typist को टंकक कहते है peon को चपरासी बोलते है officer को अधिकारी बोलते है \| छात्र जब रोजगार बनेगा तब हर कार्यालयीन शब्दावली की जानकारी उनके लिए बेहद उपयोगी बनेगा \| |
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| SIGNATURE OF THE LECTURER | |

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| Name of the Topic | और वह पढ़ गई |
| Hours required | 3 |
| Learning Objectives | बालिका विद्या |
| Previous knowledge to be remined | स्त्री विद्या से सम्बंधित कहानी |
| Examples/Illustrations | निजी जीवन के उदाहरण |
| Additional inputs | Youtube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | मृणाल सेन, प्रभाखेतन जैसे लेखिकाओं की रचनाएँ |
| Student activity planned after teaching | लघु प्रशों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | और वह पढ़ गई :<br>इस कहानी के कहानीकार श्रीमती कुसुमावियोगी जी है \| प्रस्तुत कहानी के द्वारा स्थिर चित्त से कैसे एक लड़की अपनी लक्ष्य को पा लेती है दिखाया गया \| यह एक अद्भुत प्रेरणात्मक कहानी है \| |
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| SIGNATURE OF THE LECTURER | |

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|---|---|
| Name of the Topic | काल विभाजन |
| Hours required | 5 |
| Learning Objectives | हिंदी साहित्य का काल विभाजन |
| Previous knowledge to be remined | हिंदी साहित्य की ज्ञानज्ञानकहानियां प्राचीन नवीन कविताओं आदि का ज्ञान \| |
| Examples/Illustrations | निजी जीवन के उदाहरण |
| Additional inputs | Youtube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | शुक्ल, नागेन्द्र और हजारी प्रसाद द्विवेदी जी के हिंदी साहित्य इतिहास ग्रन्थ |
| Student activity planned after teaching | लघु प्रश्नों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | हिंदी साहित्य का काल विभाजन<br>हिंदी साहित्य को आदिकाल भक्तिकाल रीतिकाल और आधुनिककाल में बांटा गया है \| छात्रों को इस पर जानकारी देंगे \| |
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| SIGNATURE OF THE LECTURER | |

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| Name of the Topic | हिंदी साहित्य का इतिहास |
| Hours required | 3 |
| Learning Objectives | हिंदी का आविर्भाव के बारे में थोड़े बहुत जानकारी |
| Previous knowledge to be remined | तेलुगु भाषा से सम्बंधित ज्ञान |
| Examples/Illustrations | शुक्ल जी द्वारा बताया गया कुछ विषय |
| Additional inputs | Youtube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | शुक्ल, नागेन्द्र आदि के द्वारा लिखे गए साहित्यक विषयक किताब |
| Student activity planned after teaching | लघु प्रशों के उत्तर |
| Activity planned outside the class room | हिंदी साहित्य की जानकारी |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | हिंदी साहित्य का इतिहास लम्बे हर्ज का है | संस्कृत से पाली, पाली से प्राकृत, प्राकृत से अपभ्रंश और अपभ्रंश से हिंदी का आविर्भाव हुआ | विवरण सहित व्याक्य किया जाएगा | |
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| SIGNATURE OF THE LECTURER | |

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|---|---|
| Name of the Topic | आवेदन पत्र |
| Hours required | 3 |
| Learning Objectives | किसी पद के लिए पत्र , कार्यालय सम्बन्धी कोई पत्र |
| Previous knowledge to be remined | व्यक्तिगत पत्रों के सहारे जानकारी देना |
| Examples/Illustrations | निजी जीवन के उदाहरण |
| Additional inputs | Youtube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | |
| Student activity planned after teaching | लघु प्रशों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | |
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| SIGNATURE OF THE LECTURER | |

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| Name of the Topic | आवेदन पत्र |
| Hours required | 3 |
| Learning Objectives | किसी पद के लिए पत्र , कार्यालय सम्बन्धी कोई पत्र |
| Previous knowledge to be remined | व्यक्तिगत पत्रों के सहारे जानकारी देना |
| Examples/Illustrations | निजी जीवन के उदाहरण |
| Additional inputs | Youtube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | |
| Student activity planned after teaching | लघु प्रशों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | |
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| SIGNATURE OF THE LECTURER | |

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|---|---|
| Name of the Topic | व्यक्तिगत पत्र |
| Hours required | 3 |
| Learning Objectives | पत्रों के माध्यम से सम्प्रेषण करना |
| Previous knowledge to be remined | छुट्टी पत्र, पिताजी को पत्र जैसे व्यक्तिगत पत्रों की विधा से दसवी और बारहवी कक्षा में छात्रों को जानकारी है |
| Examples/Illustrations | मित्र के नाम पात्र, |
| Additional inputs | You tube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| Student activity planned after teaching | लघु प्रश्नों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | छात्र अपनी आवश्यकता के लिए व्यक्तिगत पत्र अर्थात छुट्टी पत्र, पिताजी को पत्र और मित्र को पत्र जैसे पत्रों की जानकारी देना \| |
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| SIGNATURE OF THE LECTURER | |

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| Name of the Topic | व्यक्तिगत पत्र |
| Hours required | 3 |
| Learning Objectives | पत्रों के माध्यम से सम्प्रेषण करना |
| Previous knowledge to be remined | छुट्टी पत्र, पिताजी को पत्र जैसे व्यक्तिगत पत्रों की विधा से दसवी और बारहवी कक्षा में छात्रों को जानकारी है |
| Examples/Illustrations | मित्र के नाम पात्र, |
| Additional inputs | You tube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| Student activity planned after teaching | लघु प्रश्नों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | छात्र अपनी आवश्यकता के लिए व्यक्तिगत पत्र अर्थात छुट्टी पत्र, पिताजी को पत्र और मित्र को पत्र जैसे पत्रों की जानकारी देना \| |
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| SIGNATURE OF THE LECTURER | |

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| Name of the Topic | आवेदन पत्र |
| Hours required | 3 |
| Learning Objectives | किसी पद के लिए पत्र , कार्यालय सम्बन्धी कोई पत्र |
| Previous knowledge to be remined | व्यक्तिगत पत्रों के सहारे जानकारी देना |
| Examples/Illustrations | निजी जीवन के उदाहरण |
| Additional inputs | Youtube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | |
| Student activity planned after teaching | लघु प्रशों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | |
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| SIGNATURE OF THE LECTURER | |
| Name of the Topic | कारक |
| Hours required | 3 |
| Learning Objectives | कारक कितने प्रकार के है \| वाक्यों में कारक का प्रयोग कैसे होता है |
| Previous knowledge to be remined | तेलुगु भाषा के विभक्तियों की जानकारी |
| Examples/Illustrations | निजी जीवन के उदाहरण |
| Additional inputs | Youtube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | कामता प्रसाद गुरु जी का व्याकरण, किशोरीदास वाजपेयी का व्याकरण |

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| Student activity planned after teaching | लघ् प्रशों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | और वह पढ़ गई :<br>इस कहानी के कहानीकार श्रीमती कुसुमावियोगी जी है | प्रस्तुत कहानी के द्वारा स्थिर चित्त से कैसे एक लड़की अपनी लक्ष्य को पा लेती है दिखाया गया | यह एक अद्भूत प्रेरणात्मक कहानी है | |
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| SIGNATURE OF THE LECTURER | |

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| Name of the Topic | व्यक्तिगत पत्र |
| Hours required | 3 |
| Learning Objectives | पत्रों के माध्यम से सम्प्रेषण करना |
| Previous knowledge to be remined | छुट्टी पत्र, पिताजी को पत्र जैसे व्यक्तिगत पत्रों की विधा से दसवी और बारहवी कक्षा में छात्रों को जानकारी है |
| Examples/Illustrations | मित्र के नाम पात्र, |
| Additional inputs | You tube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| Student activity planned after teaching | लघु प्रश्नों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | छात्र अपनी आवश्यकता के लिए व्यक्तिगत पत्र अर्थात छुट्टी पत्र, पिताजी को पत्र और मित्र को पत्र जैसे पत्रों की जानकारी देना \| |
| | |
| SIGNATURE OF THE LECTURER | |

| | |
|---|---|
| Name of the Topic | कारक |
| Hours required | 3 |
| Learning Objectives | कारक कितने प्रकार के है \| वाक्यों में कारक का प्रयोग कैसे होता है |
| Previous knowledge to be remined | तेल्गु भाषा के विभक्तियों की जानकारी |
| Examples/Illustrations | निजी जीवन के उदाहरण |
| Additional inputs | Youtube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | कामता प्रसाद गुरु जी का व्याकरण, किशोरीदास वाजपेयी का व्याकरण |
| Student activity planned after teaching | लघु प्रशों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | और वह पढ़ गई :<br>इस कहानी के कहानीकार श्रीमती कुसुमावियोगी जी है \| प्रस्तुत कहानी के द्वारा स्थिर चित्त से कैसे एक लड़की अपनी लक्ष्य को पा लेती है दिखाया गया \| यह एक अद्भुत प्रेरणात्मक कहानी है \| |
| | |
| SIGNATURE OF THE LECTURER | |

| | |
|---|---|
| Name of the Topic | मुक्तिधन |
| Hours required | 3 |
| Learning Objectives | दिल से साफ रहने से हर बंदा खुदा बनकर सहायता करता है |
| Previous knowledge to be remined | ईदगाह प्रेमचंद की ही कहानी जो बच्चे दसवी कक्षा में पढ़े थे | |
| Exmples/Illustrations | छात्रों के खुद की जिंदगियों से निकलवाना |
| Additional inputs | Youtube |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| References cited | मानसरोवर |
| Student activity planned after teaching | लघु प्रशों के उत्तर |
| Activity planned outside the class room | निबंध के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | मुक्तिधन कहानीकार प्रेमचंद जी है | प्रेमचंद ३०० से ज्यादा कहानियां लिखे थे | प्रस्तुत कहानी में दादूदयाल और रहमान पात्रों के दवारा इंसानियत का एक आदर्श रूप प्रस्तुत किया | |
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| SIGNATURE OF THE LECTURER | |
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| | |
|---|---|
| Name of the Topic | व्यक्तिगत पत्र |
| Hours required | 3 |
| Learning Objectives | पत्रों के माध्यम से सम्प्रेषण करना |
| Previous knowledge to be remined | छुट्टी पत्र, पिताजी को पत्र जैसे व्यक्तिगत पत्रों की विधा से दसवी और बारहवी कक्षा में छात्रों को जानकारी है |
| Examples/Illustrations | मित्र के नाम पात्र, |
| Additional inputs | You tube ppt |
| Teaching aids used | पाठ्यपुस्तक, श्यामपट, खड़िया |
| Student activity planned after teaching | लघु प्रश्नों के उत्तर |
| Activity planned outside the class room | कहानी के उद्देश्य |
| Any other activity | ग्रंथालय संदर्शन |
| Topic synopsis | छात्र अपनी आवश्यकता के लिए व्यक्तिगत पत्र अर्थात छुट्टी पत्र, पिताजी को पत्र और मित्र को पत्र जैसे पत्रों की जानकारी देना \| |
| | |
| SIGNATURE OF THE LECTURER | |

# Government Degree College

## Rajampet Annamayya Dist.

(Affiliated to Yogi Vemana University, Kadapa)

# TEACHING PLAN
# Academic Year: 2023-2024

## Department of Computer Science

## Name of the Lecturer: P. Naresh Behera

| Sl. No. | Paper |
|---|---|
| 1 | Web Interface Designing Technologies |
| 2 | Web Applications<br>Development using PHP& MYSQL |
| 3 | Database Management Systems |
| 4 | Problem Solving using C |

# Teaching Notes

# For

# Paper 6A-Web Interface Designing Technologies

# Teaching Plan No.-1

| | |
|---|---|
| **Name of the topic** | **HTML Basics** |
| **Hours required** | 10 |
| **Learning Objectives** | ● Understand the basic structure of an HTML document.<br>● Learn about common HTML elements and their attributes.<br>● Create a simple HTML page. |
| **Previous Knowledge to be reminded** | File navigation,Text editors, Web browsers |
| **Eaxmples/Illustrations** | Web pages and websites |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | https://www.w3schools.com/, |
| **Student Activity planned after teaching** | Online Quiz |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | Introduction to web designing,<br>difference between web applications and desktop<br>applications,<br>introduction to HTML,<br>HTML structure,<br>elements, attributes,<br>headings,paragraphs,<br>styles, colours,<br>HTML formatting, Quotations, Comments,<br>images, tables, lists,<br>blocks and classes, HTML CSS, HTML frames, file paths, layout, symbols, HTML<br>responsive. |

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# Teaching Plan No.-2

| | |
|---|---|
| **Name of the topic** | **HTML forms** |
| **Hours required** | 3 |
| **Learning Objectives** | ● Understand the basic structure and purpose of HTML forms.<br>● Identify and use common form elements<br>● Create simple forms with basic elements.<br>● Understand the role of the <form> element and its attributes. |
| **Previous Knowledge to be reminded** | Text editors, Web browsers |
| **Eaxmples/Illustrations** | Registration and login forms |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | https://www.w3schools.com/, |
| **Student Activity planned after teaching** | Designing a Login form |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | HTML form elements,<br>input types,<br>input attributes,<br>HTML5,<br>HTMLgraphics,<br>HTML media – video, audio, plug INS, you tube. |

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# Teaching Plan No.-3

| | |
|---|---|
| **Name of the topic** | **HTML API's** |
| **Hours required** | 2 |
| **Learning Objectives** | What HTML APIs are, their purpose, and how they allow JavaScript to interact with HTML elements and content dynamically. |
| **Previous Knowledge to be reminded** | Text editors, Web browsers |
| **Eaxmples/Illustrations** | GPS , MAP |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | https://www.w3schools.com/, |
| **Student Activity planned after teaching** | Online Quiz |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | Geo location,<br>Drag/drop,<br>local storage,<br>HTML SSE. |

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# Teaching Plan No.-4

| | |
|---|---|
| **Name of the topic** | **Cascading Style Sheets(CSS)** |
| **Hours required** | 5 |
| **Learning Objectives** | Understand the syntax and structure of CSS<br>Learn Selectors,properties and values<br>Understanding CSS layouts |
| **Previous Knowledge to be reminded** | HTML tags and attributes |
| **Eaxmples/Illustrations** | Applying color, margin, padding etc.. |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | https://www.w3schools.com/, |
| **Student Activity planned after teaching** | Applying CSS to HTML elements |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | CSS home, introduction, syntax,<br>colours, back ground, borders,<br>margins, padding,height/width,<br>text, fonts, icons, tables, lists,<br>CSS forms, CSS counters, CSS responsive. |

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# Teaching Plan No.-5

| | |
|---|---|
| **Name of the topic** | **Client side Validation using Javascript** |
| **Hours required** | 10 |
| **Learning Objectives** | Understand syntax and and data types of Javascript.<br>Learn variables, control statements and functions.<br>Understand DOM manipulation and events<br>Learn Javascript arrays and objects |
| **Previous Knowledge to be reminded** | HTML Basics |
| **Eaxmples/Illustrations** | Login form validation |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | https://www.w3schools.com/, |
| **Student Activity planned after teaching** | Online Quiz |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | Introduction to JavaScript - What is DHTML,<br>JavaScript, basics,<br>variables, string manipulations, mathematical functions,<br>statements, operators, arrays,<br>functions.<br>Objects in JavaScript - Data and objects in JavaScript,<br>regular expressions,<br>exception handling. |

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# Teaching Plan No.-6

| | |
|---|---|
| **Name of the topic** | **Word press** |
| **Hours required** | 20 |
| **Learning Objectives** | Identify key components of a WordPress dashboard (posts, pages, media library, settings, etc.)<br>Navigate through the WordPress admin interface to access different sections and features.<br>Create new blog posts and pages, including adding text, images, and formatting. |
| **Previous Knowledge to be reminded** | Web pages and websites |
| **Eaxmples/Illustrations** | |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab,XAMPP server |
| **References cited** | https://www.w3schools.com/, |
| **Student Activity planned after teaching** | Online Quiz , Installing XAMPP, |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | Designing a website using wordpress |
| **Topic Synopsis** | Introduction to word press,<br>servers like wamp, bitnami e.tc,<br>installing and configuring word press,<br>understanding admin panel, working with posts and pages, using editor, text formatting with shortcuts,<br>working with media-Adding, editing, deleting media<br>elements,<br>working with widgets, menus.<br>Working with themes-parent and child themes,<br>using featured images, configuring settings,<br>user and user roles and profiles, adding external links, protecting word press website from hackers. |

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**Signature of the Lecturer**

# Teaching Notes

# For

# Paper 7A-Web Applications Development using PHP & MYSQL

# Teaching Plan No.-1

| | |
|---|---|
| **Name of the topic** | The Building blocks of PHP |
| **Hours required** | 10 |
| **Learning Objectives** | ● Understand the basic structure of PHP<br>● Learn how to declare and use variables<br>● Understand data types, operators, loops,<br>● Understand function definition and calling |
| **Previous Knowledge to be reminded** | HTML Basics |
| **Eaxmples/Illustrations** | Web pages and websites |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | https://www.w3schools.com/, |
| **Student Activity planned after teaching** | Online Quiz |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | Variables,<br>Data Types,<br>Operators and Expressions,<br>Constants.<br>Switching Flow,<br>Loops,<br>Code Blocks and Browser Output.<br>What is function?, Calling functions,<br>Defining Functions,<br>User-Defined Functions,<br>Variable Scope,<br>Saving state between Function calls<br>with the static statement, more about arguments. |

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# Teaching Plan No.-2

| | |
|---|---|
| **Name of the topic** | **Arrays, Strings & Objects in PHP** |
| **Hours required** | 10 |
| **Learning Objectives** | ● Learn to create different types of arrays<br>● Understand different ways to declare strings<br>● Learn to search for substrings, compare strings, and format strings.<br>● Understand the concept of a class as a blueprint for creating objects.<br>● Understand the relationship between classes and objects (instances of classes). |
| **Previous Knowledge to be reminded** | Building blocks of PHP |
| **Eaxmples/Illustrations** | Array function and string functions |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | https://www.w3schools.com/, |
| **Student Activity planned after teaching** | Online Quiz, Seminars |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | Working with Arrays: What are Arrays? Creating Arrays,<br>Some Array-Related Functions.<br>Working with Objects: Creating Objects, Object Instance<br>Working with Strings,<br>Formatting strings with PHP, Investigating Strings with PHP,<br>Manipulating Strings with PHP,<br>Using Date and Time Functions in PHP. |

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# Teaching Plan No.-3

| | |
|---|---|
| **Name of the topic** | **Working with PHP Forms** |
| **Hours required** | 10 |
| **Learning Objectives** | ● Learn about different form elements and how to use attributes<br>● Learn how to handle form submissions in PHP using the $_POST and $_GET superglobals.<br>● Learn how to handle file uploads using PHP. |
| **Previous Knowledge to be reminded** | HTML forms |
| **Eaxmples/Illustrations** | Login forms |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | https://www.w3schools.com/, |
| **Student Activity planned after teaching** | Online Quiz, Assignments |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | Validating Login forms |
| **Topic Synopsis** | Creating Forms,<br>Accessing Form Input with User defined Arrays,<br>Combining HTML and PHP code on a single Page,<br>Using Hidden Fields to save state,<br>Redirecting the user,<br>Sending Mail on Form Submission,<br>and Working with File Uploads. |

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# Teaching Plan No.-4

| | |
|---|---|
| **Name of the topic** | **Working with Files and Directories** |
| **Hours required** | 10 |
| **Learning Objectives** | ● Learn to open, read, write, and close files using functions<br>● Learn to create, delete, and list directories using functions<br>● Understand how to change directory paths using functions |
| **Previous Knowledge to be reminded** | File Navigation and file paths |
| **Eaxmples/Illustrations** | |
| **Additional Inputs** | Absolute and relative paths |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | https://www.w3schools.com/, |
| **Student Activity planned after teaching** | Creating, reading, writing and closing of files |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | Including Files with inclue(),<br>Validating Files, Creating and<br>Deleting Files, Opening a File for Writing,<br>Reading or Appending, Reading from Files,<br>Writing or Appending to a File,<br>Working with Directories, Open Pipes to and from Process<br>Using popen(), Running Commands with exec(),<br>Running Commands with system() or passthru(). |

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# Teaching Plan No.-5

| | |
|---|---|
| **Name of the topic** | **Interacting with MySQL using PHP** |
| **Hours required** | 10 |
| **Learning Objectives** | ● Understand the concept of a database, tables, rows, and columns.<br>● Learn how to create, modify, and delete databases and tables using SQL.<br>● Learn basic SQL syntax for selecting, inserting, updating, and deleting data.<br>● Understand how to execute SQL queries and handle the results. |
| **Previous Knowledge to be reminded** | Structured Query Language |
| **Eaxmples/Illustrations** | |
| **Additional Inputs** | Database |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | https://www.w3schools.com/, |
| **Student Activity planned after teaching** | Creating database, tables, insert data, delete data in MySQL and using PHP |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | MySQL Versus MySQLi Functions,<br>Connecting to MySQL with PHP,<br>Working with MySQL Data.<br>Creating an Online Address Book: Planning<br>and Creating Database Tables,<br>Creating Menu, Creating Record Addition Mechanism,<br>Viewing Records,<br>Creating the Record Deletion Mechanism, |

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# Teaching Notes

# For

# Database Management Systems

# Teaching Plan No.-1

| | |
|---|---|
| **Name of the topic** | **Overview of Database Management System** |
| **Hours required** | 12 |
| **Learning Objectives** | Differentiate between database systems and file based systems |
| **Previous Knowledge to be reminded** | Data & information, spread sheets |
| **Eaxmples/Illustrations** | College database |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | Database Management Systems by Raghu Ramakrishnan, McGrawhill |
| **Student Activity planned after teaching** | Seminar Presentation on Database Management Systems |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | Introduction to data, information,<br>database, database management systems,<br>file-based system, Drawbacks of file-Based System,<br>database approach,<br>Classification of Database Management Systems,<br>advantages of database approach,<br>Various Data Models,<br>Components of Database Management System,<br>three schema architecture of data base,<br>costs and risks of database approach. |

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# Teaching Plan No.-2

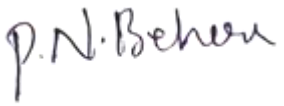
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|---|---|
| **Name of the topic** | **Entity-Relationship Model** |
| **Hours required** | 12 |
| **Learning Objectives** | Understand the building blocks of ER model<br>Design a database using ER model |
| **Previous Knowledge to be reminded** | Data & information, spread sheets |
| **Eaxmples/Illustrations** | ER diagram Hospital administration |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | Database Management Systems by Raghu Ramakrishnan, McGrawhill |
| **Student Activity planned after teaching** | Case Study on ER model and EER model |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | Introduction,<br>the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree,<br>relationship classification,<br>reducing ER diagram to tables,<br>enhanced entity-relationship model (EER model), generalization and specialization,<br>**IS A** relationship and attribute inheritance,<br>multiple inheritance,<br>constraints on specialization and generalization,<br>advantages of ER modeling. |

P. N. Behera

**Signature of the Lecturer**

# Teaching Plan No.-3

| | |
|---|---|
| **Name of the topic** | **Relational Model** |
| **Hours required** | 12 |
| **Learning Objectives** | Understand the concept of Relational model<br>Use relational model in database design<br>Understand relational algebra<br>Learn Normalization of databse schema |
| **Previous Knowledge to be reminded** | Data & information, spread sheets |
| **Eaxmples/Illustrations** | Creation of college database and establish relationships between tables |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | Database Management Systems by Raghu Ramakrishnan, McGrawhill |
| **Student Activity planned after teaching** | Exercise on Normalization |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | Introduction,<br>CODD Rules,<br>relational data model,<br>concept of key,<br>relational integrity,<br>relational algebra, relational algebra operations,<br>advantages of relational algebra,<br>limitations of relational algebra,<br>relational calculus, tuple relational calculus,<br>domain relational Calculus (DRC),<br>Functional dependencies and normal forms upto 3rd normal form. |



**Signature of the Lecturer**

# Teaching Plan No.-4

| | |
|---|---|
| **Name of the topic** | **Structured Query Language** |
| **Hours required** | 12 |
| **Learning Objectives** | Understand SQL commands<br>Use SQL commands for creating and manipulating data stored in databases. |
| **Previous Knowledge to be reminded** | Data & information, spread sheets |
| **Eaxmples/Illustrations** | Creation of database table, insert,update,delete and view data using SQL commands |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | Database Management Systems by Raghu Ramakrishnan, McGrawhill |
| **Student Activity planned after teaching** | Competition on SQL Query Writing |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | Introduction,<br>Commands in SQL,<br>Data Types in SQL,<br>Data Definition Language,<br>Selection Operation, Projection Operation,<br>Aggregate functions,<br>Data Manipulation Language,<br>Table Modification Commands,<br>Join Operation, Set Operations,<br>View, Sub Query. |

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# Teaching Plan No.-5

| | |
|---|---|
| **Name of the topic** | **PL/SQL** |
| **Hours required** | 12 |
| **Learning Objectives** | Understand PL/SQL Language Elements<br>Write PL/SQL programs to work with databases. |
| **Previous Knowledge to be reminded** | Data & information, spread sheets,SQL commands |
| **Eaxmples/Illustrations** | PL/SQL Programs using control structures |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | Database Management Systems by Raghu Ramakrishnan, McGrawhill |
| **Student Activity planned after teaching** | Peer Review of PL/SQL code |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | Introduction,<br>Shortcomings of SQL,<br>Structure of PL/SQL,<br>PL/SQL Language Elements,<br>Data Types,<br>Operators Precedence,<br>Control Structure,<br>Steps to Create a PL/SQL Program,<br>Iterative Control,<br>Procedure, Function,<br>Database Triggers, Types of Triggers. |

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# Teaching Notes

# For

# Problem Solving Using C

# Teaching Plan No.-1

| | |
|---|---|
| **Name of the topic** | **Introduction to computer and programming** |
| **Hours required** | 7 |
| **Learning Objectives** | Understand the working of a digital computer<br>To explore basic knowledge on computers<br>Learn to write algorithms and design flowchart |
| **Previous Knowledge to be reminded** | Basic computer knowledge |
| **Eaxmples/Illustrations** | Making tea, process of college admission |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | Computer fundamentals and programming in C, REEMA THAREJA, OXFORD UNIVERSITY PRESS |
| **Student Activity planned after teaching** | Online Quiz |
| **Activity planned outside the Class room, if any** | Identify the different types of computers,printers,networking devices and their configurations in the college premises. |
| **Any other activity** | |
| **Topic Synopsis** | Introduction,<br>Basic block diagram,<br>functions of various components of computer,<br>Concepts of Hardware and software,<br>Types of software,<br>Compiler and interpreter,<br>Concepts of Machine level, Assembly level and high-level programming,<br>Flowcharts and Algorithms |

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**Signature of the Lecturer**

# Teaching Plan No.-2

| | |
|---|---|
| **Name of the topic** | **Fundamentals of C** |
| **Hours required** | 8 |
| **Learning Objectives** | Understand basic concepts of C programming<br>Learn how to solve common types of computing problems. |
| **Previous Knowledge to be reminded** | Algoriths and flowcharts |
| **Eaxmples/Illustrations** | Adding two numbers, calculate simple interest etc. |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978- 1- 25- 90046-2 |
| **Student Activity planned after teaching** | Online Quiz, Programming practice in computer lab. |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | History of C,<br>Features of C,<br>C Tokens-variables and keywords and identifiers, constants<br>Data types,<br>Rules for constructing variable names,<br>Operators,<br>Structure of C program,<br>Input /output statements in C<br>Formatted and Unformatted I/O |

P.N. Behera

**Signature of the Lecturer**

# Teaching Plan No.-3

| | |
|---|---|
| **Name of the topic** | **Control statements in C** |
| **Hours required** | 10 |
| **Learning Objectives** | Understand and apply the if, if-else, and else if ladder statements<br>Master the use of while, for, and do-while loops<br>Analyze and develop a solution to a given problem with suitable control structures |
| **Previous Knowledge to be reminded** | Algorithms and flowcharts, structure of C |
| **Eaxmples/Illustrations** | Find the sum of individual digits of a positive integer<br>Generate Fibonacci sequence<br>Check whether a number is Armstrong or not.<br>Generate all the prime numbers between 1 and n |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978- 1- 25- 90046-2 |
| **Student Activity planned after teaching** | Online Quiz, Structured Programming Assignment. |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | **Decision making statements:**<br>if, if else, else if ladder,<br>switch statements.<br>**Loop control statements**:<br>while loop,<br>for loop<br>do-while loop.<br>**Jump Control statements:**<br>break, continue and goto. |

P.N. Behera

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# Teaching Plan No.-4

| | |
|---|---|
| **Name of the topic** | **Arrays & Strings in C** |
| **Hours required** | 10 |
| **Learning Objectives** | Apply the derived data types in program solutions<br>Learn how to declare, initialize, and access elements of an array using indexing.<br>Learn how to declare, initialize, and access characters in a string using indexing. |
| **Previous Knowledge to be reminded** | Algorithms and flowcharts, structure of C |
| **Eaxmples/Illustrations** | Addition and Multiplication of two matrices |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978- 1- 25- 90046-2 |
| **Student Activity planned after teaching** | Online Quiz, Array and String Program Debugging. |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | **Arrays:**<br>One Dimensional arrays -<br>Declaration, Initialization and Memory representation;<br><br>Two Dimensional arrays -<br>Declaration, Initialization and Memory representation.<br><br>**Strings**:<br>Declaring & Initializing string variables;<br>String handling functions,<br>Character handling functions |

P. N. Behera

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# Teaching Plan No.-5

| | |
|---|---|
| **Name of the topic** | **Functions in C** |
| **Hours required** | 6 |
| **Learning Objectives** | Understand the syntax and components of a C function<br>Understand how to invoke a function<br>Learn different ways to pass arguments to functions, including call by value and call by reference.<br>Understand the concept of variable scope |
| **Previous Knowledge to be reminded** | Algorithms and flowcharts, structure of C |
| **Eaxmples/Illustrations** | Demonstrate Call by Value and Call by Reference mechanism<br>Find GCD of Two numbers using Recursion |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978- 1- 25- 90046-2 |
| **Student Activity planned after teaching** | Online Quiz,Pair Programming Exercise on Functions |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | Function Prototype,<br>definition and calling.<br>Return statement.<br>Nesting of functions.<br>Categories of functions.<br>Recursion,<br>Parameter Passing by address & by value.<br>Local and Global variables.<br>**Storage classes**:<br>automatic, external, static and register. |

P.N. Behera

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# Teaching Plan No.-6

| | |
|---|---|
| **Name of the topic** | **Pointers in C** |
| **Hours required** | 6 |
| **Learning Objectives** | Apply the derived data types in program solutions<br>Learn how to declare, initialize, and access elements of an array using indexing.<br>Learn how to declare, initialize, and access characters in a string using indexing. |
| **Previous Knowledge to be reminded** | Algorithms and flowcharts, structure of C |
| **Eaxmples/Illustrations** | Perform various operations using pointers |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978- 1- 25- 90046-2 |
| **Student Activity planned after teaching** | Online Quiz, Programming practice in computer lab. |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | **Pointers:**<br>Pointer data type,<br>Pointer declaration, initialization,<br>accessing values using pointers.<br>Pointer arithmetic.<br>Pointers and arrays,<br>pointers and functions. |

P.N.Behera

**Signature of the Lecturer**

# Teaching Plan No.-7

| | |
|---|---|
| **Name of the topic** | **Dynamic Memory Management in C** |
| **Hours required** | 6 |
| **Learning Objectives** | Understand the concept of dynamic memory allocation and its advantages over static memory allocation.<br>Learn malloc, calloc, realloc, and free functions and their usage. |
| **Previous Knowledge to be reminded** | Arrays,functions and pointers in C |
| **Eaxmples/Illustrations** | Usage of dynamic memory management functins. |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978- 1- 25- 90046-2 |
| **Student Activity planned after teaching** | Online Quiz, Programming practice in computer lab. |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | **Dynamic Memory Management:**<br>Introduction,<br>Functions-<br>malloc,<br>calloc,<br>realloc,<br>free |

P.N. Behera

**Signature of the Lecturer**

# Teaching Plan No.-8

| | |
|---|---|
| **Name of the topic** | **Structures and Unions in C** |
| **Hours required** | 6 |
| **Learning Objectives** | Define structures and unions in C programming<br>Differentiate between structures and unions<br>Access and modify members of structures & unions |
| **Previous Knowledge to be reminded** | Arrays,functions and pointers in C |
| **Eaxmples/Illustrations** | Read data of 10 employees with a structure |
| **Additional Inputs** | |
| **Teaching Aids used** | PPT, LCD Projector, Computer Lab |
| **References cited** | E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978- 1- 25- 90046-2 |
| **Student Activity planned after teaching** | Online Quiz, Appropriate use of structures and nested structures. |
| **Activity planned outside the Class room, if any** | |
| **Any other activity** | |
| **Topic Synopsis** | **Structures:**<br>Basics of structure,<br>structure members,<br>accessing structure members,<br>nested structures,<br>array of structures,<br>structure and functions,<br>structures and pointers.<br>**Unions:**<br>Union definition;<br>difference between Structures and Unions. |

P. N. Behera

**Signature of the Lecturer**

## Teaching Plan / Lesson No. Sem-II

| | |
|---|---|
| Name of the Topic | 1. వ్యగ్రత్వ కారక సైద్ధాంతికాంశాలు |
| Hours required | 12 |
| Learning Objectives | భాష - ఉత్పత్తి వాదాల గురించి విద్యార్థులకు వివరించుట. |
| Previous knowledge to be reminded | గతంలో బోధన అభ్యసన తరగతుల గురించి పున శ్చరణ గావించుట |
| Examples / Illustrations | ఉదాహరణలతో భాషా వాదాల గురించి వివరించుట. |
| Additional inputs | భాషా వాదాలపై పలువురి అభిప్రాయం |
| Teaching Aids used | పల్లబల్ల - సుద్దముక్క |
| References cited | వెలమల సిమ్మన్న - భాషాశాస్త్రం |
| Student Activity Planned after the teaching | భాషా శాస్త్రానికి సంబంధించిన పలు ఉదాహరణలతో వివరించుట |
| Activity planned outside the class room, if any | విద్యార్థులకు ప్రశ్నలు ఇచ్చి తెలుసుకొనుట |
| Any other activity | — |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>1. భాష నిర్వచనాలు, లక్షణాలు<br>2. భాష అవశ్యకత ప్రయోజనాలు<br>3. భాషోత్పత్తి వాదాలు<br>4. వర్ణం - పదం - వాక్యం |

Signature of the Lecturer

## Teaching Plan / Lesson No. 2/IInd Sem

| | |
|---|---|
| Name of the Topic | 11. అనువాద రచన |
| Hours required | 12 |
| Learning Objectives | అనువాదం లోని ప్రత్యేకతను గూర్చి విద్యార్థులు తెలుసుకుంటారు |
| Previous knowledge to be reminded | గత తరగతులలో జరిగిన విషయాలను పునశ్చరణ గావించుట. |
| Examples / Illustrations | పలు ఉదాహరణల ద్వారా అనువాద రకాలను వివరించుట |
| Additional inputs | అనువాదానికి చెందిన పలుగ్రంథాలు |
| Teaching Aids used | నల్లబల్ల - సుద్దముక్క |
| References cited | చే.రా అనువాద పద్ధతులు<br>కా.రా. అనువాద సమస్యలు. |
| Student Activity Planned after the teaching | తరగతి పూర్తయిన వెంటనే అనువాదానికి సంబంధించిన పలుప్రశ్నలు-అడుగుట |
| Activity planned outside the class room, if any | — |
| Any other activity | — |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>1. అనువాదం - నిర్వచనాలు - అవశ్యకత<br>2. అనువాద పద్ధతులు<br>3. అనువాద సమస్యలు<br>4. చే.రా అనువాదం |

Signature of the Lecturer

## Teaching Plan / Lesson No. 3 / II Semester

| | |
|---|---|
| Name of the Topic | III. మాధ్యమాలకు రచన |
| Hours required | 12 |
| Learning Objectives | మాధ్యమాలకు ఏ విధంగా రచించాలో విద్యార్థులు తెలుసుకుంటారు. |
| Previous knowledge to be reminded | గత తరగతులలో జరిగిన విషయాలను పునశ్చరణ గావించుట |
| Examples / Illustrations | ఉదాహరణలు తో మాధ్యమాలకు రచన పాఠ్యాంశాన్ని వివరించుట |
| Additional inputs | మాధ్యమాలలో రకాలు తెలుపుట |
| Teaching Aids used | నల్లబల్ల - సుద్దముక్క |
| References cited | పాఠ్యపుస్తకం |
| Student Activity Planned after the teaching | వివిధ రకాల మాధ్యమాలను గురించి విద్యార్థులకు అడిగి తెలుసుకొనుట |
| Activity planned outside the class room, if any | స్థానిక మాధ్యమాలగురించి విద్యార్థులు తెలియ చేయుట |
| Any other activity | ఇతర రకాల వీడియోలగురించి తెలుపుట |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>1. శ్రవణ మాధ్యమం గురించి వివరించుట<br>2. శ్రవణ మాధ్యమం యొక్క ప్రయోజనాలు<br>3. దృశ్యమాధ్యమం ఆవిర్భావ వికాసాలు తెలుసుకొనుట.<br>4. దృశ్యమాధ్యమం యొక్క ఉపయోగాలు |

Signature of the Lecturer

## Teaching Plan / Lesson No. 4. - Unit-2

| | |
|---|---|
| Name of the Topic | మాధ్యమాలకు రచన ముద్రణా మాధ్యమం |
| Hours required | 10 |
| Learning Objectives | ముద్రణా మాధ్యమం గురించి తెలుపుట ఆవిర్భావ వికాసాలను తెలుపుట. |
| Previous knowledge to be reminded | ముద్రణామాధ్యమం గురించిన పూర్వ విషయాలను పునశ్చరణ గావించుట |
| Examples / Illustrations | వివిధ రకాల ముద్రణా మాధ్యమాలని చెందిన ఉదాహరణలు వివరించుట |
| Additional inputs | ముద్రణా పత్రికల గురించి వివరించుట |
| Teaching Aids used | నల్లబల్ల, సుద్దముక్క |
| References cited | పాఠ్యపుస్తకం, BROU రచనలు. |
| Student Activity Planned after the teaching | ఆగతనానంతరం ఇతర ఉదాహరణలతో విద్యార్థులని వివరించుట |
| Activity planned outside the class room, if any | తరగతి బయట ఉదాహరణలు ఇలా వివరించుట |
| Any other activity | పలు ముద్రణా పత్రికలు, రచనలు గురించి తెలుపుట |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>1. ఉద్భవమాధ్యమం, చరిత్ర వికాసం<br>2. వివిధరకాలపత్రికలు పత్రికల్ని, శైలి వైవిధ్యం.<br>3. పత్రికారచన: వార్తారచన, సంపాదకీయాలు సమీక్షలు ఇవ్వగావచ్చు. |

Signature of the Lecturer

Sem-II

## Teaching Plan / Lesson No. 11

| | |
|---|---|
| Name of the Topic | సృజనాత్మక రచన |
| Hours required | 10 |
| Learning Objectives | సృజనాత్మక రచనలోని వివిధ అంగాలను గురించి తెలుసుకొనుట |
| Previous knowledge to be reminded | సృజనాత్మక రచనల గురించి విద్యార్థులకు వివరించుట |
| Examples / Illustrations | కవిత్వం, కథ, వ్యాసం వంటి అంశాల గురించి ఉదాహరణాలతో వివరించుట |
| Additional inputs | |
| Teaching Aids used | నల్లబల్ల, సుద్దముక్క, సినారె, వల్లంపాటివారి రచనలు, నల్లబల్ల, పాఠ్యప్రణాళిక |
| References cited | సినారె. ఆధునికాంధ్ర కవిత్వం - సంప్రదాయములు |
| Student Activity Planned after the teaching | వివిధ రకాల సృజనాత్మక రచనల గురించి తదనంతరం వివరించుట |
| Activity planned outside the class room, if any | కవిత్వం, కథ, నవల, వ్యాసం వంటి రచనలలోని తేడాలను వివరించుట |
| Any other activity | రచనలను విద్యార్థులచే చదివించుట. |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>1. కవితారచన - ఉత్తమ కవితా లక్షణాలు<br>2. కథారచన - ఉత్తమ కథాలక్షణాలు<br>3. వ్యాసరచన - ఉత్తమ వ్యాసం. లక్షణాలు |

G. [signature]

Signature of the Lecturer

# COMMISSONERATE OF COLLEGIATE EDUCATION,

# GOVT. DEGREE COLLEGE

## RAJAMPET, KADAPA. Dt.

(Affiliated to Yogi Vemana University, Kadapa.)

