### SEMESTER III

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA9211</td>
<td>Mathematics – III</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CE9201</td>
<td>Strength of Materials-I</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CE9202</td>
<td>Fluid Mechanics</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>AI9201</td>
<td>Surveying</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9202</td>
<td>Theory of Machines</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9203</td>
<td>Principles of Crop Production</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE9204</td>
<td>Strength of Materials Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>AI9204</td>
<td>Survey Laboratory</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>18</td>
<td>4</td>
<td>7</td>
<td>26</td>
</tr>
</tbody>
</table>

### SEMESTER IV

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA9262</td>
<td>Numerical Methods</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CE 9253</td>
<td>Applied Hydraulics Engineering</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>AI 9251</td>
<td>Soil Science and Engineering</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>AI 9252</td>
<td>Hydrology and Water Resources Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI 9253</td>
<td>Food Science and Nutrition Technology</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>GE9261</td>
<td>Environmental Science and Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AI9254</td>
<td>Soil Science Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>AI9255</td>
<td>Fluid Mechanics and Machinery Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>18</td>
<td>3</td>
<td>6</td>
<td>25</td>
</tr>
<tr>
<td>CODE NO.</td>
<td>COURSE TITLE</td>
<td>L</td>
<td>T</td>
<td>P</td>
<td>C</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>THEORY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AI9301</td>
<td>Irrigation Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9302</td>
<td>Groundwater and Well Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9303</td>
<td>Remote Sensing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9304</td>
<td>Aquaculture Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9305</td>
<td>Design and Drawing of Agricultural Machinery</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Elective- I</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PRACTICAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AI9306</td>
<td>Irrigation Drawing</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>AI9307</td>
<td>Irrigation Field Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>GE9371</td>
<td>Communication Skills and Soft Skills</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>18</td>
<td>1</td>
<td>8</td>
<td>24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEORY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ME9037</td>
<td>Refrigeration and Air-Conditioning</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CE9036</td>
<td>Integrated Water Resources Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9351</td>
<td>Tractor and Farm Equipments</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9352</td>
<td>Geographical Information System</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9353</td>
<td>Drainage Engineering and Land Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9354</td>
<td>Systems Analysis in Irrigation Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Elective- II</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PRACTICAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AI9355</td>
<td>CAD For Agricultural Engineering</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>AI9356</td>
<td>Technical Seminar</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>21</td>
<td>1</td>
<td>6</td>
<td>25</td>
</tr>
<tr>
<td>CODE NO.</td>
<td>COURSE TITLE</td>
<td>L</td>
<td>T</td>
<td>P</td>
<td>C</td>
</tr>
<tr>
<td>----------</td>
<td>---------------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td><strong>SEMESTER VII</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AI 9401</td>
<td>Agricultural Economics And Farm Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI 9402</td>
<td>Soil And Water Conservation Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI 9403</td>
<td>Food Processing Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI 9404</td>
<td>It in Agricultural Systems</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI 9405</td>
<td>Irrigation Equipment Design</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Elective- III</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AI 9406</td>
<td>Practical training (4 Weeks )</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td><strong>SEMESTER VIII</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective-Iv</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Elective- V</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AI 9451</td>
<td>Project Work</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td>6</td>
<td>0</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>
### ELECTIVES FOR B.E AGRICULTURAL AND IRRIGATION ENGINEERING

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE9037</td>
<td>Participatory Water Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9021</td>
<td>Watershed Development</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9022</td>
<td>Flood And Drought Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9023</td>
<td>Irrigation Water Quality And Modeling</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9024</td>
<td>Minor Irrigation And Command Area Development</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9025</td>
<td>Advanced Irrigation Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9026</td>
<td>Geology For Irrigation Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9027</td>
<td>Bio-Technology Principles</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9028</td>
<td>Seed Technology Applications</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9029</td>
<td>Post-Harvesting Technology</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9030</td>
<td>Bio Energy Resource Technology</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9031</td>
<td>Commercial Micro Irrigation Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9032</td>
<td>Dairy Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9033</td>
<td>Instrumentation And Control Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9034</td>
<td>Manufacturing Process</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9035</td>
<td>Unit Operations In Bio-Processing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>GI9030</td>
<td>Remote Sensing And GIS For Agriculture And Forestry</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AI9036</td>
<td>Agricultural Business Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>CE9401</td>
<td>Principles of Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>MA9267</td>
<td>Statistics And Linear Programming</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>ME9355</td>
<td>Heat And Mass Transfer</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>GE9075</td>
<td>Intellectual Property Rights (IPR)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>GE9072</td>
<td>Indian Constitution And Society</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>GE9073</td>
<td>Contract Laws And Regulations</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>GE9022</td>
<td>Total Quality Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>GE9021</td>
<td>Professional Ethics In Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
AIM
To facilitate the understanding of the principles and to cultivate the art of formulating physical problems in the language of mathematics.

OBJECTIVES
- To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems
- To acquaint the student with Fourier transform techniques used in wide variety of situations in which the functions used are not periodic
- To introduce the effective mathematical tools for the solutions of partial differential equations that model physical processes
- To develop Z-transform techniques which will perform the same task for discrete time systems as Laplace Transform, a valuable aid in analysis of continuous time systems

UNIT I Fourier Series

UNIT II Fourier Transform

UNIT III Partial Differential Equations
Formation – Solutions of first order equations – Standard types and Equations reducible to standard types – Singular solutions – Lagrange’s Linear equation – Integral surface passing through a given curve – Solution of linear equations of higher order with constant coefficients.

UNIT IV Applications of Partial Differential Equations
Method of separation of Variables – Solutions of one dimensional wave equation and one-dimensional heat equation – Steady state solution of two-dimensional heat equation – Fourier series solutions in Cartesian coordinates.

UNIT V Z-Transform and Difference Equations

L: 45, T: 15, TOTAL: 60 PERIODS

TEXT BOOK
OBJECTIVE:
Enable the student to understand the behaviour of deformable structural elements, subjected to different types of loadings

UNIT I  STRESS, STRAIN AND DEFORMATION OF SOLIDS  12

UNIT II  ANALYSIS OF PLANE TRUSSES  12
Stability and equilibrium of plane frames – perfect frames - types of trusses – Analysis of forces in truss members – Method of joints – Method of tension co-efficient – Method of sections.

UNIT III  BENDING OF BEAMS  12

UNIT IV  TORSION  12
Theory of simple torsion - Stresses and deformation in circular and hollow shafts – Stepped shafts – Shafts fixed at both ends – Stresses and deflection in helical springs.

UNIT V  DEFLECTION OF BEAMS  12
Double Integration method – Macaulay’s method – Area moment method – Conjugate beam method for computation of slopes and deflections in determinate beams.

TEXT BOOKS:
REFERENCES:

1. Irwing H. Shames, James M. Pitarresi, "Introduction to Solid Mechanics, Prentice Hall of India, New Delhi, 2002.

CE 9202 FLUID MECHANICS L T P C
3 1 0 4

OBJECTIVE:
The student is introduced to the mechanics of fluids through a thorough understanding of the properties of the fluids, behaviour of fluids under static conditions. The dynamics of fluids is introduced through the control volume approach which gives an integrated understanding of the transport of mass, momentum and energy. 2. The applications of the conservation laws to a) flow measurements b) flow through pipes (both laminar and turbulent) and c) forces on vanes is studied.

UNIT I FLUIDS PROPERTIES AND FLUID STATICS 12
Scope of fluid mechanics - Definitions of a fluid - Methods of analysis - Dimensions and units - viscosity, density, perfect gas, vapour pressure and surface tension - Basic equation of fluid statics - Pressure measurements - Manometers. - Forces on plane and curved surfaces - Buoyancy and floatation - Stability of floating bodies - Relative equilibrium.

UNIT II BASIC CONCEPTS OF FLUID FLOW 12
(a) Kinematics – Methods of describing fluid motion - Classification of flows - Streamline, streak-line and path-lines - Stream function and velocity potentials - Flow nets; (b) Dynamics - Dimensional Concepts of System and Control volume - Application of control volume to continuity, energy and momentum - Euler's equation of motion along a stream line - Bernoulli’s equation - Applications to velocity and discharge measurements - Linear momentum equation and moment-of-momentum equations and their applications.

UNIT III DIMENSIONAL ANALYSIS AND MODEL STUDIES 12
Fundamental dimensions - dimensional homogeneity - Rayleigh’s method and Buckingham Pi-Theorem - Dimensionless parameters - Similitude and model studies. Distorted Models.

UNIT IV INCOMPRESSIBLE VISCOUS FLOW 12
Laminar flow between parallel plates, and pipes - Development of laminar and turbulent flows in pipes - Reynolds experiment - Darcy-Weisbach equation - Moody diagram - Major and minor losses of flow in pipes - Pipes in series and in parallel.
UNIT V BOUNDARY LAYERS

L: 45 + T: 15 TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES

AI 9201 SURVEYING L T P C
3 0 0 3

OBJECTIVE:
The objective of this course is to introduce to the students the various methods of surveying.

UNIT I INTRODUCTION AND CHAIN SURVEYING

UNIT II COMPASS SURVEYING AND PLANE TABLE SURVEYING

UNIT III LEVELLING AND APPLICATIONS
UNIT IV  THEODOLITE SURVEYING AND MODERN SYSTEMS

UNIT V  ENGINEERING SURVEYS
Reconnaissance, preliminary and location surveys for engineering projects – Layout – Setting out works – Route surveys for highways and waterways – Curve ranging – Horizontal and vertical curves – Simple curves – Setting with chain and tapes, tangential angles by theodolite, double theodolite – Compound and reverse curves – Transition curves – Functions and requirements – Setting out by offsets and angles – Vertical curves – Sight distances.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
OBJECTIVE:
To introduce the students the theory of machines pertaining to agricultural engineering.