## TEACHING PLAN

ACADEMIC YEAR 2023 -2024

Name of the Department : Botany

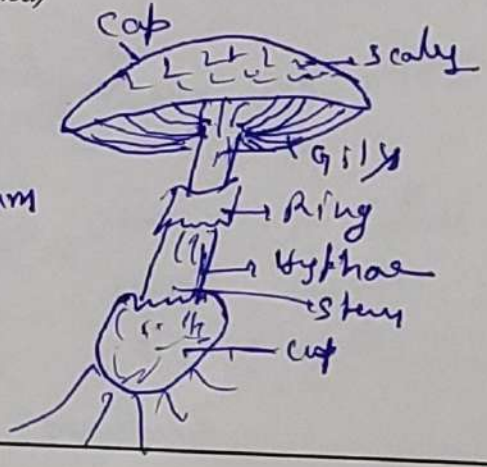
NAME OF THE LECTURER : B. Nagesh Babu

Course / Group : III BZC & BCS & II BCom

Subject / Page :

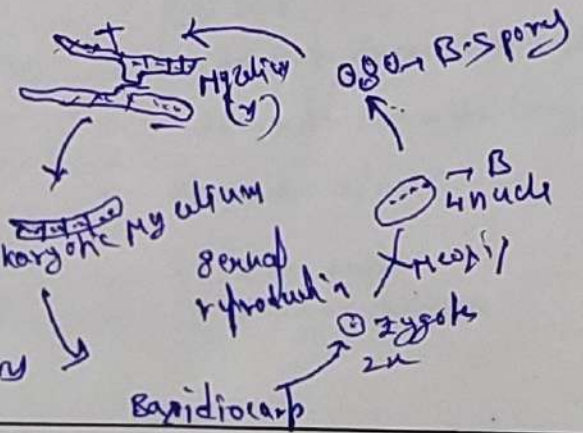
| Sl.No. | Subject | Paper | Page No. |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | structure of Mushroom |
| Hours required | |
| Learning Objectives | To understand the structure of Mushrooms |
| Previous knowledge to be reminded | Recollect the information from previous knowledge. |
| Examples / Illustrations | Diagrams & charts, PPT |
| Additional inputs | Black Board, slides |
| Teaching Aids used | Black Board, slides |
| References cited | Text book, Vivek publications |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)* structure<br>stipe<br>pileus<br>Annulus<br>Trama<br>Subhymenium<br>Hymenium<br>  <br> |

B. Nagesh Rathod
Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Life cycle of Mushrooms |
| Hours required | |
| Learning Objectives | understand the life cycle of mushroom |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | Diagram, charts Expt |
| Additional inputs | |
| Teaching Aids used | Black Board & ICT tools |
| References cited | Text book, vivane publications |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)* life cycle vegetative ↓ Asexual ↓ Sexual ↓ Plasmogamy karyogamy Basidiocarp → Basidiospore   |

B. Mahesh Babu
Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Differences between edibles, poisonous mushroom |
| Hours required | |
| Learning Objectives | Differentiate the mushrooms |
| Previous knowledge to be reminded | Recollect the information comprising knowledge |
| Examples / Illustrations | Diagrams, charts & Slides |
| Additional inputs | |
| Teaching Aids used | Black Board, ICT |
| References cited | Text book, vivak publication |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>poisonous — edible<br>- cut → green @ purple — cut → doesn't green @ purple<br>- taste - stings tongue — doesn't burn the tongue<br>- have a bad odour — pleasant odour<br>- bitter — sweet taste<br>- no presence of worms — presence of worms |

B. Nagendra Babu
Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | ~~Morphological feature of button mushrooms.~~ |
| Hours required | |
| Learning Objectives | understand the morphology of button mushroom<br>~~understand the morphology of button mushroom~~ |
| Previous knowledge to be reminded | Recollect the information from previous knowledge<br>~~understand the morphology of button mushroom~~ |
| Examples / Illustrations | Diagrams, charts, ppt slides |
| Additional inputs | |
| Teaching Aids used | Black board, ICT |
| References cited | Textbook, various publications |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>cap → 2.5 to 12 cm – hoary pinkish<br>Gills → ~~stem~~ free from the stem – short<br>Stem → 2-7 cm long 1-2.5 cm thick – blade with small scales<br>Flesh → white and firm<br>odor and taste – pleasant<br>chemical reaction – KOH negative |

B. Nafeela Banu

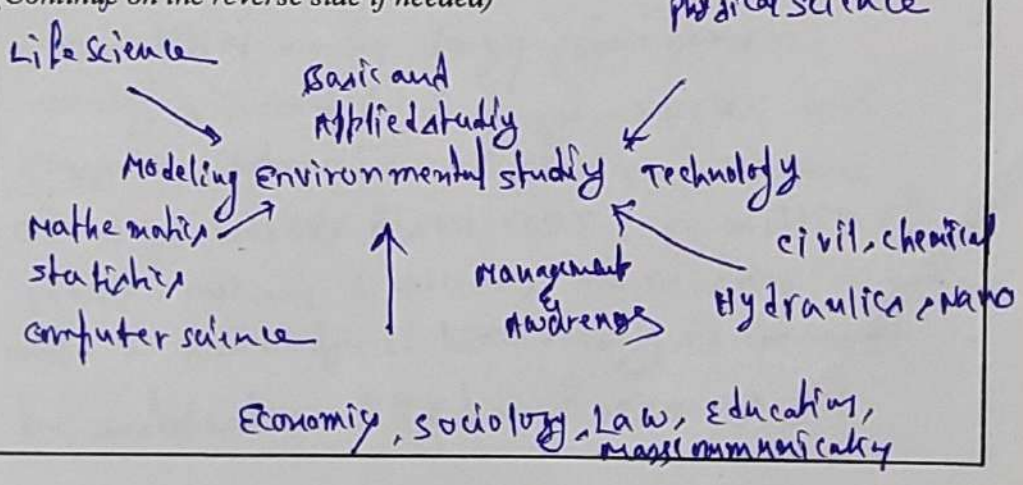
Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Nutritional value of mushrooms |
| Hours required | |
| Learning Objectives | Know the importance of mushrooms in daily life |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | Diagrams, charts and ppt Slides |
| Additional inputs | |
| Teaching Aids used | Black Board, ICT |
| References cited | |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>- used as food since time immemorial<br>- placed between meat and vegetable<br>- rich protein, carbohydrate and vitamins<br>- low in caloric value - good for heart and diabetic patients<br>- source of vit-B1 B2, niacin, pantothenic acid, biotin, folic acid, vit C, D, A & K<br>- rich essential aminoacids. |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Multidisciplinary nature of environmental education |
| Hours required | |
| Learning Objectives | understand the nature of Environmental Education |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | Diagrams, charts & slides |
| Additional inputs | |
| Teaching Aids used | Black Board, ICT tool |
| References cited | Text book, Vivek publications |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)*   |

B. Nagesh Babu

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Biodiversity |
| Hours required | |
| Learning Objectives | understand about the Biodiversity |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | Diagrams, charts & ppt slides |
| Additional inputs | |
| Teaching Aids used | Black board, ICT |
| References cited | Text book, vivek publications |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)* variability among living organisms - variety & variability of genes - species and Ecosystems between and within - the term coined by Walter Rosen, 1985 - 50 million of plants, animals & microbes are existing in the world - knowledge of biodiversity is essential for sustainable utilization of resources. |

B. Nagarjuna Reddy
Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Lay out of mushroom farm |
| Hours required | |
| Learning Objectives | understand the layout of mushroom farm |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | Diagrams, charts |
| Additional inputs | |
| Teaching Aids used | Black Board |
| References cited | Text book. |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment. |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>composting platform – Bulk chamber – pasteurization room<br>↓<br>spawn unit → Growing rooms<br>least possible land – wind direction → phase-I bunkers constructed in line nearer to the phase-II tunnels for their operational convenience |

B. Nagarjuna Reddy

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Methods of composting |
| Hours required | |
| Learning Objectives | Understand about the methods of composting |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | Diagrams & charts |
| Additional inputs | |
| Teaching Aids used | Black Board, ICT |
| References cited | Text book, viva publications |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment. |
| Topic Synopsis | *(Continued on the reverse side if needed)* long & short<br>wetting of the straw, wetting of the ingredients<br>mixing straw + Ingredients · moisture 72-75%.<br>↓ Pile formation<br>↓ I turning<br>↓ II turning<br>↓ III turning (add Gypsum)<br>↓<br>IV, V, VI and turning. |

B. Nagesh Babu

Signature of the Lecturer

the pile → pile formating
in NH3

1 lit of formaldehyde + 50g Bavistin
of water / ton of compost

heap and cover with poly sheet for 45 days

the sheet, shake the compost and spawn

phase I outdoor composting

phase II stream pasteurisation

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Human population growth and its impacts on environment. |
| Hours required | |
| Learning Objectives | Understand the impacts on environment |
| Previous knowledge to be reminded | Recollect the information from previous knowledge. |
| Examples / Illustrations | Diagrams & charts |
| Additional inputs | |
| Teaching Aids used | Black Board |
| References cited | Text book & Vivek publications |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>- Increasing the extraction of resources from the environment.<br>- Increasing the burning of fossil fuels for energy<br>- Increase in fresh water use for drinking, agriculture, recreation and industrial processes.<br>- Increasing ecological impacts on environments. |

B. Navya Sree
Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Deforestation |
| Hours required | |
| Learning Objectives | Understand about the deforestation |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | Diagrams & charts |
| Additional inputs | |
| Teaching Aids used | Black board |
| References cited | Textbook, virch publications |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)* it is the process of cutting down the trees - clearing the forest on a large scale to use the land for cultivation, building houses, factories, etc. causes - human beings - forest fire, floods, droughts effects of deforestration:- Global warming increased air pollution, increased temperature, desertification, scarcity of raw materials |

B. Nagesh Kumar

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Green house effect global warming |
| Hours required | |
| Learning Objectives | understand the green house effect |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | Diagrams & charts |
| Additional inputs | |
| Teaching Aids used | Black board |
| References cited | Text book |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>— is the process by which radiations from the sun are absorbed by the greenhouse gases and not reflected back into space. This insulates the surface of the earth and prevents it from freezing. A green house is a house made of glass that can be used to grow plants. The sun's radiation warms the plants and the air inside the greenhouse |

B. N. Sastry Rao

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | spawning |
| Hours required | |
| Learning Objectives | understand about the spawning |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | Diagrams & charts |
| Additional inputs | |
| Teaching Aids used | Black Board |
| References cited | Text book |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Mixing the mushroom seed (or spawn) in the compost is called as spawning.<br>- Surface spawning - Double layer spawning<br>- Through spawning - Spot spawning<br>- Sparse running - Supplementating spawning. |

B. Nagendra

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Casing |
| Hours required | |
| Learning Objectives | Knowledge about the casing |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | Diagrams, charts |
| Additional inputs | |
| Teaching Aids used | Black board |
| References cited | Text book |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment. |
| Topic Synopsis | (Continue on the reverse side if needed) covering the top of mushroom beds after completing of spawn run with a layer of appropriate soil mixture is known as casing. - Casing soil is a nutrient deficient medium, which help in converting the vegetative phase into fruiting. it helps in conserving the environment in mushroom beds. |

B. Nandhini

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | problems in cultivation - mushrooms |
| Hours required | |
| Learning Objectives | Understand the problems in mushroom cultivation |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | Diagrams, charts |
| Additional inputs | |
| Teaching Aids used | Black Board |
| References cited | Text book |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)* Contamination - Humidity - Excess moisture - Fresh air - light - wrong climate - wrong substrate - Faulty spawn - Quantum of spawn - lack of knowledge - lack of patience - improper harvesting |

B. Naik

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | picking and packing of mushroom |
| Hours required | |
| Learning Objectives | understand the package of mushroom |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | Diagrams - charts |
| Additional inputs | |
| Teaching Aids used | Black board |
| References cited | Text book |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>- Modified atmosphere packaging (MAP)<br>Modified atmosphere is created in a sealed package of a fresh product by respiratory gas exchange<br>- Modified humidity packaging:-<br>Most polymeric films used in conventional packing have lower water vapour transmission rate relative to transpiration rate of fresh produce. |

B. Nandhini
Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | sustainable development |
| Hours required | |
| Learning Objectives | Understand the sustainable development |
| Previous knowledge to be reminded | Knowledge<br>Recollect the information from previous |
| Examples / Illustrations | Diagrams & charts |
| Additional inputs | |
| Teaching Aids used | Black board |
| References cited | Text book |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)* sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.<br>- End poverty in all its forms everywhere.<br>- ensure healthy lives and promote well-being for all at all ages.<br>- Ensure inclusive and equitable quality Education, |

B. Nandhini

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | conservation of biodiversity |
| Hours required | |
| Learning Objectives | understand the conservation of biodiversity |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | diagrams, charts |
| Additional inputs | |
| Teaching Aids used | Black board |
| References cited | Text book. |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)* Sustainability is a concept related to the development of products, goods, and services that involves meeting our present needs without compromising the ability of future generations to fulfil their own needs. Without compromising the ability as a concept recognising that the |

B. Nandhini

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | ~~Environmental agreements~~ International Agreements |
| Hours required | |
| Learning Objectives | Understand the agreements in Environment |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | Diagrams, charts |
| Additional inputs | |
| Teaching Aids used | Black board |
| References cited | Text book |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>International agreements are formal understandings between two(or) more country. An agreement between two country is called "bilateral", while an agreement between several country is "multilateral". The country bound by an international agreement are generally referred to as "state party" |

B. Nath Das
Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | shelf life of mushrooms |
| Hours required | |
| Learning Objectives | Understand the shelf life of mushrooms |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | Diagrams & charts |
| Additional inputs | |
| Teaching Aids used | Black Board |
| References cited | Text book |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | (Continue on the reverse side if needed)<br>The self life of freshly harvested mushroom is limited to 1-3days at ambient condition. shelf life improved through - Temperature - stored at 0°d - Respiration- to prevent thin - rapid cooling technique - increase shelf life upto 2days - Relative humidity to store mushroom in an environment with relatively low humidity less than 95% |

D. Nadhan

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | value added products of mushrooms |
| Hours required | |
| Learning Objectives | Understand the value added products |
| Previous knowledge to be reminded | Recollect the information from previous knowledge |
| Examples / Illustrations | Diagrams, charts |
| Additional inputs | |
| Teaching Aids used | Black Board |
| References cited | Text Book |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | |
| Any other activity | Assignment |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>• Mushroom fortified cakes:- can be ~~made~~ by fortification to a level of 10-20% of dry mushroom powder in the wheat flour. The process of making cake remains the same. * Mushroom based vegetarian sausages:- by adding 5% saturated fat and binding agent - carrageenan, soyaprotein, casein * Mushroom fortified instant noodly: prepared from pleurotus ostreatus. |

B. Nadhan

Signature of the Lecturer

# COMMISSONERATE OF COLLEGIATE EDUCATION,

# GOVT. DEGREE COLLEGE

## RAJAMPET, KADAPA. Dt.

(Affiliated to Yogi Vemana University, Kadapa.)

## TEACHING PLAN

ACADEMIC YEAR 2023-2024

**Name of the Department** : MATHEMATICS

**NAME OF THE LECTURER** : K. SEKHAR BABU M.Sc, M.Phil,

**Course / Group** : B.Sc (MPCs, MSCs, EM) B.Sc Major

**Subject / Page** :

| Sl.No. | Subject | Paper | Page No. |
|---|---|---|---|
| 1 | Integral Transforms with Applications | 7B | 1 – 11 |
| 2 | Analytical Skills (Life Skill Course) | LSC-I | 12 – 21 |
| 3 | Advances in Mathematical Sciences | P – II | 22 – 23 |
| 4 | | | |

MPCs & MSCs III B.Sc / Sem - V

July — 2024 **Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Integral Transforms with Applications |
| Hours required | UNIT - I Laplace Transforms - I (12 Hours) |
| Learning Objectives | Defination of Laplace Transforms Linear Property - Price - wise Continuous functions Existance Thm. - class A function, Exponential order function |
| Previous knowledge to be reminded | Limits Integration methods |
| Examples / Illustrations | Examples & Solved Problems |
| Additional inputs | Objective Questions |
| Teaching Aids used | Blank Board, Text book |
| References cited | S. Chand & Co Text book. |
| Student Activity Planned after the teaching | Learning the objectives. get to gether |
| Activity planned outside the class room, if any | Study hours for Slows Learners |
| Any other activity | Test. |
| Topic Synopsis | *(Continue on the reverse side if needed)* Defination $\int_0^\infty e^{-st} F(t)\,dt = f(s)$ Linear Property Price - wise Continuous Function Existance of Laplace Transforms Exponential order and class A |

Signature of the Lecturer

August 2 % **Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Laplace Transform UNIT – II |
| Hours required | 12 |
| Learning Objectives | Laplace Transform – II |
| Previous knowledge to be reminded | Integration methods |
| Examples / Illustrations | Solved Problems |
| Additional inputs | Objective Questions |
| Teaching Aids used | Board & Text Book |
| References cited | A Text book Laplace Transform by S. Chand & Co |
| Student Activity Planned after the teaching | Home Work |
| Activity planned outside the class room, if any | Learning |
| Any other activity | Test, Study hours for Slow Learners |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>First Shifting theorem<br>Second Shifting theorem<br>Change of Scale property<br>Laplace Transforms of derivative<br>Initial Value theorem<br>Final Value theorem. |

Signature of the Lecturer

August 23 **Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | UNIT – III Inverse laplace Transform I |
| Hours required | |
| Learning Objectives | Inverse Laplace Transforms |
| Previous knowledge to be reminded | Integration methods<br>Laplace Transforms |
| Examples / Illustrations | Solved Problem & proof of thy. |
| Additional inputs | Objective Questions |
| Teaching Aids used | Text Books, Board |
| References cited | A Text book of Integral Transform by S. Chand |
| Student Activity Planned after the teaching | Learning Class Review |
| Activity planned outside the class room, if any | Home work |
| Any other activity | Study hour |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>L+ of Integrals – real application by t<br>Diwsn by t Bessel function<br>Definition of Inverse Laplace<br>Solving Inverse Laplace by using partial fractions |

Signature of the Lecturer

Sept – 23

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Inverse Laplace Transforms |
| Hours required | 12 |
| Learning Objectives | Inverse Laplace Transforms |
| Previous knowledge to be reminded | Partial Fractions, Integration methods |
| Examples / Illustrations | Solved Problems |
| Additional inputs | Objective Questions |
| Teaching Aids used | Board and Text Books |
| References cited | Text Book by S. Chand |
| Student Activity Planned after the teaching | Home work |
| Activity planned outside the class room, if any | Study Hour |
| Any other activity | Learning |
| Topic Synopsis | *(Continue on the reverse side if needed)* Convolution theorem proof and its Applications Methods of find Inverse Laplace Transforms |

oct - 28

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Applications of Laplace Transforms |
| Hours required | 12 |
| Learning Objectives | DEs Solving by Using Laplace |
| Previous knowledge to be reminded | Laplace and Inverse |
| Examples / Illustrations | Solved problems |
| Additional inputs | Objective Questions |
| Teaching Aids used | Board and Text Book |
| References cited | S. Chand Text Book |
| Student Activity Planned after the teaching | Test |
| Activity planned outside the class room, if any | Learning |
| Any other activity | Study Hours |
| Topic Synopsis | *(Continue on the reverse side if needed)* Solutions of DEs by using Laplace Transforms Constant Coeff, Variable coeff- -ients D-E. — |

Signature of the Lecturer

Nov 28 **Teaching Plan / Lesson No.** 11

| | |
|---|---|
| Name of the Topic | Revision |
| Hours required | |
| Learning Objectives | Revision |
| Previous knowledge to be reminded | |
| Examples / Illustrations | Revision |
| Additional inputs | |
| Teaching Aids used | |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | Revision |
| Topic Synopsis | *(Continue on the reverse side if needed)* Refer Q-Ps |

Signature of the Lecturer

I B.Sc Sem-I Life Skill Course
I BA Sem-I **Teaching Plan / Lesson No.** 13

| | |
|---|---|
| Name of the Topic | Analytical Skills |
| Hours required | 10 |
| Learning Objectives | Arithmetic Ability Ex |
| Previous knowledge to be reminded | Yes basics Mathematical Abilities |
| Examples / Illustrations | Solved Problems |
| Additional inputs | Objective Questions |
| Teaching Aids used | Board Ex Text book |
| References cited | CCE, JKC T.B |
| Student Activity Planned after the teaching | Practices |
| Activity planned outside the class room, if any | Learning |
| Any other activity | Refer daily News Papers |
| Topic Synopsis | *(Continue on the reverse side if needed)* BODMAS, Fractions, Divisibility rules LCM, GCD, |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Verbal Reasoning |
| Hours required | 10 |
| Learning Objectives | Verbal Reasoning |
| Previous knowledge to be reminded | Coding, ~~Attb~~ |
| Examples / Illustrations | Solved Problems |
| Additional inputs | Objective Questions |
| Teaching Aids used | Board & Text Book |
| References cited | CCE, JKC, T.Book |
| Student Activity Planned after the teaching | Learning, Home Work |
| Activity planned outside the class room, if any | Practices |
| Any other activity | get to gether |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Number Series<br>Coding & decoding<br>Blood Relation Ship<br>Clocks<br>Calendars |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Quantitative Apptitude. |
| Hours required | 10 |
| Learning Objectives | Quantitative Apptitude |
| Previous knowledge to be reminded | Lower class Maths |
| Examples / Illustrations | Solved Problems |
| Additional inputs | Objective Questions |
| Teaching Aids used | Board & Text Book |
| References cited | CCE, JKC, TBook. |
| Student Activity Planned after the teaching | Home work |
| Activity planned outside the class room, if any | Learning |
| Any other activity | Practices |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Averages<br>Ratio and Proportion<br>Problems on ages<br>Time - distance and Speed |

Signature of the Lecturer

19

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Business Computations |
| Hours required | 10 |
| Learning Objectives | Business Computations |
| Previous knowledge to be reminded | Lower Class Mathematics |
| Examples / Illustrations | Solved problems |
| Additional inputs | Objective Questions |
| Teaching Aids used | Board & Text Book |
| References cited | CCE, JKS, T-Book |
| Student Activity Planned after the teaching | Home Work |
| Activity planned outside the class room, if any | Learning |
| Any other activity | Practices |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Percentages<br>Profit & Loss<br>Partnership<br>Simple interest<br>Compound interest |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | ~~DA~~ Data Interpretations |
| Hours required | 10 |
| Learning Objectives | Data Interpretations |
| Previous knowledge to be reminded | graphs, Circles, Tables (data) |
| Examples / Illustrations | Solved Problems |
| Additional inputs | Objective Questions |
| Teaching Aids used | Board & Text Book |
| References cited | CCE, JKC, Text Book |
| Student Activity Planned after the teaching | Home Work |
| Activity planned outside the class room, if any | Learning |
| Any other activity | Practices |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Tabulation<br>Bar Graphs<br>Pie charts<br>Line charts, graphs<br>Venn diagrams |

Signature of the Lecturer

I B.Sc — Sem — I (Major) Maths Sp C.S

Advances in Mathematical Sciences 23

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Mathematical Sciences |
| Hours required | 12 |
| Learning Objectives | Geometry, Calculus |
| Previous knowledge to be reminded | Intermediate maths |
| Examples / Illustrations | Solved Problems |
| Additional inputs | Objective Questions |
| Teaching Aids used | Board Board & Study material |
| References cited | Text Books - Intermediate by — own — Reddani |
| Student Activity Planned after the teaching | Home work |
| Activity planned outside the class room, if any | Practices |
| Any other activity | Learning. |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Straight line (2-D)<br>Limits and differentiation<br>Integration<br>Matrices |

Signature of the Lecturer

# COMMISSONERATE OF COLLEGIATE EDUCATION,

# GOVT. DEGREE COLLEGE

## RAJAMPET, KADAPA. Dt.

(Affiliated to Yogi Vemana University, Kadapa.)

## TEACHING PLAN

ACADEMIC YEAR 2023-2024

Name of the Department : Mathematics

NAME OF THE LECTURER : V.K. Madhu

Course / Group : B.Sc

Subject / Page : Mathematics

| Sl.No. | Subject | Paper | Page No. |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

I B.Sc I - Sem

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Mathematical, physical & chemical Sciences |
| Hours required | 2 |
| Learning Objectives | Advances in Basics Mathematics. |
| Previous knowledge to be reminded | Lines, limits, Integration |
| Examples / Illustrations | solved and Example problems |
| Additional inputs | Model questions. |
| Teaching Aids used | Text Book, Board and chalk piece |
| References cited | S. chand |
| Student Activity Planned after the teaching | Home work |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed)<br>* Stright lines: Different forms - Reduction of general equation into various forms - point of intersection.<br>* limits and Differentation: standard limits, Derivative of a fuction - problems.<br>* Integration: Integration as a reverse process of diff - Basics methods of Integration.<br>* Matrices: Types of matrices - scalar multiplication - Transpose of a matrix - determinants. |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Essentials and applications of mathematical physical and chemical Sciences |
| Hours required | 2 |
| Learning Objectives | Complex numbers & Trigonometric Ratios |
| Previous knowledge to be reminded | Numbers, Trigonometry |
| Examples / Illustrations | Solved problems |
| Additional inputs | Example problems. |
| Teaching Aids used | Text Book, Board |
| References cited | A text book of ~~Engineering~~ Mathematics |
| Student Activity Planned after the teaching | Home work |
| Activity planned outside the class room, if any | Learning. |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed)<br>* Complex numbers :- Introduction, new symbol $i$ - General form of a complex number - modulus - Amplitude - Conversion of ~~Conversions~~ forms of complex numbers<br>* Trigonometric Ratios :- Trigonometric Ratios and their relations - problems on Calculations of angles<br>* Vectors :- Def. of vector addition - Cartesian form, scalar and vector product - problems on statistical measures Mean, Median, mode of a data and problems. |

Signature of the Lecturer

II. B.Sc, paper - IV. Sem - IV

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Real number and infinite series. |
| Hours required | 6+6 |
| Learning Objectives | Infinite series |
| Previous knowledge to be reminded | Series |
| Examples / Illustrations | Examples, model questions |
| Additional inputs | solved problems |
| Teaching Aids used | Board, Text Book |
| References cited | S. chand vol - II |
| Student Activity Planned after the teaching | Home work |
| Activity planned outside the class room, if any | slipted Conducted |
| Any other activity | Objective questions for Arithmetic and Roots. |
| Topic Synopsis | (Continue on the reverse side if needed)<br>* Def. of series, convergent and divergent series<br>* limit comparison test<br>* Cauchy n'th root test<br>* D Alemberts test<br>* Leibnitz test. |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Limits and Continuity |
| Hours required | 6+6 |
| Learning Objectives | Limits ad Continuity. |
| Previous knowledge to be reminded | Limits. |
| Examples / Illustrations | solved problems. |
| Additional inputs | Excercise problems. |
| Teaching Aids used | Board, Text Book. |
| References cited | S. chand vol - I |
| Student Activity Planned after the teaching | Home - work. |
| Activity planned outside the class room, if any | Prepare for next topic |
| Any other activity | Study hours. |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* limit of a function<br>* limit of a infinit continuous function<br>* Combination of Continuity function<br>* Continuous function on integration<br>* Uniform continuous. |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Differentiation and mean value theorems |
| Hours required | 6+6 |
| Learning Objectives | Differentiation |
| Previous knowledge to be reminded | Differentiation and integration |
| Examples / Illustrations | Examples |
| Additional inputs | Solved problems |
| Teaching Aids used | Text book & Board |
| References cited | S. chand vol II |
| Student Activity Planned after the teaching | Study Hours |
| Activity planned outside the class room, if any | Home - work |
| Any other activity | Seminars |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* Derivability of a function on interval at a point.<br>* Derivability and continuity of a function<br>* Graphical method of a derivation<br>* mean value theorems<br>* Cauchy mean value theorems & Lagranges theorems<br>* Rolle's theorems |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Riemann Integration - I |
| Hours required | 12 |
| Learning Objectives | Intro. Integration Riemann Integration |
| Previous knowledge to be reminded | Limit, Integration |
| Examples / Illustrations | Solved problems |
| Additional inputs | Examples |
| Teaching Aids used | Board, Text Book |
| References cited | Solved value - I |
| Student Activity Planned after the teaching | Studying |
| Activity planned outside the class room, if any | Home work |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed)<br>* Def. of R.I & Riemann integral<br>* Integral function, Darboux thm<br>* Nec & Suff condition for R-Integral<br>* Some class of bounded Integral functions. |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Riemann Integration - II |
| Hours required | 12 |
| Learning Objectives | Riemann Integration - II |
| Previous knowledge to be reminded | Riemann Integration - I |
| Examples / Illustrations | Solved problems. |
| Additional inputs | Examples |
| Teaching Aids used | Board - Text book |
| References cited | A Text Book of S. Chand vol II |
| Student Activity Planned after the teaching | Learning |
| Activity planned outside the class room, if any | Home - work |
| Any other activity | Seminars. |
| Topic Synopsis | (Continue on the reverse side if needed)<br>* A properties of Integral functions<br>* Fundamental theorem of Integral calculus<br>* Integral as the limit of a sum<br>* Mean value theorem |

Signature of the Lecturer

III. B.Sc

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Multiple Integrals |
| Hours required | 15 |
| Learning Objectives | Double & Triple Integrals. |
| Previous knowledge to be reminded | Integration |
| Examples / Illustrations | Example problems. |
| Additional inputs | solved problems. |
| Teaching Aids used | Text Book, Board |
| References cited | chand Text Book |
| Student Activity Planned after the teaching | Home - work |
| Activity planned outside the class room, if any | Learning. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* Introduction, double integrals, Evaluation of double integrals properties of double integrals.<br>* Region of integration, double integrations in polar-coordinates & change of order<br>* Triple integrals, region of integration, Evaluation of triple integrals. |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Vector Differentiation - I |
| Hours required | 15 |
| Learning Objectives | Vector diff. partial diff. Grad, Dive |
| Previous knowledge to be reminded | Vectors. Dot product, Cross product. |
| Examples / Illustrations | Examples |
| Additional inputs | Solved problems. |
| Teaching Aids used | Board, Text Book |
| References cited | chand text Book |
| Student Activity Planned after the teaching | Leaving. |
| Activity planned outside the class room, if any | Home - Work |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* vector diff, ordinary derivatives of vectors partial diff.<br>* Gradient of a scalar point function.<br>* Directional derivatives<br>* Angle b/w two surfaces. |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Vector differentiation - II |
| Hours required | 15 |
| Learning Objectives | Divergence, Curl |
| Previous knowledge to be reminded | Dot product and Cross product |
| Examples / Illustrations | Examples |
| Additional inputs | Solved problems. |
| Teaching Aids used | Board, Text Book |
| References cited | S. chand Text Book |
| Student Activity Planned after the teaching | Home work |
| Activity planned outside the class room, if any | |
| Any other activity | Seminar Conducted. |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* Divergence<br>* Curl and laplacian operator<br>* formulae involving Nabla operators. |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Vector Integration |
| Hours required | 15 |
| Learning Objectives | Vector differentiation & partial diff |
| Previous knowledge to be reminded | Integration |
| Examples / Illustrations | Examples. |
| Additional inputs | Solved problems. |
| Teaching Aids used | Board, Text book |
| References cited | S. chand text book |
| Student Activity Planned after the teaching | Learn practice the problems |
| Activity planned outside the class room, if any | Home - work |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* Line Integrals<br>* Surface integrals<br>* volume Integrals |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Applications of vector Integration. |
| Hours required | 15 |
| Learning Objectives | Gauss, Green's, stoke's thms & its applications. |
| Previous knowledge to be reminded | Integration. |
| Examples / Illustrations | Examples. |
| Additional inputs | Solved problems. |
| Teaching Aids used | Board, class room |
| References cited | S. Chand text book |
| Student Activity Planned after the teaching | Home work. |
| Activity planned outside the class room, if any | practice the problems |
| Any other activity | Assignment Given |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* Gauss thms & its applications<br>* Greens thms & its applications<br>* stokes thms & its applications |

Signature of the Lecturer

I. sem

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Arithmetic ability & Verbal Reasoning |
| Hours required | |
| Learning Objectives | Number operations & coading and decoding |
| Previous knowledge to be reminded | multiplication and additions. |
| Examples / Illustrations | Examples |
| Additional inputs | solved problems. |
| Teaching Aids used | Board and class room |
| References cited | R.S. Agarwal Text Book |
| Student Activity Planned after the teaching | practice the Examples |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Arithmetic ability :-<br>* BODMAS rule, Fractions<br>* Divisibility and LCM & GCD (HCF)<br>Verbal Reasoning :-<br>* Number series, Coding & decoding.<br>* Blood Relationship<br>* Clocks & calendars. |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Quantitative aptitude & Business computations |
| Hours required | |
| Learning Objectives | profit loss problems, Time |
| Previous knowledge to be reminded | |
| Examples / Illustrations | Examples. |
| Additional inputs | Solved problems. |
| Teaching Aids used | Board, Text book. |
| References cited | R.S. agarwal text book |
| Student Activity Planned after the teaching | practice the solved problems. |
| Activity planned outside the class room, if any | Assignment given |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Quantitative aptitude:-<br>* Average, Ratio and proportions<br>* problems on ages & Time - distance - Speed.<br>Business computations:-<br>* percentages, profit & loss<br>* partnership<br>* Simple Compound interest. |

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Data Interpretation |
| Hours required | |
| Learning Objectives | Graphs, charts, ven-diagrams. |
| Previous knowledge to be reminded | |
| Examples / Illustrations | Exaples |
| Additional inputs | Word problems |
| Teaching Aids used | Board, text Book. |
| References cited | R.S. Agarwal text Book. |
| Student Activity Planned after the teaching | Assigned Conducted. |
| Activity planned outside the class room, if any | practice like problems. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* Tabulation, Bar Graphs<br>* pie-charts, line Graphs<br>* venn diagrams. |

Signature of the Lecturer

VI Sem

# Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | |
| Hours required | |
| Learning Objectives | |
| Previous knowledge to be reminded | |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* |

Signature of the Lecturer

## Teaching Plan / Lesson No. 7

| | |
|---|---|
| Name of the Topic | రాజనీతి — వనుయు Aug |
| Hours required | 10 |
| Learning Objectives | రాజనీతి పాఠ్యాంశాన్ని వనుయ గారు రచించారు. ఆంధ్రమహాభారతం గురించి విద్యార్థులకు తెలుపుట |
| Previous knowledge to be reminded | వనుయ కవిత్వ రచనలు పరిచయం చేయుట వ్యాసమహర్షి ప్రాచీన భారతాన్ని గురించి తెలుపుట |
| Examples / Illustrations | మహాభారతం లోని అనేక సంఘటనలు. ఉదాహరణలతో విద్యార్థులకు వివరించుట |
| Additional inputs | ఆంధ్రమహాభారతం. |
| Teaching Aids used | బోధనోపకరణములు. |
| References cited | ఆంధ్ర మహా భారతం |
| Student Activity Planned after the teaching | మహాభారతం లోని పాత్రలను విద్యార్థులచే తెలియ చేసేలా చూచుట. |
| Activity planned outside the class room, if any | మహాభారతంకు సంబంధించిన అంశాలను చూపించుట |
| Any-other activity | ఆసక్తికరంగా బోధించుట |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>రాజనీతి పాఠ్యాంశాన్ని వనుయగారు రచించారు. వనుయకు "ఆదికవి నన్నయభట్టు అనువాదులు" కలవు. మహాభారతాన్ని తెలుపుట రాజనీతి అంటే ప్రజలకు రాజు చేసే నీతులు తెలుపుట పాఠ్యాంశం వివరించుట జరిగి. |

Signature of the Lecturer

## Teaching Plan / Lesson No. 11

| | |
|---|---|
| Name of the Topic | గుణింతం – గుణింత పాఠములు కలిపి. |
| Hours required | 10. |
| Learning Objectives | గుణింతం కావ్య విశేషాంశను తెలుపుట పంచమునకు గుణింతము ఇచ్చిన సంబోధనతెల్పటం |
| Previous knowledge to be reminded | దళిత సాంకీర్త్య కవులను పరిచయం చేయుట చారి రచనలు తెలుపుట |
| Examples / Illustrations | దళిత సాంకీర్త్యమును ఉదాహరణలతో వివరించుట |
| Additional inputs | దళిత సాంకీర్త్యాంశాలు. తెల్పటం. |
| Teaching Aids used | బోధనా పత్రములు. |
| References cited | పాఠ్యగుణింతం, దళిత సాంకీర్త్యం. |
| Student Activity Planned after the teaching | కవులను గురించి విద్యార్థులు తెలుసుకొనేలా చేయుట. |
| Activity planned outside the class room, if any | కవుల జాబ్యులను వివరించేలా చేయటం. |
| Any other activity | అదనపు పెంచే |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>పాఠ్యవాచారి రచనలు తెలుపుట.<br>గుణింత కావ్యాన్ని వివరించటం.<br>పంచమునకు గుణింతంతో చెప్పిన విషయాలను తెలియపరుచుట<br>దళిత సాంకీర్త్యశీతిని వర్ణించుట. |

Signature of the Lecturer

## Teaching Plan / Lesson No. 10

| | |
|---|---|
| Name of the Topic | అలరాజు పుట్టుక - కళ్యాణ సుందరీజననాటక |
| Hours required | 10. |
| Learning Objectives | ధీనవంతులు, వేదల మధ్య వున్న భావనా మాలాన్ని తెలపడం. |
| Previous knowledge to be reminded | కథానిక ను విద్యార్థులకు తెలుపుట |
| Examples / Illustrations | అనేక కథలను విద్యార్థులకు తెలియజేయుట. |
| Additional inputs | కథానాల వేషధ్యాన్ని తెలుపడం. |
| Teaching Aids used | బోధనా పద్ధతులు |
| References cited | అలరాజు పుట్టుక - కళ్యాణసుందరీజననాటక. |
| Student Activity Planned after the teaching | మనుషుల జీవితంలోని అనేక విషయాలను ఎలా పాత్రీకరిస్తారనే విషయాలను పిల్లలకు తెలుపుట |
| Activity planned outside the class room, if any | అనేక కథలను చదివించుట |
| Any other activity | వివిధ రకాల కథలను చదివించుట |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>కళ్యాణ సుందరీ జగన్నాథ రచయిత్రి పరిచయం కథాంశాన్ని తెలియపరుచుట<br>కథా వేషధ్యాన్ని సంవేశాన్ని, పాత్ర చిత్రణను తెలియపరుచుట. |

Signature of the Lecturer

## Teaching Plan / Lesson No. IV

| | |
|---|---|
| Name of the Topic | అసమర్థుని శీవయాత్ర . Nov |
| Hours required | 10. |
| Learning Objectives | త్రిపురనేని గోపీచంద్ గారి రచనా విధానం తెలుపుట. |
| Previous knowledge to be reminded | మనా విశ్లేషణాత్మక నవలలను పరిచయం చేయుట. |
| Examples / Illustrations | అసమర్థుని శీవయాత్ర నవలను వివరించుట |
| Additional inputs | పాఠంలో పరమైన రచనలు తెలుపుట |
| Teaching Aids used | బోర్డును పద్ధతులు. |
| References cited | అసమర్థుని శీవయాత్ర - గోపీచంద్. |
| Student Activity Planned after the teaching | అనేక నవలను పరిచయం చేసి వివరించడం. |
| Activity planned outside the class room, if any | మనుషుల మనస్తత్వాలను తెలియ చేయడం. |
| Any other activity | నవలను తిలపడం |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>గోపీచంద్ పరిచయం.<br>నవల ఇతి వృత్తాన్ని తెలపడం., ముఖ్యమైన పాత్రలను వర్ణించడం, నవల సందేశాన్ని తెలుపుట నవలా శైలిని వివరించుట తెలిపి. |

Signature of the Lecturer

## Teaching Plan / Lesson No. 7

| | |
|---|---|
| Name of the Topic | మూడు వాక్యేతర శిల్పాలు. |
| Hours required | |
| Learning Objectives | సంకీర్ణం, సంకీర్ణ కారులను పరిచయం చేయుట |
| Previous knowledge to be reminded | గతంలో విద్యార్థులు చదివిన కవుల.ను. మరలా పరిచయం చేయుట. |
| Examples / Illustrations | కవితారచనలు ఉదాహరణలు తెలుపుట |
| Additional inputs | చార్ట్ |
| Teaching Aids used | చార్టులు పుస్తకములు. |
| References cited | సంకీర్ణ చరిత్ర. |
| Student Activity Planned after the teaching | సంకీర్ణ గ్రంథాలు, కవుల.గురించి వివరించుట |
| Activity planned outside the class room, if any | కవితా రచనలు తెలుసుకొనేలా చేయడం. |
| Any other activity | విద్యార్థులతో ప్రయోగాత్మకము చేయించడం. |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>తీరుల రూపాంతర కవి పరిచయం.<br>వేటూరి ప్రభాకరశాస్త్రి. మానవల్లి రామకృష్ణ కవి మొదటైన వారి గురించి విద్యార్థులకు తెలియ చేయుట |

Signature of the Lecturer

## Teaching Plan / Lesson No. Grames

| | |
|---|---|
| Name of the Topic | వ్యాకరణాంశాలు Sep, Oct |
| Hours required | 10. |
| Learning Objectives | సంధులు, సమాసాలు వివరణాత్మకముగా తెలుపుట |
| Previous knowledge to be reminded | చంధస్సు అలంకారాలు అంతకు ముందు చదివిన అంశాలను పునశ్చరణ చేయుట. |
| Examples / Illustrations | ఉదాహరణలతో వివరించి తెలుపుట |
| Additional inputs | ఉదాహరణ పద్యములు. |
| Teaching Aids used | చాక్‌పీస్ పద్ధతులు. |
| References cited | చిన్నయ సూరి - బాలవ్యాకరణం. పెద్దుల సిద్ధయ్య భాషాపాఠ్యపుస్తకం |
| Student Activity Planned after the teaching | విద్యార్థులచే పద్యగానం చేయుట నేర్పుట |
| Activity planned outside the class room, if any | సంధులు విడదీసి వివరణం సమాస పదములకు విగ్రహవాక్యం తెలుగులోకి చేయుట |
| Any other activity | విద్యార్థులచే పద్యగతిని చేయించుట. |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>సంధులు → తెలుగు సంధులు సంస్కృత సంధుల<br>సమాసాలు వివరణాత్మకముగా.<br>చంధస్సు → వృత్తాలు, ఉపజాతులు పరిచయం<br>అలంకారాలు → శబ్దాలంకారాలు, అర్థాలంకారాలు<br>వివరణాత్మకంగా తెలుపుట |

Signature of the Lecturer

**Teaching Plan / Lesson No.** I (యూనిట్)

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| Name of the Topic | వ్యక్తీకరణ వైపరీత్యాలు. Anglyse |
| Hours required | 10 |
| Learning Objectives | భాషను వివరణాత్మకంగా తెలియజేయుట |
| Previous knowledge to be reminded | వ్యక్తీకరణ వైపరీత్యాలను విద్యార్థులతో కల్పించుట వారితో కూర్చి వైపరీత్యాలు పెరిపాందించు కొనేలాచేయడం |
| Examples / Illustrations | భాషా విధానాలను తెలియజేయుట |
| Additional inputs | వ్యక్తీకరణ వైపరీత్యాలను పెరిపాందించడం. |
| Teaching Aids used | బోధనోపకరణములు. |
| References cited | భాషా శాస్త్రం తెలుగు పీఠిక. |
| Student Activity Planned after the teaching | విద్యార్థులు వినతి పత్రాలు రాసే విధానం తెలుసుకునేలా చేయుట |
| Activity planned outside the class room, if any | మనస్తత్వ భాషాలను వ్యక్తీకరించి కథలు రాయుట |
| Any other activity | అసైన్‌మెంట్ ఇవ్వడం |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>వినతి పత్రాలు రాయడం. వివరించుట<br>కరపత్రాలు. తెలియజేయుట<br>పాస్పోర్టును గురించి తెలుపుట<br>తెలుగున రాయడం వివరించుట<br>మొదలైనవి. |

Signature of the Lecturer

**Teaching Plan / Lesson No.** 11 యూనిట్

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| Name of the Topic | ప్రబంధ కథా రచన |
| Hours required | 10. |
| Learning Objectives | ప్రబంధ రచనల విశిష్టతను తెలియజేయుట |
| Previous knowledge to be reminded | కవిత్వం, కథలు, వ్యాసం మొదలైనవి ఎట్లైనా విద్యార్థులు అంతకు ముందు వాటిని ఆస్వాదించి ఉంటారు వారికి వ్యాస విధానం తెలియజేయాలి |
| Examples / Illustrations | కథలు, కవిత్వరచన, వ్యాసం గురించి. వారికి ఉదాహరణలతో వివరించుట |
| Additional inputs | ప్రబంధ కథా రచన |
| Teaching Aids used | బోధనా పద్ధతులు. |
| References cited | ఆధునికాంధ్ర కవిత్వం - సంప్రదాయము - వచన కవిత్వ సాహిత్యాలు |
| Student Activity Planned after the teaching | ప్రబంధ కథా రచనలోని విశిష్టత పైన చర్చించి. కథారచనలుగా, కవితగా వ్యాస విధానాన్ని వ్రాయుట |
| Activity planned outside the class room, if any | కథలు, కవితలు, వ్యాసాలు వ్రాయుట |
| Any other activity | కథలు, కవితలు, వ్యాస గురించి సాంఘికాధ్యయనం |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>కవిత్వరచన, లక్షణాలు వివరించుట.<br>కథారచన ఉద్దేశము, లక్షణాలు తెల్పుట<br>వ్యాసరచన ఉత్తమ వ్యాసం, లక్షణాలు తెలియజేయుట |

Signature of the Lecturer

## Teaching Plan / Lesson No. అనువాదశాస్త్రం III

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| Name of the Topic | అనువాదశాస్త్రం oct |
| Hours required | 10 |
| Learning Objectives | అనువాదం అనే నిర్వచనం తెలిసి వాటి పద్ధతులను తెలియజేయడం. |
| Previous knowledge to be reminded | తెలుగు నుండి ఇంగ్లీషులోనికి అనువదించడం గురించి తెలియజేయడం. |
| Examples / Illustrations | ఇంగ్లీషు నుండి తెలుగులోకి తెలుగు నుండి ఇంగ్లీషులోకి ఎలా చేయాలో తెలపడం. |
| Additional inputs | బోధన వర్క్‌షీట్ సహాయంతో |
| Teaching Aids used | బోధనా పద్ధతులు. |
| References cited | అనువాద సమస్యలు - కాసిరెడ్డి కాసులు |
| Student Activity Planned after the teaching | ఇంగ్లీషులోకి ఎలా వాక్యాలు పునశ్చరణ చేసుకోవడం |
| Activity planned outside the class room, if any | భాషాశిక్షణ ఎలా వాక్యాలు తెలుసుకోవడం |
| Any other activity | భిన్నాంశ రంగాన్ని తెలుసుకోవడం |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>అనువాదాన్ని నిర్వచనం, వాటి పద్ధతులు తెలపడం.<br>అనువాద సమస్యలు - భాషాపర, భిన్నాంశ సమస్యలు, పరిష్కారాలు వివరించుట.<br>ఆంగ్లం నుండి తెలుగు తెలుగు నుండి ఆంగ్లానికి వేరుగా అనువదించడం |

Signature of the Lecturer

## Teaching Plan / Lesson No. యూనిట్ IV

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| Name of the Topic | వార్తా రచన (ముద్రణా మాధ్యమం/ప్రింట్ మీడియా) NOV |
| Hours required | 10 |
| Learning Objectives | ప్రసార మాధ్యమాలను గురించి క్షుణ్ణంగా వివరించుట |
| Previous knowledge to be reminded | వార్తాపత్రికలు, మొబైల్ యాప్‌లు అందరికీ ఉండును వున్న వాటన్నిటి వారికి పరిచయం చేయుట |
| Examples / Illustrations | మాధ్యమాలను పరిచయం చేయడం. |
| Additional inputs | ముద్రణా మాధ్యమాలు ప్రింట్ మీడియా సమాచారాలు క్విజ్ |
| Teaching Aids used | పవర్ పాయింట్ ప్రజెంటేషన్. |
| References cited | మాధ్యమాల రచన } మా.వి.ఆర్ అండ్ కో ప్రచురణ<br>ముద్రణా మాధ్యమం } మరియు ఇంటర్నెట్. |
| Student Activity Planned after the teaching | వార్తా పేపర్లు పూర్తిగా చదివి వున్నవాటిని సేకరించి చేయడం. |
| Activity planned outside the class room, if any | విద్యార్థులు పత్రికలను పరిచయం చేయుట |
| Any other activity | సంపాదకీయాలు ప్రస్తుత సమస్యలపై విద్యార్థులకు |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>ముద్రణా మాధ్యమాల పరిచయం, పరిధి, కాలం.<br>వివిధ రకాల పత్రికలు పరిశీలన పత్రికాభాష శైలి తెలుసుకొనుట<br>వార్తా రచన సంపాదకీయాలు, సమస్యలు, అవగాహన |

Signature of the Lecturer

**Teaching Plan / Lesson No.** యూనిట్ 5

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| Name of the Topic | మాధ్యమాలు, రచన ప్రసారయోగ్యత/ NOV ఎక్స్టాపోలేషన్ |
| Hours required | 10 |
| Learning Objectives | శ్రవణ, దృశ్య మాధ్యమాలను విద్యార్థులు వివరించుట |
| Previous knowledge to be reminded | ప్రసార మాధ్యమాలు ఏవేవి ఉనాయో అనగా రచన కల్పించడం. |
| Examples / Illustrations | ప్రసార మాధ్యమాల రకాలు తెలపడం. |
| Additional inputs | కొన్ని రచన తెలపడం యూట్యూబ్, ఫ్లిప్కార్ట్, వాట్సాప్ మొదలగు తెలపడం. |
| Teaching Aids used | బోధనా పద్ధతులు. |
| References cited | విజ్ఞానం చా॥ వ. ఆచార్య అంబేద్కర్ విశ్వవిద్యాలయం తెలుగు పరిశీలనం - ఉపాధ్యాయులు రాధాకృష్ణ |
| Student Activity Planned after the teaching | యూనిట్ లోని విషయాలు నేర్చుకోవడం మరికొన్ని రచన ప్రాసెవిధానం తెలుసుకోవడం |
| Activity planned outside the class room, if any | ఇంటర్నెట్ ను ఉపయోగించి వివిధ రకాలుగా తెలుసుకోవడం. |
| Any other activity | యూనిట్, టెలివిజన రచన అప్లికేషన్ సమాచారం చేయుటకు |
| Topic Synopsis | *(Continue on the reverse side if needed)* ప్రసార మాధ్యమాల నిర్వచనం, రకాలు విశ్లేషి ప్రయోజనాలు. శ్రవణ మాధ్యమాలు రేడియో. రచన ప్రసంగాలు నాటికలు ప్రసార సమాచారం. దృశ్యమాధ్యమాలు, యూనిట్, టెలివిజన రచన మొదలగునవి. |

Signature of the Lecturer

## Teaching Plan / Lesson No. పాఠ్యాంశం 1

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| Name of the Topic | మాండ్రపదాలు – పరిచయం. |
| Hours required | 10 |
| Learning Objectives | మాండ్రపదాలతో భాషా ప్రయోగాన్ని తెలుపుట నిర్వచన రకాలు, ప్రాధాన్యతను తెలుపుట. |
| Previous knowledge to be reminded | పాఠ్యాంశ భాషా విధానాన్ని మాండ్రపదాలతో పోల్చి గా ఉపయోగిస్తారని తెలుపుకోవడం. |
| Examples / Illustrations | భూమి, ప్రయోజనం, రకాలు తెలుపుట |
| Additional inputs | పోషణ |
| Teaching Aids used | పాఠ్యపుస్తకాలు |
| References cited | మాండ్రపదాల రచన కాళ్ళ. ఆంధ్ర ప్రదేశ్ ప్రభుత్వం |
| Student Activity Planned after the teaching | మాండ్రపదాలకు ఏలా త్రాయడాలో విద్యార్థులచే వివరించుట. |
| Activity planned outside the class room, if any | ఏమే మాండ్రపదాలు ప్రయోగించారో విద్యార్థులు తెలుసుకొని వేరు చేయుట |
| Any other activity | ఏ ఉపాధి అవకాశాలు ప్రయోగించారో తెలుసుకోవడం |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* మాండ్రపదాల పరిచయం.<br>* మాండ్రపదాల నిర్వచనం, రకాలు.<br>* మాండ్రపదాల్లో భాషా ప్రయోగం.<br>* మాండ్రపదాల విస్తృతి, ప్రాధాన్యత<br>* మాండ్రపదాల చర్చ<br>* మాండ్రపదాలు – ఉపాధి అవకాశాలు వివరణ. |

Signature of the Lecturer

**Teaching Plan / Lesson No.** యూనిట్ II

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| Name of the Topic | ముద్రణా మాధ్యమం - పరిచయం 3rd oct |
| Hours required | 10 |
| Learning Objectives | పత్రికలు ఎన్ని రకాలు వాటిలో భాషా శైలి ఎలా వుంటుంది తెలపడం |
| Previous knowledge to be reminded | సాంఘిక శాస్త్రం, ఆర్థశాస్త్రం, వ్యాపార, వాణిజ్యం, దిన పత్రికలు పరిచయం చేయుట. |
| Examples / Illustrations | వార్త రచన ఎలా వుంటుంది తెలుసుకోవడానికి విద్యార్థులకు వివరించుట. |
| Additional inputs | వెల్లబల్ల - పుస్తకములకు |
| Teaching Aids used | బోధనా పద్ధతులు |
| References cited | మాధ్యమాల పరిచయం : డా॥ వి. లక్ష్మణరావు ప్రచురణ. |
| Student Activity Planned after the teaching | అచ్చు యంత్రాలను ఎలా ముద్రిస్తారు వంటి వివరాలు ఉపన్యాసం చేయడం. |
| Activity planned outside the class room, if any | పత్రికలకు భాషను ఎలా ప్రయోగాలు చేయవచ్చు |
| Any other activity | పత్రికలను సేకరించ చేయడం |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* ముద్రణా మాధ్యమాలను పరిచయం చేయుట<br>* పత్రికా భాష, శైలి వైవిధ్యాన్ని తెలుపుట<br>* పత్రికా రచన, - భాషాపరమైన మెళకువలు పరిచయం చేయుట |

Signature of the Lecturer

**Teaching Plan / Lesson No.** అనుబంధం 111

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| Name of the Topic | ముద్రణా మాధ్యమం – వైవిధ్యాభివృద్ధి |
| Hours required | 10. |
| Learning Objectives | పత్రికా రచన, రేడియో, టీవీ. రచనకు ఎలా భిన్నమైనదో విద్యార్థులకు తెలియజేయుట |
| Previous knowledge to be reminded | తప్పక, దృశ్య మాధ్యమములను గురించి వివరంగా స్మరణకు తెలియజేయుట |
| Examples / Illustrations | శీర్షికలు, ప్రకటనలు, వివిధ పత్రికల గురించి ఉదాహరణలతో తెలుపుట |
| Additional inputs | వర్తమాన సమాచారం |
| Teaching Aids used | బోధనా పరికరములు. |
| References cited | మాధ్యమముల పరిచయం పాఠ్య గ్రంథం అనుసరించి |
| Student Activity Planned after the teaching | పుస్తక సమీక్షలు, ఇంటర్వ్యూలు వివిధ రకాలు రాయడం, చేయడం ఎలా నేర్పించుట |
| Activity planned outside the class room, if any | వార్తా రచన ఎలా ప్రయోగాలు తెలపడం (పత్రికలకు) |
| Any other activity | పత్రికలు సేకరించుట |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>*పత్రికలు - వార్తా రచన.<br>* శీర్షికా రచన, వార్తల సంక్షేప్తికరణ. విపులీకరణ<br>* సంపాదకీయాలు.<br>* పుస్తక సమీక్షలు, ఇంటర్వ్యూలు, వివేదికలు.<br>* ప్రకటన, వివిధ పత్రికలు., అవగాహన మొదలైన<br>* వి వివరణాత్మకంగా తెలియజేయడం |

Signature of the Lecturer

## Teaching Plan / Lesson No. యూనిట్ IV

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| Name of the Topic | ప్రసార మాధ్యమం – పరిచయం. |
| Hours required | (ప్రసార) 10 |
| Learning Objectives | ప్రసార మాధ్యమాల విస్తృతి ప్రయోజనాలను తెలియ చేయుట. |
| Previous knowledge to be reminded | ప్రసార మాధ్యమాలతో శ్రవణ, దృశ్య మాధ్యమాలు గురించి తెలుపుట |
| Examples / Illustrations | రాట్సప్, యూట్యూబ్, మొబైల్ ఫోన్ మొ॥వి. |
| Additional inputs | వల్లెపల్లి సుష్మలత. |
| Teaching Aids used | బోధనోపకరణాలు. |
| References cited | ప్రసార మాధ్యమాలు – [illegible] |
| Student Activity Planned after the teaching | రేడియో, టివి, పత్రికలకు ఎలా స్క్రిప్టులు రాయాలో తెలియజేయడం. |
| Activity planned outside the class room, if any | క్లాసులు ఏవిధంగా విభజించాలో తెలుపుట లు చేయడం. |
| Any other activity | సెమినార్ విద్యార్థులచే నిర్వహించుట |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* ప్రసార మాధ్యమాల విస్తృతి, ప్రయోజనాలు తెలుపుట<br>* ప్రసార మాధ్యమాల్లో కార్యక్రమాల నిర్వహణ. లోతు తెలుసుకొని వివరణాత్మకంగా తెలియజేయుట<br>* ప్రసార మాధ్యమాలు వివిధ రకములు – పరిచయం. అవకాశాన కల్పించడం మొ॥వి. |

Signature of the Lecturer

**Teaching Plan / Lesson No.** మాడ్యూల్ 5

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| Name of the Topic | ఉపాధ్యాయ వ్యాఖ్యలు – వైఫల్యాల్ని వృద్ధి. |
| Hours required | 15 |
| Learning Objectives | స్క్రిప్ట్ రచన, కెమెరా రచన, క్రాస్ విధానం. లాస్ విధానం తెలియచేయడం. |
| Previous knowledge to be reminded | ఇంటర్వ్యూలు ప్రత్యక్ష ప్రసారాలు. ఎలా వ్యాఖ్యానం తెలియచేయడం. |
| Examples / Illustrations | టీవీ, రేడియో కి క్రాస్ విధానం |
| Additional inputs | (బ్లాక్ బోర్డ్) సుద్దముక్క, వల్లెబల్లె |
| Teaching Aids used | చూడ్డానికి పద్ధతులు. |
| References cited | మాధ్యమాల పరిచయాలు:- రాజు, బాబు అంటే లేదు అన్నట్లు |
| Student Activity Planned after the teaching | విద్యార్థులకు ఎలా ప్రాజెక్టులు విద్యార్థి చేత్తు కునేలా చెప్పడం. |
| Activity planned outside the class room, if any | షూట్ మెంటరీ క్రాస్ విధానం తెలుసుకునేలా చెప్పడం |
| Any other activity | గ్రూప్ వర్క్ మెంటర్, సెమినార్ విద్యార్థులచే ప్రెజెంటేషన్ |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* స్క్రిప్ట్ రచన, కెమెరా రచన, క్రాస్ రచన<br>* వార్తా రచనా విధానాలు.<br>* వాక్యాల్ని ప్రకటనలు, ఇంటర్వ్యూలు, ప్రత్యక్ష ప్రసారాలు, షూట్ మెంటరీలు – రచనా విధానాలు<br>* రేడియో, రచన, టెలివిజన్ రచన, ఓటింగ్ వేదికలు-రచనా విధానం. మొదలైన |

Signature of the Lecturer

సృజనాత్మక రచన

Semister II **Teaching Plan / Lesson No.** I

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| Name of the Topic | వ్యక్తీకరణ నైపుణ్యాలు |
| Hours required | 10 |
| Learning Objectives | భాషను వివరణాత్మకంగా తెలియపరుచుట |
| Previous knowledge to be reminded | వ్యక్తీకరణ నైపుణ్యాలను విద్యార్థులతో కలిగించుట వారితో కొత్త నైపుణ్యాలను పంచుకొనించుట |
| Examples / Illustrations | భాషాం, వర్ణం, ధ్వని, పదం, వాక్యం మొదలి తెలుపుట |
| Additional inputs | వ్యక్తీకరణ నైపుణ్యాలను పంచుకొనించుట |
| Teaching Aids used | బోధనా పద్ధతులు |
| References cited | ఆధునిక భాషా శిక్షణ సిద్ధాంతాలు రచయిత సుబ్బారావు |
| Student Activity Planned after the teaching | భాషా భాగాలను గుర్తించేలా చేయుట ధ్వని వర్ణ పరివాక్య నమూనాయులను తెల్పుట |
| Activity planned outside the class room, if any | మనుష్యులని భాషాలను వ్యక్తీకరించే కథలను ప్రాయించుట |
| Any other activity | అసైన్ మెంట్ ప్రాయించుట |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>భాష - నిర్వచనాలు లక్షణాలు తెలుపుట<br>భాష ఆవశ్యకత ప్రయోజనాలు వివరించుట<br>భాష ఉత్పత్తి వాదాలు వివరణాత్మకంగా చెప్పుట<br>వ్యాకరణం పదం వాక్యం పదాతకరణాలతో వివరించుట మొదలి. |

Signature of the Lecturer

## Teaching Plan / Lesson No. II - Unit

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| Name of the Topic | అనువాద శాఖ |
| Hours required | 10 |
| Learning Objectives | అనువాద నిర్వచనం తెలిసి వాని పద్ధతులను సమస్యలు, భేదాలు, భాషా సాంస్కృతిక సమస్యలతెల్సి |
| Previous knowledge to be reminded | తెలుగు నుండి ఇంగ్లీషులోనికి అనువదించేలా చేయుట |
| Examples / Illustrations | ఇంగ్లీషు నుండి తెలుగులోకి తెలుగు నుండి ఇంగ్లీషులోకి ఎలా అనువదించాలో తెలియజేయడం. |
| Additional inputs | భాషనా పద్ధతులు వళ్ళులు - సుష్మావుకే |
| Teaching Aids used | భాషనా పద్ధతులు. |
| References cited | అనువాద సమస్యలు - రామకృష్ణారెడ్డి |
| Student Activity Planned after the teaching | ఇంగ్లీషులోకి ఎలా క్రియలు చేసుకోవడం. చేసుకోవడం. |
| Activity planned outside the class room, if any | భాషా శిబిరి ఎలా క్రియలు తెలుసుకోవడం |
| Any other activity | భాషాంతర శంగాన్ని తెలుసుకోవడం సెమినార్ |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* అనువాదాన్ని నిర్వచించి వాని పద్ధతులు తెలపడం.<br>*అనువాద సమస్యలు భేదాలు భాషా సాంస్కృతిక సమస్యలు పరిష్కారాలు వివరించుట<br>అనువాదం (Translation) అనిచి వాటివివరాలు ఇంకా తెలుసుకునేలా చేయడం |

Signature of the Lecturer

## Teaching Plan / Lesson No. Unit - III

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| Name of the Topic | మూభ్రమాలను రచన. |
| Hours required | 10 |
| Learning Objectives | ప్రసంకేమూభ్రమలను గురించి స్పష్టంగా వివరించుట |
| Previous knowledge to be reminded | వార్తా పత్రికలు, సంపాదకీయాలు, మూభ్రమాలు మొదలైన వాటి గురించి స్పష్టంగా తెలుపుట |
| Examples / Illustrations | మూభ్రమాలను ఫలితాలయం చేయుట |
| Additional inputs | ముద్రణా మూభ్రమాలు, శ్రవ్య దృశ్య మూభ్రమాలను తెలుపుట |
| Teaching Aids used | బోధనోపకరణాలు. |
| References cited | మూభ్రమాల రచన / ముద్రణా మూభ్రమం / పాఠ్యపుస్తకం. అంతర్జాల విద్యావిధానాలు. |
| Student Activity Planned after the teaching | వార్తా పత్రికలు సేకరించుట యాంకరింగ్ ఎలా చేయాలో నేర్పించుట |
| Activity planned outside the class room, if any | మూభ్రమాలను ఎలా ప్రాయాలో విద్యార్థులు తెలుసుకునేలా చేయుట |
| Any other activity | సంపాదకీయాలు, పుస్తక సమీక్షలు ఇంకా విధానాలు నేర్పుకోవడం |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>వివిధ రకాల పత్రికల పరిశీలన పత్రికా భాషా శైలి గురించి వార్తా రచన సంపాదకీయాలు, పుస్తక సమీక్షలు ప్రకటనలు శ్రవ్య మూభ్రమాలు కార్యక్రమాల ప్రసారాలు దృశ్య మూభ్రమాలు టెలివిజన్ కార్యక్రమాల రచన. యాంకరింగ్ తెలుగు. ముద్రణా మూభ్రమం శ్రవ్య, దృశ్య మూభ్రమ రచన. విద్యార్థులచే రచన చేయించుట |

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## Teaching Plan / Lesson No. Unit IV

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| Name of the Topic | తెలుగు వ్యాసరచన. |
| Hours required | 10. |
| Learning Objectives | వ్యాసరచన, ఉత్తమ వ్యాస లక్షణాలు. వ్యాస భేదాలు, పాఠ్యేతర అంశాలను తెలుపుట. |
| Previous knowledge to be reminded | వ్యాసలక్షణాలు, పాఠ్యేతర అంశాలు లక్ష్యసాధనలుగా గురించి సంధుల పూర్వాపరాలు గురించి తెలుపుట |
| Examples / Illustrations | వ్యాసం ఎలా రాయాలో చెప్పుట. |
| Additional inputs | వ్యాసం, ఉత్తమ వ్యాస లక్షణాలను స్పష్టంగా తెలుపుట |
| Teaching Aids used | బోర్డు నోట్సు పుస్తకములు. |
| References cited | పాఠ్యేతరం – పాఠ్యాంశాలు లక్ష్యసాధనలు కాకుండా. చదువు – పఠనము – కాలవలయం అని కొలుచుట. |
| Student Activity Planned after the teaching | స్వీయ రచనలు తన పెంపొందించేలా వ్యాసాలను రాసి విద్యార్థులు కల్పించుట. |
| Activity planned outside the class room, if any | స్వీయ మాతృభాషను మరచిపోకుండా ఉండేలా ప్రతిరోజు పాఠ్యాన్ని మార్చడం |
| Any other activity | వ్యాసం గురించి సాంతంగా రాసేలా చేయడం |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* తెలుగు వ్యాసం ను నిర్వచించి కొన్ని లక్షణాలను తెలుపుట<br>* పాఠ్యేతర వ్యాసం స్వీయ ను గురించి తెలుపుట<br>* ఉపోద్ఘాత ఉపోద్ఘాత – మునిపోకేర్ం వాసం కొన్ని రాయి గురించి తెలుపుట<br>* విద్యార్థి చేత వ్యాసరచన చేయించడం |

Signature of the Lecturer

## Teaching Plan / Lesson No. UNIT - V

| | |
|---|---|
| Name of the Topic | తెలుగు సాంకేతికత తెలుగులిపి |
| Hours required | 10 |
| Learning Objectives | తెలుగు భాష సాంకేతికను తెలుగు లిపిని గురించి వర్ణించుట |
| Previous knowledge to be reminded | అచ్చులు, హల్లులు, పూర్వపు ప్రాథమిక లిపి తెలియచేయుట |
| Examples / Illustrations | లిపి ఎలా ప్రాయుట తెలుపుట. |
| Additional inputs | పోషన వల్లివల్ల సుప్తాలుక్ |
| Teaching Aids used | పోస్టరాపచ్చలు. |
| References cited | సాంకేతికలిపి పుస్తుపుస్తకాల్ |
| Student Activity Planned after the teaching | యునిక్ కోడ్ల సంబంధ వరకాత్మకంగు అంతర్జాలంలో HP, IBM లు తెలుపుట. |
| Activity planned outside the class room, if any | కంప్యూటరికరణ తెలుసుకునేలా చేయుట |
| Any other activity | ఎలక్ట్రానిక్ మ్యూనల్ సంబంధ తెలుపుట |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* తెలుగులిపియునికోడ్ను వివరించుట<br>* అచ్చులు, హల్లులు పరిచయం<br>* తెలుగులిపి సంయుక్తాక్షర ప్రాముఖ్యతతెలుపుట<br>* సాంకేతిక పదజాలాన్ని తెలియచేయుట<br>* ఫుటి, ఫిమల ఎనిమేషన్లు తెలియపరుచుట |

Signature of the Lecturer

**Teaching Plan / Lesson No.** 1st B.A - Paper - I

| | |
|---|---|
| Name of the Topic | Fundamentals of social science |
| Hours required | 5 Unit - I |
| Learning Objectives | → Scope of social science<br>→ Different " " |
| Previous knowledge to be reminded | Introduction of social science |
| Examples / Illustrations | sociology, Political science. |
| Additional inputs | Social work, History, Economics |
| Teaching Aids used | Black board & chalk. |
| References cited | Academic Text books |
| Student Activity Planned after the teaching | Assignment |
| Activity planned outside the class room, if any | notes. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Social sciences scope & Defferents<br>→ sociology - gender roles<br>→ Psychology - Emotions<br>→ Political science - Public Policy<br>→ Economics - Macro Economic trends<br>→ History - Social cultural<br>→ Social work. - Improve the lives. |

V. Mahesh

Signature of the Lecturer

**Teaching Plan / Lesson No.** I B.A Paper - I

| | |
|---|---|
| Name of the Topic | social science Methods and Differences |
| Hours required | 5 - I BA Unit - IV |
| Learning Objectives | → social science Methods<br>→ social science Differences. |
| Previous knowledge to be reminded | scope of social science.<br>Methods. |
| Examples / Illustrations | Human society & behavior. |
| Additional inputs | Quantitative research & numerical data. |
| Teaching Aids used | Black board & chalk. |
| References cited | Academic text books |
| Student Activity Planned after the teaching | student seminars. |
| Activity planned outside the class room, if any | notes |
| Any other activity | - |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Methods of social science.<br>→ Quantitative research.<br>→ surveys, experiments<br>→ Mixed Methods<br>→ observational studies.<br>→ Natural & social science Difference |

V. Mallika
Signature of the Lecturer

**Teaching Plan / Lesson No.** II B.A - Unit-I

| | |
|---|---|
| Name of the Topic | Economic Development |
| Hours required | 5 - II BA |
| Learning Objectives | → Scope of Economic development<br>→ Importance of Economic Development |
| Previous knowledge to be reminded | Introduction of Development Economics |
| Examples / Illustrations | People in a society |
| Additional inputs | Economic social aspects |
| Teaching Aids used | Black board & chalk |
| References cited | Academic text books |
| Student Activity Planned after the teaching | Assignments |
| Activity planned outside the class room, if any | notes. |
| Any other activity | - |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Development Economics<br>→ Scope of development Economics<br>→ Importance of Development Economics<br>→ Measures of development Economics<br>→ Limitations of Development Economics |

V. Muthu

Signature of the Lecturer

**Teaching Plan / Lesson No.** II B.A - Unit I

| | |
|---|---|
| Name of the Topic | sustainable development & Inclusive growth |
| Hours required | S - II BA |
| Learning Objectives | → Interaction - Economy & environment<br>→ Sustainable Development<br>→ Inclusive Growth |
| Previous knowledge to be reminded | Economic Development |
| Examples / Illustrations | Environment in Economy |
| Additional inputs | Production, distribution & consumption |
| Teaching Aids used | Black board & chalk |
| References cited | Academic text books. |
| Student Activity Planned after the teaching | student seminars |
| Activity planned outside the class room, if any | notes. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Environment in Economic Analysis<br>→ sustainable developement<br>→ sustainable - Goals<br>→ Environmental crisis<br>→ Inclusive Growth<br>→ Elements of inclusive Growth |

V. mulu

Signature of the Lecturer

**Teaching Plan / Lesson No. GC - III B.A**

| | |
|---|---|
| Name of the Topic | Insurance concept and principles |
| Hours required | 5 - III BA Unit - I |
| Learning Objectives | → Risk management<br>→ Risk classification<br>→ |
| Previous knowledge to be reminded | Introduction of Insurance |
| Examples / Illustrations | Insurance |
| Additional Inputs | Risk uncertainity |
| Teaching Aids used | Black board & chalk |
| References cited | Academic text books |
| Student Activity Planned after the teaching | Assignments |
| Activity planned outside the class room, if any | notes |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Introduction of Risk.<br>→ Risk management<br>→ Risk classification<br>→ Risk uncertinity<br>→ Importance of Insurance |

V. Malathi

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Insurance – Types. |
| Hours required | 10 |
| Learning Objectives | → Principles of Insurance<br>→ Insurance Regulation in India<br>→ Role of IRDA |
| Previous knowledge to be reminded | Risk management |
| Examples / Illustrations | Insurance Policies |
| Additional inputs | Primiums |
| Teaching Aids used | Black board & Chalk. |
| References cited | Academic text books |
| Student Activity Planned after the teaching | student seminars. |
| Activity planned outside the class room, if any | notes |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ concept of Insurance<br>→ Importance of Insurance<br>→ Insurance ombudsman<br>→ Scope for Insurance business in India |

V. Malathi

Signature of the Lecturer

**Teaching Plan / Lesson No. 7.C - III BA**

| | |
|---|---|
| Name of the Topic | Principles of Banking and Indian Banking |
| Hours required | 10 Unit - I |
| Learning Objectives | → Banking - meaning<br>→ Principles of Banking<br>→ Function " - |
| Previous knowledge to be reminded | Introduction of Banking |
| Examples / Illustrations | Banks |
| Additional inputs | RBI |
| Teaching Aids used | Black board & chalk |
| References cited | Academic text books |
| Student Activity Planned after the teaching | Assignments |
| Activity planned outside the class room, if any | notes |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ structurure of Indian Banking system.<br>→ Regulations of Banking in India.<br>→ Role of RBI in Banking |

V. Mehta

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Anti-Money Laundering |
| Hours required | 5 |
| Learning Objectives | → Financial Literacy<br>→ |
| Previous knowledge to be reminded | Banking system |
| Examples / Illustrations | Indian banking. |
| Additional inputs | financial opportunities. |
| Teaching Aids used | Black board & chalk |
| References cited | Academic Text books. |
| Student Activity Planned after the teaching | seminars |
| Activity planned outside the class room, if any | Notes |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Basics of Financial Literacy<br>→ Problems of Banking in India<br>→ challenges of " " |

V. Muthu

Signature of the Lecturer

**Teaching Plan / Lesson No.**

| | |
|---|---|
| Name of the Topic | Financial Markets |
| Hours required | 6 |
| Learning Objectives | Indian Financial systems |
| Previous knowledge to be reminded | Financial Markets |
| Examples / Illustrations | Knowledge of financial terms |
| Additional inputs | Indian Finance |
| Teaching Aids used | Black board & chalk |
| References cited | Academic text books |
| Student Activity Planned after the teaching | Assignments |
| Activity planned outside the class room, if any | notes |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Financial system - components<br>→ Financial markets<br>→ Financial Institutions. |

V. Muthu

Signature of the Lecturer

**Teaching Plan / Lesson No. I B A - Paper - I**

| | |
|---|---|
| Name of the Topic | Political Economy |
| Hours required | 10 unit - IV |
| Learning Objectives | Introduction of Political Economy |
| Previous knowledge to be reminded | Basics of Economy |
| Examples / Illustrations | Polity & Economy |
| Additional Inputs | Political system. |
| Teaching Aids used | Black board & chalk. |
| References cited | Academic text books |
| Student Activity Planned after the teaching | Assignment & seminars |
| Activity planned outside the class room, if any | notes |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ understanding Political system<br>→ Political system - organs & state<br>→ understanding over Economics - Micro and Macro concepts<br>→ Economic Growth and Development Various aspects of development |

V. Mulati

Signature of the Lecturer

**Teaching Plan / Lesson No. II** B.A - Unit - II

| | |
|---|---|
| Name of the Topic | Modern Economic Growth |
| Hours required | 5 |
| Learning Objectives | characteristics of Underdeveloped Countries. |
| Previous knowledge to be reminded | Economic Growth |
| Examples / Illustrations | Growth and development |
| Additional inputs | World Bank & IMF |
| Teaching Aids used | Black board & chalk |
| References cited | Academic text books |
| Student Activity Planned after the teaching | Assignment |
| Activity planned outside the class room, if any | notes |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ world Bank & IMF classification of Countries<br>→ Modern Economic growth<br>→ Kuznets six characteristics<br>→ obstacles to economic development |

V. ruhi

Signature of the Lecturer

**Teaching Plan / Lesson No.** II nd B.A Unit - II

| | |
|---|---|
| Name of the Topic | Vicious & Modern Economic Growth |
| Hours required | 10 |
| Learning Objectives | Vicious circle & Poverty and Cumulative causation. |
| Previous knowledge to be reminded | Economic development |
| Examples / Illustrations | Capital goods, Human Resources. |
| Additional inputs | Planning Commission of India. |
| Teaching Aids used | Black board & chalk. |
| References cited | Academic text books. |
| Student Activity Planned after the teaching | Seminars |
| Activity planned outside the class room, if any | Notes |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Factors of economic growth<br>→ Economic and non-economic<br>→ capital Formation<br>→ Foreign and Domestic capital<br>→ Debt and Disinvestment |

V. mulu

Signature of the Lecturer

**Teaching Plan / Lesson No. II B.A - unit - II**

| | |
|---|---|
| Name of the Topic | Life Insurance and Products |
| Hours required | 10. |
| Learning Objectives | Life Insurance - nature and Features |
| Previous knowledge to be reminded | Insurance Introduction |
| Examples / Illustrations | Insurance Companies |
| Additional inputs | Insurance services |
| Teaching Aids used | Black board & chalk. |
| References cited | Academic text books |
| Student Activity Planned after the teaching | Debate |
| Activity planned outside the class room, if any | notes. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Major life Insurance Companies in India.<br>→ Importance life Insurance Products<br>→ Features - conventional, unit linked, Annuities Group policies<br>→ medical Examiner |