UNIT I TERMINOLOGY
Definitions - Kinematic links - Pairs - Chain - Machines and mechanism - Types and uses - Velocity and acceleration in mechanisms - Vector polygon and instantaneous centre methods - Problems.

UNIT II FRICTIONS IN BEARINGS
Friction - Bearings - Pivot and collar bearings - Antifriction bearings - Application - loss of power due to friction in bearings - viscosity - theory of lubrication.

UNIT III BELT DRIVES AND CLUTCHES

UNIT IV MOTION OF CAM AND FOLLOWER
Cam and follower - types - application - profiles for uniform velocity - acceleration - simple harmonic and cycloidal motion - uniform angular velocity.

UNIT V GEARS AND GOVERNORS

TEXT BOOKS:

REFERENCE:
OBJECTIVES:
- To introduce the students to principles of field and horticultural crop production, and to provide a glimpse of their production practices.
- To delineate the role of relate each of the crop production practices to the role of an agricultural / irrigation engineer, explicitly.

UNIT I AGRICULTURE AND CROP PRODUCTION 9+3
Introduction to agriculture and its crop production sub-sectors: agronomy and horticulture factors affecting crop growth and production – Principles of crop production: crop selection; systems of cropping; field preparation; plant spacing and arrangement; nutrient management; water management; crop protection.

UNIT II SOIL AS A MEDIUM FOR PLANT GROWTH 9+3
Soil physical and chemical properties of relevance to crop growth – Soil-water relations – Soil-nutrient relations – Soil and land degradation: physical constraints, chemical constraints, erosion and methods of their prevention and reclamation.

UNIT III FIELD PRACTICES 9+3

UNIT IV FIELD CROPS 9+3
Important groups of field crops in Tamil Nadu and the generalized cultivation practices for each group: cereal crops; grain legumes; oil seed crops; sugarcane; and fibre crops – Special purpose crops, such as green manures, and their management.

UNIT V HORTICULTURAL CROPS 9+3
Important groups of horticultural crops in Tamil Nadu and the generalized cultivation practices for each group: vegetable crops; fruit crops; flower crops, plantation crops and others.

TEXT BOOKS:

REFERENCES:

CE9204  STRENGTH OF MATERIALS LABORATORY  L T P C
0 0 3 2

OBJECTIVE:
To study the properties of materials when subjected to different types of loading.

1. Tension test on mild steel / tor steel rod
2. Compression test on wood
3. Double shear test on metal
4. Torsion test on mild steel rod
5. Impact test on metal specimen
6. Hardness test on metals
7. Deflection test on metal beam
8. Compression test on helical spring
9. Deflection test on carriage spring
10. Tests on bricks, concrete cubes and tiles - Demonstration only

TOTAL: 45 PERIODS

AI9204  SURVEY LABORATORY  L T P C
0 0 4 2

OBJECTIVE:
The objective of this course is to train the students to acquire skill in operation of various survey instruments and to obtain accurate results.

1. CHAIN SURVEYING
   i  Study of chain and its accessories
   ii  Ranging, chaining and pacing
   iii  Chain surveying.
2. COMPASS SURVEYING  
   i Triangulation problems  
   ii Compass traversing

3. PLANE TABLE SURVEYING  
   i  
      a) Study of Plane table and its accessories  
      b) Radiation  
   ii Intersection – Triangulation problems  
   iii Plane table traversing

4. LEVELLING  
   i Study of levels and leveling staves  
   ii Fly leveling using dumpy level  
   iii Fly leveling using tilting level  
   iv Check leveling  
   v Block contouring  
   vi Radial contouring

5. THEODOLITE SURVEYING  
   i Study of Theodolites  
   ii Measurements of Horizontal angles  
   iii Measurements of Vertical angles  
   iv Stadia Tacheometry

6. Experiment using Total station and GPS  

TOTAL: 60 PERIODS

MA 9262  
NUMERICAL METHODS  
L  T  P  C  3  1  0  4

AIM:  
This course gives a complete procedure for solving different kinds of problems occur in engineering and technology numerically.

OBJECTIVE:  
The students would be acquainted with the basic concepts in this course and their uses.

UNIT I  
SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS  
9 + 3
UNIT II  INTERPOLATION AND APPROXIMATION  9 + 3
Interpolation with unequal intervals – Lagrange interpolation – Newton’s divided difference interpolation – Cubic Splines – Interpolation with equal intervals – Newton’s forward and backward difference formulae.

UNIT III  NUMERICAL DIFFERENTIATION AND INTEGRATION  9 + 3

UNIT IV  INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS  9 + 3

UNIT V  BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS  9 + 3
Finite difference methods for solving two-point linear boundary value problems. Finite difference techniques for the solution of two dimensional Laplace’s and Poisson’s equations on rectangular domain – One dimensional heat-flow equation by explicit and implicit (Crank Nicholson) methods - One dimensional wave equation by explicit method.

L: 45, T: 15 TOTAL: 60 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVES:

- The objectives of the course are to introduce the students to various hydraulic engineering problems like open channel flows and hydraulic machines.
- At the completion of the course, the student should be able to relate the theory and practice of problems in hydraulic engineering.

UNIT I  OPEN CHANNEL FLOW  9+3
Steady uniform flow - Best hydraulic sections for uniform flow - Specific energy and specific force.

UNIT II  STEADY GRADUALLY VARIED FLOWS  10+3
Dynamic equation - Water surface flow profile classifications - Profile determination by graphical method, direct step method and standard step methods.

UNIT III  RAPIDLY VARIED FLOWS  8+2
Hydraulic jumps - Types - Energy dissipation - Surges and surge through channel transitions.

UNIT IV  TURBO MACHINES  10+4
Turbines – Classification - Reaction turbines – Francis turbine, Radial flow turbines, draft tube and cavitation - Propeller and Kaplan turbines - Impulse turbines - Performance of turbines - Similarity laws; Centrifugal pumps - Minimum speed to start the pump – NPSH - Cavitation in pumps - Operating characteristics - Multistage pumps.

UNIT V  POSITIVE DISPLACEMENT PUMPS  8+3
Reciprocating pumps - Negative slip - Flow separation conditions - Air vessels, indicator diagrams and its variations - Savings in work done - Rotary pumps.

L: 45 + T:15  TOTAL: 60 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
At the end of the course the students would be exposed to fundamental knowledge in
- Soil Physical parameters
- Permeability- Compaction and compressibility
- Types and methods of soil survey and interpretative groupings

UNIT I  INTRODUCTION AND PHYSICAL PROPERTIES  9 + 3

UNIT II  PHASE RELATIONSHIP  9 + 3
Weight and Volume relationships- Gradation analysis- Atterberg Limits-Classification of soil based on the above- Compaction theory- Lab and field compaction study.

UNIT III  ENGINEERING PROPERTIES OF SOIL  9 + 3
Shear strength-Mohr-Coloumb strength theory-Basic tests-Compressibility- Assessment of seepage through flow net construction-Permeability-Darcy’s law-measurements- Consolidation-Coefficient of Compressibility-Earth pressure theory-Active and passive conditions

UNIT IV  BEARING CAPACITY AND SLOPE STABILITY  9 + 3
Bearing capacity of soils-Shallow foundation-Terzaghi’s formula- BIS standards- Factors affecting Bearing Capacity- Slope stability-Analysis of infinite and finite slopes-Simple method.

UNIT V  SOIL CLASSIFICATION AND SURVEY  9 + 3

L:45+T:15 TOTAL : 60 PERIODS

TEXT BOOKS:

REFERENCES:
AI 9252 HYDROLOGY AND WATER RESOURCES ENGINEERING  L T P C
3 0 0 3

OBJECTIVE:
To introduce the student to the concept of hydrological aspects of water availability and requirements. At the completion of the course the student should be able to quantify, control and regulate the water resources.

UNIT I PRECIPITATION AND ABSTRACTIONS 10

UNIT II RUNOFF 8
Watershed, catchment and basin-Catchment characteristics-factors affecting runoff-Runoff estimation using empirical-Strange’s table and SCS methods-Stage discharge relationships-flow measurements- Hydrograph- Unit Hydrograph

UNIT III STORAGE AND DISTRIBUTION WORKS 10
Classification of reservoirs, General principles of design, site selection, spillways, surface area Vs elevation Vs storage relationship, life of reservoirs-Canals-Canal alignment, Cross drainage works

UNIT IV GROUNDWATER AND RAIN WATER HARVESTING 10
Origin- Classification and properties of aquifers-Groundwater potential-Darcy’s law-Importance- RWH in rural and urban areas- RWH from building roof and open areas-direct storage sumps- RWH structures.

UNIT V FLOODS AND DROUGHTS 7

TOTAL: 45 PERIODS

TEXT BOOKS:
REFERENCES:

AI 9253 FOOD SCIENCE AND NUTRITION TECHNOLOGY
L T P C
3 0 0 3

OBJECTIVES:
At the end of the course the students would be exposed to fundamental knowledge in
- Food groups, Energy from food and nutrition
- Food processing
- Food preservation

UNIT I  FOOD GROUP AND FOOD SCIENCE
Food, Food groups and Food science – objectives - Quality attributes – size, shape, colour consistency, viscosity, texture, taste and flavour - Sensor evaluation of foods - Microorganisms in food spoilage - Food laws and standards PFA, FPO, Agmark, BIS International standards for export - Food adulteration, definition, common adulterants effect of food adulteration - Methods for detection of food adulterants - Nutrition definition characteristics of well and poorly nourished population, relation of nutrition to good health.

UNIT II  ENERGY FROM FOOD
Energy – estimation of food energy, total energy needs of the body BMR - Carbohydrates, classification, functions, digestion Carbohydrates, absorption, Sources, requirements - Assessing the quality of protein AA score, BV, PER, NPR and NPU, Supplementary value of proteins and deficiency - Lipids, classification, function, digestion and absorption - Lipids, sources and requirements, saturated and Unsaturated fatty acids, rancidity.

UNIT III  NUTRITION
Fat-soluble vitamins, vitamin A, D, E & K, importance, sources, deficiency and RDA - Mid semester examination - Vitamins, folic acid, Pyridoxine, pantothenic acid and B12, importance, sources, deficiency and RDA - Minerals, macronutrients importance, sources, deficiency and RDA - Minerals, micronutrients, importance, sources, deficiency and RDA - Germination technology, Preparation of Weaning foods.

UNIT IV  FOOD PROCESSING
Baking, Bread, Role of ingredients in baking, quality aspects, spoilage in bread – Preparation of cake, biscuits and cookies - Extrusion technology, development of Extruded products, vermicelli, macaroni, noodles and spaghetti - Confectionary - Role of raw ingredients - manufacture of crystalline and non, Crystalline candies - Processing of fruits and vegetables, principles and methods - Preservation by sugar, Jam, Jelly, Marmalade - Preservation by sugar, candies and preserve.
UNIT V  PRESERVATION OF FOOD

Preservation by chemicals, squash, Ready to serve beverage - Preservation by fermentation, wine, vinegar - Canning, spoilage - Drying and dehydration - Rules and regulations for setting up of fruit processing industry - Food packaging, Definition, functions, requirements and methods of package.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCE:
1. Lal and Siddappa, Food and vegetable preservation, ICMR. 1986.

GE9261  ENVIRONMENTAL SCIENCE AND ENGINEERING  L T P C
3 0 0 3

AIM:
To create awareness in every engineering graduate about the importance of environment, the effect of technology on the environment and ecological balance and make them sensitive to the environment problems in every professional endeavour that they participates.

OBJECTIVE:
At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non-government organization in environment managements.

UNIT I  ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.
Field study of common plants, insects, birds
Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION  8
Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution
(c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear
hazards – soil waste management: causes, effects and control measures of municipal
solid wastes – role of an individual in prevention of pollution – pollution case studies –
disaster management: floods, earthquake, cyclone and landslides.
Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES  10
Forest resources: Use and over-exploitation, deforestation, case studies- timber
extraction, mining, dams and their effects on forests and tribal people – Water
resources: Use and over-utilization of surface and ground water, floods, drought, conflicts
over water, dams-benefits and problems – Mineral resources: Use and
exploitation, environmental effects of extracting and using mineral resources, case
studies – Food resources: World food problems, changes caused by agriculture and
overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging,
salinity, case studies – Energy resources: Growing energy needs, renewable and non
renewable energy sources, use of alternate energy sources. case studies – Land
resources: Land as a resource, land degradation, man induced landslides, soil erosion
and desertification – role of an individual in conservation of natural resources – Equitable
use of resources for sustainable lifestyles.
Field study of local area to document environmental assets – river / forest / grassland /
hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT  7
From unsustainable to sustainable development – urban problems related to energy –
water conservation, rain water harvesting, watershed management – resettlement and
rehabilitation of people; its problems and concerns, case studies – role of non-
governmental organization- environmental ethics: Issues and possible solutions –
climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and
holocaust, case studies. – wasteland reclamation – consumerism and waste products –
environment production act – Air (Prevention and Control of Pollution) act – Water
(Prevention and control of Pollution) act – Wildlife protection act – Forest conservation
act – enforcement machinery involved in environmental legislation- central and state
pollution control boards- Public awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT  6
Population growth, variation among nations – population explosion – family welfare
AIDS – women and child welfare – role of information technology in environment and
human health – Case studies.

TOTAL: 45 PERIODS
**TEXT BOOKS**


**REFERENCES**


**AI 9254 SOIL SCIENCE LABORATORY**

**OBJECTIVES:**
On completion of the course students are expected to

- Identify the soil texture and interpret its physical characteristics
- Identify problem soils and estimate remedial lime requirement
- Classify irrigation water

1. Identification of rocks and minerals
2. Collection and processing of soil samples
3. Determination of soil moisture, EC and pH
4. Bulk density determination by cylinder and wax coating method.
5. Textural analysis of soil by International Pipette method
6. Sedimentation and separation of different textural fractions
7. Preparation of HCl extract and assessment of soil colour
8. Estimation of CEC and exchangeable cations.
9. Organic carbon determination
10. Description of soil profile
11. Estimation of gypsum and lime requirements
12. Collection of irrigation water and analysis for EC and pH, and CO$_3$ and HCO$_3$

**TOTAL: 45 PERIODS**
OBJECTIVES:
- To get competence in the use of flow measuring devices in pipe and open channel flows.
- To develop characteristics of pumps and turbines

PRACTICAL SCHEDULE:
1. Flow measurement through venturimeter.
2. Determination of friction coefficient in pipes.
3. Flow measurement through V-notch and rectangular notch.
4. Flow measurement through circular orifice.
5. Flow measurement through Parshall flume, Cutthroat flume and Venture flume.
6. Determination of mean velocity by Pitot tube and current meter.
7. Characteristics of Centrifugal pumps.
10. Characteristics of Submersible pump.

TOTAL: 45 PERIODS

REFERENCES:
OBJECTIVE:
At the end of the semester, the student shall understand the need and mode of irrigation. The student also shall know the irrigation management practices of the past, present and future. The structures involved the elementary hydraulic design of different structures and the concepts of maintenance shall also form part. Finally, the student shall be in a position to conceive and plan any type of irrigation project.

UNIT I  INTRODUCTION  9

UNIT II  IRRIGATION METHODS  8

UNIT III  DIVERSION AND IMPOUNDING STRUCTURES  10

UNIT IV  CANAL IRRIGATION  9
Alignment of canals – Classification of canals – Canal drops – Hydraulic design of drops – Cross drainage works – Hydraulic design of cross drainage works – Canal Head works – Canal regulators – River Training works.

UNIT V  IRRIGATION WATER MANAGEMENT  9

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVE:
This subject aims to understand the concepts of assessing and utilizing groundwater and wells.

UNIT I INTRODUCTION
Purpose and Objectives- Groundwater monitoring programme- Essentials of groundwater modeling and management- India and Tamil Nadu scenario.

UNIT II GROUNDWATER DATABASE

UNIT III WELL HYDRAULICS AND DESIGN
Evaluation of Aquifer Parameters- Transmissivity and Storage coefficient-Pumping test-steady state analysis-Dupuit Forcheimer assumptions and derivations- unsteady state analysis-Theis-Jacob method-concept of image well theory. Design characteristics-sedimentary-igneous-metamorphic-alternate well design-design problems-location and number-diameter-casing and screening-development-well efficiency.

UNIT IV WELL CONSTRUCTION AND MAINTENANCE
Drilling principles-methods-application-monitoring well drilling methods-well development-gravel packing- well casing- drill pipe, plumpness and alignment- sterilization- Well maintenance- dewatering.

UNIT V SPECIAL TOPICS
Wells in hard rock area- Pumps and pumping performance- Artificial recharge-Groundwater regulation- Sea water intrusion- MODFLOW principles.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:

- To introduce the basic concepts and principles of Remote Sensing systems
- To introduce the methods of image enhancement and classification techniques
- To describe various aspects of possible applications of Remote Sensing techniques in Agriculture.

UNIT I EMR AND ITS INTERACTION WITH ATMOSPHERE AND EARTH MATERIALS 9
Remote sensing – Definition – Advantages – Components – electromagnetic radiation – 
Wave theory. Particle theory, Stefan – Boltzmann Laws – Interaction of EMR with 
Atmosphere – Scattering – Rayleigh, Mie and Non-Selective scattering – Absorption – 
Atmospheric windows – interaction of EMR with Earth objects – Spectral Signature – 
Spectral reflectance characteristics of vegetation, soil and water.

UNIT II REMOTE SENSING AND SATELLITES AND SENSORS 9
Platforms – Types – Applications – Sun Synchronous and geo synchronous orbits – 
Active and passive Sensors – Resolution – Spatial, Spectral, Radiometric and Temporal, 
Significance of Resolution – Remote sensing satellites and sensors – LANDSAT, SPOT, IRS, RESOURCESAT, CARTOSAT, High Resolution commercial satellites – 
Meteorological satellites and sensors – METEOSAT, NOAA – Microwave Remote 
sensing Satellites – ERS, RADARSAT.

UNIT III IMAGE INTERPRETATION 7
interpretation elements – interpretation key.

UNIT IV DIGITAL IMAGE ANALYSIS 7
Digital image processing – Image enhancement – image classification – Supervised and 
unsupervised – Vegetation Indices.