V. mukta

Signature of the Lecturer

**Teaching Plan / Lesson No. 7C - III BA**

| | |
|---|---|
| Name of the Topic | Deposits loans and Digital Banking |
| Hours required | 10 Unit - II |
| Learning Objectives | Bank Deposit Account types. |
| Previous knowledge to be reminded | Account opening and closing |
| Examples / Illustrations | Bank customers |
| Additional inputs | KYC Norms |
| Teaching Aids used | black board & chalk |
| References cited | Academic text books |
| Student Activity Planned after the teaching | Quiz |
| Activity planned outside the class room, if any | Notes |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Negotiable Instruments - cheque Bill of Exchange, Promissory note Endorsement<br>→ Principles of Lending - Priority sector lending<br>→ E-Banking facilities :- Debit card, Net Banking, core Banking solutions |

V. mulu

Signature of the Lecturer

**Teaching Plan / Lesson No.** I B.A. Paper - II

| | |
|---|---|
| Name of the Topic | Money market |
| Hours required | 10 |
| Learning Objectives | Introduction of money market |
| Previous knowledge to be reminded | Financial markets |
| Examples / Illustrations | shares, debentures, |
| Additional inputs | bonds, mutual funds |
| Teaching Aids used | Black board & chalk |
| References cited | Academic text books |
| Student Activity Planned after the teaching | seminars |
| Activity planned outside the class room, if any | notes |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>- capital Market<br>→ capital Market - functions<br>→ " " - organizations<br>→ " " - elements<br>→ Debt market<br>→ Equity market and secondary market |

V. Murthy

Signature of the Lecturer

**Teaching Plan / Lesson No.** I B.A Paper-II

| | |
|---|---|
| Name of the Topic | Man in Society - UNIT - 1 |
| Hours required | 10 |
| Learning Objectives | Human Nature and life Engagement |
| Previous knowledge to be reminded | Human Nature. |
| Examples / Illustrations | Social eba Institutions. |
| Additional inputs | Social changes |
| Teaching Aids used | socialization Black board & chalk |
| References cited | Academic text books |
| Student Activity Planned after the teaching | study Project |
| Activity planned outside the class room, if any | notes |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ social Groups and social Dynamics<br>→ Individualism and collectivism<br>→ Ethical Concerns<br>→ Human life - Social Influence and social IMPact |

V. mallu

Signature of the Lecturer

**Teaching Plan / Lesson No.** I B.A. Paper-II

| | |
|---|---|
| Name of the Topic | Political Economy unit - IV |
| Hours required | 15 |
| Learning Objectives | → understanding political systems. |
| Previous knowledge to be reminded | social sciences. |
| Examples / Illustrations | Growth and development |
| Additional inputs | |
| Teaching Aids used | Black board & chalk. |
| References cited | Academic text book. |
| Student Activity Planned after the teaching | seminars |
| Activity planned outside the class room, if any | notes |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Political systems - organs of state<br>→ understanding over Economics Micro and macro concepts<br>→ Economic Growth and development various aspects of development |

V. Mukhi

Signature of the Lecturer

**Teaching Plan / Lesson No.** II B.A - Unit - III

| | |
|---|---|
| Name of the Topic | Theories of development & underdevelop ment |
| Hours required | 10 Hours |
| Learning Objectives | → Classical Theory<br>→ Adam smith Ricardo and malthus<br>→ Marxian Theory. |
| Previous knowledge to be reminded | Modern Economic Growth |
| Examples / Illustrations | · Labour of nation· |
| Additional inputs | Classical Economists |
| Teaching Aids used | Black board & chalk. |
| References cited | Academic text books |
| Student Activity Planned after the teaching | Group Discussion. |
| Activity planned outside the class room, if any | - |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Schumpeter Theory<br>→ Rostow's stages of Economic Growth<br>→ Harrod-Domar two sector Model<br>→ Solow's model and Robinson's Golden Age |

V. Mehta

Signature of the Lecturer

## Teaching Plan / Lesson No. II BA

| | |
|---|---|
| Name of the Topic | Strategies of Economic Development |
| Hours required | 12 Unit - IV & V |
| Learning Objectives | → Strategies of Economic Development<br>→ Big Push - Balanced & Unbalanced Growth |
| Previous knowledge to be reminded | Theories of development |
| Examples / Illustrations | Agriculture & Industry |
| Additional inputs | Capital intensive Technology. |
| Teaching Aids used | PPTs & Black board & chalk |
| References cited | Academic text books |
| Student Activity Planned after the teaching | Debat |
| Activity planned outside the class room, if any | notes |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ mahalanobis model - Agriculture vs Industry<br>→ Capital Intensive Technology vs labour Intensive Technology<br>→ Role of Infrastructure in Economic Develop<br>→ Institutions and Economic Development<br>→ Role of markets - Market Failure.<br>→ NITI Ayog - Economic Federalism<br>→ IDBI, IMF, FDIs. |

V. Mulati

Signature of the Lecturer

**Teaching Plan / Lesson No.** III BA - 7C

| | |
|---|---|
| Name of the Topic | Banking corresponents & common service |
| Hours required | 12 Unit - III & IV |
| Learning Objectives | → Banking correspondent model.<br>→ Activities of Banking correspondent<br>→ common services centre. |
| Previous knowledge to be reminded | Deposits loans and Digital. Banking |
| Examples / Illustrations | Common services centre |
| Additional inputs | EMI, micro Finance. |
| Teaching Aids used | Black board & chalk. |
| References cited | Academic text books |
| Student Activity Planned after the teaching | seminar |
| Activity planned outside the class room, if any | Notes. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ case study of Banking correspondents<br>→ Financial services of NBFIs<br>→ NBFIs - Types - Features - EMI<br>→ micro Finance - chit funds<br>→ Payment Banking<br>→ Regulations of NBFIs in India. |

V. Malathi

Signature of the Lecturer

**Teaching Plan / Lesson No. III BA -7C**

| | |
|---|---|
| Name of the Topic | Work with Finance service. |
| Hours required | 10 Unit - V |
| Learning Objectives | → Types of loans by FSC<br>→ Customer of FSC. |
| Previous knowledge to be reminded | Financial SERVICES of NBFIs |
| Examples / Illustrations | marketing of FSC |
| Additional inputs | FSC's local Area. |
| Teaching Aids used | Black board & chalk. |
| References cited | Academic text books. |
| Student Activity Planned after the teaching | Group Discussion. |
| Activity planned outside the class room, if any | Notes |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Types and Needs b FSC.<br>→ Procedures and Requirements in FSCs<br>→ Collection and Recovery of FSC loans<br>→ case study of a FSC's local Area |

V. Malathi

Signature of the Lecturer

**Teaching Plan / Lesson No.** III BA . 7C.

| | |
|---|---|
| Name of the Topic | Banking correspondents and common. |
| Hours required | 12 Unit – III & IV |
| Learning Objectives | → Banking correspondent model.<br>→ Activities of Banking correspondent<br>→ Deposit mobilization. |
| Previous knowledge to be reminded | Deposits and Digital Banking |
| Examples / Illustrations | :collection and Recovery loan. |
| Additional inputs | common service centre. |
| Teaching Aids used | Black board & chailk. |
| References cited | Academic text books. |
| Student Activity Planned after the teaching | Quiz |
| Activity planned outside the class room, if any | notes. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Requirement for Regestering CSC<br>→ case study of Banking correspondent<br>→ Financial seaces of NBFIS<br>→ Non Banking Financial Institutions<br>→ EMI, micro Finance, chit Funds<br>→ Regulations of NBFIs in India. |

V. malathi

Signature of the Lecturer

**Teaching Plan / Lesson No.** III B.A, F.C

| | |
|---|---|
| Name of the Topic | Work with Finance service company |
| Hours required | 12 Unit - V |
| Learning Objectives | → Types of loans by Finance service.<br>→ customer & FSC - Types and needs<br>→ marketing of FSC's loans |
| Previous knowledge to be reminded | Financial SERVICES & NBFIS |
| Examples / Illustrations | marketing & loans |
| Additional inputs | FSC in local Area. |
| Teaching Aids used | Black board & chalk. |
| References cited | Academic text books |
| Student Activity Planned after the teaching | Student seminar |
| Activity planned outside the class room, if any | notes. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Procedures and Requirements in FSC loan sanction.<br>→ collection and Recovery of FSC loans<br>→ case study of a FSC's services in local Area. |

V. Murthy

Signature of the Lecturer

**Teaching Plan / Lesson No.** I BA Mathematical Economics

| | |
|---|---|
| Name of the Topic | Sets and Functions. |
| Hours required | 15 |
| Learning Objectives | Role of mathematical methods in economics<br>sets types; operations |
| Previous knowledge to be reminded | Basics of mathematics |
| Examples / Illustrations | Functions |
| Additional inputs | Graphics |
| Teaching Aids used | Black board & chalk. |
| References cited | Academic text books |
| Student Activity Planned after the teaching | Notes. |
| Activity planned outside the class room, if any | Practice Problems. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Functions meaning types, Graphical.<br>→ Differential Calculus<br>→ limits of Functions<br>→ Derivative "<br>→ Optimization Problems<br>→ concept of optimization in mathematics<br>→ unconstrained & constrained optimization |

V. Ruhi

Signature of the Lecturer

**Teaching Plan / Lesson No.** mathematical Economics

| | |
|---|---|
| Name of the Topic | Integrations and Linear Programming |
| Hours required | 15 |
| Learning Objectives | Concept of integrations<br>Application of integration in Economics<br>Linear Programming |
| Previous knowledge to be reminded | Optimization in Economics |
| Examples / Illustrations | sets |
| Additional inputs | Inverse method. |
| Teaching Aids used | Black board & chalk |
| References cited | Academic text books |
| Student Activity Planned after the teaching | notes |
| Activity planned outside the class room, if any | Practice Problems. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>matrices and determinants and Applications in Economics<br>→ matrix concept<br>→ determinants Inverse matrix<br>→ crarer rule<br>→ matrix theory in Economics |

V. mulu

Signature of the Lecturer

**Teaching Plan / Lesson No.** IBA Micro Economics

| | |
|---|---|
| Name of the Topic | Introduction to Economics |
| Hours required | 35 |
| Learning Objectives | → Economic Activities and system<br>→ Fundamental Problems in Economics<br>→ meaning and scope of micro |
| Previous knowledge to be reminded | Introduction to Economics |
| Examples / Illustrations | Price demand |
| Additional inputs | supply, cost |
| Teaching Aids used | Black board & chalk. |
| References cited | Academic text books |
| Student Activity Planned after the teaching | Notes. |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Demand and consumption.<br>→ Production ~ Supply<br>→ Markets<br>→ Distribution. |

V. mlutes

Signature of the Lecturer

**Teaching Plan / Lesson No.** statistical Method

| | |
|---|---|
| Name of the Topic | Introduction to statistics |
| Hours required | 20 |
| Learning Objectives | → Definition, scope, importance and limitations of statistics<br>→ Primary and secondary data. |
| Previous knowledge to be reminded | Remembers and states in a systematic way |
| Examples / Illustrations | Population studies, marks. |
| Additional inputs | Examining the blood of a Patient |
| Teaching Aids used | Black board and chalk. |
| References cited | Academic text books. |
| Student Activity Planned after the teaching | Practice Problems. |
| Activity planned outside the class room, if any | Practice Problems. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Census and sampling techniques and their merits and demerits.<br>→ Diagrammatic Analysis<br>→ Schedule and questionnairs<br>→ Frequency distribution - Tabulation<br>→ Diagram and graphic Presentation.<br>→ Histogram, Polygram - Bar Diagrams |

V. muthu

Signature of the Lecturer

**Teaching Plan / Lesson No.** statistical methods

| | |
|---|---|
| Name of the Topic | Measures of central Tendency |
| Hours required | 20 |
| Learning Objectives | → Types of averages - Arithmetic mean<br>→ Median - mode - Dispersion.<br>→ Range, Deviation - coefficient of variation |
| Previous knowledge to be reminded | collection of data. |
| Examples / Illustrations | standard Deviation. |
| Additional inputs | Karl Perasson's correlation. |
| Teaching Aids used | Black board & chalk |
| References cited | Academic text books. |
| Student Activity Planned after the teaching | Practice Problems |
| Activity planned outside the class room, if any | notes. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Types of correlation - Karl Pearson's<br>→ Spearman " - Regression Equations<br>→ Utility of Regression - Demad Forecasting<br>→ Time series and index numbers<br>→ Definition, measurement of Time series.<br>→ Laspeyers Paasche's and Fisher's Index numbers. - uses and limitations. |

V. Mehta

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**Teaching Plan / Lesson No.** Economic development in India and A.P.

| | |
|---|---|
| Name of the Topic | Basic Characteristics of Indian Economy |
| Hours required | 20 |
| Learning Objectives | → objectives and achievements of planning<br>→ Planning commission.<br>→ India Rank in Global Human Development |
| Previous knowledge to be reminded | Economic development |
| Examples / Illustrations | Niti Aayog. |
| Additional inputs | Human Indese. |
| Teaching Aids used | Black board & chalk. |
| References cited | Academic text books |
| Student Activity Planned after the teaching | · Preparing of notes. |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ national income and Demography<br>→ occupational structure and unemploy<br>→ varies schemes of employment and eradication of poverty.<br>→ Intra-state and inter-state. labour migration. |

V. Mutis

Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Agricultural and industrial Development |
| Hours required | 20 |
| Learning Objectives | → Indian Agriculture – credit – Industry<br>→ Make in India – start-up and stand-up<br>→ SEZs and corridors – COVID. |
| Previous knowledge to be reminded | National income |
| Examples / Illustrations | Food security |
| Additional inputs | Industrial Policy. |
| Teaching Aids used | Black board & chalk. |
| References cited | Academic text books |
| Student Activity Planned after the teaching | notes. |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>→ Indian Public sector – centre, state<br>→ Public Expenditure – Fiscal Policy<br>→ Andhra Pradesh Economy<br>→ A.P economy after bifurcation in 2014.<br>→ The new initiatives & develop infrastructure. – Power and Transport. |

V. mulu

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# COMMISSONERATE OF COLLEGIATE EDUCATION,

# GOVT. DEGREE COLLEGE

## RAJAMPET, KADAPA. Dt.

(Affiliated to Yogi Vemana University, Kadapa.)

## TEACHING PLAN

ACADEMIC YEAR 20 -20

**Name of the Department** : Economics

**NAME OF THE LECTURER** : V. Malathi

**Course / Group** : BA (LHEP)

**Subject / Page** : ~~Paper~~ I, II, III Years.

| Sl.No. | Subject | Paper | Page No. |
|---|---|---|---|
| 1 | 1. Fundamentals of Social Science<br>2. Perspectives of Indian Society & Economy | | |
| 2 | Development Economics | | |
| 3 | 1. GC - Insurance services<br>2. TC - Banking & Financial Services | | |
| 4 | | | |

# COMMISSONERATE OF COLLEGIATE EDUCATION,

# GOVT. DEGREE COLLEGE

## RAJAMPET, KADAPA. Dt.

(Affiliated to Yogi Vemana University, Kadapa.)

## TEACHING PLAN

ACADEMIC YEAR 2023-2024

**Name of the Department** : PHYSICS

**NAME OF THE LECTURER** : Dr L RAJA MOHAN REDDY

**Course / Group** : B.Sc, MPC

**Subject / Page** : PHYSICS, Electronic Instrumentation Paper 7C
Modern Physics

| Sl.No. | Subject | Paper | Page No. |
|---|---|---|---|
| 1 | Electronic Instrumentation | 7C | |
| 2 | Modern Physics | V | |
| 3 | | | |
| 4 | | | |

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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Types of Electronic Instruments |
| Hours required | 02 hr |
| Learning Objectives | To understand the Instrumentation equipments |
| Previous knowledge to be reminded | Analog and Digital Conversion, Transducers. |
| Examples / Illustrations | Multimeter, Voltmeter, Ammeter etc |
| Additional inputs | CRO, Function Generators |
| Teaching Aids used | Board & chalk, PPT |
| References cited | Unified Physics. |
| Student Activity Planned after the teaching | To understand the difference between Analog and digital instruments |
| Activity planned outside the class room, if any | Doubt clarifications |
| Any other activity | To Conduct Seminar |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Instrumentation:- It is a technology of measurement which serves science, Engineering, medicine etc.<br>Measuring Instruments:- The device that is used for measurement of certain physical quantity.<br>Performance characteristics:- Accuracy, Resolution, Precision, Sensitivity, expected Value and error<br>Electronic Instrument:- It is the one of which is based on electronic or electrical Principles |

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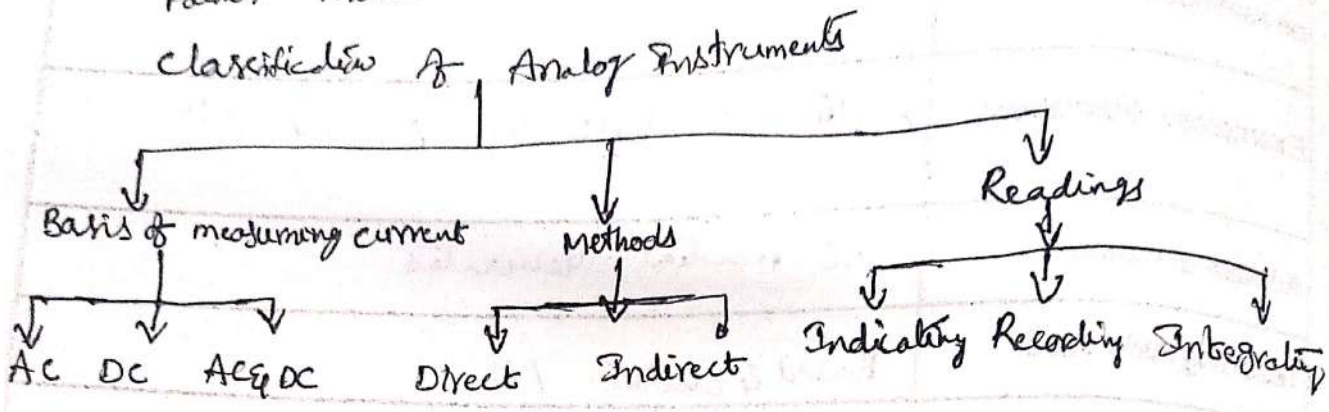
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For its measurement function

Types of Electronic Instrumentation → Analog Instruments
→ Digital Instruments

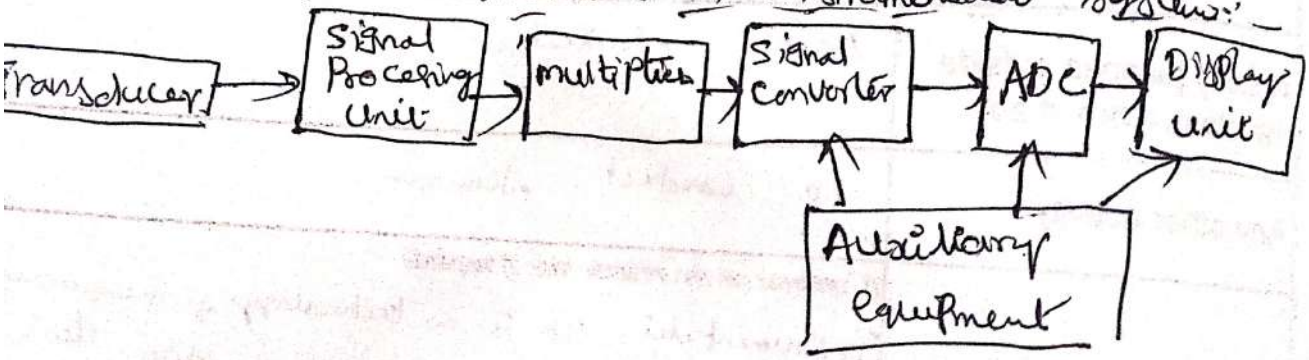
Analog Instruments - The instruments whose output is continous function of time. The instruments indicates the magnitude of the quantity in the form of AC Pointer movement

Classification of Analog Instruments



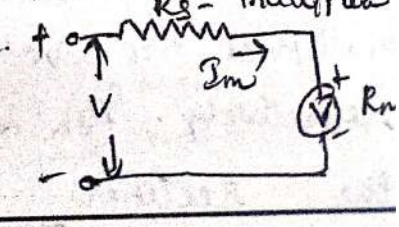

Digital Instruments - The instruments which represents the measured value in the form of digital number

Block diagram of digital Instrumentation system:-



## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | DC Voltmeter and AC Voltmeter |
| Hours required | To understand the construction and working principle of Voltmeter 02 |
| Learning Objectives | |
| Previous knowledge to be reminded | Conversion of Galvanometer into Voltmeter and Ammeter. Types of rectifiers. |
| Examples / Illustrations | Atmosphere current Solar energy |
| Additional inputs | Explanation about rectifiers and Inverters. |
| Teaching Aids used | Board & Chalk, PPT |
| References cited | Unified Physics |
| Student Activity Planned after the teaching | Conducting Assignments - Seminars |
| Activity planned outside the class room, if any | Doubt clarification |
| Any other activity | Demonstration in the lab |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Basic DC Voltmeter. A voltmeter is an instrument for measuring the electrical Potential difference between two points in a circuit. The resistance is generally to be connected in series with the basic meter movement to use it as a voltmeter. The series resistance is called as multiplier. |



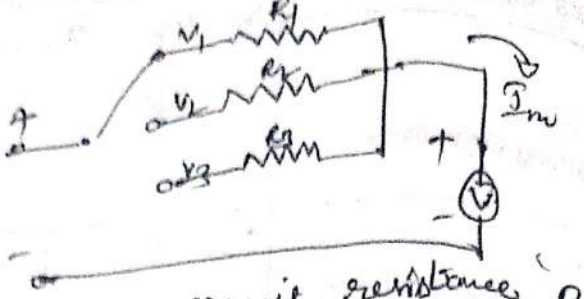

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$$R_S = \frac{V}{I_m} - R_m$$

where $R_S$ = multiplier resistance
$V$ = full range voltage of the instrument
$I_m$ = full scale deflection current of the movement
$R_m$ = Internal resistance of the movement

Multirange voltmeter:

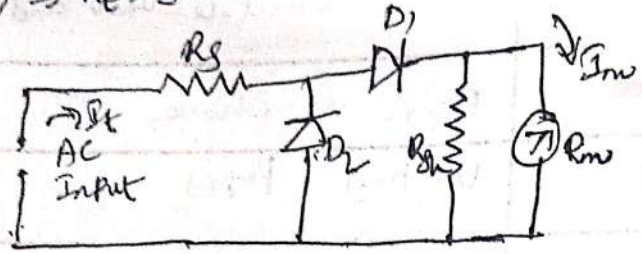



Sensitivity: Ratio of the total circuit resistance $R_t$ to the voltage range (or) The reciprocal of the full scale deflection current of the basic movement

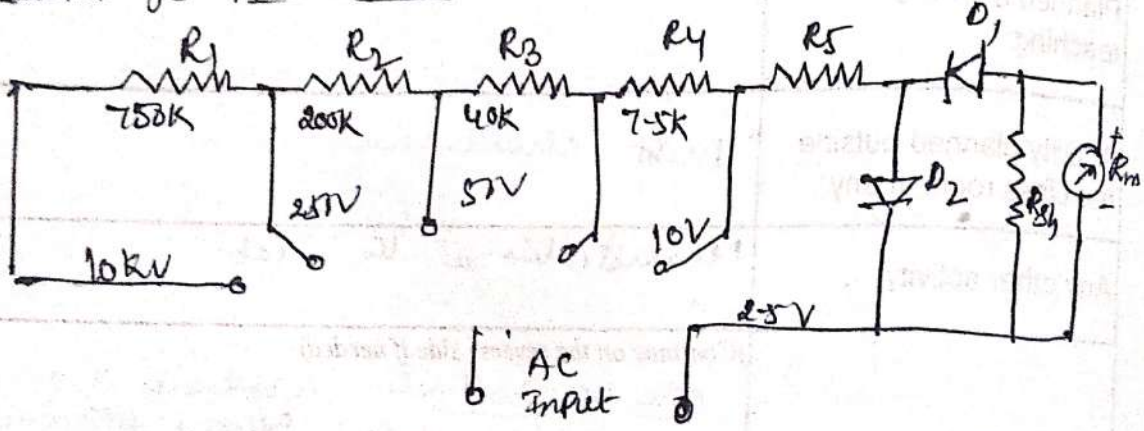
$$S = \frac{1}{I_{fsd}} \Omega/V$$

$$S = R_t/V \Rightarrow R_t = S \times V \Rightarrow R_S + R_m = S \times V \Rightarrow R_S = (S \times V) - R_m.$$

AC voltmeter:




Multirange AC voltmeter




It is a circuit for measuring ac voltages for different ranges. Resistances $R_1$, $R_3$, $R_3$ and $R_4$ form a chain of multipliers for voltage ranges of 1000V, 250V, 50V, and 10V respectively. $R_{sh}$ is the meter shunt and acts to improve the rectifier operation

## Teaching Plan / Lesson No.

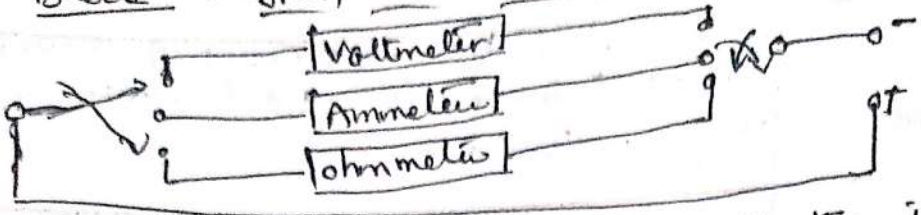
| | |
|---|---|
| Name of the Topic | Construction and Working of analog and digital Multimeter |
| Hours required | 05 |
| Learning Objectives | To understand the measurement of Voltage, Current, Testing of diode and transistor by using multimeter |
| Previous knowledge to be reminded | Shunt Resistance, multimeter |
| Examples / Illustrations | Different types of analog and digital multimeters. |
| Additional inputs | Testing of Diode, Transistors, Resistance measurement |
| Teaching Aids used | Board & chalk, PPT |
| References cited | Unified Physics |
| Student Activity Planned after the teaching. | Conducting Assignments & Seminars |
| Activity planned outside the class room, if any | Doubts Clarification |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Multimeter:- It is a device that can be used to measure multiple quantities on the basis of output measure representation, there are two types of multimeters<br>ⓐ Analog multimeter ⓑ Digital multimeter<br>Analog multimeter:- It works on the principle of D'Arsonal galvanometer. When a current is passed through its coil, the coil moves in a magnetic field produced by the permanent magnet. |

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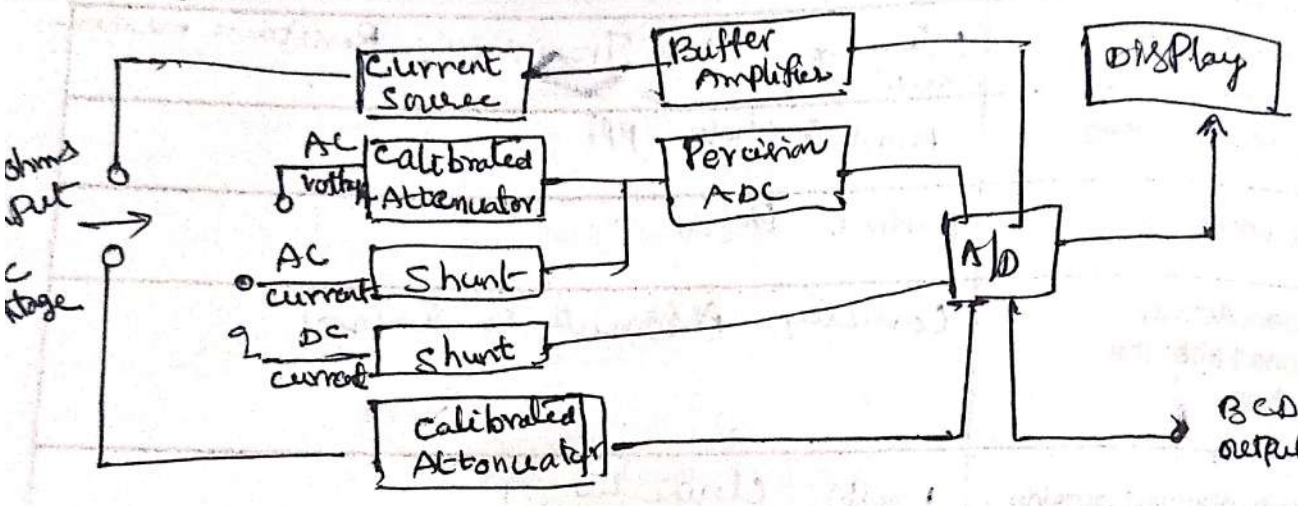
A typical analog multimeter can measure D.C voltage, A.C. voltage, D.C current, Resistance

Block diagram of Analog multimeter




Digital Multimeter:- A digital multimeter is a measuring instrument used to measure various electrical quantities like current, voltage, resistance, temperature, frequency, capacitance, continuity, transmitter gain etc

Block diagram of Digital multimeter




Steps for the use of digital multimeter

→ Turn the meter ON
→ Insert the Probes into the correct connecting Ports
→ Set the dial to the current measurement type and range for the measurement to be made
→ once the measurement is completed Place the Probes into the voltage measurement Ports and turn the range to maximum voltage

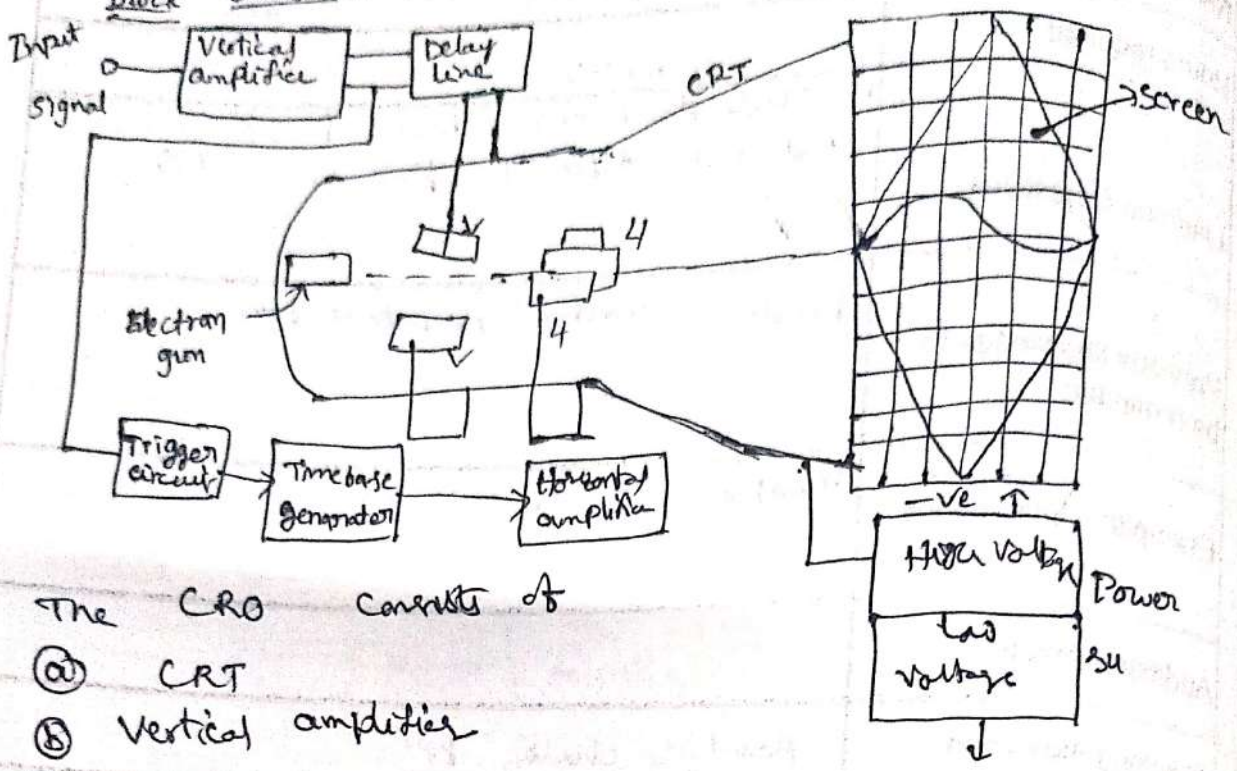
## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | CRO Introduction, Block diagram |
| Hours required | 2 hours |
| Learning Objectives | To understand the basic Principles of CRO and different Parts of CRO |
| Previous knowledge to be reminded | Frequency, Voltage, Amplitude, etc |
| Examples / Illustrations | measurement of frequency |
| Additional inputs | |
| Teaching Aids used | Board & chalk, PPT |
| References cited | Unified Physics. |
| Student Activity Planned after the teaching | Conducting Seminars & Assignments |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>CRO:- The device which allows the amplitude of Periodic or non-Periodic signals to be displayed Primarily as a function of time is called CRO. The CRO basically operates on voltages, but it is possible to convert current, Pressure, strain, acceleration and other Physical quantities into the voltage using Transducers and obtain their visual representation on the CRO |

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# Block diagram of CRO




The CRO consists of

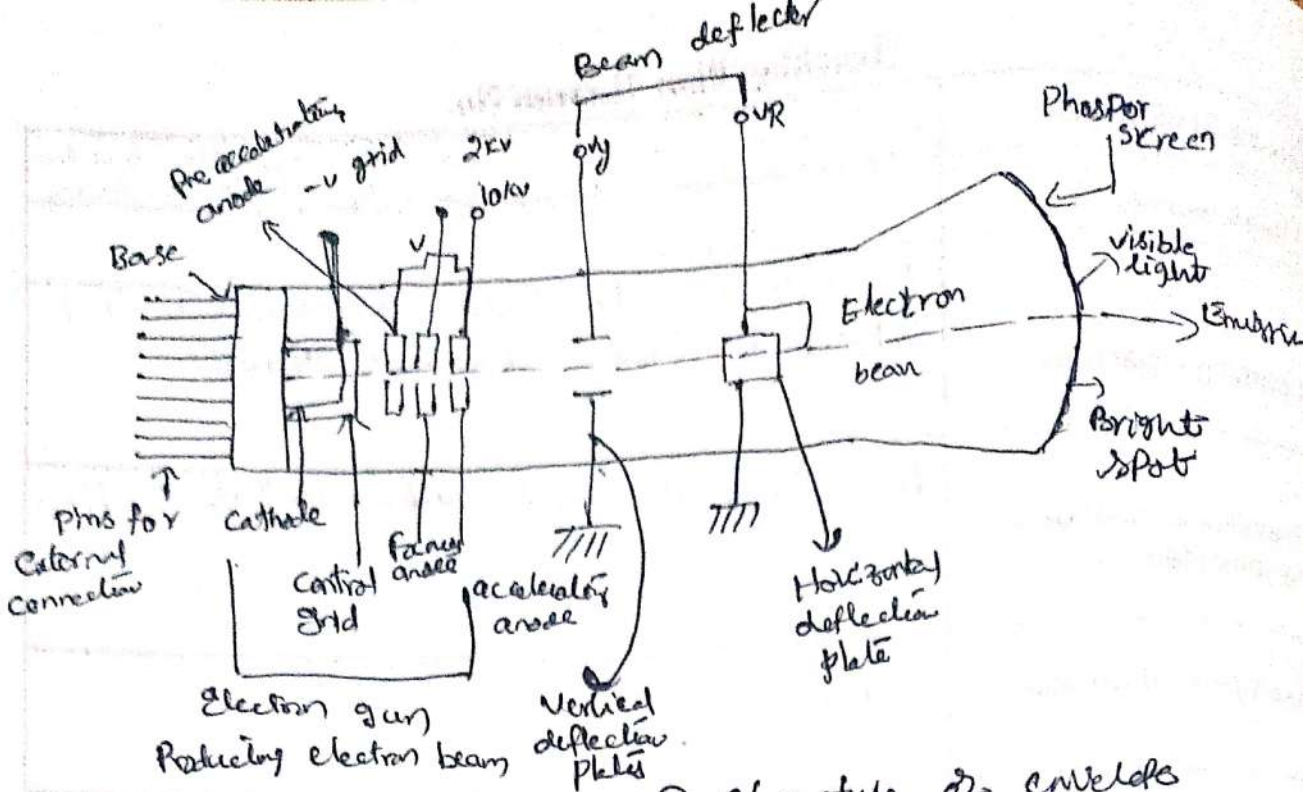
(a) CRT
(b) Vertical amplifier
(c) Delay line
(d) Horizontal amplifier
(e) Time base Generator
(f) Triggering circuit
(g) Power supply

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Cathode Ray tube Electron gun assembly time base operation Vertical & horizontal deflection system |
| Hours required | 5 hours |
| Learning Objectives | To understand the Cathode Ray tube, Vertical & horizontal system, time base operation. |
| Previous knowledge to be reminded | Production of electrons in different methods - X-ray plane |
| Examples / Illustrations | T.V. |
| Additional inputs | Function of TV |
| Teaching Aids used | Board & Chalk |
| References cited | Unified Physics |
| Student Activity Planned after the teaching | Conducting Assignments & Seminar |
| Activity planned outside the class room, if any | Doubts Clarification, Visit TV mechanic shop. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>CRT: Cathode Ray tube (CRT) is the heart of the CRO. The CRT generates the electron beam, accelerates the beam, deflects the beam and also has a screen where beam is becomes visibles as a spot.<br>The main parts of the CRT are<br>(a) Electron gun (b) deflection system |

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© Fluoresent Screen ⓓ Glass tube or envelope

ⓔ Base

Deflecting systems:- The deflection system of the cathode ray tube consist of two pairs of Parallel plates, referred to the Vertical and horizontal deflection Plates. one of the plate on each set is connected to Ground. The other Plate of ea set the external deflection voltage is applied through a internal adjustable gain approch stage.

The horizontal deflection (x) Produced will be Proportiona to the horizontal deflection voltage ($V_x$) applied to x-input

$x \propto V_x$ (or) $x = K_x V_x$

here $K_x$ is a Proportionality $K_x = x/V_x$ div/volt

ly/ Vertical deflection (Y) Produced will be the Proportional to the Vertical deflecting voltage $V_y$ applied to the y-inp

$y \propto V_y$ (or) $y = K_y V_y$

here $K_y$ = Vertical sensitivity

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Uses of CRO for the measurement of voltage (AC and DC), frequency and Phase difference |
| Hours required | 2 hour |
| Learning Objectives | To understand the measurement of voltages, frequency and Phase difference by using CRO |
| Previous knowledge to be reminded | definitation of voltage, frequency and Phase difference |
| Examples / Illustrations | Sine Wave, Square Wave etc |
| Additional inputs | |
| Teaching Aids used | PPT, CRO, Board & Chalk |
| References cited | Unified physics text Book |
| Student Activity Planned after the teaching | conducting Assignments & Seminars |
| Activity planned outside the class room, if any | Hands on Experiments |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* The device which allows the amplitude of Periodic or non-Periodic signals to be displayed Primarily as a function of time is called CRO. The CRO basically operates on voltages, but it is possible to convert current, Pressure, Strain, acceleration and other physical quantities into voltage using transducers and obtain their visual representations on the CRO |

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## Voltage measurement:

Peak to Peak voltage = (no. of divisions) × (volt/division)

The amplitude $V_m = \frac{V_{pp}}{2}$

The RMS value of sinusoidal wave

$V_{rms} = \frac{V_m}{\sqrt{2}} = \frac{V_{pp}}{2\sqrt{2}}$ only for sinusoidal signals.