UNIT V APPLICATIONS TO AGRICULTURE, SOIL AND WATER RESOURCES 13
Spectral reflectance of soil, crops – Optical, thermal and microwave regions – crop 
acreage estimation – Production forecasting through digital image analysis – Crop 
condition assessment – soil mapping using RS data – Problem soil identification and 
mapping – soil erosion – Soil sedimentation studies – Soil loss assessment – soil 
conservation – Irrigation scheduling – case studies.

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:
Sensing, New Delhi, 2003.
Natural Resources Management and Environmental Monitoring”, Manual of Remote 
OBJECTIVE:
At the end of the course the students would be exposed to basic knowledge in
 Definition of Aquaculture Engineering
 Operation and maintenance of Aquaculture farms and effective implementation of projects.
 Design, constructions and preparations of master plan for large scale – Aquaculture complex.

UNIT I SURVEY AND LOCATION OF SUITABLE SITES FOR AQUACULTURE
Study of topographical features of the proposed area water source, Hydro-meteorological parameters, Availability of seed and feed, power supply, Availability of skilled human resources, Machineries and equipments, infrastructure facilities, freshwater, Potable water supply, Availability of processing centres. Source of finance and Insurance coverage, Marketability-Aquaculture authority GOI guidelines and case studies.

UNIT II LAYOUT AND DESIGN OF AQUACULTURE FARMS
Leading canal, Pumping systems, Main inlet, Electrical distribution system, farm stead approach road, Peripheral dyke, Diffuser tank, Feeder canal and feeder canal dyke, inlet for culture ponds, size of culture ponds, Drainage canal dyke, partition dyke, culture pond outlet, Main outlet, Aerators, feeding trays, vehicles and other conveyance systems, watch towers.

UNIT III CONSTRUCTION OF AQUACULTURE FARMS
Administration of the contract, Supervision of the work, Materials and works in compliance with the specifications.

UNIT IV WATER INTAKE SYSTEMS
Freshwater intake from precipitation, Freshwater intake by using precipitation and groundwater, Freshwater intake by using irrigation canal water from a multipurpose project, Brackish water intake from a tidal creek/ an estuary by tidal influence, Brackish water intake by using both tide and pump, Brackish water/Freshwater intake through seepage, Brackish water/seawater intake through pumps, Pumps used in aquaculture for water exchange, maintaining water quality such as aeration, temperature control, depth control, complete draining etc.

UNIT V WATER QUALITY MANAGEMENT IN AQUACULTURE

TOTAL: 45 PERIODS
TEXT BOOK:

REFERENCES:

AI 9305   DESIGN AND DRAWING OF AGRICULTURAL MACHINERY    L  T  P  C
3  1  0  4

OBJECTIVE:

- To introduce to the students about the basic concepts of design of agricultural machineries.
- To get through the detailed design & drawing of various components of agricultural machineries.

UNIT I    DESIGN OF MACHINE PARTS  9+3
Types of loading and induced stresses - Allowable stress - eccentric loading - combined stresses - principal stresses. Design of simple components - bolts and nuts - keys and key ways - knuckle and cotter joints - Shafting - design considerations - determination of shaft sizes on the basis of strength and rigidity.

UNIT II   DESIGN OF BELT  9+3
Belt drives - materials - flat belt Euler’s formula - V belt - design - power calculation and selection.

UNIT III   DESIGN OF CHAIN AND COUPLINGS  9+3

UNIT IV    STRENGTH OF GEARS  9+3

UNIT V    BEARINGS  9+3
Bearing - types - bearing loads - materials - anti friction bearings types. Fits and tolerance - dimensional control.

L:45+T:15  TOTAL: 60 PERIODS
TEXT BOOKS:

REFERENCES:

AI 9306 IRRIGATION DRAWING L T P C
0 0 3 2

OBJECTIVE:
At the end of the semester, the student shall be able to conceive, design and draw all
 types of irrigation structures in detail showing plan, elevation and sections.

UNIT I TANK IRRIGATION STRUCTURES 8
Tank bunds – Tank surplus weirs – Tank sluices weirs on pervious foundations -
Drawings showing foundation, plan and elevation.

UNIT II IMPOUNDING STRUCTURES 7
Gravity Dams – Earth dams – Arch dams – Spill ways –Drawing showing plan, elevation,
half sections including foundation

UNIT III CANAL TRANSMISSION STRUCTURES 7
Aqueducts – Syphon aqueducts – Super passage – Canal syphon – Canal drops –
Drawing showing plan, elevation and foundation

UNIT IV CANAL REGULATION STRUCTURES 8
Canal head works – Canal regulator – Canal escape –Drawing showing detailed plan,
elevation and foundation.

TOTAL: 45 PERIODS

TEXT BOOKS
2. Satyanarayana Murthy, “Irrigation Design and Drawing”, Published by Mrs. L.

REFERENCE
OBJECTIVES:
- The students will get familiarized with agro- meteorological station, data collection and recording
- The students get exposure in flow measurement at field level using various irrigation methods

1. Collection of data on agro-meteorological parameters
2. Estimation of soil moisture for irrigation scheduling
3. Measurement of infiltration
4. Demonstration on measurement of plant transpiration
5. Flow measurement in irrigated channels
6. Flow measurement in closed conduit
7. Evaluation of surface and micro irrigation systems

TOTAL: 45 PERIODS

REFERENCES:

GE 9371 COMMUNICATION SKILLS AND SOFT SKILLS (LABORATORY COURSE) L T P C 0 0 2 1

AIM:
To enhance the overall capability of students and to equip them with the necessary Communication Skills and Soft Skills that would help them excel in their profession.

OBJECTIVES:
- To equip students of engineering and technology with effective speaking and listening skills in English.
- To help them develop their soft skills and interpersonal skills, which will make the transition from college to workplace smoother and help them excel in their jobs.
- To enhance the performance of students at Placement Interviews, Group Discussions and other recruitment exercises.

A. VIEWING AND DISCUSSING AUDIO-VISUAL MATERIALS

UNIT I RESUME / REPORT PREPARATION / LETTER WRITING 2
Letter writing – Job application with Resume - Project report - Email etiquette.
UNIT II  PRESENTATION SKILLS  
Elements of effective presentation – Structure of presentation - Presentation tools – Body language.

UNIT III  SOFT SKILLS  
Time management – Stress management – Assertiveness – Negotiation strategies.

UNIT IV  GROUP DISCUSSION  
Group discussion as part of selection process, Structure of group discussion – Strategies in group discussion – Mock group discussions.

UNIT V  INTERVIEW SKILLS  
Kinds of interviews – Interview techniques – Corporate culture – Mock interviews. (Career Lab Software may be used for this section).

B. PRACTICE SESSION  (24 PERIODS)

1. Resume / Report Preparation / Letter writing: Students prepare their own resume and report. 4
2. Presentation Skills: Students make presentations on given topics. 8
3. Group Discussion: Students participate in group discussions. 6
4. Interview Skills: Students participate in Mock Interviews 6

TOTAL : 30 PERIODS

REFERENCES:

ME 9037  REFRIGERATION AND AIR-CONDITIONING  L T P C
3 1 0 4

AIM:
To include the students with the knowledge of refrigeration and air conditioning.

OBJECTIVES:
• To understand the underlying principles of operation in different refrigeration & Air conditioning systems and components.
To provide knowledge on basic design aspects of Refrigeration & Air conditioning systems.

UNIT I   REFRIGERATION CYCLE  8+2

UNIT II   REFRIGERANTS, SYSTEM COMPONENTS AND BALANCING  9+4

UNIT III   PSYCHROMETRY  10+3
Psychrometric processes use of psychrometric charts – grand and room sensible heat factors – bypass factors – air washers, requirements of comfort air conditioning, summer and winter air conditioning.

UNIT IV  AIR CONDITIONING SYSTEMS  9+3
Cooling load calculation working principles of – centralized Air conditioning systems, split, ductable split, packaged air conditioning, VAV & VRV systems. Duct design by equal friction method, indoor air quality concepts.

UNIT V   UNCONVENTIONAL REFRIGERATION CYCLES  9+3
Vapor absorption systems – Ejector jet, steam jet refrigeration, thermo electric refrigeration. 
Applications: ice – plant – food storage plants – milk chilling plants.

L:45+T:15  TOTAL: 60 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVES:

- To introduce the student to the concept of Ecology, Environment, and Socio-economic disciplines in management of Water Resources.
- At the completion of the course the students should be able to understand the integrated effects of inter disciplinary approach in water resources management.

UNIT I  IWRM CONCEPT  6
Integrated Water Resources Management (IWRM) Definition – Principles- Approaches- Global issues – food securities

UNIT II  RIVER BASIN  12

UNIT III  ENVIRONMENT  8
Impact of land use changes in basin morphology – impact of watershed changes an qualities and quantities

UNIT IV  WATER ECONOMY  7
Economic view of water issues – Economic characteristics of water as good and services – Policy operation for water conservation and sustainable issue – Water budgeting-Auditing- Pricing.

UNIT V  SPECIAL TOPICS  12

TOTAL: 45 PERIODS

REFERENCES:
OBJECTIVES:
At the end of the course the students would be exposed to fundamental knowledge in
- Farm Equipments and tractors, Working principles and Tractor Transmission
- Power tiller - special features, Makes of tractors and power tillers
- Tillage, methods of ploughing, Secondary tillage implements and sowing methods
- Farm mechanization benefits and constraints, Identification of components of primary and secondary tillage implements.