## Current measurement:-

current $I = \frac{V_{measured\ on\ CRO}}{R}$

## Period & frequency measurement:

Time Period T = (No. of divisions occupied by 1 cycle) × (time/division) sec

Frequency $f = \frac{1}{T}$ Hz

## Applications of CRO:-

(a) measurement of ac/dc voltages
(b) Finding B/H curves for hysteresis loop
(c) For engine Pressure analysis
(d) For study of stress, strain, torque, accelerations etc
(e) frequency and phase determination by using Lissajous figure
(f) Radiation Pattern of antenna
(g) Amplifier Gain
(h) Modulation Percentage

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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Classification of transducers. Selection of transducers |
| Hours required | 3 hours. |
| Learning Objectives | To understand transducers and types of transducers and their selection |
| Previous knowledge to be reminded | Different types of Energies. |
| Examples / Illustrations | Laptops. Mobile Phones |
| Additional inputs | |
| Teaching Aids used | Board & Chalk, PPT |
| References cited | Unified Physics Text Book |
| Student Activity Planned after the teaching | Conducting Assignments & Seminars |
| Activity planned outside the class room, if any | Doubts clarification |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>The non electrical quantities is converted to an electrical signal by a device called transducer. There are two types of transducers active and Passive transducers<br>The active or self generating transducers convert energy directly from one state to another without an external Power supply |

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A Passive transducers does not convert energy directly, but derives the required for energy conversion from an external source

Transducers

Active
- (a) Thermo couple
- (b) Moving coil generator
- (c) Photovoltaic cells
- (d) Piezo electric pickup

Passive
- (a) Potentiometer
- (b) Resistance thermometer
- (c) Strain guage
- (d) Photo conductive cell
- (e) Thermistor
- (f) Resistance hygrometer
- (g) Capacitor transducers
- (h) Dielectric transducers etc

## Basic requirements of transducers

- (a) Range
- (b) Accuracy
- (c) Reliability
- (d) Sensitivity
- (e) Environmental effects
- (f) Noise
- (g) Loading effect
- (h) Output impedance
- (i) Power requirements
- (j) Frequency response
- (k) Linearity
- (l) Ruggedness

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# Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Resistive, Capacitive & Inductive transducers |
| Hours required | To understand the Resistive and Capacitive Inductive transducers |
| Learning Objectives | Resistance, Capacitance, Inductance |
| Previous knowledge to be reminded | Radio, TV, Fans |
| Examples / Illustrations | LDR, Mobile Touch |
| Additional inputs | Board & Chalk, PPT |
| Teaching Aids used | Unified text book, Fundamentals of electronics by Subramanyam |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | Doubts Clarification |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Resistive transducer:- Resistive element is used to measure several non-electrical quantities<br>$R = \frac{\rho A}{l}$<br>ex① Potentiometer (POT):- It is a Passive transducer with a thin wire of Pt-Ni alloy<br>② Resistance thermometer:- It is a Primary electrical transducer used for measuring temperature change in terms of resistance changes<br>$R_t = R_0(1+\alpha t)$ |

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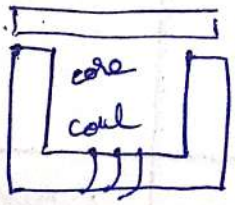
(c) Thermistor:- Thermistor is a resistive transducer whose resistivity depends upon surrounding temperature. The term thermistor is a combination of thermal and resistor. There are two types of thermistor NTC & PTC

Capacitive transducer:- The transducer whose capacitance change w.r.t change in input parameter is is capacitive transducer

$$C = A\frac{\varepsilon_0 \varepsilon_r}{d} = A\frac{\varepsilon}{d}$$

(a) Variable Area capacitive transducer
(b) Variable distance between two plates
(c) Variable dielectric constant capacitive transducer

Inductive transducer:- The transducer whose inductance changes w.r.to change is input parameter is known as inductive transducer. The inductance of a coil depends on the magnetic flux linking with it. A change in the inductance proportional to the quantity to be measured is obtained by changing the flux linkage



## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | LVDT, Piezoelectric Transducers. |
| Hours required | 2 hours |
| Learning Objectives | To understand the working Principle of LVDT and Piezoelectric Transducer |
| Previous knowledge to be reminded | Induction, Piezoelectric effect, force, |
| Examples / Illustrations | Crystals |
| Additional inputs | |
| Teaching Aids used | Board, Chalk, PPT |
| References cited | Unified physics text book. Introduction to electronics by Millman and Halkias |
| Student Activity Planned after the teaching | Conducting Assignment and Seminars |
| Activity planned outside the class room, if any | Drafts, Quadrides |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Linear Variable differential Transformer (LVDT)<br>. It converts linear displacement into an electrical signal<br>. It works on the Principle of mutual Inductance.<br>to the flux of the Primary winding is induced to the secondary winding<br>. The change in output voltage is directly Proportional to the displacement of the core. |

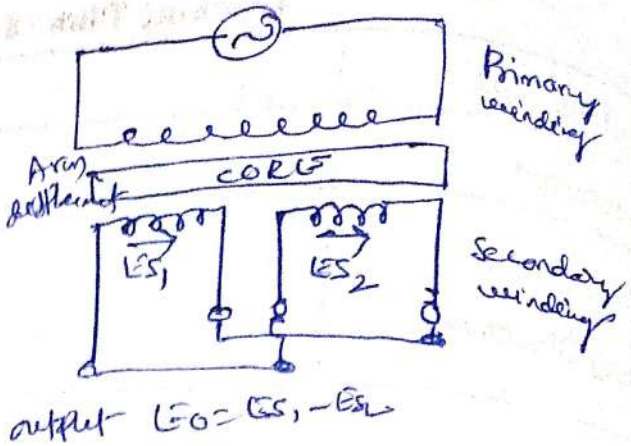
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(i) $E_{S_1} > E_{S_2}$, $E_0$ is +ve
So $E_0$ is in phase with the Primary voltage

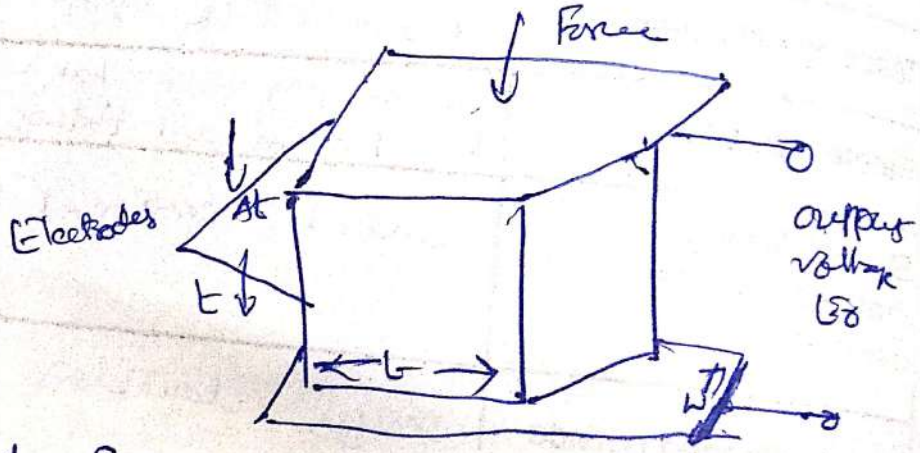
(ii) $E_{S_1} < E_{S_2}$, $E_0$ is -ve.
The output voltage $E_0$ is 180° out of phase with the Primary winding

(iii) $E_0 = E_{S_1} - E_{S_2} = 0$.




## Piezoelectric Transducers:-

- A Piezoelectric transducer is a device which can convert mechanical energy like force or pressure into an electrical energy
- It uses Piezoelectric effect for the generation of electric charge




- If F is applied force and Q is the charge developed due to it. Then Q ∝ F

$$Q = dF$$

here 'd' is known as Piezoelectric coefficient of the material

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Resistive and capacitive touch screen transducers used in mobiles |
| Hours required | 2 hours |
| Learning Objectives | To understand the Resistive and capacitive touch sensors |
| Previous knowledge to be reminded | Resistance, Capacitance, Resistive transducers and capacitive transducers |
| Examples / Illustrations | Mobiles, Laptops, LCD etc. |
| Additional inputs | |
| Teaching Aids used | Board, Chalk, PPT |
| References cited | Unified text book |
| Student Activity Planned after the Teaching | Conducting seminars and Assignments |
| Activity planned outside the class room, if any | Doubts clarifications |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* Touch sensors - Touch sensors are also called as tactile sensors. and are sensitive to touch forces or pressure, when there is contact with the surface of the touch sensor the circuit is closed inside the sensor and there is a flow of current when the contact is released the circuit is opened and no current flows |

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Capacitive touch sensors: Capacitive touch sensors widely used for mobile phones and MP3 players

$C = \varepsilon_0 \varepsilon_r A/d$.

Capacitance is directively proportional to the area and inversely proportional to the distance

If the area of the sensor electrode is bigger and the thickness of the cover material is less the touch capacitance is also big. So the capacitance difference between touched Pad and Untouched sensor Pad is also big.

There are two types of touch sensors. Surface Capacitive sensing and Projected capacitive sensing

Resistive touch sensors:-

The resistive touch ~~sensor~~ screen mainly two layers a flexible top layer and a rigid bottom layer. The flexible upper layer is made with Polyethylene and the second layer is with glass.

A Conductive coating made up of Indium Tin oxide (ITO) is provided for both the layers and also spaces are used for spacing.

The resistive touch screen transmits only 75% of light from the display monitor. The resistive touch screen furthermore split into 4 wired, 5 wired, 6 wired, 7 wired and 8 wired resistive touch screen

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Introduction to display decode seven segment |
| Hours required | 2 hours. |
| Learning Objectives | To understand the seven segment Display |
| Previous knowledge to be reminded | BCD, Binary numbers |
| Examples / Illustrations | Traffic Signals, Wall clocks etc. |
| Additional inputs | |
| Teaching Aids used | Board & chalk, PPT |
| References cited | Unified text book. |
| Student Activity Planned after the teaching | visiting Traffic Signals. |
| Activity planned outside the class room, if any | Conduct Seminars & Assignments |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Display devices Provide a required display of numbers letters and symbols in response to an electrical input. Display devices constitute the interface between the human observer and the instrument<br>Display devices can be decided into two categories<br>(a) Analog display devices<br>(b) Digital display devices |

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Seven Segment Displays:- The Segmental displays may be either 7-Segment or 14-Segment depending upon whether numeric or alpha numeric.

The 7-Segment displays are Seven LEDS lined up in a particular Pattern. In fig. the number 8 shape is shown. Each of the seven LED's is called a Segment forms Part of numerical digit to be displayed

7-Segment format

The Segmental displays may be either 7 or 14 segments ones depending upon whether numeric or alpha numeric displays are segments

Seven Signents are two types.

(a) Common anode SSD

(b) Common Cathode SSD

In Common Cathode type Connection all Cathodes are shoted to a Common terminal. Each LED will be activated by the +ve voltage w.r.t Common Cathode terminal.

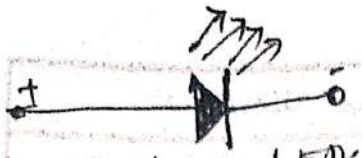
In common anode type displays require an activated by a -ve voltage w.r.t Common anode terminal.

## Teaching Plan / Lesson No.

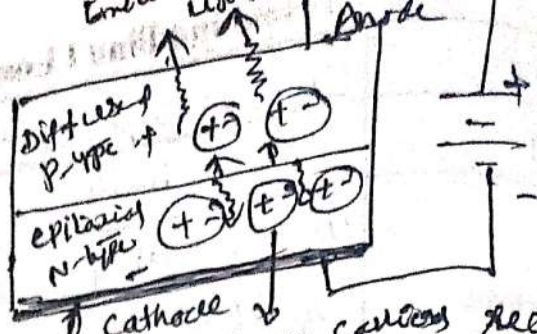
| | |
|---|---|
| Name of the Topic | LED Displays Construction and Operation. |
| Hours required | 3 hours. |
| Learning Objectives | To understand the construction and operation of LED. |
| Previous knowledge to be reminded | Binary numbers, Seven Segment display, Semiconductor Photoelectric effect |
| Examples / Illustrations | Photo cells, Traffic Signals |
| Additional inputs | |
| Teaching Aids used | Board, Chalk, PPT |
| References cited | Unified text book, Jaya Prakash Publications |
| Student Activity Planned after the teaching | Conducting Seminars and Assignments. |
| Activity planned outside the class room, if any | Doubts clarifications |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>LED:- Light Emitting diode is a special type of semiconductor P-N Junction. Under forward biased conditions it can emit external spontaneous radiation in UV, VIS and IR regions of electromagnetic spectrum. It depends on the type of the semiconductor material used for their construction |

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Symbol of LED.




Charge carriers Recombination

The Semiconductor materials used is a direct bandgap material

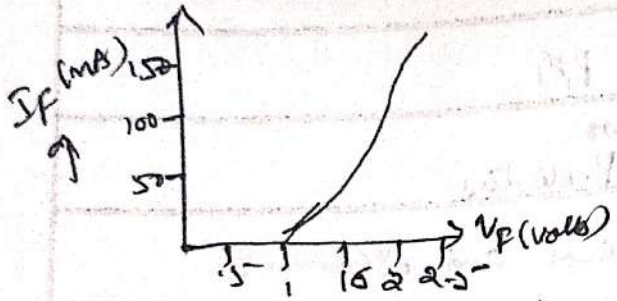
Gallium Arsenide (GaAs) Gallium Arsenide Phosphide (GaAsP)

Gallium Phosphide (GaP)

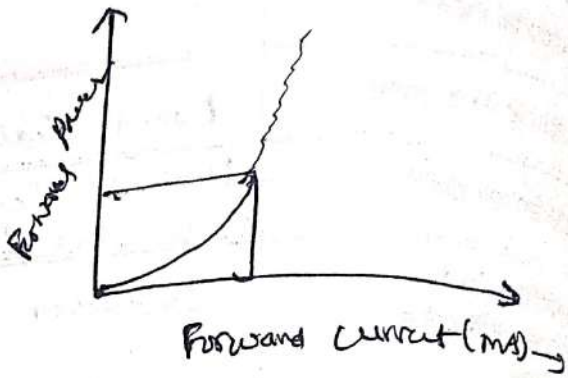
(a) GaAs: Infrared Radiation (Invisible)

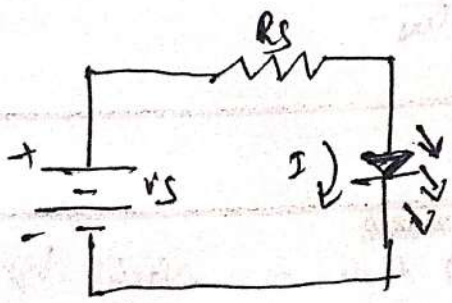
(b) GaP: Red or Green light (Visible)

(c) GaAsP: Red or Yellow light (Visible)




Forward bias characteristics







$$I = \frac{V_S - V_D}{R_S}$$

$$R_S = \frac{(V_{out})_{peak} - V_F}{I_F}$$

here $(V_{out})_{peak}$ = Peak output voltage

$V_F$ = LED voltage drop

$I_F$ = LED current

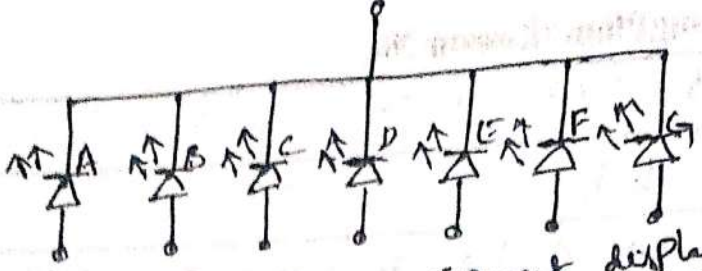
$I$ = current through LED

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Types of SSDS, limitations of SSDS. |
| Hours required | 4 hours. |
| Learning Objectives | To understand the limitations and different types of SSDS |
| Previous knowledge to be reminded | SSDS, LED |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | Board, chalk |
| References cited | Jaya Prakash Publications Unified Physics |
| Student Activity Planned after the teaching | Conducting Seminars and Assignments |
| Activity planned outside the class room, if any | Doubts clarifications |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Types of SSDS: There are two types of SSDS<br>(a) common cathode (b) common Anode<br>Common cathode seven segment display<br>In this display all the cathode pin are connected together to ground or logic 0. the other anode pin is taken out and are given high or logic 1 signal to illuminate the particular LED segment from a to g. The diagram shown below is for the common cathode seven segment display. |

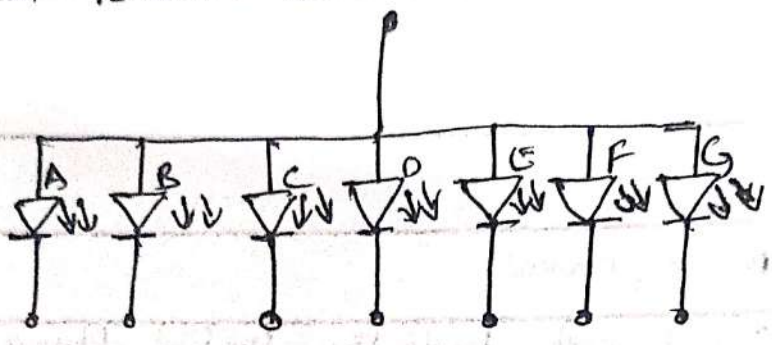
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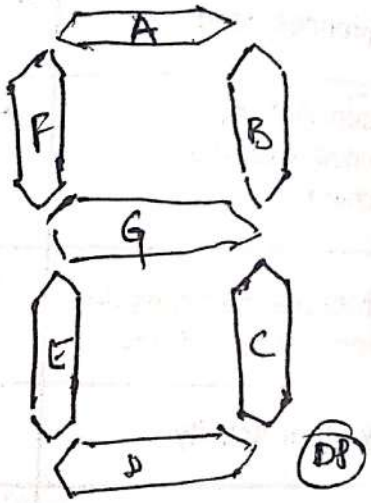



Common Anode Seven Segment display

In common anode display all the anode pins are connected together to high Pin Ground or logic 0. The other cathode pins is taken out and are given high or Logic 1 signal to illuminate the particular LED segment from a to g. The diagram shown below is for the common anode SSD-



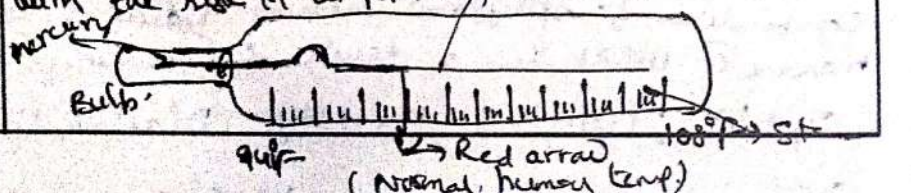

Here is the Picture of the SSD. LEDS from A to G and one dot Point as 'DP'. If we display '0' on the Seven Segment then you have illuminate LED's A, B, C, D, E and F. similarly if you wish to display 5 then you will illuminate LEDS A F G C and D




| Numerals | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 2 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| 3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| 4 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| 5 | 1 | 0 | 1 | 1 | 0 | 1 | 1 |
| 6 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| 7 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 8 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 9 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |

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# Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Basic Operating Principles and uses of Clinical thermometer, stethescope, sphygmomanometer |
| Hours required | 4 hours. |
| Learning Objectives | To understand the Principle of clinical thermometer, stethescope etc |
| Previous knowledge to be reminded | Temperature, B.P. |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | Board & chalk, PPT |
| References cited | Unified text book, Jaya Prakash Publications |
| Student Activity Planned after the teaching | Conducting Assignments & Seminars |
| Activity planned outside the class room, if any | Doubts clarification |
| Any other activity | visiting hospitals |
| Topic Synopsis, | (Continue on the reverse side if needed)<br>Clinical thermometer: It is used to measure the temperature of animal body<br>Types of thermometers: (A) mercury thermometer (B) digital thermometer (C) strip-type thermometer (D) Infrared thermometer<br>(A) Mercury clinical thermometer:- mercury expands with the rise in temperature, uniform glass capillary tube<br>  <br> |

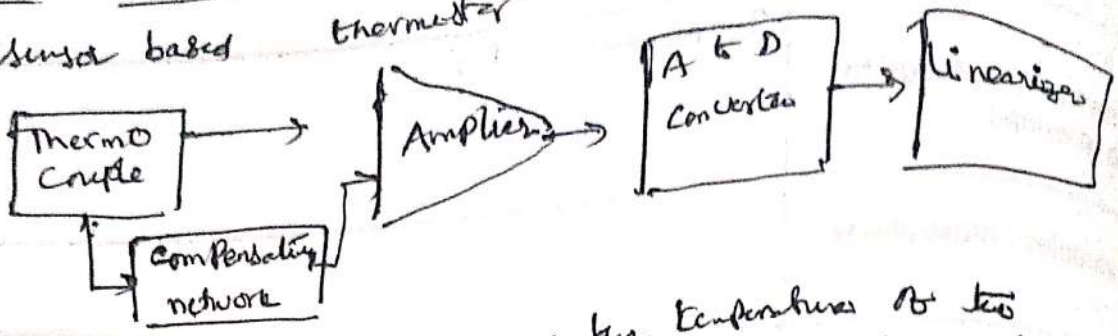
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$^{\circ}C = (F-32)/1.8$

Advantages:- (a) mercury is a good conductor
(b) mercury is opaque and shine
(c) mercury does not stick to glass tube
(d) mercury is uniform expansion.

Digital thermometer:- An electronic clinical thermometer uses a sensor based thermistor

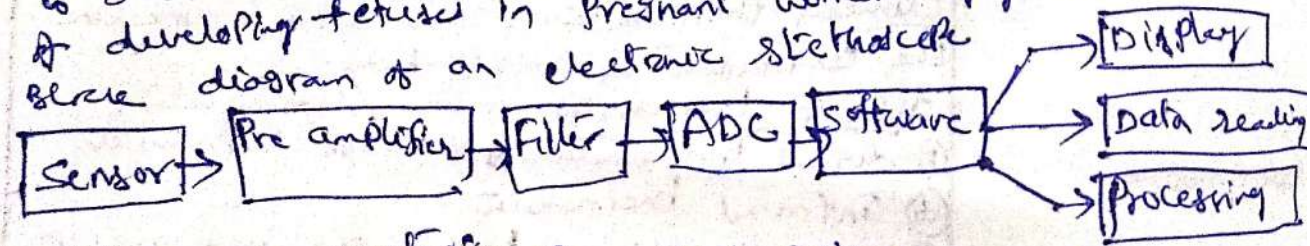



The thermocouple measure the temperature of the human body. It produces proportional thermoelectric emf (voltage) in response to the change in temperature from ambient to human body.

Strip type thermometer:- A strip thermometer contains heat sensitive liquid crystals in a plastic strip. Temperature change affects the colours of a liquid crystals.

Infrared thermometer:- An infrared thermometer is also known as non-contact thermometer or temperature guns or laser thermometers. They measures a temperature from a portion of the thermal radiation emitted by the human body.

Stethoscope:- It is used primarily to listen to sounds of lungs, heart and intestinal tract. It is also used to listen to blood flow in peripheral vessels and the heart sounds of developing fetuses in pregnant women. Fig shows the block diagram of an electronic stethoscope




Sphygmomanometer:- The word sphygmomanometer is a combination of sphygmos meaning beating of the heart or pulse manometer which is a device for measuring pressure or tension.

Systolic: 110-120 mm of Hg Diastolic: 65-80 mm Hg

Capillaries: 20-30 mm Hg Veins: 0-20 mm Hg

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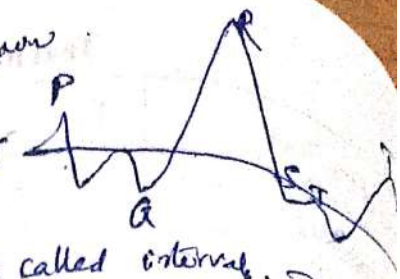
## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | ECG & Ultrasound Scanning |
| Hours required | 3 hours. |
| Learning Objectives | To Understand the ECG & Ultrasound Scanning |
| Previous knowledge to be reminded | Ultrasonics. |
| Examples / Illustrations | Human ECG, Pregnant lady Scanning |
| Additional inputs | |
| Teaching Aids used | Board, chalk, PPT |
| References cited | Medical Physics Text Book, Jaya Prakash Publications |
| Student Activity Planned after the Teaching | Conducting Seminars & Assignments |
| Activity planned outside the class room, if any | Visiting Medical hospitals & Labs. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>ECG: It is defined as the recording of electrical actives of heart on a Graph Paper. The Graph on which the electrical activity is recorded is called electrocardiogram. Depolarization is the electrical changes that take place due to contraction of any muscle. These changes can be detected by electrodes attached on specific locations on the surface of the body. Three types of ECG machine.<br>(a) Single channel ECG (One lead trace at a time)<br>(b) Three channel ECG (three leads at a time)<br>(c) Twelve channel ECG (twelve leads simultaneously) |

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The basic Pattern of the ECG is shown in fig. As shown in fig the Pattern comprises of three waves named P, Q R S (a wave complex) and T. The time between two specific ECG events is called interval. The interv commonly measured on an ECG include the PR interval, QRS interval, QT interval and TR interval.




Uses of ECG:

(a) Heart rate (b) Rhythm (c) Cardiac axes

(d) It is a diagnostic tool for various hearts conditions like heart blockage of artery in heart or Pace makers acti

(e) ECG is a recording electrical activity and not the Mechanical function of heart.

Ultrasound Scanning:-

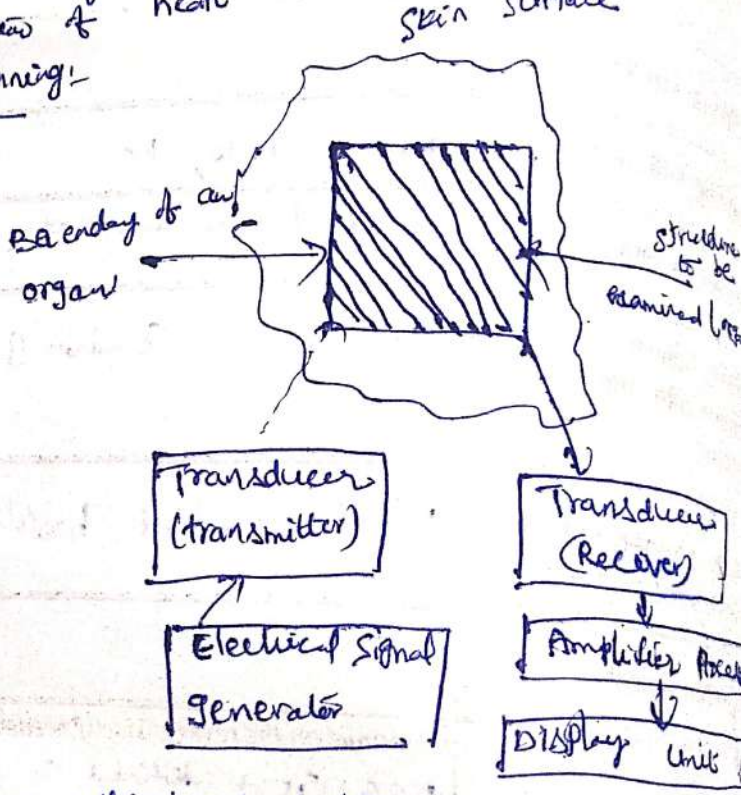
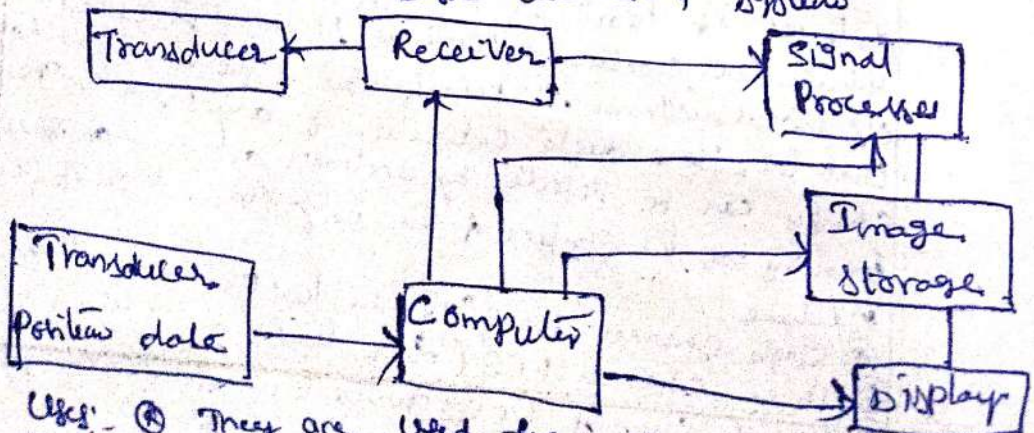



fig: Basic ultrasound systems.




Uses:- (a) They are used for imaging of the abdomen, pelvis. Fetus, vascular system, breasts, chest etc.

(b) Ultrasound-guided interventions are used to facilitate

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Pulse oxymeter & Glucometer |
| Hours required | 3 hours |
| Learning Objectives | To understand the working function of Pulse oxymeter and Glucometers. |
| Previous knowledge to be reminded | Pulse range & Sugar levels of human body |
| Examples / Illustrations | Before Fasting & After fasting Sugar levels. & Pulse range of human body |
| Additional inputs | |
| Teaching Aids used | Board, Chalk, PPT |
| References cited | Chithra & Jaya Prakash Publications. |
| Student Activity planned after the teaching | Conducting Seminars and Assignments |
| Activity planned outside class room, if any | Doubt clarifications, visit to Hospital and clinic labs. |
| Any other activity | |
| Basic Synopsis | *(Continue on the reverse side if needed)*<br>Pulse oximeter:- A Pulse oximeter is a device which uses light beam to estimate the oxygen saturation of the blood and the Pulse rate. The test is now invasive. ie the amount of oxygen in blood is estimate without drawing a blood sample. There are three types of Pulse oxymeters.<br>ⓐ Fingertip ⓑ hand held ⓒ Fetal Pulse.<br>The most oxymeters show two or three numbers. The most important number is oxygen saturation level abbrivated as $SpO_2$. The Pulse rate is abbreviated as PP. The third number is for strength of the signal. |

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oxygen saturation are between 95% to 100%. For healthy individuals. It can be lower in people using long Pulse

Principle:

(a) Haemoglobin (Hb) and oxygenated hemoglobin ($HbO_2$) differ in their absorption of red and infrared light.

(b) The volume of arterial blood in tissue and as such the light absorption by the hemoglobin changes during the Pulse. The relation of red and infrared signal amplitude can be directly related to arterial oxygen saturation by the relation

$$\% \text{ oxygen saturation} = \frac{c(HbO_2)}{c(HbO_2)+c(Hb)} \times 100$$

here $c(HbO_2)$ is the concentration of oxygenated haemoglobin $C(Hb)$ is concentration of de oxygenated haemoglobin.

Uses:- (a) To assess of deoxygenerates haemoglobin

(b) To monitor oxygen levels during & after surgery

(c) To assess a Persons ability to tolerate increased physical activity.

Glucometer:- A blood Glucometer is a small, Portable machine that is used to measure how much glucose is in the blood

The three Principle enzymatic reactions used by Glucometer are

(a) Glucose oxidate (b) Glucose dehydrogenase (c) hexokinase

Uses:- Glucometers are widely used in hospitals, out Patient dept emergency rooms, ambulances and home self-monitoring.

Glucometer have two essential Parts.

(a) A test-strip where enzymatic reaction takes Place

(b) A detector

In each strip there is an enzyme called glucose oxide. These enzyme reacts with the glucose in the blood sample and creates an acid called gluconic acid then reacts with another chemical in the testing strip called ferricyanide. The ferricyanide and the gluconic acid, then combine to create ferrocyanide.

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# COMMISSONERATE OF COLLEGIATE EDUCATION,

# GOVT. DEGREE COLLEGE

## RAJAMPET, KADAPA. Dt.

(Affiliated to Yogi Vemana University, Kadapa.)

## TEACHING PLAN

ACADEMIC YEAR 2023-2024

**Name of the Department** : Zoology

**NAME OF THE LECTURER** : Dr. N. Chandra Mohan

**Course / Group** : I Sem & III Sem.

**Subject / Page** : Zoology.

| Sl.No. | Subject | Paper | Page No. |
|---|---|---|---|
| 1 | Zoology - I | Sem-I-Paper-I | |
| 2 | Zoology - III | Paper - III | |
| 3 | Zoology - Sem - IV | Paper - IV | |
| 4 | Zoolog - Sem - VI | Papa - III | |

I Sem.

# Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Systematics & Nomenclature, Ecosystem & Pollution. |
| Hours required | 06 Hrs. |
| Learning Objectives | - To Know the Importance of Nomenclature<br>- To Know the Concept of Systematics<br>- To Know the Types & importance of Ecosystem<br>- To Know the Pollutants & Air Pollution. Causes. |
| Previous knowledge to be reminded | - Systematics Classification<br>- Nomenclature<br>- Food Chain, Food web, Ecological Pyramids,<br>- Ecosystem Pollution. |
| Examples / Illustrations | - Binomial & Trinomial nomenclature<br>- Producers, consumers,<br>- Aquatic ecosystem. Pollutants. |
| Additional inputs | Importance of Nomenclature, Functions of Ecosystem, Ecological Balance, Preventive measures Pollution & Types |
| Teaching Aids used | Chalk & Board, |
| References cited | A Text Book of Botany. |
| Student Activity Planned after the teaching | Students write the imp points. |
| Activity planned outside the class room, if any | students prepare the notes. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Systematics.<br>Nomenclature<br>– Binomial<br>– Trinomial. |

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Ecosystem – Producers, Consumers, Decomposers

Aquatic, Terrestrial – Grassland, Mountain, Desert, Cropland, Forest, Desert

Natural – Artificial, – Urban (Agriculture)

Air pollution. Pollutants, Name & formula.

$CO$, $CO_2$, $SO_2$, $NO_2$

Greenhouse effect, Acid Rain

$O_3$. Acid rain, gas.

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Classification of Kingdom Animalia of Chordata, Basic of organ systems of their functions & Spermatogenesis. |
| Hours required | 06 Sep. |
| Learning Objectives | - To know the classification of Kingdom Animalia of Chordata<br>- To know the organ systems & their functions.<br>- To know the formation of Spermatogenesis. |
| Previous knowledge to be reminded | - Five Kingdom classification.<br>- Chordata & Non Chordata<br>- Names of organ systems.<br>- Hormones, Cancer. |
| Examples / Illustrations | - Human Kingdom & Five Kingdom classification.<br>- Chordates Vs Non-chordates.<br>- organ systems in humans. Sperm & Ovum. |
| Additional inputs | - Five Kingdom classification<br>- Difference between Chordate & Non chordate. |
| Teaching Aids used | - Chalk & Board, PPT |
| References cited | - A Text Book of Animal Physiology - Rastogi publications.<br>- A text Book of Embryology - Saran publications. |
| Student Activity Planned after the teaching | Student writing the key points |
| Activity planned outside the class room, if any | Student preparing the table. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Classification of Kingdom Animalia<br>Sub Kingdom<br>Protozoa, Parazoa, Gametogenesis<br>Spermatogenesis, Oogenesis<br>Division<br>Mitosis, Meiosis<br>Prophase, Metaphase, Anaphase, Telophase<br>Sub Division, Acraniata, Hemichordata, Schizocoelomata, Enterocoelomata |

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Classification of Chordata

subphylum
- Urochordata
  - class
    - Ascidiacea
    - Thaliacea
    - Larvacea
- Cephalochordata
  - Cephalochordi
- Vertebrata

Superclass
- Agnatha
  - class
    - Ostracodermi
    - Cyclostomata
- Gnathostomata
  - Pisces, Chondrichthyes, Osteichthyes, Amphibians, Reptiles, Birds & mammals.

organ System
- Digestive system
- Respiratory system
- Circulatory System
- Muscular system
- Nervous system
- Endocrine system
- Lymphatic System
- Excretory system
- Reproductive system
- Skeletal system
-

Spermatogenesis — formation of Sperms - Spermatogenesis.

Multiplication phase
Growth phase
Maturation phase

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Oogenesis, Pituitary hormones, Thyroid & Parathyroid hormones, Adrenal gland, Pancreas & Gonads |
| Hours required | 05 Hrs. |
| Learning Objectives | - To know the process of Oogenesis<br>- To know the Secretion & Importance of hormones of different endocrine glands. |
| Previous knowledge to be reminded | - Gametogenesis, spermatogenesis,<br>- hormones, enzymes,<br>- Endocrine Vs exocrine glands. |
| Examples / Illustrations | - Human egg & Bird egg.<br>- Different Endocrine glands. |
| Additional inputs | - difference b/w Spermatogenesis & Oogenesis.<br>- Hormonal disorders. |
| Teaching Aids used | - Chalk, Board & PPT. |
| References cited | - Text book of Animal physiology - Rastogi publications |
| Student Activity Planned after the teaching | Students clarify their doubts. |
| Activity planned outside the class room, if any | Students prepare the notes. |
| Any other activity | - |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>- Oogenesis — Multiplication phase<br>- Growth phase (previtellogenesis, Vitellogenesis)<br>- maturation phase<br>- Pituitary hormones — GH (STH), FSH, LH, LTH, ACTH, TSH, PTH, Oxytocin, Vasopressin.<br>Thyroxine, Diarrhoea |

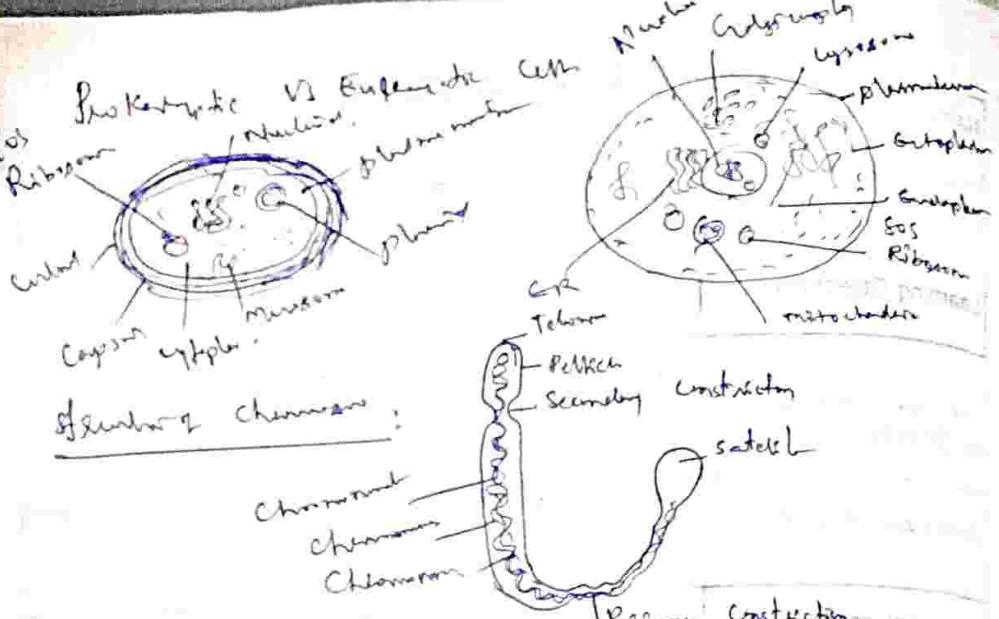
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Thyroid gland – Thyroxin. Goiter (Hyper thyroidism)
Exophthalmic goiter (Hyper thyroidism)
Parathyroid gland. Parathormone.
Adrenal gland – Adrenalin Noradrenalin.
– Cortisol, Aldosterone
– Addisons & Cushings disease
– Pancreas. Insulin & Glucagon.
– Gonads. male – Testosterone
female – Estrogen Progesterone,
placenta. CG.