UNIT I TRACTORS AND EQUIPMENTS

UNIT II COMPONENTS OF TRACTORS

UNIT III FARM EQUIPMENTS

UNIT IV TILLAGE AND INTERCULTURAL IMPLEMENTS

UNIT V FARM POWER

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

AI 9352 GEOGRAPHICAL INFORMATION SYSTEMS L T P C

3 0 0 3

OBJECTIVES:
To introduce the basic principles of geographical information systems
- To introduce the spatial data models, analysis and presentation techniques
- To describe various applications of Geographical Information Systems in Agriculture.

UNIT I INTRODUCTION
Definition – Map and their influences – Characteristics of Maps – Elements – Map scale, Projection, Coordinate systems – Sources of spatial data – History and development of GIS – Definition – Components – Hardware and Software.

UNIT II DATA INPUT STORAGE
Data – Spatial, Non-Spatial – Database models – Hierarchical network, Relational and Object Oriented Data Models – Raster and Vector – Methods of Data input – Data Editing – Files and formats – Data structure – Data compression

UNIT III DATA ANALYSIS AND MODELLING

UNIT IV DATA OUTPUT AND ERROR

UNIT V GIS APPLICATIONS
Agriculture census – Agro economics – Integration of GPS for Precision Farming – Disease Tracking and control – Command area monitoring and management – Subsidy Administration – Case studies.

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:

AI 9353 DRAINAGE ENGINEERING AND LAND MANAGEMENT L T P C 3 0 0 3

OBJECTIVES:
• Students will be exposed to drainage concepts, and to planning, design and management of drainage related work.
• They will learn about the latest developments in drainage and land management on the basis of a clear understanding of the principles of drainage engineering.

UNIT I NEED AND HISTORY OF DRAINAGE
Need for land drainage – Progression of drainage from being an art to engineering science – Factors to be considered for land drainage.

UNIT II HYDRAULICS OF DRAINAGE
Basic concepts of ground water flow – Subsurface flow into drains – Static condition-Steady and unsteady state equations – Seepage from river into aquifers – Seepage from open channels.

UNIT III DRAINAGE CRITERIA
UNIT IV DESIGN AND MANAGEMENT OF DRAINAGE SYSTEMS


UNIT V SALINITY CONTROL


TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

AI 9354 SYSTEMS ANALYSIS IN IRRIGATION ENGINEERING

OBJECTIVES:
- Students will be introduced to application of systems concept to irrigation planning and management.
- Optimization technique for modeling water resources systems, irrigation management and advanced optimization techniques to cover the socio-technical aspects will be taught.

UNIT I SYSTEM CONCEPTS
Definition, classification, and characteristics of systems – Scope and steps in systems engineering – Need for systems approach to water resources and irrigation.

UNIT II LINEAR PROGRAMMING
Introduction to operations research – Linear programming, problem formulation, graphical solution, solution by simplex method – Sensitivity analysis, application to design and operation of reservoir, single and multipurpose development plans – Irrigation water allocation- Cropping pattern optimization.

UNIT III DYNAMIC PROGRAMMING
Bellman’s optimality criteria, problem formulation and solutions – Application to design and operation of reservoirs, Single and multipurpose reservoir development plans – Applications in Irrigation management.
UNIT IV  SIMULATION  9

UNIT V  ADVANCED OPTIMIZATION TECHNIQUES  9
Integer and parametric linear programming – Applications to Irrigation water management-Goal programming models with applications.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

AI 9355  CAD FOR AGRICULTURAL ENGINEERING  L T P C
0 0 4 2

OBJECTIVE:
- Draft the agricultural engineering related machineries and structures manually and also by computer aided methods.
  1. Design and Drawing of Underground pipeline system
  2. Design and Drawing of Check dam
  3. Design and Drawing of Mould board plough
  4. Design and Drawing of Disk plough
  5. Design and Drawing of Post harvest technology units (threshers and winnowers)
  6. Design and Drawing of Biogas plant

TOTAL: 60 PERIODS
REFERENCES:


AI 9356 TECHNICAL SEMINAR

AIM:
To work on a specific technical topic in Civil Engineering and acquire the skill of written and oral presentation. To acquire writing abilities for seminars and conferences.

SYLLABUS:
The students will work for three hours per week guided by a group of staff members. They will be asked to talk on any topic of their choice and to engage in dialogue with the audience. A brief copy on their talk also should be submitted. Similarly, the students will have to present a seminar of not more than fifteen minutes on the technical topic. They should also answer the queries on the topic. The students as the audience also should interact. Evaluation will be based on the general and technical presentation and the report and also on the interaction shown during the seminar.

AI 9401 AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

OBJECTIVES:
At the end of the course the students would be exposed to fundamental knowledge in
- Farm Management, and Basic Concept of Farm Management. Product Relationship and Law of diminishing return
- Type of resource and Investment analysis in agriculture sector
- Farm financial analysis, Investment and Budgeting for farms

UNIT I INTRODUCTION & SCOPE OF FARM MANAGEMENT
Farm Management - definition and scope - relationship between farm management and other sciences - Characteristics and significance. Farm management decision making process. Basic concepts in farm management. Factor and Farm layout - Farm records and Accounts - Farm Appraisal Techniques. Valuation and Depreciation – Factor

UNIT II LAWS OF ECONOMICS
production. - Economies of scale external and internal economies and diseconomies. Returns to scale - Economies of size. Factor - Factor relationship.

UNIT III  COST CURVES

UNIT IV  MANAGEMENT OF RESOURCES
Types of uncertainty in agriculture - Managerial decisions to reduce risks in production process. Management of resources - Types of resources - land, labour, capital, and measurement of their efficiencies - mobilization of farm resources. Cost of maintenance of machinery and break even analysis - Estimation of cost of production. Dairy and poultry products - Investment analysis. Undiscounted and Discounted methods.

UNIT V  FINANCIAL ANALYSIS

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To present the basic principles and concepts of soil and water conservation so that students understand their importance to man and the environment.
- To enable the students to use the principles and concepts to solve problems of soil and water management.

UNIT I INTRODUCTION 12

UNIT II SOIL EROSION 9

UNIT III WIND EROSION 6
Factors influencing wind erosion - mechanics of wind erosion - suspension, saltation, surface creep-control measures - windbreaks and shelterbelts - sand dunes and their stabilization.

UNIT IV RAINWATER HARVESTING 9
In-situ soil moisture conservation - micro catchments – catchment yield - rainwater harvesting – methods - storage and its use for domestic and groundwater recharge - Farm ponds and percolation ponds.

UNIT V GROUNDWATER WELLS 9
Aquifers - types of wells and sizes - pumps - reciprocating pumps - centrifugal pumps - submersible pumps - jet pumps - airlift pumps - selection of pumps - operation and their maintenance.

TOTAL: 45 PERIODS

TEXT BOOKS:
REFERENCES:

AI 9403 FOOD PROCESSING ENGINEERING L T P C
3 0 0 3

OBJECTIVES:
At the end of the course the students would be exposed to fundamental knowledge in
- Food, its properties and effect of heat
- Different methods of food processing
- Quality control in food processing

UNIT I FOOD AND ITS PROPERTIES 8
Constituents of food and its energy value-thermal processing of foods, thermal properties, thermal conductivity, specific heat & thermal diffusion-cooking, blanching, sterilization, pasteurization, canning.

UNIT II REACTION AND KINETICS 12
Interaction of heat energy on food components, reaction kinetics, Arhenius equation, Thermal death time curves, water activity, sorption isotherms, monolayer value, BET isotherms, Raoult’s law, Salwin-slawn equation.

UNIT III METHODS OF PROCESSING 8
Concentrations of foods, freeze concentration, osmotic and reverse osmotic concentration, drying and dehydration off food, tunnel, belt, vacuum and freeze drying, rehydration of dehydrated foods.

UNIT IV EXTRUSION PROCESSING 10
Extrusion processing of foods- Fat and oil processing, sources, extraction, methods and equipments, refining of oils, hydrogenation, manufacture of margarine. Food preservation methods- preservation by irradiation, microwave and dielectric heating of food, principle and application.

UNIT V QUALITY CONTROL 7

TOTAL: 45 PERIODS
TEXT BOOKS:

REFERENCES:

AI 9404 IT IN AGRICULTURAL SYSTEMS LT P C
3 0 0 3

OBJECTIVES:
Students will be introduced to some of the possible areas of agricultural systems in which IT and computers could play a major role. At the end of the course the students would have learned about the IT applications in agricultural systems in general and IT applications in precision farming, environmental control systems, agricultural systems management, and weather prediction models in particular.

UNIT I PRECISION FARMING 9
Precision agriculture and agricultural management, GIS and mapping software, Yield mapping systems, Ground based sensors, remote sensing, crop production modeling.

UNIT II ENVIRONMENT CONTROL SYSTEMS 9
Artificial light systems, management of crop growth in greenhouses, simulation of CO₂ consumption in greenhouses, on-line measurement of plant growth in the greenhouse, models of plant production and expert systems in horticulture.

UNIT III AGRICULTURAL SYSTEMS MANAGEMENT 9
Agricultural systems a managerial overview, Reliability of agricultural systems, Simulation of crop growth and field operations, Optimizing the use of resources, Linear programming, Project scheduling, Artificial intelligence and decision support systems.

UNIT IV WEATHER PREDICTION MODELS FOR PROFITABLE AGRICULTURAL PRODUCTION 9
Importance of climate variability and seasonal forecasting, Understanding and predicting world’s climate system, Global climatic models and their potential for seasonal climate forecasting, General systems approach to applying seasonal climate forecasts.

UNIT V IT IN AGRICULTURAL SYSTEMS 9
Expert systems, decision support systems, Agricultural and biological databases, E-commerce, e-business systems & applications, Technology enhanced learning systems and solutions, e-learning, Rural development and information society.
TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

AI 9405 IRRIGATION EQUIPMENT DESIGN L T P C
3 0 0 3

OBJECTIVES:
At the end of the course the students would be exposed to fundamental knowledge in
- Pumps for Irrigation use
- Design of sprinkler & Drip irrigation components
- Design of valves and controls

UNIT I WATER PUMPS
Indigenous water lifts – types and their working-Types of pumps- Positive displacement and variable displacement pumps –Reciprocating pump- Principle- Components- Single acting and double acting- Work done – Coefficient of discharge- Slip- Centrifugal pump- Principle and working- Work done by centrifugal pump- Pump characteristics and efficiencies.

UNIT II SUBMERSIBLE AND DEEP WELL PUMPS
Multistage-Submersible- Turbine pumps mixed flow – Axial flow – Jet and Airlift pumps- Pump selection and installation- Pump troubles and Remedies.

UNIT III Drip IRRIGATION DESIGN
Drip irrigation – advantages-Components- Dripper- types and equations governing flow through drippers- Wetting pattern- Filters and Fertigation tanks- Derivation of equation for flow through pipes with uniform spaced outlets- Design of laterals- Submain- main lines- Pump capacity- Operation and maintenance of Drip irrigation system.
UNIT IV  SPRINKLER IRRIGATION DESIGN
Sprinkler irrigation- Components- Sprinkler performance- Sprinkler discharge – Distance of throw- distribution pattern- Application rate- Droplet size, Sprinkler selection and spacing- Capacity of sprinkler system- Hydraulic design of sprinkler systems.

UNIT V  VALVES
Surge and cablegation–Greenhouse irrigation system design- Types of valves-pressure relief valve- Gate valve- Non return valve- Butterfly valve- Solenoid valves.

TOTAL:45 PERIODS

TEXT BOOKS:

REFERENCE

AI 9406  PRACTICAL TRAINING  LT P C
- - 0 2

To train the students in field work so as to have a first hand knowledge of practical problems in carrying out engineering tasks. To develop skills in facing and solving the field problems.

The students individually undertake training in reputed civil engineering companies for the specified duration. At the end of the training, a report on the work done will be prepared and presented. The students will be evaluated through a viva-voce examination by a team of internal staff.

AI 9451  PROJECT WORK  L T P C
0 0 12 6

To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination.

The student works on a topic approved by the head of the department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor. The student will be evaluated based on the report and the viva voce examination by a team of examiners including one external examiner.
OBJECTIVES:
- To introduce the student the concept of Peoples involvement in water management.
- At the completion of the course the students should be able to understand the value of
- Participatory approach for better performance of the completed systems and other facilities through their organized associations.

UNIT I     FUNDAMENTALS OF SOCIOLOGY
Sociology – Basic concept – Perspectives of sociology – social system – Sociological Understanding.

UNIT II    CONCEPT OF PARTICIPATION

UNIT III   ORGANIZATIONAL DESIGN
Membership and decision making – Leadership and responsibilities – Development strategy – Channels for implementation – Improving agency relations – Technical cooperation – Special roles.

UNIT IV    PARTICIPATION IN WATER MANAGEMENT

UNIT V     FARMER ORGANIZATION AND PARTICIPATION

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVES:

- To provide the technical know-how of analyzing the degradation of soil and water resources and implementation of the measures for soil and water conservation.
- To provide a comprehensive treatise on the engineering practices of watershed management for realizing the higher benefits of watershed management.

UNIT I INTRODUCTION
Concept and significance – morphological characteristics – elements – delineation – codification - basic factors influences watershed development.

UNIT II SOIL CONSERVATION PRACTICES

UNIT III WATER CONSERVATION AND HARVESTING

UNIT IV WATERSHED DEVELOPMENT

UNIT V SPECIAL TOPICS

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVE:
Floods and Droughts represent the surplus and deficit of water in hydrology. This subject aims at making the students to understand these two phenomena along with their estimation, control and management.

UNIT I FLOOD ESTIMATION
9

UNIT II FLOOD ROUTING
9

UNIT III FLOOD MITIGATION
9
Flood mitigation measures – Storage methods – channel improvement and soil conservation measures – Levees and flood walls - Data communication and warning – Flood fighting

UNIT IV DROUGHT ANALYSIS
9

UNIT V DROUGHT CONTROL MEASURES
9
Drought control - Supply and demand oriented measures – Drought Prone Areas Programme (DPAP) – Criteria for identification of areas to be included/ excluded under DPAP.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
2. http:\\enoe.unl.edu\ndmc
3. http:\\www.nws.noa.gov\om\drought.htm
4. http:\\stormfax.com\drought.htm
5. http:\\www.uwex.edu\ces\news\info\drought.pdf
OBJECTIVE:

- This course introduces water quality concepts, its estimation and evaluation for irrigation purposes, besides relevant environmental problems and modeling of non-point pollution sources. 2. At the end of the course, the students will understand the importance of water quality for irrigation and environment and the collection and use of water quality data.

UNIT I   HYDROCHEMISTRY  7

UNIT II   WATER QUALITY ESTIMATION  9

UNIT III   EVALUATION OF WATER QUALITY  10

UNIT IV   WATER QUALITY MODELS  10

UNIT V   ENVIRONMENTAL ISSUES RELATED TO WATER QUALITY  9
Water quality indices - Agro ecosystems – Sustainable agriculture – Ecological farming principles - Irrigation projects and environmental impacts.

TOTAL: 45 PERIODS

REFERENCES:

OBJECTIVES:

At the end of the course the students would be exposed to fundamental knowledge in

- Definition and Minor Irrigation development
- Operation and Maintenance, Components of tanks and People’s participation in tank irrigation
- On farm structures, policy and operation and maintenance

UNIT I MINOR IRRIGATION 9
Definition – Minor Irrigation through wells, tanks, ooranies and canals – Minor Irrigation development in India.

UNIT II LIFT IRRIGATION 9
Dug wells and Tube well irrigation, conjunctive use of ground water – Operation and Maintenance – Ground water market – Tube well societies – GEC norms-Case studies.

UNIT III TANK IRRIGATION 9
Classification – Components of tanks, water distribution network, number of filling – Cascade of tanks – People’s participation in tank irrigation and Maintenance – Turn over –Case studies.

UNIT IV COMMAND AREA DEVELOPMENT 9
On farm structures – Definition, policy – On farm development organization, operation and maintenance and water management – Farmer’s participation – Turn over – Case studies.

UNIT V SPECIAL TOPICS 9

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCE:
OBJECTIVES:
- Students will be introduced to soil-water-plant relationship from the context of irrigation water management.
- At the completion of the course the students would have learnt about irrigation systems in general, and irrigation scheduling, irrigation water distribution, and design and evaluation of irrigation methods, in particular.

UNIT I DEVELOPMENT OF IRRIGATION

UNIT II CROP WATER REQUIREMENT

UNIT III WATER DISTRIBUTION

UNIT IV SURFACE IRRIGATION METHODS
Classification of irrigation methods – Border irrigation: design parameters, evaluation and ideal wetting pattern – Furrow irrigation: design parameters, types of furrows, evaluation, ideal wetting pattern and planting techniques – Basin irrigation: types of basins, suitable crops, soils and slopes, ideal wetting pattern, shapes and size – Efficiency of surface irrigation methods – Land leveling and shaping.

UNIT V DRIP AND SPRINKLER IRRIGATION METHODS

TOTAL: 45 PERIODS

TEXT BOOKS:
REFERENCES:

REFERENCES:
AI 9027 BIO-TECHNOLOGY PRINCIPLES L T P C

3 0 0 3

OBJECTIVE:
To expose the students to the fundamental principles in bio-technology and bio-informatics.

UNIT I MOLECULAR BIOLOGY
Structure of Eukaryotic cell-Cytoplasm-Cell organelles-Chromosomes-Structure of DNA and RNA-Definition of gene-coding sequences-Types and process of replication-DNA repair.

UNIT II ENZYME TECHNOLOGY
Sterile techniques-cell culture-Isolation and purification of enzymes-Enzymes in food processing-Enzyme immobilization and applications-Basic modes of fermentation-Bioreactor design-screening and isolation of industrially important bacterial strains-Metabolic pathways and applications in food industry.

UNIT III PLANT BIOTECHNOLOGY

UNIT IV ENVIRONMENTAL BIOTECHNOLOGY

UNIT V BIOINFORMATICS
Biotechnology-genomics and proteomics-Homology and diversity-DNA and protein sequencing-Human genome project-Biological databases-sequence and structural analysis-comparisons-Internet resources.

TOTAL: 45 PERIODS

REFERENCES:

OBJECTIVES:
At the end of the course the students would be exposed to fundamental knowledge in
- Scope and Importance of Seed production
- Principles and special techniques of seed production
  Seed treatment and Sowing technologies. Post harvesting seed management
- Planning seed production - procurement and pricing policy-economics of seed production

UNIT I  INTRODUCTION  9
Scope and importance of seed production in horticultural crops- Traditional practices-area-seed demand and production.