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Fertilization, Cleavage, Cell theory, Organogenesis, Prokaryotic and Eukaryotic cells, Apical, Sexual, Asexual, Extension & Correlative gene |
| Hours required | 08 hrs |
| Learning Objectives | – To know the types & process of fertilization<br>– To know the types of cleavage & formation of zygote.<br>– To know the difference b/w. Prokaryotic & Eukaryotic cells<br>– To know the types of Apical, Sexual & Asexual<br>– To know the structural Chromosome & Concept of gene |
| Previous knowledge to be reminded | – Fertilization,<br>– cleavage, zygote & organ system<br>– Apical, Asexual, Sexual.<br>– Chromosome, gene. Bacteria, Eukaryotic cells |
| Examples / Illustrations | – External / Internal fertilization<br>– Bees, Fish, Bacteria, Animal cells. |
| Additional inputs | – Process of fertilization in Aquatic and Land Animals.<br>– Organic Fertilizer farming, Types of Chromosomes, Structure of DNA. |
| Teaching Aids used | Charts, Board & PPT. |
| References cited | – A Textbook of Chordate embryology – Chand Publication<br>– A Textbook of cell Biology, Genetics, molecular Biology, Gupta & Elangovan – Chand Publications |
| Student Activity Planned after the teaching | Students notes the important points |
| Activity planned outside the class room, if any | Students prepared the notes of charts. |
| Any other activity | – |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Fertilization. Fusion of nuclei of gametes.<br>External / Internal fertilization.<br>Cleavage :- Holoblastic, Radial, Spiral, Rotational, Determinate & Indeterminate cleavage.<br>Organogenesis. Ectoderm<br>Mesoderm<br>Endoderm. |

Signature of the Lecturer




Structure of Chromosome :

Gene. Codon, Reading system.

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Central Dogma in molecular Biology, origin of life. |
| Hours required | 03 |
| Learning Objectives | - To know the concept of Central Dogma in molecular Biology<br>- To know the theories of origin of life. |
| Previous knowledge to be reminded | - DNA, RNA<br>- Transcription, Translation,<br>- Using miller experiment |
| Examples / Illustrations | - Replication in DNA<br>- Transcription in prokaryotes |
| Additional inputs | Replication, Transcription, Translation, theories of Evolution |
| Teaching Aids used | Chalk & Board. |
| References cited | A text book of Cell Biology, Genetics, Molecular Biology Evolution & Ecology, Charu publications, Verma & Agarwal |
| Student Activity Planned after the teaching | Students noted the imp points |
| Activity planned outside the class room, if any | Students prepared the notes |
| Any other activity | - |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Central Dogma in molecular Biology<br>Replication (DNA) → Transcription (mRNA) → Translation (Protein)<br>- Nucleus (Eukaryote), cytoplasm (Prokaryote)<br>Origin of life — Creationism, panspermia, Abiogenesis, Biogenesis, organic evolution theory<br>- Urey & Miller expt. |

Signature of the Lecturer

III Sem.

# Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | — History of Cell Biology, Prokaryotic Vs Eukaryotic Cell. |
| Hours required | — Aug 02. |
| Learning Objectives | - To know the History of Cell Biology<br>- To know the Difference Between Prokaryotic & Eukaryotic Cell. |
| Previous knowledge to be reminded | - Cell,<br>- Cytology,<br>- Cell Biology<br>- Bacteria, Prokaryotes, Eukaryotes. |
| Examples / Illustrations | - Bacteria, Cell<br>- Eukaryotic - Animal cell & plant cell. |
| Additional inputs | - Structure of Bacteria, plant cell - Animal cell. |
| Teaching Aids used | Chalk, Board & PPT. |
| References cited | - Textbook of Cell Biology, Genetics, Molecular Biology & Evolution. S. Chand Publication. Verma & Agarwal. |
| Student Activity Planned after the teaching | Students notes the key Points |
| Activity planned outside the class room, if any | students prepare notes. |
| Any other activity | Students prepare the charts. |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>- Cell Biology Definition.<br>- Cell Discovery, Cell theory,<br>- Prokaryote Vs Eukaryotic Cell.<br>- Definite Nucleus,<br>- Cell organelles,<br>- |

Signature of the Lecturer

# Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Virus, Viroids, Mycoplasma, Ultrastructure of Animal cell, plasma membrane, Golgi, ER, Mitochondria, Lysosome, Ribosome, Nucleus & Chromosome |
| Hours required | (12) Sep. |
| Learning Objectives | - To know the structure of Virus, Viroid, Mycoplasma & Animal cell<br>- To know the structure & functions of Cell organelles |
| Previous knowledge to be reminded | - Virus, Viroid, Mycoplasma<br>- Cell,<br>- Cell organelles. |
| Examples / Illustrations | - Animal cell structure<br>- Largest & Smallest cells. |
| Additional inputs | - plant cell structure, Types of Chromosomes. |
| Teaching Aids used | - Chalk, Board & PPT |
| References cited | A Textbook of Cell Biology, Genetics, Molecular Biology, Ecology, Evolution - S. Chand Publications, Verma & Agarwal |
| Student Activity Planned after the teaching | Student noted the key points |
| Activity planned outside the class room, if any | Student prepare the notes. |
| Any other activity | Student prepare the charts. |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>- Virus. Prion, Types of Virus.<br>- Viroid,<br>- Mycoplasma. Smallest cell<br>- Animal cell — Plasma membrane, Cytoplasm & cell organelles.<br>- plasma membrane — Model. - Unit membrane model<br>- Bimolecular leaflet model<br>- Fluid mosaic model<br>- Micelle, bilayer |

Signature of the Lecturer

Golgi Complex – Cisternae, Vesicles, Vacuoles
Function – Formation of cell wall, Secretion

Endoplasmic Reticulum – Cisterna, Tubules & Vesicles
Rough & Smooth Endoplasmic Reticulum

Lysosomes – Primary, Secondary, Residual Bodies & Autophagic Vacuoles
Ribosomes – 80S & 70S, Protein Synthesis

Mitochondria – Power house of the cell, Cristae, Oxidative Process
Nucleus – Centre of the cell (Brain)
– Nuclear Membrane, Nucleoplasm & Nucleolus

Chromosomes – Pellicle, Chromonema, Primary constriction, Secondary Constriction, Telomere, Satellite

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Mendel's laws of Inheritance, Incomplete, Lethal Dominance, Polygenes, Multiple alleles, Sex-determining Genotypic Mechanisms, Mutations, Mutagens |
| Hours required | 12 Oct. |
| Learning Objectives | To Know the Process of Heredity.<br>- To Know the types of genes & Dominance,<br>- To know the Sex determination process.<br>- To Know the Basics of Sex-linked inheritance, & mutations. |
| Previous knowledge to be reminded | - Chromosomes, Genes, Heredity<br>- Sex determination, Sex-linked genes<br>- Mutations. |
| Examples / Illustrations | - Mendel's hybrid, Dihybrid Cross, Blood group Inheritance,<br>- X.Y determination, X.Y. X Y linked inheritance,<br>- Types of Mutations. |
| Additional inputs | - Complementary genes, Structural genes. Types of Sex determination in many Species of Insects. chromosomal aberrations |
| Teaching Aids used | Chalk, Board & PPT. |
| References cited | - A Textbook of Genetics – Sctaral publications. |
| Student Activity Planned after the teaching | Students notes the five point of clearity Heredity doubts. |
| Activity planned outside the class room, if any | Student prepare the notes for lecture. |
| Any other activity | – |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>- Mendel's laws – Law of Dominance.<br>– " of purity of gametes<br>–, Monohybrid Cross<br>–, Dihybrid cross<br>- Incomplete Dominance – New form.<br>- Co-dominance – Blood groups<br>- Lethal genes – Mouse.<br>- Polygenes – |

Signature of the Lecturer

- Sex determination

F M Human  F M Drosophila
XX - XY ;  XX - XO
M F  M F
ZZ - ZW -  ZZ - ZO.

Reptile, Bird

Green hop

Sex Linked inheritance.

Color Blindness Haemophilia.

Cl's - Cross Inheritance.

Mutations - Chromosomal Gene.

Sudden changes

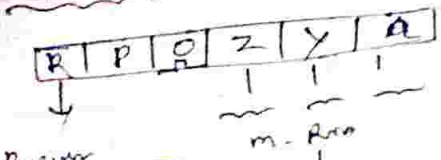
Mutagenesis - Mutagens. { Physical / Chemical / Biological.

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Chromosomal Disorders, Human Karyotype, pedigree Analysis, Gene Regulation, Transcription, Translation, Gene expression, Mutation. |
| Hours required | Cell cycle, Haematopoiesis, Inv. Division, Lamarckism. (10) nov |
| Learning Objectives | - To Know the Chromosomal disorders<br>- To Know the importance of human Karyotype.<br>- To Know the imp of Pedigree Analysis.<br>- To know the process of Transcription, Translation, Gene expression<br>- To know the Darwin, Lamarckism & Hardy-Weinberg |
| Previous knowledge to be reminded | - Chromosomal Syndromes,<br>- Human Chromosome,<br>- To Know the process of Transcription, Translation, Gene expression<br>- Darwin, Lamarckism. |
| Examples / Illustrations | - Autosomal, Allosomal Disorders, Human Pedigree chart,<br>- Natural Selection, Darwin finches,<br>- Prokaryotic Gene expression |
| Additional inputs | - Autosomal, Allosomal disorders. DNA → RNA → Protein<br>- Finch Beaks, Crossfire, |
| Teaching Aids used | Chalk, Board & PPT |
| References cited | A Textbook of cell Biology, Genetics, Molecular Biology, Evolution & Ecology. |
| Student Activity Planned after the teaching | Student Draw the diagram & write the important |
| Activity planned outside the class room, if any | Students prepare the notes |
| Any other activity | — |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>- Turner's Syndrome - 45+XO<br>- Klinefelter Syndrome 44+XXY<br>- Down Syndrome, 21st Trisomy<br>- Edwards Syndrome - 18th Trisomy<br>- Patau Syndrome - 13th Trisomy.<br>- Transcription - DNA → RNA<br>Translation - RNA → Protein |

Signature of the Lecturer

Gene expression in Prokaryotes.




Gen expression in Prokaryotes — Regulation

Operon → Group of structural genes

Lactose → Group of structural genes

Substance Z → Active Character

→ Genepleon theory. Weismann - Rats.

Hardy-Weinberg law. $p^2 + q^2 = 1$

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Isolation, Speciation, Genetic drift, Natural selection. |
| Hours required | 04 Hrs |
| Learning Objectives | - To know the Isolation Mechanisms<br>- To know the process of Speciation,<br>- To know the Genetic drift.<br>- To know the Types of Natural Selection. |
| Previous knowledge to be reminded | - Evolution,<br>- Species,<br>- Natural Selection. |
| Examples / Illustrations | - Isolating barriers, Darwin finches,<br>- DDT adapted insects,<br>- Moths England. |
| Additional inputs | - Isolation mechanisms, characters of species,<br>Types of Natural Selection. |
| Teaching Aids used | - Chalk & Board |
| References cited | A textbook of Cell Biology, Genetics, Molecular Biology, Ecology & Evolution |
| Student Activity Planned after the teaching | Students noted the important points |
| Activity planned outside the class room, if any | Students prepare lecture notes, charts. |
| Any other activity | - |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>- Isolation. - Pre zygotic - Ecological, Seasonal, Gametic.<br>Post zygotic - Zygote mortality, embryonic mortality, Hybrid inviability, Hybrid sterility |

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Genetic Drift → Founder effect
Bottle neck effect

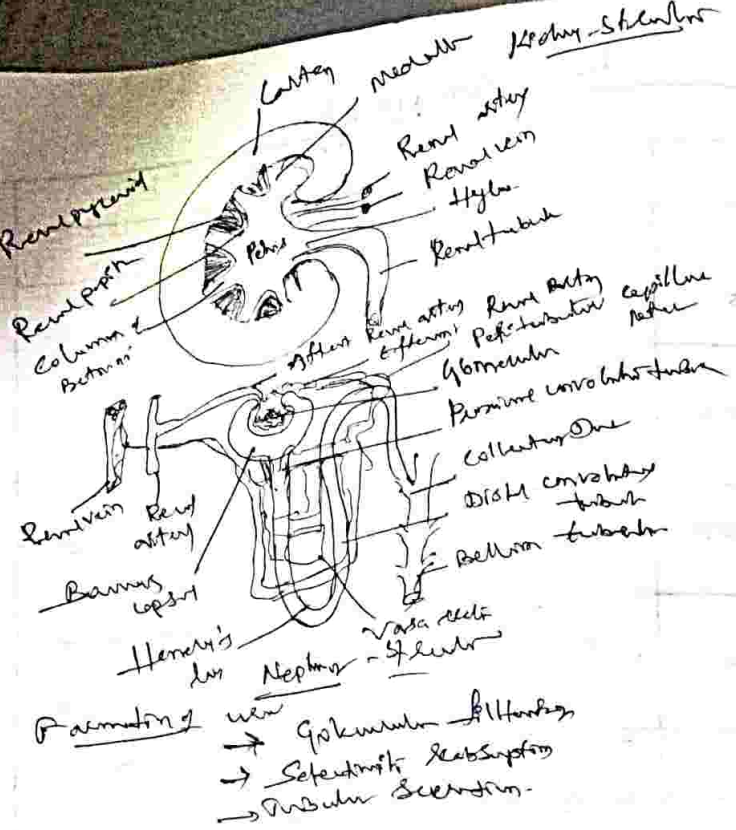
## Natural Selection

- Directional
- Disruptive
- Stabilizing

# Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Structure of Kidney & formation of Urine |
| Hours required | Feb'. 2024 |
| Learning Objectives | - To Know the Structure of Kidney<br>- To Know the Structure of Nephron<br>- To Know the formation of Urine.<br>- To Know the Urinary Problems. |
| Previous knowledge to be reminded | - Excretion.<br>- Excretory Products<br>- Excretory organs in Mammals.<br>- Urine |
| Examples / Illustrations | - Structure of Mammalian Kidney<br>- Excretory Products. |
| Additional inputs | - Excretory organs in other than mammals.<br>- Urinary Problems. |
| Teaching Aids used | Chalk & Board. |
| References cited | Essentials of Animal Physiology - SC Rastogi |
| Student Activity Planned after the teaching | Nephron Classification |
| Activity planned outside the class room, if any | Preparation of notes. |
| Any other activity | - |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>- Mammalian Excretory organs Kidney.<br>- Retroperitoneal organs.<br>- Dorsal side, Renal Region<br>- Bean shaped<br>- Red color |

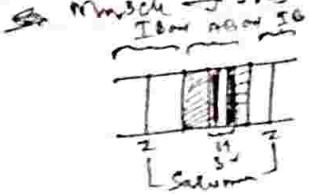
Signature of the Lecturer

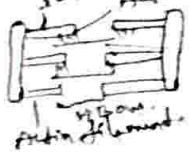



## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Nervous impulse Transmission, Muscle contraction, Parathyroid gland, Pancreas, Hormonal control, Menstrual cycle, Reproductive system, Cellular metabolism, Spermatogenesis |
| Hours required | March 2024 |
| Learning Objectives | - To know the transmission of Nerve impulse.<br>- To know the structure of Neuron<br>- To know the structure & types of muscle & muscle contraction<br>- To know the Hormones & their functions Parathyroid gland, Pancreas<br>- To know the Hormonal effect of Menstrual cycle, Reproductive system |
| Previous knowledge to be reminded | - Neuron. Neuron types.<br>- Nerve impulse Transmission.<br>- Endocrine glands, Exocrine glands.<br>- Hormones. |
| Examples / Illustrations | - Myelinated - Non myelinated Neurons<br>- Exocrine & Endocrine glands<br>- Hormones.<br>- make a Female Reproductive system |
| Additional inputs | - Hormones Vs Gonadotropins.<br>- structure of male & female (mammal) Reproductive system |
| Teaching Aids used | Chalk & Board. |
| References cited | A textbook of Animal physiology - S. C Rastogi<br>A Textbook book Embryology - Saras publication - Gilbert. |
| Student Activity Planned after the teaching | Doubts Clarification |
| Activity planned outside the class room, if any | Preparation of notes |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Neurons Impulse Transmission - Polarization, Depolarization, Repolarization & Resting Potential<br>Saltatory conduction - Myelinated Neuron.<br>Muscle contraction - Striated muscle, Non-striated muscle, Cardia muscle. |

Signature of the Lecturer




Muscle fibres

Parathyroid gland → Parathormone hormone – $Ca^{2+}$ regulation, osteoporosis, Tetany.

Pancreas → Mixed gland. { Insulin – Glycogenesis, Glucose → Glycogenolysis, Diabetes.
Exocrine.

Hormonal Control on Human reproductive system.

Male – FSH, LH, Testosterone

Female – FSH, LH, LTH, Progesterone, Oestrogen, Relaxin, oxytocin. Menstrual Cycle { Proliferative, Secretive, Luteal, Desquamating, Physiology

Classification of Carbohydrates – Monosaccharides (Glucose, Fructose, Galactose, Ribose, Deoxyribose)

Classification of Proteins. – Simple proteins
– Conjugated Proteins
– Derived proteins.
– Structural Proteins.

Spermatogenesis – Testes. Male

Primordial germ cell → Spermatogonium cell — Primary spermatocyte
Secondary spermatocyte — Spermatid — Sperm.

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | ~~Carbohydrates~~, Cellular metabolism & Embryology |
| Hours required | April – 2024. |
| Learning Objectives | - To Know the classification of lipids.<br>- To Know the external & cellular metabolism<br>- To Know the Protein metabolism<br>- To Know the Oogenesis process, fertilization, Types e.g. Types of cleavage & Frog Development |
| Previous knowledge to be reminded | - Carbohydrates, Proteins & lipids<br>- Glucose, Glycogen, Krebs cycle, Glycolysis, Urea cycle, Cori cycle<br>- ovum, fertilization, egg, Cleavage, Frog |
| Examples / Illustrations | - Glycolysis, Krebs Cycle, Cori cycle, Urea Cycle, Frog Development. |
| Additional inputs | - Oogenesis formation, importance of fertilization<br>- importance of Cleavage, Frog Development. |
| Teaching Aids used | Chalk & Board, you Tube, |
| References cited | - A Textbook of Biochemistry. U Satyanarayana.<br>- A Textbook of Embryology – Sarasa publication, Gurgaon |
| Student Activity Planned after the teaching | Students Classify their doubts<br>Questions from ~~Teacher~~ |
| Activity planned outside the class room, if any | Preparation of notes. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>- Classification of lipids –<br>simple – fats, oils, wax<br>compound lipids – phospholipids, Glycolipids & Sulfolipids.<br>Derived lipids – Alcohol, prostaglandins, steroids, Isoprenoids.<br>Oogenesis → ~~Meiosis~~<br>multiplication phase<br>Growth phase – Previtellogenesis, Vitellogenesis<br>Maturation phase. |

Signature of the Lecturer

Co

Permanent of Germ cells - Primary ~~Spermatocyte~~ - Secondary

Glycolysis → Glucose — 2 pyruvic acids

Krebs cycle → Pyruvic acid - citric acid, oxalosuccinic acid - malic acid - oxalo acetic acid

Electron Transport System - NAD, FAD, Cytochrom b, a, a3, ADP+iP → ATP.

Gluconeogenesis → Non carbohydrates — Glucose.
Ex: Cori Cycle.

β-oxidation of — fatty acids → Palmitic acid.
Acetyl Co. → Acetyl CoA synthetase
130 ATP's

Protein Metabolism

Transamination — Transfer of Amino group

Deamination — Removal of Amino group

Urea cycle

Fertilization - Sperm + Ovum → Zygote

External / Internal, Fertilization & Artificial fertilization

Process of fertilization — Association of gametes, Activation & sperm & Activation of Ovum

Types of eggs → Amount of yolk, Distribution of yolk, presence/Absence of shell, Determinate / Indeterminate

Types of Cleavage, Holoblastic / Meroblastic & Superficial, Radial, Spiral, Bilateral, Rotational, Discoidal

Frog Development → Zygote — Morula — Blastula — Gastrula
Spiral / Amphi.

Enzyme - Bio-catalyst —
— Types - Transaminase, oxidoreductase, Deaminase, Transferase, Hydrolases, Isomerase, Dehydrogenase

Mechanism of Enzyme action
— Lock & key theory - Emil Fischer
- Induced fit theory - Koshland.

I Minor

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | General Characters & Classification of phylum mollusca. |
| Hours required | PPD 24 |
| Learning Objectives | To know the General characters & Classification of phylum mollusca |
| Previous knowledge to be reminded | - Invertebrates,<br>- Pila, Unio, Pearl. |
| Examples / Illustrations | Pila, Unio, Sepia, Octopus, |
| Additional inputs | Torsion in Gastropoda |
| Teaching Aids used | Chalk & Board |
| References cited | A Textbook of Zoology, Vivek publications - Dyear B.Sc C. Gupta. |
| Student Activity Planned after the teaching | Animals classification |
| Activity planned outside the class room, if any | Pila preparation, |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>- Pila,<br>- Shell<br>- Unio<br>- Torsion<br>- Foot<br>- Radula<br>- Reproduction<br>— Larva & Pearl.<br><br>Classification<br>Aplacophora<br>Monoplacophora<br>Polyplacophora<br>Gastropoda<br>Scaphopoda<br>Pelecypoda<br>Cephalopoda. |

Signature of the Lecturer

2 minor

# Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Pearl — Formation in molluscs Phylum Echino dermata Hemichordata |
| Hours required | 1 hour |
| Learning Objectives | - To know its formation of Pearl in molluscs<br>- To know & Classification phylum Echinodermata<br>- To know its structure of Pearl oyster & star fish |
| Previous knowledge to be reminded | - Invertebrates<br>- Pearl<br>- star fish |
| Examples / Illustrations | - Mollusc, Pearl oyster<br>- star fish. |
| Additional inputs | - structure of pearl oyster & star fish |
| Teaching Aids used | Chalk & Board |
| References cited | - A textbook of zoology - I year B.Sc. Vivek Publications - S. Gopal |
| Student Activity Planned after the teaching | Doubts Clarification |
| Activity planned outside the class room, if any | Notes preparation. |
| Any other activity | - |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Pearl formation in Molluscs.<br>- Defence mechanism<br>- Pearl oyster Pinctada Vulgaris<br>- Nacreous layer<br>- Pearl Bag theory<br>- Composition of pearl<br>- Types of pearls |

Signature of the Lecturer

General characters of Echinodermata

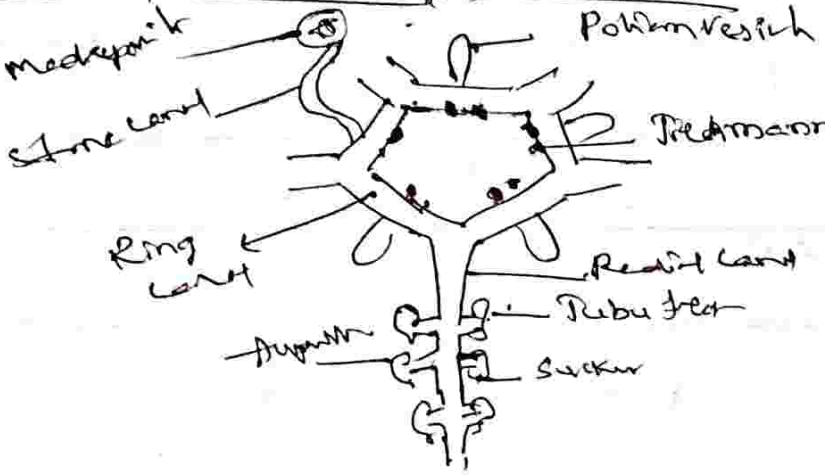
Larva, Head, Arms, Oral/Aboral, madreporite, Tube feet
Reproduction Regeneration - Ambulacral groove
Classification. Subclass - Pelmatozoa
↓
Class - Crinoidea. - Asteroidea
Sea lily Sea star

Subclass 2 Eleutherozoa

Class 1 2 3 4

Asteroidea. Ophiuroidea Echinoidea Holothuroidea
Sea star Brittle star Sea urchin Sea cucumber

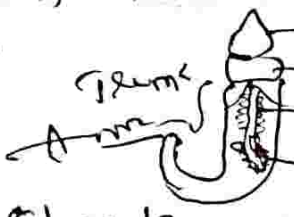
Water vascular System in Starfish




Functions
- Locomotion
- Food capture
- Attachment
- Respiration

Hemichordata - Partial / Half Chordata

Marine. Sessile/free live, Colonial/solitary, Burrowing, Sluggish
Climentary canal, Indirect development Triploblastic
Body classification — Gastrovascular of pterobranchia
Balanoglossus -




Affinities - Echinoderm — Similarities
Differences
Annelida — Similarities
Differences
Echinodermata — Similarities
Differences

Semester

# Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | phylum mollusca & phylum Chordata |
| Hours required | March 2024 |
| Learning Objectives | • To know the General Characters & classification of phylum mollusca<br>• To know the General Characters & classification of phylum Echinodermata<br>• To know the Pearl formation. To know the structure, function of Water vascular system & Starfish |
| Previous knowledge to be reminded | • Invertebrates<br>– Pila, Wonky Pearl, Starfish. |
| Examples / Illustrations | - Pearl oyster, & Starfish |
| Additional inputs | - Torsion in Gastropoda<br>• Difference b/w Land Snails / water vascular system. |
| Teaching Aids used | Chalk & Board |
| References cited | - A text book of I.B.S Zoology. Vivek publications<br>C. Gopal. |
| Student Activity Planned after the teaching | Doubt Clarification |
| Activity planned outside the class room, if any | Notes preparation. |
| Any other activity | - |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>General Characters of phylum mollusca<br>• Mollusca.<br>– Soft Body<br>– Shell,<br>• Torsion<br>– Pearl,<br>– Larva<br>– Foot<br>– mantle.<br>– Coelom.<br>Development<br>Classification:<br>– Aplacophora<br>– monoplacophora<br>– Polyplacophora<br>– Gastropoda<br>– Scaphopoda<br>– Pelecypoda<br>– cephalopoda |

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## Pearl formation in Mollusca



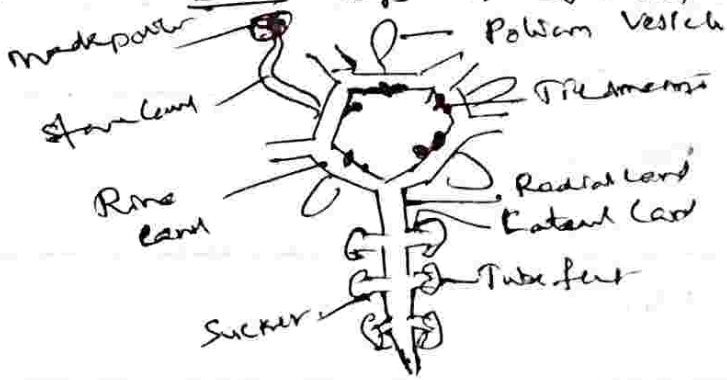

## General Characters of Echinodermata

- marine
- Head
- Radial disc
- Arms
- Oral / Aboral
- Coelom
- Dudenstomes
- Reproduction
- Development
- Regeneration
- Ambulacral groove

## Classification

- Subclass - Pelmatozoan Pentacrinus
  - class - Crinoidea - Sea lilies
- subclass - Eleutherozoa
  - class - 1. Asteroidea - Sea stars
  2. Ophiuroidea - Brittle stars
  3. Echinoidea - Sea urchins
  4. Holothuroidea - Sea cucumbers

## Water vascular system in starfish




Functions
- Locomotion
- Food capture
- Respiration
- Attachment.

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | placy war 1757 A.D. |
| Hours required | 02 |
| Learning Objectives | British monarchism |
| Previous knowledge to be reminded | carnataka wars |
| Examples / Illustrations | Carnataka wars |
| Additional inputs | Mussolini |
| Teaching Aids used | Board and Chalks - P.P.T |
| References cited | Bipin Chandrapal Text books. |
| Student Activity Planned after the teaching | questions and answers |
| Activity planned outside the class room, if any | Assignments. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>① Bengal - siraj-uddawla.<br>② British commander - Robertclive.<br>③ Kalakatta dark night event<br>④ 1757 placy war:-<br>⑤ Eastablished britisth authority in in Bengal. |

G. Ravindrababu
Signature of the Lecturer

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Warren Hastings |
| Hours required | 02 |
| Learning Objectives | British policies & Expansion |
| Previous knowledge to be reminded | Robert clive |
| Examples / Illustrations | Boxar war |
| Additional inputs | Maratha wars. |
| Teaching Aids used | Board and Chalk |
| References cited | D.V. sambasivarao English Text book |
| Student Activity Planned after the teaching | questions and Answers |
| Activity planned outside the class room, if any | study project |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>① warren Hastings conquests :-<br>① oudh :- :-<br>② Rohil khand :-<br>③ Maratha wars :-<br>④ Mysore wars :-<br>⑤ Results :- |

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Anglo - Maratha wars |
| Hours required | 03 |
| Learning Objectives | The Maratha confederacy was strengthened, subsidiary and subsidies |
| Previous knowledge to be reminded | Anglo Mysoor wars |
| Examples / Illustrations | Third carnataka war |
| Additional inputs | First Mysoor war. |
| Teaching Aids used | Board and Chalks - Maps and Charts |
| References cited | Bipin chandra pal English text Books |
| Student Activity Planned after the teaching | questions and Answers. |
| Activity planned outside the class room, if any | Assignments. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Anglo-Maratha wars:-<br>① First Anglo - Maratha war (1775-1782)<br>② second Anglo - Maratha war :-(1802 - 1805)<br>③ Third Anglo - Maratha war :-(1817-1818)<br>course of the war :-<br>Result of the war :- |

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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Subsidiary Alliance |
| Hours required | 02 |
| Learning Objectives | Thus wellesley helped the british Too rise over its difficulties and emerge as a paramount power in India |
| Previous knowledge to be reminded | carnan wallis |
| Examples / Illustrations | parmenent land revenue system |
| Additional inputs | parmenent land revenue system - In England |
| Teaching Aids used | Board and Chalks |
| References cited | Dr. sambasivarao English text book |
| Student Activity Planned after the teaching | questions and answers |
| Activity planned outside the class room, if any | Swach Bharath |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>① subsidiary Alliance system :-<br>① Merits :-<br>② demerits<br>③ states That Joined The subsidiary Alliance system :-<br>① Hyderabad ② Mysore ③ Tanjore ④ oudh<br>⑤ Gorakhpur ⑥ Rohilkhand ⑦ Mughal emperor |

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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | William Bentinck |
| Hours required | 02 |
| Learning Objectives | British Administration |
| Previous knowledge to be reminded | warren hastings |
| Examples / Illustrations | Lord ripon |
| Additional inputs | Lord curzon |
| Teaching Aids used | Board and chalk |
| References cited | English text books |
| Student Activity Planned after the teaching | questions and answers |
| Activity planned outside the class room, if any | project work |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* Reforms of bentinck :- ① Economic reforms :- ② Judicial reforms :- ③ social reforms :- ④ Educational reforms :- (English education) ⑤ public works :- ⑥ foreign policy :- ⑦ estimate :- |

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Nature and scope of Tourism |
| Hours required | The Tourism Society of England 02 |
| Learning Objectives | The Tourism society of England |
| Previous knowledge to be reminded | A.P. Tourism |
| Examples / Illustrations | Heritage Tourism |
| Additional inputs | some photos |
| Teaching Aids used | Board and Chalk |
| References cited | English tourism text book |
| Student Activity Planned after the teaching | questions and Answers |
| Activity planned outside the class room, if any | study project |
| Any other activity | NSS |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>1) definitions of The Tourism<br>2) united nations world tourism organization<br>3) The Tourism society of England<br>4) The Austrian Economist, Hermann von Schu<br>rand in 1910 nature of Tourism<br>5) The scope of Tourism |

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## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Motive & Domestic Tourist |
| Hours required | 02 |
| Learning Objectives | The motive of health and sports. |
| Previous knowledge to be reminded | Tourism nature |
| Examples / Illustrations | Tourism and scope |
| Additional inputs | some Photos |
| Teaching Aids used | Board and Chalk |
| References cited | English tourism Text Book |
| Student Activity Planned after the teaching | Assignments. |
| Activity planned outside the class room, if any | Questions and Answers. |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* ① Excursion Tourists<br>② Regional Tourists<br>③ national level tourists<br>④ Inter national Tourists<br>⑤ A temporary visitor staying less than 24 hours in the country visited including travelers and cruisers |

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# COMMISSONERATE OF COLLEGIATE EDUCATION,

# GOVT. DEGREE COLLEGE

## RAJAMPET, KADAPA. Dt.

(Affiliated to Yogi Vemana University, Kadapa.)

## TEACHING PLAN

ACADEMIC YEAR 2023-2024

Name of the Department : Physics

NAME OF THE LECTURER : N. B. Sivaramireddy

Course / Group : III Sem

Subject / Page : Heat and Thermodynamics

| Sl.No. | Subject | Paper | Page No. |
|---|---|---|---|
| 1 | Heat and Thermodynamics | III | |
| 2 | Mechanics and Properties of Matter | I | |
| 3 | (Physics Mind) | | |
| 4 | | | |

MPCS/MPC

## Teaching Plan / Lesson No. 1

| | |
|---|---|
| Name of the Topic | Introduction to Isothermal and Adiabatic processes |
| Hours required | 01 |
| Learning Objectives | After Completion of this topic Student shall be Understand what is Isothermal and Adiabatic processes and give examples and also distinguished between Isothermal and Adiabatic process |
| Previous knowledge to be reminded | Zeroth Law of thermodynamics, First Law of thermodynamics and relation between pressure and volume. |
| Examples / Illustrations | |
| Additional inputs | Workdone in an Isothermal process and Workdone in an Adiabatic process. |
| Teaching Aids used | — |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | — |
| Any other activity | — |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>**Isothermal process:-** If a System undergoes physical Change, during the processing time the temperature remains Constant then that type of system/process is called as Isothermal process. In this process $T$ = constant and $dT = 0$<br>**Adiabatic process:** If a System undergoes physical change, during the time heat energy remains constant here $Q$ = constant and $dQ = 0$ (PTO) |

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## Isothermal Process

1) $T$ = Constant and $dT = 0$
2) The Container made up of Good Conductor
3) Heat Energy is transferable
4) It obeys $PV$ = Constant Boyle's law
5) No change in its Internal Energy

## Adiabatic process

(1) $Q$ = Constant and $dQ = 0$
(2) The Container made up of Bad Conductor
(3) Heat energy Cannot transferred
(4) It obeys $PV^{\gamma} = k$
(5) Change in its Internal Energy.

**Teaching Plan / Lesson No. 2**

| | |
|---|---|
| Name of the Topic | Reversible and Irreversible Processes. |
| Hours required | 01 |
| Learning Objectives | After Completion of this topic Students Can Understand Reversible & Irreversible processes. Give examples |
| Previous knowledge to be reminded | Different types of thermodynamic systems Open System, Closed System and Isolated Systems. |
| Examples / Illustrations | Real life example reversible and irreversible processes. |
| Additional inputs | — |
| Teaching Aids used | — |
| References cited | — |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed)<br>Reversible process :- A reversible process on which can be retraced at every point<br>examples :- All Isothermal and Adiabatic processes performed very slowly<br>② Slow evaporation and Condensation<br>③ Slow elongation and contraction of spring without oscillatory motion.<br>(PTO) |

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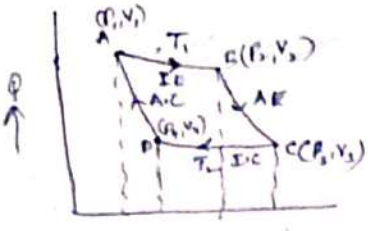
**Irreversible processes:-** An Irreversible process one which cannot be retraced at every point.

**Ex:-** All physical changes
All Chemical Changes
All Natural Processes
Heat is generated when current is passing through resistor.

**Teaching Plan / Lesson No. 3**

| | |
|---|---|
| Name of the Topic | Carnot's Reversible Engine |
| Hours required | 2 |
| Learning Objectives | After completion of this topic students would be able to understand what is Carnot's heat engine & its applicable to real life and practical etc |
| Previous knowledge to be reminded | Isothermal expansion, Adiabatic Expansion, Isothermal Contraction and Adiabatic Contraction |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed)<br>A heat engine is a device to convert heat into work<br>In this engine there are 4 parts (i) Working Substance (ii) Source (iii) Sink (iv) Insulating Stand<br>Carnot's Cycle :- The working substance is undergone 4 Cyclic process of operation made up of Four parts ① Isothermal Expansion ② Adiabatic Expansion ③ Isothermal Contraction ④ Adiabatic Contraction. |

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During I E the gas is expanded from State $(P_1, V_1)$ to State $(P_2, V_2)$

The quantity of heat absorbed by the gas is equal to amount of work done $(Q_1) = W_1 = \int_{V_1}^{V_2} P\,dV$

$$= \int_{V_1}^{V_2} \frac{RT_1}{V}\,dV = RT_1 \log_e\left(\frac{V_2}{V_1}\right) \rightarrow (1)$$

During A.E. i.e from A to C the gas expanded due to its internal energy. Work done during this process $W_2 = \int_{V_2}^{V_3} P\,dV = \int_{V_2}^{V_3} \frac{K}{V^\gamma}\,dV$

By simplifying above eqn $W_2 = \frac{R(T_1 - T_2)}{(\gamma - 1)} \rightarrow (2)$

During I.C $Q_2 = W_3 = \int_{V_3}^{V_4} P\,dV = -RT_2 \log_e\left(\frac{V_3}{V_4}\right) \rightarrow (3)$

During A-C $Q W_4 = \int_{V_4}^{V_1} P\,dV = \int_{V_4}^{V_1} \frac{K}{V^\gamma}\,dV = -\frac{R(T_1 - T_2)}{(\gamma - 1)} \rightarrow (4)$

Note

Total Quantity of heat absorbed by the gas = Total work done by the gas

$$W = Q_1 - Q_2 = W_1 + W_2 + W_3 + W_4 \quad (\because W_2 = -W_4)$$

$$= W_1 + W_3$$

$$W = \frac{RT_1 \log_e\left(\frac{V_2}{V_1}\right)}{} - RT_2 \log_e\left(\frac{V_3}{V_4}\right) \rightarrow (5)$$

Net points B, C are in same adiabatic line. Hence $T_1 V_2^{\gamma-1} = T_2 V_3^{\gamma-1}$

again points A, D are in same adiabatic line hence $T_1 V_1^{\gamma-1} = T_2 V_4^{\gamma-1}$

$$\frac{T_1}{T_2} = \left(\frac{V_3}{V_2}\right)^{\gamma-1} \rightarrow (6) \qquad \frac{T_1}{T_2} = \left(\frac{V_4}{V_1}\right)^{\gamma-1} \rightarrow (7)$$

from (1) & (5) $\Rightarrow \frac{V_3}{V_2} = \frac{V_4}{V_1} \Rightarrow \frac{V_3}{V_4} = \frac{V_2}{V_1} \rightarrow (8)$

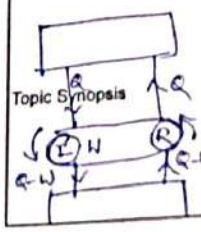
Substitute eqn (8) in eqn (5) $\Rightarrow W = RT_1 \log_e\left(\frac{V_2}{V_1}\right) - RT_2 \log_e\left(\frac{V_2}{V_1}\right)$

$\therefore$ efficiency $\eta = \frac{W}{Q_1} = \frac{R(T_1 - T_2)\log_e\left(\frac{V_2}{V_1}\right)}{RT_1 \log_e\left(\frac{V_2}{V_1}\right)}$ $= R(T_1 - T_2)\log_e\left(\frac{V_2}{V_1}\right)$

$\therefore \eta = 1 - \frac{T_2}{T_1}$

**Teaching Plan / Lesson No. 4**

| | |
|---|---|
| Name of the Topic | Carnot's theorem |
| Hours required | 01 |
| Learning Objectives | Students would be able to understand Carnot's engine is only ideal but not Practicable. |
| Previous knowledge to be reminded | Reversible and Irreversible processes, Efficiency of Carnot's engine. |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed) According to Carnot theorem, no engine can be more efficient than reversible engine working in the same temperature. Proof:- The amount of heat which is received from the source is removed by the 'R' to the sink. $Q = Q' + W$ (or) $W = Q - Q'$ |




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If possible if the efficiency of Irreversible Engine is greater than that of reversible engine

$$\text{i.e.,} \quad \frac{W}{Q} > \frac{W'}{Q} \quad \text{i.e.,} \quad W > W' \longrightarrow (1)$$

Now imagine that the two engines are coupled by a belt in such a way that the Engine R works directly and it drives the engine R reversibly. The Compound engine extracts an amount of heat $(Q-W')$ from the sink and gives an amount of heat $Q$ to the sink. Therefore net amount of heat drawn from the sink

$$= (Q-W') - (Q-W)$$

$$= W - W' \longrightarrow (2)$$

i.e. heat delivered to sink by the Coupling engine is greater than heat delivered by the sink to the coupling engine. It is highly impossible without the assistance of external agency we cannot draw the heat from the sink.

∴ Our assumption is incorrect. i.e. efficiency of Irreversible Engine is always less than that of efficiency of Reversible engine.

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**Teaching Plan / Lesson No. 5**

| | |
|---|---|
| Name of the Topic | Kelvin's Scale of Temperature. |
| Hours required | 01 |
| Learning Objectives | Students would be able to understand Kelvin's Scale of Temperature from Second Law of Thermodynamics. |
| Previous knowledge to be reminded | Second Law of Thermodynamics. |
| Examples / Illustrations | |
| Additional inputs | First Law of thermodynamics. |
| Teaching Aids used | |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed)<br>Kelvin's Statement for Second Law of Thermodynamics:-<br>It is highly impossible to derive a continuous supply of work by cooling a body to a temperature lower than that of the coldest of its surroundings.<br>It says that if the source temperature is high and sink temperature is low then only the heat engine works. |

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## Clausius Statement of Second Law :-

It is impossible for a self acting machine unaided by any external agency to convert heat from a cold body to a hot body.

Kelvin Stated with the result that no engine of all reversible engine working between the same two temperatures is a function of two temperatures only and is independent of the nature of working substance.

$$\therefore \eta = 1 - \frac{Q_2}{Q_1} = f(T_1, T_2)$$

$$\frac{Q_2}{Q_1} = 1 - f(T_1, T_2)$$

$$\frac{Q_1}{Q_2} = \frac{1}{1 - f(T_1, T_2)} = F(T_1, T_2) \rightarrow (1)$$

Now we Consider another reversible engine absorbing heat $Q_2$ at temperature $T_2$ and rejecting heat $Q_3$ at temp $T_3$

Then

$$\frac{Q_2}{Q_3} = F(T_2, T_3) \rightarrow (2)$$

If

$$\frac{Q_1}{Q_3} = F(T_1, T_3) \rightarrow (3)$$

$(1) \times (2) \Rightarrow$

$$\frac{Q_1}{Q_2} \times \frac{Q_2}{Q_3} = F(T_1, T_2) \times F(T_2, T_3) \rightarrow (4)$$

Comparing eqn (3) & (4) $\Rightarrow$

$$F(T_1, T_3) = F(T_1, T_2) \times F(T_2, T_3) \rightarrow (5)$$

$$F(T_1, T_2) = \frac{\phi(T_1)}{\phi(T_2)}, \quad F(T_2, T_3) = \frac{\phi(T_2)}{\phi(T_3)}$$

$$\therefore \frac{Q_1}{Q_3} = \frac{\phi(T_1)}{\phi(T_3)} = \frac{T_1}{T_3}$$

The thermodynamic scale of temperature is at which the ratio of any two temperatures is equal to the ratio of heat absorbed and heat rejected by a reversible engine working between those two temperatures.

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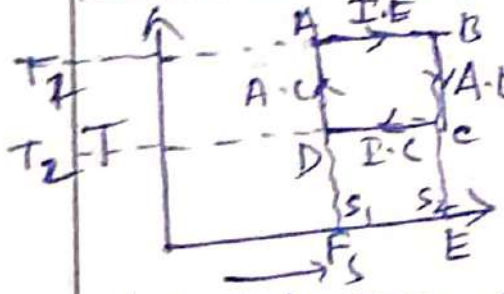
**Teaching Plan / Lesson No. 6**

| | |
|---|---|
| Name of the Topic | Entropy |
| Hours required | 01 |
| Learning Objectives | After Completion of this topic student should be able to understand what is Entropy and Change in Entropy |
| Previous knowledge to be reminded | Adiabatic process, Celsius scale of temperature. |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed)<br>Entropy :- The thermal property of a body which remains Constant during an adiabatic process is called as Entropy.<br>$\frac{Q_1}{T_1} = \frac{Q_2}{T_2} = \frac{Q_3}{T_3} = \cdots = \frac{Q}{T}$ constant.<br>The quantity $Q/T$ is defined as entropy. |

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## Teaching Plan / Lesson No. 7

| | |
|---|---|
| Name of the Topic | T-S Diagram |
| Hours required | 01 |
| Learning Objectives | After Completion of this topic Student would be able to Understand what is T-S diagram and its applications |
| Previous knowledge to be reminded | P-V diagram and efficiency of Reversible Engine |
| Examples / Illustrations | |
| Additional inputs | Uses of T-S diagram. |
| Teaching Aids used | |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* |




During I.E at constant temperature $T_1$ the entropy of a substance increased from $S_1$ to $S_2$. During Adiabatic expansion BC there is no change in entropy and Temperature will decrease from $T_1$ to $T_2$.

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During IC entropy of a system decreases from $S_2$ to $S_1$ and temperature remains constant.

During AC entropy remains constant and temperature increases from $T_2$ to $T_1$

Let $Q_1$ be the amount of heat absorbed by the working substance in Isothermal expansion AB and $Q_2$ be the amount of heat rejected in I.C

then $Q_1 = T \times dS = T \times (S_2 - S_1)$

$= AF \times AB$

$=$ Area of ABEF $\longrightarrow$ (1)

further $Q_2 = T_2 \times (S_2 - S_1)$

$= DF \times DC$

$=$ Area of DCEF $\longrightarrow$ (2)

$\therefore$ Available energy per ~~second~~ cycle converted into useful work $= Q_1 - Q_2$

$=$ Area of ABEF $-$ Area of DCEF

$=$ Area of ABCD

That the area of the cycle on T-S diagram gives the available thermal Energy that can be converted into useful work

the efficiency of can be calculated

$$\eta = \frac{Q_1 - Q_2}{Q_1} = \frac{\text{Area of ABCD}}{\text{Area of ABEF}} = \frac{AB \times AD}{AB \times AF}$$

$$= \frac{T_1 - T_2}{T_1}$$

$$\therefore \eta = 1 - \frac{Q_2}{Q_1} = 1 - \frac{T_2}{T_1}$$

**Teaching Plan / Lesson No. 8**

| | |
|---|---|
| Name of the Topic | Change in Entropy when Ice to water, Vapour |
| Hours required | 01 |
| Learning Objectives | After Completion of this topic Students would be able to Understand and appreciate the changes in Entropy when Ice to Vapour and also change in Entropy when Ice to Vapour Conversion. |
| Previous knowledge to be reminded | Latent heat of fusion, Latent heat of Vaporisation |
| Examples / Illustrations | Example given when some grams of Ice at some temperature converted into water at various temperatures. |
| Additional inputs | Latent heat of fusion, Latent heat of Vaporisation. |
| Teaching Aids used | |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis (1) | (Continue on the reverse side if needed) There are three Cases in This ~~Complete~~ Change Process First one is when m grams of Ice at $T_1$K is converted into m grams of water at $T_1$K ~~Second one is~~ (2) Change in Entropy during this process $dS_1 = \frac{mL_1}{T_1}$ $\longrightarrow$ (1) |

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**Second phase:** m grams of water at $T_1$ K is converted into m grams of water at $T_2$ K.

Change in Entropy during this process.

$$dS_2 = \int_{T_1}^{T_2} \frac{dQ}{T} = \int_{T_1}^{T_2} \frac{mc\,dT}{T} = m c \log_e\left(\frac{T_2}{T_1}\right) \rightarrow ②$$

**Third phase:** finally m grams of water at $T_2$ K is converted into m grams of water vapour at $T_2$ K

∴ Change in Entropy during this process

$$dS_3 = \frac{mL_2}{T_2} \rightarrow ③$$

The total change in Entropy when ice (m grams) converted into steam

$$dS = dS_1 + dS_2 + dS_3$$

$$\boxed{dS = \frac{mL_1}{T_1} + 2.303\, m c \log_{10}\left(\frac{T_2}{T_1}\right) + \frac{mL_2}{T_2}}$$

**Teaching Plan / Lesson No. 7**

| | |
|---|---|
| Name of the Topic | Thermodynamic potentials |
| Hours required | 01 |
| Learning Objectives | Student can understand what are Thermodynamic potentials and their significance and their mathematical formulation |
| Previous knowledge to be reminded | Thermodynamic state of system and its surroundings, Thermodynamic variables like P, V, T and S |
| Examples / Illustrations | |
| Additional inputs | Dependent and Independent variables |
| Teaching Aids used | |
| References cited | Unified physics Volume-2 by Gupta Kumar Sharma |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed) The thermodynamic functions (or) potentials are energy functions formed by combining the basic thermodynamic variables. The thermodynamic potentials are (i) Internal Energy (U), (ii) Helmholtz free energy (F) (iii) Enthalpy (or) total heat function (H) and Gibbs function (G). |

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## Teaching Plan / Lesson No. 10

| | |
|---|---|
| Name of the Topic | Maxwell thermodynamic Relations. |
| Hours required | 01 |
| Learning Objectives | Students would be able to derive Maxwells relations from thermodynamic Potentials. |
| Previous knowledge to be reminded | ~~Potentials~~ First Law of Thermodynamics. Thermodynamic Potentials. |
| Examples / Illustrations | |
| Additional inputs | Partial derivatives and Laws of differentiation. |
| Teaching Aids used | |
| References cited | Gupta Kumar Sarma Unified physics Volume – 2 |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* From ~~First~~ Law of Thermodynamics $dq = dU + dW = dU + PdV \rightarrow (1)$ From Entropy equation $dS = \frac{dq}{T} \Rightarrow dq = TdS \rightarrow (2)$ From (1) & (2) $\Rightarrow dU = TdS - PdV \rightarrow (3)$ $\left(\frac{\partial U}{\partial S}\right)_V = T$ and $\left(\frac{\partial U}{\partial V}\right)_S = -P \rightarrow (4)$ (.....Continue not pas) |

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$dU$ is Perfect differential hence we can write

$$\frac{\partial}{\partial V}\left(\frac{\partial U}{\partial S}\right)_V = \frac{\partial}{\partial S}\left(\frac{\partial U}{\partial V}\right)_S \longrightarrow (5)$$

From (4) and (5) $\Rightarrow$ $\left(\frac{\partial T}{\partial V}\right)_S = -\left(\frac{\partial P}{\partial S}\right)_V \longrightarrow (I)$

This is the First Thermodynamical relation

## Second Maxwell relation:-

$$dU = TdS - PdV = d(TS) - PdV$$

$$d(U - TS) = -PdV \Rightarrow dF = -PdV = -dW$$

where $F = U - TS$ is known as Helmholtz function (or) Helmholtz free energy

$$dF = d(U - TS) = dU - TdS - SdT$$

$$\therefore dF = (TdS - PdV) - TdS - SdT = -SdT - PdV$$

$$\left(\frac{\partial F}{\partial V}\right)_T = -P \text{ and } \left(\frac{\partial F}{\partial T}\right)_V = -S \longrightarrow (6)$$

'$dF$' is Perfect differential hence $\frac{\partial}{\partial V}\left(\frac{\partial F}{\partial T}\right) = \frac{\partial}{\partial T}\left(\frac{\partial F}{\partial V}\right)$

From (6) & (7) $\Rightarrow \left(\frac{\partial S}{\partial V}\right)_T = \left(\frac{\partial P}{\partial T}\right)_V \longrightarrow (II)$ This is Maxwell's second equation.

## Maxwell's 3rd Thermodynamic Relation:-

$$H = U + PV$$

$$dH = dU + d(PV) = TdS - PdV + PdV + VdP$$

$$\therefore dH = TdS + VdP \Rightarrow \left(\frac{\partial H}{\partial S}\right)_P = T \text{ and } \left(\frac{\partial H}{\partial P}\right)_S = V \longrightarrow (8)$$

Since '$dH$' is Perfect differential $\frac{\partial}{\partial P}\left(\frac{\partial H}{\partial S}\right)_P = \frac{\partial}{\partial S}\left(\frac{\partial H}{\partial P}\right)_S \longrightarrow (9)$

$\therefore \left(\frac{\partial T}{\partial P}\right)_S = \left(\frac{\partial V}{\partial S}\right)_P \longrightarrow (III)$ This is 3rd maxwell equation.

From (8) and (5) $\Rightarrow$

## Maxwell 4th Thermodynamic Relation:- $H = U + PV$

$dH = TdS + VdP$ if the process be Isothermal & Isobaric then $TdS = d(TS)$ and $dP = 0$ then $dH = d(TS)$

(or) $d(H - TS) =$ Constant and $G = H - TS$

$$dG = dH - TdS - SdT = TdS + VdP - TdS - SdT = VdP - SdT$$

$\left(\frac{\partial G}{\partial T}\right)_P = -S \longrightarrow (8)$ and $dG$ is Perfect differential hence

$$\left(\frac{\partial G}{\partial T}\right)_P = V \text{ and } \frac{\partial}{\partial T}\left(\frac{\partial G}{\partial P}\right)_T = \frac{\partial}{\partial P}\left(\frac{\partial G}{\partial T}\right)_P \Rightarrow \left(\frac{\partial V}{\partial T}\right)_P = \left(\frac{\partial S}{\partial P}\right)_T \longrightarrow (IV)$$

## Teaching Plan / Lesson No. 01

| | |
|---|---|
| Name of the Topic | Gradient of a Scalar field. |
| Hours required | 01 |
| Learning Objectives | Student can be able to understand what is gradient of a scalar field and give examples. |
| Previous knowledge to be reminded | Scalar, Vectors and Vector differentiation, Vector Differential operator |
| Examples / Illustrations | Electric ~~Potential~~ is a negative gradient of Conservative force & Potential and gradient of P.E. |
| Additional inputs | Vector product, Triple Product. |
| Teaching Aids used | |
| References cited | Unified physics |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* $\phi(x,y,z)$ is a Scalar point function in an Scalar field. The partial derivatives of $\phi$ along the direction of co-ordinates are $\frac{\partial\phi}{\partial x}$, $\frac{\partial\phi}{\partial y}$ and $\frac{\partial\phi}{\partial z}$ then the Gradient of a Scalar function $\phi$ is defined as $\text{grad}\,\phi = \vec{\nabla}\phi = \vec{i}\frac{\partial\phi}{\partial x} + \vec{j}\frac{\partial\phi}{\partial y} + \vec{k}\frac{\partial\phi}{\partial z}$ ..... (10) |

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Gradient is the maximum rate of change of Scalar function $S$ at any point in a Scalar field is given, in magnitude and direction by the vector

$$\text{grad } \vec{S} = \frac{\partial s}{\partial n} \cdot \hat{n}$$

The gradient of a Scalar field 'S' is a vector field whose magnitude at any point is equal to the maximum rate of 'S' at that point and whose direction is along the normal to the level surface at that point.

**Teaching Plan / Lesson No. # 2**

| | |
|---|---|
| Name of the Topic | Divergence of a Vector field |
| Hours required | 01 |
| Learning Objectives | Student should be able to understand what is the divergence of vector field and give examples to it and give its physical significance. |
| Previous knowledge to be reminded | Vector, Vector differential operator, Scalar product & Dot product. |
| Examples / Illustrations | Divergence of Current density, divergence of magnetic field and divergence of electric field |
| Additional inputs | |
| Teaching Aids used | Black Board. |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | (Continued on the reverse side if needed)<br>Def:- The Scalar product of Vector differential operator $\vec{\nabla}$ and a vector $\vec{A}$ is called as divergence of a vector field.<br>(or)<br>The divergence of a vector field at any point is defined as the amount of flux per unit volume diverging from that point<br>.... (P.T.O) |

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Let $\vec{A}$ be a vector point function differentiable at each and every point $(x,y,z)$ in a region of space. Then the divergence of $\vec{A}$ is given by

$$\vec{\nabla}\cdot\vec{A} = \left(\vec{i}\frac{\partial}{\partial x} + \vec{j}\frac{\partial}{\partial y} + \vec{k}\frac{\partial}{\partial z}\right)\cdot\left(A_x\vec{i} + A_y\vec{j} + A_z\vec{k}\right)$$

$$= \frac{\partial A_x}{\partial x} + \frac{\partial A_y}{\partial y} + \frac{\partial A_z}{\partial z}$$

$$\therefore \vec{\nabla}\cdot\vec{A} = \text{div}\,\vec{A} = \frac{\partial A_x}{\partial x} + \frac{\partial A_y}{\partial y} + \frac{\partial A_z}{\partial z}$$

## Physical Significance of divergence

The physical significance of divergence of a vector field is that at a point it gives the amount of flux per unit volume diverging from that point.

**Teaching Plan / Lesson No. 03.**

| | |
|---|---|
| Name of the Topic | Curl of a Vector field |
| Hours required | 01 |
| Learning Objectives | Student will be able to understand Curl of a vector field and the examples of Curl of vector field. |
| Previous knowledge to be reminded | Cross product of a vector |
| Examples / Illustrations | $\vec{v} = \vec{\omega}\times\vec{r}$ |
| Additional inputs | Matrix determinant |
| Teaching Aids used | Black Board. |
| References cited | Chitra Gupta. |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed) The line integral of the vector around any closed path in the field is zero. Curl $\vec{A} = \vec{\nabla}\times\vec{A} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ A_x & A_y & A_z \end{vmatrix}$ (PTO) |

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## physical Significance of Curl.

The general meaning of Curl is rotation.

The Curl of an electric field results that rate of change of magnetic field and the Curl of an electric field results that rate of change of magnetic field in perpendicular direction.

Note:- (1) Divergence of a Vector = 0 then the Vector field is incompressible

(2) $\vec{\nabla} \times \vec{A} = 0$ Vector field is irrotational.

(3)

**Teaching Plan / Lesson No. 4**

| | |
|---|---|
| Name of the Topic | Stokes Theorem |
| Hours required | 01 |
| Learning Objectives | Student would be able to understand Line integral can convert to Surface integral. |
| Previous knowledge to be reminded | Line Integration, Surface integration, Divergence and Curl of a Vector |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | Black board |
| References cited | Classical physics. |
| Student Activity Planned after the teaching | Assignment given |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side if needed) Statement:- The Line integral of a Vector field $\vec{A}$ around a closed curve is equal to the surface integral of the Curl of $\vec{A}$ taken over the surface S surrounded by the closed curve. i.e., $\oint \vec{A} \cdot d\vec{l} = \iint \text{Curl}\, \vec{A} \cdot d\vec{s} = \iint (\vec{\nabla} \times \vec{A}) \cdot d\vec{s}$ |

(-do-)

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Let the entire surface be divided into large no. of small loops. Let area of each small loop is $d\vec{s}$. Suppose $\hat{n}$ is an unit vector normal to $ds$. Then vector area of the element is $\hat{n}ds = d\vec{s}$

We know that curl of a vector field at any point is the maximum line integral of the vector computed per unit area along the boundary of an infinite simal area of that point. So the line integral of $\vec{A}$ around the boundary of the area $d\vec{s}$ is

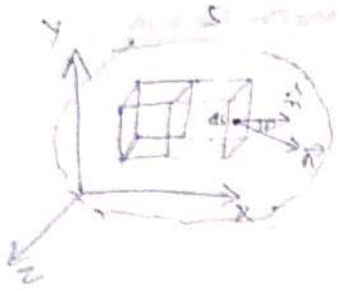
$$\text{Curl}\vec{A} \cdot d\vec{s} = \vec{\nabla} \times \vec{A} \cdot \vec{ds}$$

∴ Sum of the line integrals of $\vec{A}$ around the boundary of all the elements =

**Teaching Plan / Lesson No. 5**

| | |
|---|---|
| Name of the Topic | Gauss divergence Theorem |
| Hours required | 01 |
| Learning Objectives | After completing this topic Student would be able to understand how surface integral convert into Volume integral |
| Previous knowledge to be reminded | Surface Integral, Volume Integral, gradient of scalar field and divergence of a vector field |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | Chalk board |
| References cited | Classical book problems |
| Student Activity Planned after the teaching | Study in Library and write down important solved problems |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | (Continue on the reverse side of reading) Statement:- The surface integral of the normal component of vector taken over a closed surface S is equal to the Volume Integral of the divergence of vector A over the volume V enclosed by the surface. $\iint_S \vec{A} \cdot d\vec{s} = \iiint_V (\vec{\nabla} \cdot \vec{A}) dV = \iiint_V (\text{div}\vec{A})\, dv$ (i.e. proved) |

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The total normal flux of $\vec{A}$ passing through surface $ds$ = $\vec{A} \cdot d\vec{s}$

total flux through entire surface S is

$$\iint \vec{A} \cdot d\vec{s} \rightarrow (1)$$

according to definition of divergence is

total normal flux through unit volume = $\vec{\nabla} \cdot \vec{A}$

∴ total flux through entire closed surface having = $\iiint_V (\vec{\nabla} \cdot \vec{A}) dV \rightarrow (2)$

Both eqn (1) & (2) equal

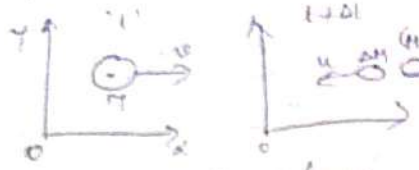
$$\therefore \iint_S \vec{A} \cdot d\vec{s} = \iiint_V (\vec{\nabla} \cdot \vec{A}) dV \rightarrow (3)$$

**Teaching Plan / Lesson No.** 6

| | |
|---|---|
| Name of the Topic | System of Variable Mass |
| Hours required | 01 |
| Learning Objectives | After completion of this topic, student would be able to understand variable mass system with example. |
| Previous knowledge to be reminded | Isolated system, mass, momentum, Newton's laws of motion particularly second and third law. |
| Examples / Illustrations | Rocket, Motion is example of Variable mass system. |
| Additional inputs | Negative and positive variable mass system |
| Teaching Aids used | Black Board |
| References cited | Classical Mechanics - |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)* If the mass of the system varies with respect time then that type of system is called as Variable mass system. Let us consider mass of falling with velocity in a reference frame. (...goto) |

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after $\Delta t$ time mass $\Delta M$ leaving from the system with a velocity of $u$ in opposite side.




from Newton's second law.

$$F_{ext} = \frac{dp}{dt} \quad \text{for small intervals of time}$$

$$F_{ext} = \frac{\Delta p}{\Delta t} = \frac{p_2 - p_1}{\Delta t}$$

$$p_2 = [(M-\Delta M)(v+\Delta v) + \Delta M u]$$

$$p_1 = Mv$$

$$\therefore F_{ext} = M\frac{\Delta v}{\Delta t} - v\frac{\Delta M}{\Delta t} - \Delta v\frac{\Delta M}{\Delta t} + u\frac{\Delta M}{\Delta t}$$

$$\Delta t \to 0 \quad \frac{\Delta v}{\Delta t} = \frac{dv}{dt} \quad \text{and} \quad \Delta t \to 0 \;\; \frac{\Delta M}{\Delta t} = \frac{dM}{dt}$$

$$\therefore F_{ext} = M\frac{dv}{dt} + v\frac{dM}{dt} - u\frac{dM}{dt}$$

$$= \frac{d}{dt}(Mv) - u\frac{dM}{dt}$$

$$M\frac{dv}{dt} = F_{ext} + (u-v)\frac{dM}{dt}$$

$$= F_{ext} + F_{reaction}$$

**Teaching Plan / Lesson No. 7**

| | |
|---|---|
| Name of the Topic | Motion of a Rocket : |
| Hours required | 01 |
| Learning Objectives | After Completion of this topic Student would be able to Understand the laws behind the motion of a Rocket |
| Previous knowledge to be reminded | Newtons Second Law and Third Law Conservation of Linear Momentum. |
| Examples / Illustrations | |
| Additional inputs | Multi Stage rocket motion. |
| Teaching Aids used | Working Model regarding Newtons third Law |
| References cited | Class Text physics. |
| Student Activity Planned after the teaching | Recapitulation conducted |
| Activity planned outside the class room, if any | Rocket working Model preparation |
| Any other activity | — |
| Topic Synopsis | (Continue on the reverse side if needed) At Velocity of Gas jet ejected from the rocket $-u$, then the Velocity of Gas jet with respect laboratory frame of reference $= (v-u) = V_{rel}$ The rate of change of momentum of gas jet leaving out of the rocket = Force acting on the Gas jet (upto) |

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$= \frac{dM}{dt}(v-u)$

From the Newton's third law which is equal to the thrust on the rocket tending to make it in the upward direction

$\therefore$ Thrust acting on the rocket to make it forward

$$T = \frac{dM}{dt}(v-u)$$

External force acting on the rocket $F_{ext} = -Mg$

resultant force acting on the rocket

$$F_{resultant} = \frac{dM}{dt}(v-u) - Mg \longrightarrow (1)$$

From Newton's second law the rate of change of momentum on the rocket = resultant force on it

$$\frac{d}{dt}(MV) = \frac{dM}{dt}(v-u) - Mg$$

$$M\frac{dv}{dt} = -u\frac{dM}{dt} - Mg \longrightarrow (2)$$

This is rocket 1st equation.

$$\frac{dv}{dt} = -\frac{u}{M}\cdot\frac{dM}{dt} - g$$

$$dv = -u\frac{dM}{M} - g\,dt \longrightarrow (3)$$

$$\int_{v_0}^{v} dv = -u\int_{M_0}^{M}\frac{dM}{M} - g_0\int_0^t dt$$

$$\therefore v = v_0 + u\log\left(\frac{M_0}{M}\right) - gt \longrightarrow (4)$$

Above Equation is rocket final velocity

**Teaching Plan / Lesson No. 8**

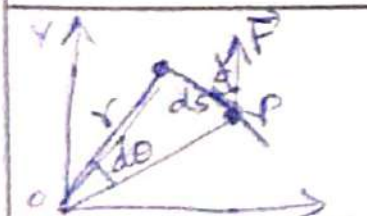
| | |
|---|---|
| Name of the Topic | Impact Parameter & Scattering Cross Section |
| Hours required | 01 |
| Learning Objectives | After completion of this topic students would be able to understand both the terms. |
| Previous knowledge to be reminded | Properties of Ellipse and Solid angle |
| Examples / Illustrations | — |
| Additional inputs | Rutherford's Scattering |
| Teaching Aids used | — |
| References cited | Classical physics of Telugu Academy |
| Student Activity Planned after the teaching | — |
| Activity planned outside the class room, if any | — |
| Any other activity | — |
| Topic Synopsis | (Continue on the reverse side if needed) The impact parameter is defined as the closest distance between incident and positive charged particle. Projected towards it. This is also known as collision parameter. Scattering Cross Section - It is the ratio of number of scattering particles per solid angle per unit time to the incident intensity in a given direction |

Scattering Cross Section of $\frac{dN}{N}$

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## Teaching Plan / Lesson No. 9

| | |
|---|---|
| Name of the Topic | Equation of Motion of A rigid rotating body |
| Hours required | 01 |
| Learning Objectives | After Completion of this topic Student would be able to understand the relation between angular momentum and torque acting on it. |
| Previous knowledge to be reminded | Power, Work done relation, Force and velocity relation, Moment of Inertia, angular velocity, angular acceleration and angular momentum |
| Examples / Illustrations | Some Example when ever external torque = 0 then angular momentum remains Constant |
| Additional inputs | Various Daily life Examples |
| Teaching Aids used | Video clippings & gif files |
| References cited | Unified physics & Engineering physics |
| Student Activity Planned after the teaching | — |
| Activity planned outside the class room, if any | — |
| Any other activity | — |




Topic Synopsis

here $ds = r\,d\theta$

$\therefore$ Power $P = T\omega$

*(Continue on the reverse side if needed)*

We know that torque $\vec{T} = \vec{r} \times \vec{F}$ → (1)

By applying this torque the body rotates around a fixed axis.

From figure work done against the particle by force $\vec{F}$ is $dw = \vec{F} \cdot d\vec{s} = F\,ds\cos\phi$

$= F\cos\phi \cdot r\,d\theta$

But in this case $F\cos\phi \times r$ = torque $T$

$\therefore dw = T\,d\theta \Rightarrow \frac{dw}{dt} = T\frac{d\theta}{dt} = T\omega$

(ATO)

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But we know that work done against the body to change its Kinetic Energy

$$\frac{dK}{dt} = \tau = \frac{d}{dt}\left(\frac{1}{2} I\omega^2\right)$$

$$\tau = \frac{1}{2} I \frac{d\omega^2}{dt} \Rightarrow \tau = I \frac{d\omega}{dt} \rightarrow (1)$$

$$\therefore \tau = I\alpha$$

This is known as Equation of motion.

But we know that $L = I\omega$

$$\frac{dL}{dt} = I \frac{d\omega}{dt} \rightarrow (2)$$

From equations (1) & (2) $\Rightarrow$

$$\boxed{\tau = \frac{dL}{dt}} \rightarrow (3)$$

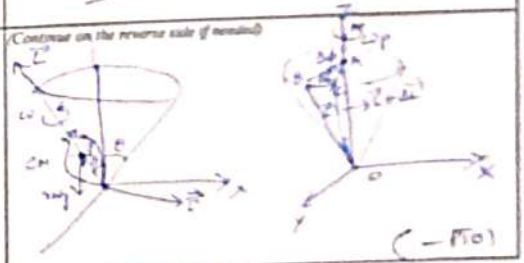
This is known as equation of motion of a rigid rotating body.

If external torque $\tau = 0 \Rightarrow$

$$\frac{dL}{dt} = 0 \Rightarrow L = \text{Constant}$$

This is known as Conservation of angular momentum

**Teaching Plan / Lesson No. 10**

| | |
|---|---|
| Name of the Topic | Precessional Motion of Spinning Top |
| Hours required | 01 |
| Learning Objectives | After Completion of this topic Students should be able to understand Precessional Motion and solve examples like precessional motion |
| Previous knowledge to be reminded | Torque definition, relation between torque and angular momentum |
| Examples / Illustrations | |
| Additional inputs | Videos Clippings and Gif files examples |
| Teaching Aids used | — |
| References cited | Unified physics, Engineering Physics |
| Student Activity Planned after the teaching | — |
| Activity planned outside the class room, if any | — |
| Any other activity | — |
| Topic Synopsis | (Continue on the reverse side if needed)  (— Pto) |

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Due to gravitational force $mg$ acting on the top so torque exerted by force $mg$ on the top can be written as

$$\vec{\tau} = \vec{r} \times \vec{F} = r\,mg\sin(180 - \theta)$$

$$= r\,mg\sin\theta \quad \text{---(1)}$$

According to definition $\vec{\tau} = \frac{\Delta L}{\Delta t} \Rightarrow \Delta L = \vec{\tau}\,\Delta t$ ---(2)

due to this torque the axis of rotation of itself rotated about a vertical axis and sweeped out a cone whose vertex is the fixed point 'O'

The motion of the rotational axis is called as precessional motion.

$$\omega_p = \frac{\Delta\theta}{\Delta t} = \frac{\frac{\Delta L}{L\sin\theta}}{\Delta t} = \frac{\Delta L}{\Delta t\, L\sin\theta} = \frac{\vec{\tau}}{L\sin\theta}$$ ---(3)

From equations (1), (2) & (3) $\Rightarrow$

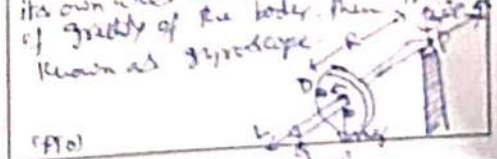
$$\omega_p = \frac{\tau}{L\sin\theta} = \frac{mgr\sin\theta}{L\sin\theta} = \frac{mgr}{I\omega}$$

$$\boxed{\omega_p = \frac{mgr}{I\omega}}$$

Where $\omega_p$ is the precession angular velocity of spinning top.

---

**Teaching Plan / Lesson No. 11**

| | |
|---|---|
| Name of the Topic | Gyroscope |
| Hours required | 01 |
| Learning Objectives | After completion of this topic student should be able to understand what is gyroscope and its applications in day to day life. |
| Previous knowledge to be reminded | Co-ordinate geometry, angular velocity, rotational motion etc. |
| Examples / Illustrations | Daily examples of gyroscope motion through Video and animated GIF files |
| Additional inputs | |
| Teaching Aids used | Digital Classroom, |
| References cited | Clinified physics |
| Student Activity Planned after the teaching | . Student activity planned after class to prepare locate working model of Gyroscope. |
| Activity planned outside the class room, if any | — |
| Any other activity | — |
| Topic Synopsis | (Continue on the reverse side if required) Gyroscope:- If the fixed point, about which a symmetrical body is spinning about its own axis coincides with the centre of gravity of the body. Then it is known as gyroscope.  (P.T.O) |

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A gyroscope is a symmetrical body which its axis of spin supported at a point away from the centre of gravity. The precessional rate of its spin axis is maintained by the gravitational torque (due to its weight) about the point

The gravitational torque acting on the disc

$\tau_g = mgR$

precessional torque on the disc $= \tau_p = I\omega_p\omega$

$= \omega_p I\omega$

∴ Gravitational torque = precessional torque

$mgR = \omega_p I\omega$

$\therefore \omega_p = \frac{mgR}{I\omega} = \frac{mgR}{mk^2\omega} = \frac{gR}{k^2\omega}$

Now time period of one precessional motion $T = \frac{2\pi}{\omega_p} = 2\pi\frac{k^2\omega}{gR}$

The precession rate, once started can be maintained by gravitational torque.

**Teaching Plan / Lesson No. 12**

| | |
|---|---|
| Name of the Topic | Precession of the Equinoxes |
| Hours required | 01 |
| Learning Objectives | After Completion of this topic Student would be able to understand the precessional motion of the earth and formation of Equinoxes. |
| Previous knowledge to be reminded | Precessional Motion |
| Examples / Illustrations | — |
| Additional inputs | — |
| Teaching Aids used | — |
| References cited | — |
| Student Activity Planned after the teaching | — |
| Activity planned outside the class room, if any | — |
| Any other activity | — |
| Topic Synopsis | (Continue on the reverse side if needed) We Know that equatorial plane of the earth and the plane of its orbit round the sun are inclined to each other at an angle of 23.5°.   The two planes intersect at Points A and A'. Point A is called vernal equinox while point A' is called autumnal equinox. The earth in its orbit around the sun completes one complete round about the sun once (1 yr) |

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Point 'A' at about 21st march (last thirty-two days to 22nd March) and Point 'N' at about 23rd September.

The line joining the points A and B is known as line of equinoxes. At equinox day and night both are equal.

This perceptional motion of the earth also causes a change in the direction of the line of equinoxes which is called the precession of equinoxes.

**Teaching Plan / Lesson No. 13**

| | |
|---|---|
| Name of the Topic | Elastic Constants and Poisson ratio. |
| Hours required | 01 |
| Learning Objectives | At the completion of this topic the student should be able to understand the relation between Stress and Strain and the types of Stress and Strains |
| Previous knowledge to be reminded | Stress and problems |
| Examples / Illustrations | Examples given to illustrate Stress and Strains |
| Additional inputs | — |
| Teaching Aids used | — |
| References cited | — |
| Student Activity Planned after the teaching | — |
| Activity planned outside the class room, if any | — |
| Any other activity | — |
| Topic Synopsis | (Continue on the reverse side if necessary)<br>Elasticity:- The property of the body by virtue of which it recovers its original Shape and Size (or opposes the deformation is called Elasticity.<br>Stress:- The Magnitude of internal force per unit area of the section is called as Stress |

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There are two types of Stress (1) Normal Stress
(2) Tangential Stress.

Young's Modulus: $(Y) = \frac{\text{Longitudinal Stress}}{\text{Longitudinal Strain}}$

$$Y = \frac{F/A}{\Delta l/l} \Rightarrow \frac{P \times l}{A \Delta l}$$

Bulk Modulus$(K) = \frac{\text{Normal Stress}}{\text{Volume Strain}} = \frac{P}{\frac{\Delta V}{V}} = \frac{PV}{\Delta V}$

Rigidity Modulus $(\eta) = \frac{\text{Tangential Stress}}{\text{Shearing Strain}}$

$$= \frac{F/A}{\theta}$$

Poisson Ratio$(\sigma) = \frac{\text{Lateral Strain}}{\text{Longitudinal Strain}} = \frac{\frac{\Delta d}{d}}{\frac{\Delta l}{l}}$

It is Dimensionless Quantity

**Teaching Plan / Lesson No. 14**

| | |
|---|---|
| Name of the Topic | Relation between Elastic Modulii |
| Hours required | 01 |
| Learning Objectives | After completion of this topic student should be able to derive relationship between Elastic constants |
| Previous knowledge to be reminded | Young's Modulus, Bulk Modulus, Rigidity Modulus and poisson ratio. |
| Examples / Illustrations | — |
| Additional inputs | — |
| Teaching Aids used | — |
| References cited | Unified physics and Telugu academy text books |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | Assignment given through google classroom |
| Any other activity | |

(Continue on the reverse side if needed)

Longitudinal (or) extension Strain $= \frac{\text{Extension Stress}}{Y} = \frac{P/A}{Y}$

Topic Synopsis: But for unit area $A = 1$ $\therefore$ Strain $= \frac{P}{Y}$

Lateral $\sigma = \frac{\text{Lateral Strain}}{\text{Longitudinal Strain}}$ $\therefore$ Lateral Strain $= \sigma \times$ Longitudinal Strain $= -P/Y$

| Stress applied | Strain Produced along | | |
|---|---|---|---|
| | X-axis | Y-axis | Z-axis |
| Along X-axis | $P/Y$ | $-\sigma P/Y$ | $-\sigma P/Y$ |
| Along Y-axis | $-\sigma P/Y$ | $P/Y$ | $-\sigma P/Y$ |
| Along Z-axis | $-\sigma P/Y$ | $-\sigma P/Y$ | $P/Y$ |

(--P.Ra...)

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Total extension along X, Y and Z axis $e_x$, $e_y$ and $e_z$

$$e_x = P/Y - \sigma P/Y - \sigma P/Y = P/Y(1-2\sigma)$$

$$e_y = P/Y(1-2\sigma), \quad e_z = P/Y(1-2\sigma)$$

Then each side of the cube becomes $1 + P/Y(1-2\sigma)$

The New Volume of the cube $= (1 + P/Y(1-2\sigma))^3$

$$\simeq 1 + \frac{3P}{Y}(1-2\sigma)$$

Since the initial volume of the cube was 1, and change in Volume $= \left[1 + \frac{3P}{Y}(1-2\sigma)\right] - 1 = \frac{3P}{Y}(1-2\sigma)$

Now Volume Strain $= \frac{\text{change in Volume}}{\text{Initial Volume}} = \frac{\frac{3P}{Y}(1-2\sigma)}{1}$

Bulk Modulus $= \frac{\text{Volume Stress}}{\text{Volume Strain}} = \frac{P}{\frac{3P}{Y}(1-2\sigma)} = \frac{Y}{3(1-2\sigma)}$

$$K = \frac{Y}{3(1-2\sigma)} \Rightarrow Y = 3K(1-2\sigma) \rightarrow (a)$$

**Relation between Y and ($\eta$)** Now Consider extension stress 'P' along X-axis and compression stress along Y-axis -

$$e_x = \frac{P}{Y} + \frac{\sigma P}{Y} = \frac{P}{Y}(1+\sigma)$$

$$e_y = \frac{-\sigma P}{Y} - \frac{P}{Y} = -P/Y(1+\sigma)$$

$$e_z = \frac{-\sigma P}{Y} + \frac{\sigma P}{Y} = 0$$

Equal extension stress along X-axis, compression along Y-axis and sheared angle '$\theta$'

$$\therefore \frac{P}{Y}(1+\sigma) + \frac{P}{Y}(1+\sigma) = 0 \Rightarrow \frac{2P}{Y}(1+\sigma) = \theta$$

$$(or) \quad \frac{P}{\theta} = \frac{Y}{2(1+\sigma)}$$

$$\therefore \eta = \frac{P}{\theta} = \frac{Y}{2(1+\sigma)} \Rightarrow Y = 2\eta(1+\sigma) \rightarrow (b)$$

from (a) and (b) we can get $\boxed{Y = \frac{9\eta K}{3K+\eta}}$

# Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Groups |
| Hours required | 05 |
| Learning Objectives | After completion of this topic, Students will be able to define group and discuss some properties related to groups |
| Previous knowledge to be reminded | sets, functions |
| Examples / Illustrations | $(\mathbb{Z}, +)$ is a group |
| Additional inputs | Applications of group theory |
| Teaching Aids used | Blackboard, Chalkpiece |
| References cited | Topics in Algebra By I.N. Herstein |
| Student Activity Planned after the teaching | Assignment, Seminar, slip test |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Def: Let G be a non-empty set and $*$ be a binary operation on G then $(G, *)$ is said to be a group if it satisfies the following<br>1. Associative property: $a*(b*c) = (a*b)*c \quad \forall a, b, c \in G$<br>2. Identity property: For each $a \in G$, there exists an element $e \in G$ such that $a*e = e*a = a$<br>3. Inverse property: For each $a \in G$, there exists an element $b \in G$ such that $a*b = b*a = e$ |

M. Rajesh

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- In a group G, identity element is unique
- In a group G, inverse of any element is unique
- The set $\mathbb{Q}_+$ of all +ve rational numbers forms an abelian group under the composition defined by $\circ$ such that $a \circ b = \frac{ab}{3}$ for $a, b \in \mathbb{Q}_+$
- The set of matrices $A_\alpha = \begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$, $\alpha \in \mathbb{R}$ forms a group w.r.t matrix multiplication if $\cos\theta = \cos\phi \Rightarrow \theta = \phi$
- The set $\mathbb{Z}$ of all integers form an abelian group w.r.t the operation defined by $a * b = a + b + 1$ for all $a, b \in \mathbb{Z}$.
- Let $(G, \cdot)$ be an algebraic structure. Then $(G, \cdot)$ is a group iff (i) $a, b, c \in G \Rightarrow (ab)c = a(bc)$ (ii) $ax = b$, $ya = b$ have unique solutions in G for every $a, b \in G$.
- Show that the fourth roots of unity form an abelian w.r.t multiplication
- If every element of a group G is its own inverse, Then $(G, \cdot)$ is an abelian group.
- Show that the set $G = \{ \ldots -3m, -2m, -m, 0, m, 2m, 3m, \ldots \}$ is an abelian group w.r.t usual addition, m being a fixed integer.

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Groups (Cont.,) |
| Hours required | 5 |
| Learning Objectives | After completion of this topic, students will be able to use the addition and multiplication modulo m |
| Previous knowledge to be reminded | Groups |
| Examples / Illustrations | $Z_5 = \{0,1,2,3,4\}$ is an abelian group w.r.t addition modulo 5 ($+_5$) |
| Additional inputs | – |
| Teaching Aids used | Blackboard, Chalkpiece |
| References cited | Topics in Algebra by I.N. Herstein |
| Student Activity Planned after the teaching | Assignment, slip test |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Cancellation laws: Let G be a group. Then for $a,b,c \in G$,<br>$ab = ac \Rightarrow b = c$ (left cancellation law)<br>and $ba = ca \Rightarrow b = c$ (right cancellation law)<br>* In a non-identity group G, for $a,b,x,y \in G$, the equations $ax = b$ and $ya = b$ have unique solutions |

M. Roy

Signature of the Lecturer

* Let $(G, \cdot)$ be an algebraic structure. Then $(G, \cdot)$ is a group iff (i) $a, b, c \in G \Rightarrow (ab)c = a(bc)$ (ii) $ax = b$, $ya = b$ have unique solutions in $G$ for every $a, b \in G$.

* The set of $n^{th}$ roots of unity under multiplication form a finite group

* The sets of all ordered pairs $(a, b)$ of real numbers for which $a \neq 0$ w.r.t the operations $\times$ defined by $(a, b) \times (c, d) = (ac, bc + d)$ is a group.

* The fourth roots of unity forms an abelian group w.r.t multiplication.

* If every element of a group $G$ is its own inverse, then $(G, \cdot)$ is an abelian group.

## Addition modulo m

Let $a, b \in Z$ and $m$ be a fixed positive integer. If $r$ is the remainder $(0 \leq r < m)$ when $a+b$ is divided by $m$, we define '$a +_m b$' $= r$ and we read '$a +_m b$' as a 'addition modulo $m$' $b$.

Ex: $20 +_6 5 = 1$, $-32 +_4 5 = 1$

## Multiplication modulo m

If $a$ and $b$ are integers and $p$ is a fixed positive integer and if $ab$ is divided by $p$ such that $r$ is the remainder $(0 \leq r < p)$, we define $a \times_p b = r$. We read $a \times_p b$ as a 'multiplication modulo $p$' $b$.

Ex: $20 \times_6 5 = 4$, $2 \times_3 3 = 1$

* The set $G = \{0, 1, 2, \ldots (m-1)\}$ of first $m$ non-negative integers is an abelian group w.r.t the operation addition modulo $m$.

* The set of non-zero residue classes modulo a prime integer $p$ forms an abelian group of order $p-1$ w.r.t multiplication of residue classes.

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | order of an element of a group |
| Hours required | 5 |
| Learning Objectives | After completion of this topic, students will be able to find the order of any element of a finite group |
| Previous knowledge to be reminded | Groups |
| Examples / Illustrations | In $Z_6$, $O(2)=3$ $[3\cdot 2=0]$<br>In $G=\{1,-1\}$, $O(-1)=2$ $[(-1)^2=1]$ |
| Additional inputs | - |
| Teaching Aids used | Blackboard, Chalkpiece |
| References cited | Topics in Algebra By I.N. Herstein |
| Student Activity Planned after the teaching | Assignment |
| Activity planned outside the class room, if any | - |
| Any other activity | - |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Let G be a group and a be any element of G. Then the order of the element a is defined as the least positive integer n such that $a^n=e$<br>If there exists no positive integer n such that $a^n=e$, then we say that a is of infinite order or zero order |

M. Rajesh

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* The order of every element of a finite group is finite and less than or equal to the order of the group.

* In a group $G$, $O(a) = O(a^{-1})$ $\forall a \in G$

* If $a$ is an element of a group $G$ such that $O(a) = n$ then $a^m = e$ iff $n/m$

* If $a$ is an element of order $n$ of a group $G$ and $(p, n) = 1$ then $O(a^p) = n$

* Let $G$ be an abelian group. If $a, b \in G$ such that $O(a) = m$, $O(b) = n$ and $(m, n) = 1$ Then $O(ab) = mn$.

* In a group $G$, if $a \in G$ and $O(a) = m$ then $O(a^k) = \frac{m}{(m, k)}$

* ~~In a~~ For any two elements $a, b \in G$, $O(a) = O(b^{-1}ab)$

* $Z_6 = \{0, 1, 2, 3, 4, 5\}$

  ~~$O(1) = 6 \cdot 1 = 0 \Rightarrow O(1) = 6$~~

  ~~$O(2) =$~~ $3 \cdot 2 = 0 \Rightarrow O(2) = 3$

  $2 \cdot 3 = 0 \Rightarrow O(3) = 2$

  $3 \cdot 4 = 0 \Rightarrow O(4) = 3$

  $6 \cdot 5 = 0 \Rightarrow O(5) = 6$

  and $O(0) = 1$

* If every element of a group $G$ except the identity element is of order two then the group is abelian.

# Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | SUBGROUPS |
| Hours required | 5 |
| Learning Objectives | After completion of this topic, students will be able to find the subgroups of a group and know some properties of subgroups |
| Previous knowledge to be reminded | Groups |
| Examples / Illustrations | $(\mathbb{Z}, +)$ is a subgroup of $(\mathbb{Q}, +)$<br>$(\mathbb{Z}, \cdot)$ is not a subgroup of $(\mathbb{Q}, \cdot)$ because $(\mathbb{Z}, \cdot)$ is not a group |
| Additional inputs | |
| Teaching Aids used | Blackboard, Chalkpiece |
| References cited | Topics in Algebra By I.N. Herestein |
| Student Activity Planned after the teaching | Assignment, Slip test |
| Activity planned outside the class room, if any | - |
| Any other activity | - |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Subgroup: Let $G$ be a group and $H$ be a non-empty subset of $G$. If $H$ is also a group under the same operation as in $G$ then $H$ is called a subgroup of $G$<br>* The identity of a subgroup $H$ of a group is same as the identity of $G$. |

M. Jayo

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* If $H$ is any subgroup of $G$ then $H = H^{-1}$

* If $H$ is any subgroup of a group $G$ then $HH = H$

* A non-empty subset $H$ of a group $G$ is a subgroup of $G$ iff

(i) $a, b \in H \Rightarrow ab \in H$ (ii) $a \in H \Rightarrow a^{-1} \in H$

* A non-empty subset $H$ of a group $G$ is a subgroup of $G$ iff

$a, b \in H \Rightarrow ab^{-1} \in H$

* A necessary and sufficient condition for a non-empty subset of a group $G$ to be a subgroup of $G$ is that $HH^{-1} \subseteq H$

* A necessary and sufficient condition for a non-empty subset of a group $G$ to be a subgroup of $G$ is that $HH^{-1} = H$

* The necessary and sufficient condition for a finite subset $H$ of a group $G$ to be a subgroup of $G$ is $a, b \in H \Rightarrow ab \in H$

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | SUBGROUPS |
| Hours required | 5 |
| Learning Objectives | After completion of this topic, students will be able to discuss the algebra of subgroups |
| Previous knowledge to be reminded | Subgroups |
| Examples / Illustrations | $H_1 = \{0,3\}$ and $H_2 = \{0,2,4\}$ are subgroups of $\{\{0,1,2,3,4,5\},+\}$<br>$\Rightarrow H_1 \cap H_2 = \{0\}$ is a subgroup of $Z_6$ |
| Additional inputs | |
| Teaching Aids used | Blackboard, Chalkpiece |
| References cited | Topics in Algebra By I.N. Herstein |
| Student Activity Planned after the teaching | Seminar |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* If H and K are two subgroups of a group G, then HK is a subgroup of G iff $HK = KH$<br>$HK = (HK)^{-1} = K^{-1}H^{-1} = KH$<br>$(HK)(HK)^{-1} = (HK)(K^{-1}H^{-1}) = H(KK^{-1})H^{-1} = HH^{-1}$<br>$= KHH^{-1} = KH = HK$ |

M. Fayad

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* If $H_1$ and $H_2$ are two subgroups of a group G then $H_1 \cap H_2$ is a subgroup of G

* The union of two subgroups of a group need not be a subgroup of the group.

For example, $H_1 = \{0, 3\}$ and $H_2 = \{0, 2, 4\}$ are subgroups of $Z_6$

but $H_1 \cup H_2 = \{0, 2, 3, 4\}$ is not a subgroup of $Z_6$

because $2 + 3 = 5 \notin H_1 \cup H_2$

* The union of two subgroups of a group is a subgroup iff one is contained in the other.

* All the subgroups of an abelian group are abelian

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Cosets and Lagrange's theorem |
| Hours required | 5 |
| Learning Objectives | After Completion of this topic, students will be able to define the coset, discuss some properties of Cosets |
| Previous knowledge to be reminded | Subgroups |
| Examples / Illustrations | For $H=\{3n \mid n \in Z\}$, $0+H$, $1+H$ and $2+H$ are the only distinct left cosets |
| Additional inputs | Applications of Lagrange's theorem |
| Teaching Aids used | Blackboard, Chalkpiece |
| References cited | Topics in Algebra By I.N. Herstein |
| Student Activity Planned after the teaching | slip test |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Coset: Let $H$ be a subgroup of a group $G$ and $a \in G$. Then the set $aH=\{ah \mid h \in H\}$ is called a left coset of $H$ in $G$ generated by $a$ and $Ha=\{ha \mid h \in H\}$ is called a right coset of $H$ in $G$ generated by $a$ |

M. Tayyab

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* If $H$ is any subgroup of a group $G$ then and $h \in G$ then $hH = H = Hh$

* If $a, b$ are any two elements of a group $G$ and $H$ is any subgroup of $G$ Then $Ha = Hb \Leftrightarrow ab^{-1} \in H$ and $aH = bH \Leftrightarrow a^{-1}b \in H$

* If $a, b$ are any two elements of a group $G$ and $H$ is any subgroup of $G$ then $a \in bH \Leftrightarrow aH = bH$ and $a \in Hb \Leftrightarrow Ha = Hb$

* If Any two left (right) cosets of a subgroup are either disjoint or identical.

* Let $H$ be a subgroup of a group $G$. Then there exists a bijection between any two left cosets of $H$ in $G$.

* If $H$ is a subgroup of a group $G$ then there is one-to-one correspondence between the set of all distinct left cosets of $H$ in $G$ and the set of all distinct right cosets of $H$ in $G$.

Lagrange's Theorem

The order of a subgroup of a finite group divides the order of a group.

Converse of the above theorem is not true

For example, Take $H = \{1, -1\} \subseteq G = \{1, -1, i, -i\}$

then $o(H) = 2 \mid o(G) = 4$

but $H$ is not a subgroup of $G$

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | NORMAL SUBGROUPS |
| Hours required | 15 |
| Learning Objectives | After Completion of this topic, students will be able to define normal subgroup and discuss some properties of normal subgroups |
| Previous knowledge to be reminded | Subgroups and Cosets |
| Examples / Illustrations | $H_1 = \{1, -1\}$ is a normal subgroup of $G = \{1, -1, i, -i\}$ |
| Additional inputs | Sylow Theorems |
| Teaching Aids used | Blackboard, chalkpiece |
| References cited | Topics in Algebra By I.N. Herstein |
| Student Activity Planned after the teaching | Assignment, Seminar, Slip Test |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Normal Subgroup: A subgroup $H$ of a group $G$ is said to be a normal subgroup of $G$ if $xhx^{-1} \in H$ $\forall x \in G, h \in H$<br>* A subgroup $H$ of a group $G$ is normal iff $xHx^{-1} = H$ $\forall x \in G$ |

M. Rajesh

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* A Subgroup H of a group G is a normal subgroup of G iff each left coset of H in G is a right coset of H in G.

* A Subgroup H of a group G is a normal subgroup of G iff the product of two right (left) cosets of H in G is again a right (left) coset of H in G.

* Every subgroup of an abelian group is normal.

* If G is a group and H is a subgroup of index 2 in G then H is a normal subgroup of G.

* The intersection of any two normal subgroups of a group is a normal subgroup.

* A normal subgroup of a group G is commutative with every complex of G.

* If N is a normal subgroup of G and H is any subgroup of G then HN is a subgroup of G.

* If H is a subgroup of G and N is a normal subgroup of G then
(i) $H \cap N$ is a normal subgroup of H (ii) N is a normal subgroup of HN

* If N, M are normal subgroups of G then NM is also a normal subgroup of G.

* If M, N are two normal subgroups of G such that $M \cap N = \{e\}$ then every element of M commutes with every element of N

* Simple group: A group G is called simple if it has no proper normal subgroups.

* Every group of prime order is simple

* Let H be a normal subgroup of G then the set $G/H = \{Ha / a \in G\}$ is a group w.r.t coset multiplication defined as

$(Ha)(Hb) = Hab$ for $a, b \in G$

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Homomorphism, Isomorphism of Groups |
| Hours required | 15 |
| Learning Objectives | After completion of this topic, students will be able to find that given map is a homomorphism or not. And, learn some properties related to homomorphism |
| Previous knowledge to be reminded | Groups and normal Subgroups |
| Examples / Illustrations | $f: (\mathbb{Z}, +) \to (\mathbb{Z}, +)$ defined as $f(x) = x+1$ is not a homomorphism |
| Additional inputs | |
| Teaching Aids used | Blackboard, Chalkpiece |
| References cited | Topics in Algebra by I.N. Herestein |
| Student Activity Planned after the teaching | Slip test, Assignment and Seminar |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>$(G, *)$ and $(G', o)$ are two groups. If $f: G \to G'$ is a function satisfying the condition $f(x * y) = f(x) o f(y)$ for $x, y \in G$ then $f$ is called a group homomorphism<br>* Kernel of a homomorphism $f$ is defined as<br>$\text{Ker } f = \{x \in G / f(x) = e'\}$ ($e'$ is identity in $G'$) |

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* Every homomorphic image of a group is a group

* Every homomorphic image of an abelian group is an abelian group

* $G, G'$ are two groups, $e, e'$ are identity elements in $G, G'$ respectively

then $f(e) = e'$ and

$f(a^{-1}) = (f(a))^{-1}$ for $a \in G$

* $f: G \to G'$ is a group homomorphism then $\ker f$ is a normal subgroup of $G$

* $f: G \to G'$ is a group homomorphism then $f$ is an epimorphism iff

$\ker f = \{e\}$

Fundamental Theorem of Homomorphism of groups

Let $G, G'$ be two groups and $f: G \to G'$ be a homomorphism then

$G/\ker f \cong f(G)$

or

Every A homomorphic image of a group is isomorphic to some quotient group

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Differential Equations of first order and first degree |
| Hours required | 15 |
| Learning Objectives | After completion of this topic, Students will be able to solve differential equations of first order and first degree such as linear, Bernoulli, exact and non-exact. |
| Previous knowledge to be reminded | Differentiation and Integration Formulae |
| Examples / Illustrations | $\frac{dy}{dx} + 2xy = x^2$ is a linear differential equation of first order in $y$ |
| Additional inputs | Applications of differential equations |
| Teaching Aids used | Blackboard, Chalkpiece |
| References cited | Ordinary Differential Equations by M.D. Raisinghania |
| Student Activity Planned after the teaching | Slip test, Assignment and Seminar |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>An equation of the form $\frac{dy}{dx} + Py = Q$ is called a linear differential equation of first order in $y$<br>General solution is<br>$y\, e^{\int P(x)\,dx} = \int Q(x)\, e^{\int P(x)\,dx}\, dx + c$ |

M. Rajesh

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* An equation of the form $\frac{dx}{dy} + P(y)\,x = Q(y)$ is called linear differential equation of first order in $x$

General solution is $x\, e^{\int P(y)\,dy} = \int Q(y)\, e^{\int P(y)\,dy}\, dy + c$

* An equation of the form $\frac{dy}{dx} + Py = Qy^n$ ($n \in \mathbb{R}, n \neq 0$ and $n \neq 1$) is called a Bernoulli's differential equation. This equation can be solved by converting it into linear differential equation.

Exact differential equation:

An equation $M\,dx + N\,dy = 0$ is said to be an exact differential equation if there exists a function $f(x,y)$ having continuous first partial derivatives such that

$$M = \frac{\partial f}{\partial x} \quad \text{and} \quad N = \frac{\partial f}{\partial y}$$

* A necessary and sufficient condition for $M\,dx + N\,dy = 0$ to be exact is $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$

* Working rule for solving an exact differential equation

1. Compare the given equation with $M\,dx + N\,dy = 0$ and find out $M$ and $N$. Then find out $\frac{\partial M}{\partial y}$ and $\frac{\partial N}{\partial x}$
2. Given equation will be exact if $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$
3. Integrate $M$ partially w.r.t $x$, treating $y$ as constant. Denote it by $\int^x M\,dx$
4. Integrate only those terms of $N$, which do not contain $x$, w.r.t $y$
5. The general solution of the given exact differential equation is

$$\int^x M\,dx + \int (\text{Terms of } N \text{ not involving } x)\,dy = c$$

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | |
| Hours required | |
| Learning Objectives | |
| Previous knowledge to be reminded | |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Integrating Factor<br>Let $Mdx + Ndy = 0$ be not an exact differential equation. If $Mdx + Ndy = 0$ can be made exact by multiplying it with a suitable function $\mu(x,y) \neq 0$, then $\mu(x,y)$ is called an integrating factor of $Mdx + Ndy = 0$ |

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## Methods to find integrating factors of $Mdx + Ndy = 0$

**Method 1: By Inspection**

$d(xy) = x\,dy + y\,dx$ $\quad d[\log(xy)] = \frac{x\,dy + y\,dx}{xy}$ $\quad d\left(\frac{x}{y}\right) = \frac{y\,dx - x\,dy}{y^2}$

$d\left(\frac{y}{x}\right) = \frac{x\,dy - y\,dx}{x^2}$ $\quad d\left(\frac{y^2}{x}\right) = \frac{2xy\,dy - y^2\,dx}{x^2}$ $\quad d\left(\frac{x^2}{y}\right) = \frac{2xy\,dx - x^2\,dy}{y^2}$

$d\left(\tan^{-1}\frac{y}{x}\right) = \frac{x\,dy - y\,dx}{x^2+y^2}$ $\quad d\left(\tan^{-1}\frac{x}{y}\right) = \frac{y\,dx - x\,dy}{x^2+y^2}$ $\quad d\left(\frac{e^x}{y}\right) = \frac{y e^x dx - e^x dy}{y^2}$

**Method 2:** If $Mdx + Ndy = 0$ is a non-exact homogeneous differential equation and $Mx + Ny \neq 0$ then $\frac{1}{Mx+Ny}$ is an integrating factor of $Mdx + Ndy = 0$

**Working Rule to Solve $Mdx + Ndy = 0$**

1. General equation is $M\,dx + N\,dy = 0$ $\quad$ (i)

   Observe $\frac{\partial M}{\partial y} \neq \frac{\partial N}{\partial x} \Rightarrow$ (i) is not exact

2. Observe $M$ and $N$ are homogeneous functions of same order

3. Find $Mx + Ny$ and observe it $\neq 0$. Then $\frac{1}{Mx+Ny}$ is an I.F of (i).

4. Multiply (i) with I.F to Transform it into an exact equation of (ii)

   $M_1\,dx + N_1\,dy = 0$ $\quad$ (ii)

5. Solve (ii) to get the general solution of (i)

**Method 3:** If the equation $M\,dx + N\,dy = 0$ is of the form $y f(x,y)\,dx + x g(x,y)\,dy = 0$ and $Mx - Ny \neq 0$ then $\frac{1}{Mx-Ny}$ is an integrating factor of

$Mdx + Ndy = 0$

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Differential Equations of first order but not of first degree |
| Hours required | 15 |
| Learning Objectives | After completion of this topic, students will be able to solve differential equations (nonlinear) |
| Previous knowledge to be reminded | Differentiation and integration |
| Examples / Illustrations | $\left(\frac{dy}{dx}\right)^2 + 2 \cdot \frac{dy}{dx} + y = 0$ is a non linear first order equation |
| Additional inputs | Applications of differential equations |
| Teaching Aids used | Blackboard, Chalkpiece |
| References cited | ordinary and partial differential equations by M.D Raisinghania |
| Student Activity Planned after the teaching | Assignment, Seminar and Slip test |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>* An equation of the form $f(x, y, p) = 0$, where $p$ is not of first degree is called a differential equation of first order and not of first degree<br>These equations can be divided into four types:<br>(i) Solvable for $p$ (ii) Solvable for $x$ (iii) Solvable for $y$<br>(iv) clairaut's equation |

M Bajpai

Signature of the Lecturer

## Equations solvable for p

Let $f(x,y,p)=0 \longrightarrow (1)$ be the given equation of first order and degree $n$

$\therefore$ (1) can be written as $p^n + P_1(x,y)p^{n-1} + \dots + P_n(x,y) = 0 \longrightarrow (2)$

If (2) is solved for $p$, let $n$ solutions be

$$p = f_1(x,y),\ p = f_2(x,y),\ \dots\ p = f_n(x,y) \longrightarrow (3)$$

$\therefore$ (2) can be expressed in the form

$$[p - f_1(x,y)]\ [p - f_2(x,y)] \dots [p - f_n(x,y)] = 0 \longrightarrow (4)$$

Solving each equation in (3), we get $n$ solutions

$F_1(x,y,c_1)=0,\ F_2(x,y,c_2)=0,\ \dots\ F_n(x,y,c_n)=0$ for $n$ equations respectively

Since $F_1(x,y,c_1)=0$ is solution to $p = f_i(x,y)$ for each $i$, $F_i(x,y,c_i)=0$ is also solution of (4)

$\therefore$ The solution of (1) is $F_1(x,y,c_1)\,F_2(x,y,c_2) \dots F_n(x,y,c_n) = 0$

Since the equation (1) is of first order, the general solution should have only one arbitrary constant.

Taking $c_1 = c_2 = \dots = c_n = c$, the general solution of (1) is

$$F_1(x,y,c)\,F_2(x,y,c) \dots F_n(x,y,c) = 0$$

## Equations solvable for x

Let $f(x,y,p)=0$ be the given differential equation $\longrightarrow (1)$

If the equation (1) cannot be split up into rational and linear factors and (1) is of first degree in $x$, then (1) can be solved for $x$.

(1) can be expressed in the form $x = F(y,p) \longrightarrow (2)$

Differentiating (2) w.r.t $y$ gives an equation of the form $\frac{1}{p} = g\left(y, p, \frac{dp}{dy}\right) \longrightarrow (3)$

Since (3) is an equation in two variables $p$ and $y$, it can be solved

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | |
| Hours required | |
| Learning Objectives | |
| Previous knowledge to be reminded | |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Equations Solvable for y:<br>Let $f(x,y,p)=0$ be the given differential equation —(1)<br>If (1) cannot be resolved into two rational and linear factors and (1) is of first degree in y, then it can be solved for y |

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① can be expressed in the form $y = F(x, p) \rightarrow ②$

Differentiation of ② w.r.t $x$ gives an equation of the form

$$p = g\left(x, p, \frac{dp}{dx}\right) \rightarrow ③$$

Since ③ is an equation in two variables $p$ and $x$, it can be solved.

The solution of ① is $\psi(x, y, c) = 0$

## Equations that do not contain $x$ (or $y$)

If the equation is of the form $f(x, p) = 0$ and is solvable for $p$, it will give $\frac{dy}{dx} = \phi(x)$, which is integrable. But if it is solvable for $x$, then $x = F(p)$

~~which is~~ If the equation is of the form $f(y, p) = 0$ and is solvable for $p$, it will give $\frac{dy}{dx} = \phi(y)$, which is integrable. But if it is solvable for $y$, then $y = F(p)$

## Clairaut's Equation

The differential equation of the form $y = xp + f(p)$ is called clairaut's equation. This equation is solved by considering it as $y = f(x, p)$, solvable for $y$ type.

Solution of Clairaut's equation:

Let the given equation be $y = xp + f(p) \rightarrow ①$

$$\Rightarrow \frac{dy}{dx} = x\frac{dp}{dx} + p + f'(p)\frac{dp}{dx} \Rightarrow p = \left[x + f'(p)\right]\frac{dp}{dx} + p$$

$$\Rightarrow (x + f'(p))\frac{dp}{dx} = 0 \Rightarrow \frac{dp}{dx} = 0 \Rightarrow p = c$$

$\therefore$ The general solution of clairaut's equation ① is $y = xc + f(c)$

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Higher Order Linear Differential Equations – I |
| Hours required | 15 |
| Learning Objectives | After completion of this topic, students will be able to solve the higher order linear differential equations with Constant Coefficients when $Q(x) = e^{ax}$ or $\sin ax$ or $\cos ax$ or $x^k$ |
| Previous knowledge to be reminded | Finding roots of the equations and differentiation and integration formulae |
| Examples / Illustrations | $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 2y = 0$ is a second order linear differential equation |
| Additional inputs | – |
| Teaching Aids used | Blackboard and Chalkpiece |
| References cited | Ordinary and partial differential equations by M.D. Raisinghania |
| Student Activity Planned after the teaching | Assignment, Seminar and Slip test |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>*An equation of the form $a_n\frac{d^ny}{dx^n} + a_{n-1}\frac{d^{n-1}y}{dx^{n-1}} + \dots + a_1\frac{dy}{dx} + a_0 y = Q(x)$ where $a_0, a_1, \dots a_n, Q$ are continuous real functions in $x$ is called a linear differential equation of order $n$. |

M. Tayo

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* If $y = y_1(x), y = y_2(x), \ldots y = y_k(x)$ are any k solutions of the $k^{th}$ order equation $f(D)y = 0$ then $y = c_1y_1 + c_2y_2 + \cdots + c_ky_k$ ($c_1, c_2 \cdots c_k$ are constants) is also a solution of $f(D)y = 0$

Case(i) When the auxiliary equation has real and distinct roots then the general solution of $f(D)y = 0$ is $y = c_1e^{m_1x} + c_2e^{m_2x} + \cdots + c_ne^{m_nx}$

$(D^2 - 3D + 2)y = 0$

Auxiliary equation is $f(m) = m^2 - 3m + 2 = 0$

$\Rightarrow (m-1)(m-2) = 0 \Rightarrow m = 1, 2$

General Solution is $y = c_1e^x + c_2e^{2x}$

Case(ii) When Auxiliary Equation has some equal roots

then G.S is $y = (c_1 + c_2x)e^{mx}$

$(D^2 - 2D + 1)y = 0$

A.E is $f(m) = m^2 - 2m + 1 = 0$

$\Rightarrow (m-1)^2 = 0 \Rightarrow m = 1, 1$

G.S is $y = (c_1 + c_2x)e^x$

Case(iii) When A.E has only a pair of conjugate complex roots

then G.S is $y = e^{ax}(c_1 \cos bx + c_2 \sin bx)$, $m = a \pm ib$

$(D^2 + D + 1)y = 0$

A.E is $f(m) = m^2 + m + 1 = 0$

$\Rightarrow m = \frac{-1 \pm \sqrt{1-4}}{2} = -\frac{1}{2} \pm i\frac{\sqrt{3}}{2}$

G.S is $y = e^{-\frac{1}{2}x}\left(c_1 \cos\frac{\sqrt{3}}{2}x + c_2 \sin\frac{\sqrt{3}}{2}x\right)$

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | |
| Hours required | |
| Learning Objectives | |
| Previous knowledge to be reminded | |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>If Q is any function of x defined on an interval I and $\alpha$ is a constant then a particular value of $\frac{1}{D-\alpha}Q$ is equal to $e^{\alpha x}\int Qe^{-\alpha x}dx$<br>$\frac{1}{(D-\beta)(D-\alpha)}Q = \frac{1}{D-\beta}\left[e^{\alpha x}\int Qe^{-\alpha x}dx\right]$<br>$= e^{\beta x}\int\left[e^{\alpha x}\int Qe^{-\alpha x}dx\right]dx$ |

M. Thyagu

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* If $Q = e^{ax}$ then $P.I = \frac{1}{f(D)} e^{ax} = \begin{cases} \frac{e^{ax}}{f(a)}, & f(a) \neq 0 \\ \frac{x^k}{\phi(a)k!} e^{ax}, & \phi(a) \neq 0 \text{ when } a \text{ repeats } k \text{ times} \end{cases}$

$P.I$ of $(D^2 - 5D + 6)y = e^{4x}$ is

$$y_p = \frac{1}{D^2 - 5D + 6} e^{4x} = \frac{1}{16 - 20 + 6} e^{4x} = \frac{e^{4x}}{2}$$

* If $Q = \sin bx$ or $\cos bx$ then

$$P.I = \frac{1}{f(D)} Q = \frac{1}{\phi(D^2)} Q = \frac{1}{\phi(-b^2)} Q, \quad \phi(-b^2) \neq 0$$

if $\phi(-b^2) = 0$ then $P.I = \frac{1}{D^2 + b^2} \sin bx = -\frac{x}{2b} \cos bx$

$$P.I = \frac{1}{D^2 + b^2} \cos bx = \frac{x}{2b} \sin bx$$

$P.I$ of $(D^2 - D - 2)y = \sin 2x$

$$y_p = \frac{1}{D^2 - D - 2} \sin 2x = \frac{1}{-4 - D - 2} \sin 2x = -\frac{1}{D + 6} \sin 2x$$

$$= -\frac{D - 6}{D^2 - 36} \sin 2x = -\frac{D - 6}{-40} \sin 2x = 2\cos 2x - 6\sin 2x$$

$(1+x)^{-1} = 1 - x + x^2 - x^3 + \dots$, $(1-x)^{-1} = 1 + x + x^2 + x^3 + \dots$

$(1+x)^{-2} = 1 - 2x + 3x^2 - 4x^3 + \dots$ $(1-x)^{-2} = 1 + 2x + 3x^2 + 4x^3 + \dots$

* If $Q = x^k$ then $P.I = \frac{1}{f(D)} x^k$

$P.I$ of $(D^2 - 3D + 2)y = 2x^2$

$$y_p = \frac{1}{D^2 - 3D + 2} 2x^2 = \frac{2}{2\left(1 + \frac{D^2 - 3D}{2}\right)} x^2 = \left(1 + \frac{D^2 - 3D}{2}\right)^{-1} x^2$$

$$= \left[1 - \frac{D^2 - 3D}{2} + \left(\frac{D^2 - 3D}{2}\right)^2\right] x^2 = x^2 - \frac{D^2 x^2 - 3Dx^2}{2} + \frac{9D^2}{4} x^2$$

$$= x^2 - \frac{2 - 6x}{2} + \frac{9 \cdot 2}{4} = \frac{2x^2 - 2 + 6x + 9}{2} = \frac{2x^2 + 6x + 7}{2}$$

## Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Higher order Linear Differential Equations – II |
| Hours required | 15 |
| Learning Objectives | After completion of this topic, students will be able to solve the higher order linear differential equations when $Q(x) = e^{ax}\sin bx$ or $e^{ax}\cos bx$ or $e^{ax}V$ $(V = x^k)$. |
| Previous knowledge to be reminded | Finding roots of equations and differentiation and integration formulae |
| Examples / Illustrations | |
| Additional inputs | |
| Teaching Aids used | |
| References cited | |
| Student Activity Planned after the teaching | |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>Working rule to find PI of $f(D)y = Q$, $Q = e^{ax}V$<br>$P.I = \frac{1}{f(D)} e^{ax} V$<br>$= e^{ax} \frac{1}{f(D+a)} V$ |

M. Priya

Signature of the Lecturer

Solve $(D^2-2D+1)y = x^2e^{3x}$

Sol: $y_c = (c_1+c_2x)e^x$

$$y_p = \frac{1}{(D-1)^2}x^2e^{3x}$$

$$= e^{3x}\frac{1}{(D+3-1)^2}x^2 = e^{3x}\frac{1}{(D+2)^2}x^2$$

$$= e^{3x}\cdot\frac{1}{4}\left(1+\frac{D}{2}\right)^{-2}x^2$$

$$= e^{3x}\cdot\frac{1}{4}\left(1-\frac{D}{2}+\frac{D^2}{4}\right)x^2$$

$$= e^{3x}\left(\frac{x^2}{4}-\frac{2x}{8}+\frac{2}{16}\right)$$

General solution of given equation is $y = y_c + y_p$

$$\Rightarrow y = (c_1+c_2x)e^x + e^{3x}\left(\frac{x^2}{4}-\frac{x}{4}+\frac{1}{8}\right)$$

Working rule to find P.I of $f(D)y = Q$ ; $Q = xV$

$$P.I = \frac{1}{f(D)}xV = x\frac{1}{f(D)}V - \frac{f'(D)}{[f(D)]^2}V$$

Solve $(D^2+4)y = x\sin x$

Sol: Given equation is $(D^2+4)y = x\sin x$

$f(D) = D^2+4$

$\Rightarrow f(m) = m^2+4 = 0 \Rightarrow m = \pm 2i$

$y_c = c_1\cos 2x + c_2\sin 2x$

$$y_p = \frac{1}{D^2+4}x\sin x$$

$$= x\frac{1}{D^2+4}\sin x - \frac{2D}{(D^2+4)^2}\sin x$$

$$= x\frac{1}{-1+4}\sin x - \frac{2D}{(-1+4)^2}\sin x$$

$$= \frac{x\sin x}{3} - \frac{1}{9}2\cos x$$

General solution to the given equation is

$$y = y_c + y_p$$

$$\Rightarrow y = c_1\cos 2x + c_2\sin 2x + \frac{x\sin x}{3} - \frac{2\cos 3x}{9}$$

# Teaching Plan / Lesson No.

| | |
|---|---|
| Name of the Topic | Higher order Linear Differential Equations (non constant coefficients) |
| Hours required | 15 |
| Learning Objectives | After completion of this topic, students will be able to solve the higher order linear differential equations with non constant coefficients |
| Previous knowledge to be reminded | Differentiation and integration formulae |
| Examples / Illustrations | $x\frac{d^2y}{dx^2}+(x-2)\frac{dy}{dx}-2y=x^3$ is a higher order equation with non-constant coefficients |
| Additional inputs | |
| Teaching Aids used | Blackboard, chalkpiece |
| References cited | ordinary and partial differential equations by M.D. Raisinghania |
| Student Activity Planned after the teaching | slip test, Assignment, Seminar |
| Activity planned outside the class room, if any | |
| Any other activity | |
| Topic Synopsis | *(Continue on the reverse side if needed)*<br>∝ An equation of the form $\frac{d^2y}{dx^2}+P(x)\frac{dy}{dx}+Q(x)=R(x)$ where $P(x)$, $Q(x)$ and $R(x)$ are real valued functions of $x$ is called the linear equation of the second order with Variable Coefficients |

M. Payal

Signature of the Lecturer

Rules to find a solution of $\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy = 0$

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Rule 1: $y = e^{ax}$ is a solution if $a^2 + Pa + Q = 0$

Rule 2: $y = x^m$ is a solution if $1 - P + Q = 0$

& $y = x$ is a part of CF if $P + Qx = 0$

& $\frac{y}{x}$ = working rule to solve $\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy = R$ → (1)

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1. Reduce the given equation to standard form as given in (1)

2. Either a part of C.F is given or it can be found by inspection in some given above. Let it be $y = u$

3. Let $y = uv$ the general solution of (1) where $v$ = real.

4. Then $\frac{dy}{dx} = u\frac{dv}{dx} + v\frac{du}{dx}$ and $\frac{d^2y}{dx^2} = v\frac{d^2u}{dx^2} + 2\frac{du}{dx}\frac{dv}{dx} + u\frac{d^2v}{dx^2}$

5. With these substitutions in (1), it take the form

$$\frac{d^2v}{dx^2} + P_1\frac{dv}{dx} = R_1 \text{ where } P_1 = P + \frac{2}{u}\frac{du}{dx} \text{ and } R_1 = \frac{R}{u}$$

6. Taking $\frac{dv}{dx} = V$, it becomes $\frac{dV}{dx} + P_1V = R_1$ which is linear in $V$ and $x$ hence it can be solved for $V$

7. $V = \frac{dv}{dx}$ on integration gives $v$.

8. Then the required general solution $y = uv$

The End

M-Engg