UNIT II  PRINCIPLES AND SPECIAL TECHNIQUE  9
Principles and special techniques for seed production of important commercial horticultural crops-vegetables-flower crops- fruits-spices and condiments - plantation crops.

UNIT III  SEED PROCESSING AND TREATMENT  9
Seed treatment and sowing-technologies for hybrid seed production-seed extraction methods- processing-treating and packaging- seed health management. harvesting indices- post harvest seed management techniques seed extraction-seed processing-drying-cleaning-upgrading-seed treatment- packaging-storage and seed health management-marketing etc., seed legislation and seed law enforcement-certification and seed law enforcement-seed testing-seed standards.

UNIT IV  ORGANIZATIONS  9
Organization set up of seed company- organizations involved in seed production i.e., public, quasi, co operative, private etc. Visit to seed farms and study the production technologies and field standards- visit to private-state national and multinational seed companies within and outside Tamil Nadu state. Market analysis of seed demand and supply.

UNIT V  PLANNING FOR SEED PRODUCTION  9
Planning seed production programme- seed farm organisation-procurement and pricing policy-economics of seed production of different crops-government policy in seed? production and study of export potential of seeds. Working out seed production programme for small, medium and large scale entrepreneurs- preparing seed projects for credit facilities- export procedures and formalities and seed / plant quarantine methods.

TEXT BOOKS:
REFERENCES

AI 9029 POST-HARVESTING TECHNOLOGY L T P C
3 0 0 3

OBJECTIVES:
At the end of the course the students would be exposed to fundamental knowledge in
• Post harvest properties of Agricultural materials
• Threshing and processing of harvested crops
• Processing, Grading, milling and storage of crops

UNIT I ENGINEERING PROPERTIES OF AGRICULTURAL MATERIALS 4
Post harvest engineering of crops-objectives-post harvest losses in agricultural commodities-optimum stage of harvest-engineering properties of agricultural material.

UNIT II THRESHING 12
Threshing-traditional methods- mechanical threshers-types-principles and operation-moisture content-measurement-direct and indirect methods- moisture meters-equilibrium moisture content-psychometry-drying -principles-constant and falling rate of drying- thin layer and deep bed drying- source of heat-types of dryers.

UNIT III GRADING PRINCIPLES & SEED TREATMENT 12
Cleaning and grading-principles- air screen cleaner-cylinder separator-spiral separator-magnetic separator- color sorter -inclined belt separator-effectiveness of separation and performance index- shelling and decortication-principles and operation- maize Sheller-husker Sheller for maize- ground nut decortication- seed processing - sequence-equipments- seed treatments- layout of seed processing units.

UNIT IV PADDY PROCESSING 12

UNIT V MILLING & STORAGE 5
Milling equipments- material handling- belt conveyor- screw conveyor and bucket elevators-storage conditions for safe storage- bag and bulk storage- modified and controlled atmosphere storage.

TOTAL: 45 PERIODS
TEXT BOOKS:

REFERENCE:

AI 9030 BIO ENERGY RESOURCE TECHNOLOGY L T P C

3 0 0 3

OBJECTIVES:
At the end of the course the students would be exposed to fundamental knowledge in
• Importance of Bio resources, Bio energy and reactors,
• Alcohol and ethanol production and
• Energy and Environment

UNIT I BIO RESOURCE AN INTRODUCTION 9

UNIT II BIO ENERGY 9

UNIT III BIO REACTORS AND FERMENTORS 9

UNIT IV ALCOHOL PRODUCTION 9
Alcohol ethanol production- Acid hydrolysis- enzyme hydrolysis-Methanol synthesis- Anti biotics- enzymes- principles of thermo chemical conversion combustion- pyrolysis-Gasification – types of gasifies.

UNIT V ENERGY AND ENVIRONMENT 9

TOTAL: 45 PERIODS

55
AI 9031 COMMERCIAL MICRO IRRIGATION ENGINEERING L T P C
3 0 0 3

OBJECTIVE:
To expose the students to micro engineering and commercial practice of the technologies in agricultural engineering.

UNIT I DRIP IRRIGATION SYSTEM AND DESIGN 9
Modern method of irrigation- Pressure irrigation-Basic principles soil moisture plant relationship-Drip irrigation concept- Drip irrigation advantages limitation – Layout Design main, sub-main and lateral- Selection of material for pipes, emitter selection- Problems on drip irrigation design- Layout planning for agricultural crops.

UNIT II ECONOMICS OF DRIP IRRIGATION 9
PUMP-selection- Cost economics of drip irrigation- Problems based on cost economics- Basic survey of Drip irrigation systems in field- Installation of drip system.

UNIT III SPRINKLER IRRIGATION SYSTEM 9
Sprinkler irrigation concept- Types of sprinkler- Factors governing efficiency, pipe friction-Factors governing adaptability of sprinkler irrigation.

UNIT IV DESIGN OF SPRINKLER IRRIGATION SYSTEM 9
Design of lateral, main-Design of sprinkler head and installation- Problems on the design of sprinklers-selection pumps for sprinklers- Operation and maintenance of sprinklers.

UNIT V ECONOMICS OF SPRINKLER IRRIGATION 9
Economics of sprinkler irrigation- Problems on economics of sprinklers- Exposure to manufacturing firms- Installation of sprinkler system- Basic survey for sprinkler systems and data analysis- plan preparation- commodities and futures.

TOTAL: 45 PERIODS

TEXTBOOK:
OBJECTIVES:
At the end of the course the students would be exposed to fundamental knowledge in
- Properties of Milk
- Processing of Milk and Manufacture of dairy products
- Sanitation and effluent treatment in dairy industry

UNIT I  PROPERTIES OF MILK  7

UNIT II  PROCESSING OF MILK  8
Processing of Milk-Staining-Filtering and Clarification of Milk-cream separation-Pasteurization.-Homogenization-Methods and Equipments-Emulsification-Fortification

UNIT III  DAIRY PRODUCTS  10
Manufacture of dairy products-Butter properties-Process involved in Manufacture of butter-Market Grades of butter-Manufacturing of Cheese-Classification-Composition-Methods and Equipment-Ghee Processing-Methods and Equipments-Processing of ice cream-Classification-Composition-Methods and Equipments.

UNIT IV  MILK POWDER PROCESSING  8

UNIT V  SANITATION AND EFFLUENT TREATMENT  12
Processing of Milk Products-Skim milk-Butter milk-Flavoured Milk, whey, casein, yoghurt and panner-Packaging of Milk and Milk Products-Fillers-Cippers-pouch fillers-Transportation of Milk-Flexible paucher Milk-Storage Tanks-Storage of icecream etc. in freezers-Cleaning and Sanitation-Importance-Detergents-Properties-Cleaning procedures-Cleaning in place-Sanitation-Dairy effluent treatment and disposal.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCE:
OBJECTIVE:
Control Engineering serves as an analytical tool to study the behaviour of any system and Instrumentation Engineering provides the necessary information and interface to study the behaviour.

UNIT I PRINCIPLES OF MEASUREMENT AND INSTRUMENTATION 12

UNIT II SIGNAL CONDITIONING CIRCUITS AND DATA ACQUISITION 9
Instrumentation Amplifiers – Filters – LP, HP, BR, Active Filters, - Integration and Differentiation – Voltage to Frequency Converters – Frequency to Voltage Converters – A/D and D/A Converters – Data Loggers – Data Analyzers

UNIT III CONTROL SYSTEM REPRESENTATION AND CONTROL COMPONENTS 9

UNIT IV TIME DOMAIN AND FREQUENCY DOMAIN ANALYSIS 6

UNIT V CLOSED LOOP CONTROL SYSTEMS 9

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
At the end of the course the students would be exposed to fundamental knowledge in
- Classification of Manufacturing Processes, Rolling Process principles
- Basic components - Principles of operation
- Quality control in Manufacturing Processes

UNIT I ENGINEERING MATERIALS 9

UNIT II PRIMARY MANUFACTURING PROCESSES 9

UNIT III PRINCIPLES OF MANUFACTURING MACHINES 9

UNIT IV WELDING, FINISHING AND MOULDING 9

UNIT V SMITHY AND FOUNDRY 9
Smithy - handling of tools - firing the hearth - making `s` hook - triangular link - bullring - chain link - fullering, drawing and necking down - making bolt. Foundry - moulding sand - conditioning - tempering - use of tools - moulding practice using patterns like loose piece pattern, split piece pattern, flat back pattern, sweep pattern and moulding using cores.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCE:
OBJECTIVES:
At the end of the course the students would be exposed to fundamental knowledge in:
- Evaporation and Types of evaporators in Agricultural Processing
- Filtration, Sedimentation Fundamentals
- Processing, Characteristics of mixtures and Sieve analysis
- Crystallization and Distillation in processing of Agricultural produce.

UNIT I EVAPORATION
Introduction-Unit operations involved in agricultural processing-examples-Conservation of mass and energy-Overall view of an engineering process-Evaporation-Definition-Liquid characteristics-Single and multiple effect-Types of evaporators-Once through and circulation evaporators-Short tube evaporators and long tube evaporators –Agitated film evaporator-Performance of evaporators and boiling point elevation-Single effect evaporator –Multiple effect evaporator-Capacity-Economy and heat balance- Solving problems in single and multiple effect evaporators

UNIT II FILTRATION
Filtration-Definition –Filter media-Types and requirements-Constant rate filtration-Constant pressure filtration-Filter cake resistance-Filter equipment-Rotary vacuum filter-Filter process- Solving problems on filtration process.

UNIT III SEDIMENTATION AND SEPARATION

UNIT IV PROCESSING

UNIT V CRYSTALLISATION AND DISTILLATION
Crystallization-Equilibrium –Rate of crystal growth stage-Equilibrium crystallization-Crystallizers-Equipment-Classification- Construction and operation – Crystallizers-Tank-

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCE:

GI 9030 REMOTE SENSING AND GIS FOR AGRICULTURE AND FORESTRY

OBJECTIVES:
This course enables the students to understand and apply remote sensing and GIS techniques in various fields of agriculture, soil, land and forest resources.

UNIT I CROPS

UNIT II SOILS

UNIT III LAND EVALUATION AND MANAGEMENT

UNIT IV DAMAGE ASSESSMENT
Introduction – damage by pests and diseases – crop loss assessment by floods – flood hazard zone mapping – remote sensing capabilities and contributions for drought
management – land degradation due to water logging and salinity – crop stress –
reflectance properties of stressed crops – identification of crop stress.

UNIT V FORESTRY
Introduction – forest taxonomy – inventory of forests – forest type and density mapping –
biomass assessment – timber volume estimation – factors for forest degradation –
mapping degraded forests – deforestation and aforestation – forest fire mapping and
damage assessment – sustainable development of forests.

TOTAL: 45 PERIODS

REFERENCES:

AI 9036 AGRICULTURAL BUSINESS MANAGEMENT

L T P C
3 0 0 3

OBJECTIVES:
At the end of the course the students would be exposed to fundamental knowledge in
• Importance of Agri. business- management and characteristics
• Principles, Management approaches
• Functional areas of Agri-business, Marketing management
• Product pricing methods, Market potential assessment

UNIT I SCOPE OF AGRICULTURAL BUSINESS
Agri-business - definition, scope, characteristics, types. Management - importance,
definition, management and administration, management thoughts, management
approaches. Small business - characteristics and stages of growth - Management
functions - planning, organizing, departmentation.

UNIT II AGRI – BUSINESS ORGANIZATION
Principles, forms of agri-business organisations, staffing. Directing - principles, elements,
supervision and motivation. Controlling - types, performance evaluation and control
techniques. Management approaches - Profit Centered Approach, Management by
objectives and Quality Circles. Strength, Weakness, Opportunities and Threat (SWOT)
Analysis.
UNIT III   AGRICULTURAL MARKETING

UNIT IV   AGRICULTURAL BUSINESS FINANCE
Forms of agri-business organizations. Role of lead bank in agribusiness finance. Business project scheduling of raw material procurement - production management - launching products (branding, placement) - Input marketing promotion activities.

UNIT V   MARKET PROMOTION AND HUMAN RESOURCES

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVE:
To introduce the basic concepts of management needed for an Agricultural Engineer

UNIT I  BASIC CONCEPTS IN MANAGEMENT  
Types of business operations - Sole proprietorship – Partnership – Company – Public and private sector enterprises / Joint ventures, collaborations.

Functions of Management - Principles of management – Functions of management – Functions of a manager.


UNIT II  INTRODUCTION TO MARKETING AND FINANCIAL MANAGEMENT  

UNIT III  MATERIALS AND EQUIPMENT MANAGEMENT  
Planning – Identification, Procurement, Schedule and Cost control – systems approach in resource management – ABC analysis, VED analysis, FSN analysis, vendor rating evaluation, buying versus leasing of equipment

UNIT IV  HUMAN RESOURCE MANAGEMENT  

UNIT V  INTRODUCTION TO COMPUTER APPLICATION IN CONSTRUCTION MANAGEMENT  
Planning – Scheduling and Resource analysis - Recording and operations- Project accounting, costing and finance – usage of project management software.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
MA 9267  STATISTICS AND LINEAR PROGRAMMING  L T P C
3 1 0 4

AIM:
Probability and statistics appear explicitly or implicitly in many disciplines including computer and information sciences, economics, biology, operations research and all branches of engineering. Linear programming is a mathematical technique designed to assist an organization in allocating its limited resources. This course aims at providing necessary tools for solving engineering and management problems.

OBJECTIVES:
At the end of the course, the student would
- Have a fundamental knowledge of the basic probability concepts.
- Have a well-founded knowledge of standard distributions, which can describe real-life phenomena.
- Be introduced to the notation of sampling distribution and would have acquired a knowledge of statistical techniques useful in making rational decisions in management problems.
- Be able to identify and mathematically formulate allocation problems involving linear objective functions and linear constraints and be able to obtain the optimal solution.
- Have acquired an ability to solve certain class of allocation problems, which can be modeled as a Transportation or Assignment problems.

UNIT I  PROBABILITY AND RANDOM VARIABLE  12

UNIT II  STANDARD DISTRIBUTION  12
Binominal, Poisson, Geometric, Uniform, Normal, Exponential and Gamma distributions – Expectations – Variance – Moments – Moment generating function and their properties.

UNIT III  TESTING HYPOTHESIS  12
Statistical hypothesis – General concepts – Test of hypothesis for mean, difference of mean, variance, ratio of variance, independence of attributes and goodness of fit using Normal, t, Chi-Square and F distributions.

UNIT IV  DESIGN OF EXPERIMENTS  12
Analysis of variance – one-way classification – Completely randomized design – Two-way classification – Randomized block design – Latin square design.

UNIT V  LINEAR PROGRAMMING  12
Formulation of linear programming problem – Graphical solution – Simplex algorithm – Transportation and assignment models.

L:45 T:15 TOTAL: 60 PERIODS
TEXT BOOKS:

REFERENCES:

ME 9355 HEAT AND MASS TRANSFER L T P C
3 0 0 3

OBJECTIVES:
- The course is intended to build up necessary background for the understanding of the physical behavior of the various modes of heat transfer, like, conduction, convection and radiation.
- To understand the application of various experimental heat transfer correlations in engineering calculations.
- To learn the thermal analysis and sizing of heat exchangers and to understand the basic concepts of mass transfer.

UNIT I CONDUCTION 11

UNIT II CONVECTION 10

UNIT III PHASE CHANGE HEAT TRANSFER AND HEAT EXCHANGERS 9
UNIT IV RADIATION

UNIT V MASS TRANSFER
Basic concepts – Diffusion mass transfer – Fick’s Law of diffusion – Steady state molecular diffusion – Convective mass transfer – Momentum, heat and mass transfer analogy – Convective mass transfer correlations.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

GE 9075 INTELLECTUAL PROPERTY RIGHTS (IPR) L T P C
3 0 0 3

UNIT I

UNIT II

UNIT III
UNIT IV

UNIT V
Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition.

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:

GE 9072  INDIAN CONSTITUTION AND SOCIETY  L T P C
3 0  0 3

UNIT I

UNIT II
Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review.

UNIT III

UNIT IV
Indian Federal System – Center – State Relations – President’s Rule – Constitutional Amendments – Constitutional Functionaries – Assessment of working of the Parliamentary System in India.
UNIT V
Society : Nature, Meaning and definition; Indian Social Structure; Castle, Religion, Language in India; Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

GE 9073 CONTRACT LAWS AND REGULATIONS

UNIT I
CONSTRUCTION CONTRACTS

UNIT II
TENDERS

UNIT III
ARBITRATION

UNIT IV
LEGAL REQUIREMENTS

UNIT V LABOUR REGULATIONS

TOTAL: 45 PERIODS

REFERENCES:
2. Tamilnadu PWD Code, 1986

GE 9022 TOTAL QUALITY MANAGEMENT

AIM
To provide comprehensive knowledge about the principles, practices, tools and techniques of Total quality management.

OBJECTIVES
- To understand the various principles, practices of TQM to achieve quality
- To learn the various statistical approaches for quality control.
- To understand the TQM tools for continuous process improvement.
- To learn the importance of ISO and Quality systems.

UNIT I INTRODUCTION

UNIT II TQM PRINCIPLES
Leadership – Strategic quality planning, Quality statements - Customer focus – Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement – PDSA cycle, 5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS & TECHNIQUES I
UNIT IV  
TQM TOOLS & TECHNIQUES II  
9

UNIT V  
QUALITY SYSTEMS  
9

TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES

GE 9021  
PROFESSIONAL ETHICS IN ENGINEERING

AIM
To sensitize the engineering students on blending both technical and ethical responsibilities.

OBJECTIVES
- Identify the core values that shape the ethical behavior of an engineer.
- Utilize opportunities to explore one’s own values in ethical issues.
- Become aware of ethical concerns and conflicts.
- Enhance familiarity with codes of conduct.
- Increase the ability to recognize and resolve ethical dilemmas.

UNIT I  
ENGINEERING ETHICS  
9
UNIT II ENGINEERING AS SOCIAL EXPERIMENTATION 9
Engineering as Experimentation – Engineers as responsible Experimenters – Research Ethics - Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – The Challenger Case Study

UNIT III ENGINEER’S RESPONSIBILITY FOR SAFETY 9

UNIT IV RESPONSIBILITIES AND RIGHTS 9

UNIT V GLOBAL ISSUES 9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES