AFFILIATED INSTITUTIONS
ANNA UNIVERSITY, CHENNAI
REGULATION – 2008
CURRICULAM & SYLLABUS II – VIII SEMESTERS
B.E GEOINFORMATICS ENGINEERING

SEMESTER II
(Common to all B.E. / B.Tech. Degree Programmes
except B.E. – Marine Engineering)

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TOTAL : 28 CREDITS

* Common to all B.E. / B.Tech. Programmes

+ Offering English Language Laboratory as an additional subject (with no marks) during 2nd semester may be decided by the respective Colleges affiliated to Anna University Chennai.
A. CIRCUIT BRANCHES

I  Faculty of Electrical Engineering
   1. B.E. Electrical and Electronics Engineering
   2. B.E. Electronics and Instrumentation Engineering
   3. B.E. Instrumentation and Control Engineering

II Faculty of Information and Communication Engineering
   1. B.E. Computer Science and Engineering
   2. B.E. Electronics and Communication Engineering
   3. B.E. Bio Medical Engineering
   4. B.Tech. Information Technology

B. NON – CIRCUIT BRANCHES

I  Faculty of Civil Engineering
   1. B.E. Civil Engineering

II Faculty of Mechanical Engineering
   1. B.E. Aeronautical Engineering
   2. B.E. Automobile Engineering
   3. B.E. Marine Engineering
   4. B.E. Mechanical Engineering
   5. B.E. Production Engineering

III Faculty of Technology
   1. B.Tech. Chemical Engineering
   2. B.Tech. Biotechnology
   3. B.Tech. Polymer Technology
   4. B.Tech. Textile Technology
   5. B.Tech. Textile Technology (Fashion Technology)
   7. B.Tech. Plastics Technology
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AIM
To encourage students to actively involve in participative learning of English and to help them acquire Communication Skills.

OBJECTIVES:
- To help students develop listening skills for academic and professional purposes.
- To help students acquire the ability to speak effectively in English in real-life situations.
- To inculcate reading habit and to develop effective reading skills.
- To help students improve their active and passive vocabulary.
- To familiarize students with different rhetorical functions of scientific English.
- To enable students write letters and reports effectively in formal and business situations.

UNIT I
Technical Vocabulary - meanings in context, sequencing words, Articles- Prepositions, intensive reading & predicting content, Reading and interpretation, extended definitions, Process description

Suggested activities:
1. Exercises on word formation using the prefix ‘self’ - Gap filling with preposition.
2. Exercises - Using sequence words.
3. Reading comprehension exercise with questions based on inference – Reading headings and predicting the content – Reading advertisements and interpretation.

UNIT II

Suggested activities:
1. Reading comprehension exercises with questions on overall content – Discussions analyzing stylistic features (creative and factual description) - Reading comprehension exercises with texts including graphic communication - Exercises in interpreting non-verbal communication.
2. Listening comprehension exercises to categories data in tables.
3. Writing formal letters, quotations, clarification, complaint – Letter seeking permission for Industrial visits – Writing analytical paragraphs on different debatable issues.

UNIT III
Cause and effect expressions – Different grammatical forms of the same word - Speaking – stress and intonation, Group Discussions - Reading – Critical reading - Listening, - Writing – using connectives, report writing – types, structure, data collection, content, form, recommendations .

Suggested activities:
Exercises combining sentences using cause and effect expressions – Gap filling exercises using the appropriate tense forms – Making sentences using different grammatical forms of the same word. ( Eg: object –verb / object – noun )
1. Speaking exercises involving the use of stress and intonation – Group discussions–analysis of problems and offering solutions.
2. Reading comprehension exercises with critical questions, Multiple choice question.

UNIT IV
12
Numerical adjectives – Oral instructions – Descriptive writing – Argumentative paragraphs – Letter of application - content, format (CV / Bio-data) - Instructions, imperative forms - Checklists, Yes/No question form – E-mail communication.

Suggested Activities:
1. Rewriting exercises using numerical adjectives.
2. Reading comprehension exercises with analytical questions on content – Evaluation of content.
3. Listening comprehension – entering information in tabular form, intensive listening exercise and completing the steps of a process.
4. Speaking - Role play – group discussions – Activities giving oral instructions.

UNIT V
9
Speaking - Discussion of Problems and solutions - Creative and critical thinking – Writing an essay, Writing a proposal.

Suggested Activities:
1. Case Studies on problems and solutions
2. Brain storming and discussion
3. Writing Critical essays
4. Writing short proposals of 2 pages for starting a project, solving problems, etc.
5. Writing advertisements.

TOTAL : 60 PERIODS

TEXT BOOK:

REFERENCES:

Extensive Reading:

Note:
The book listed under Extensive Reading is meant for inculcating the reading habit of the students. They need not be used for testing purposes.
UNIT I  ORDINARY DIFFERENTIAL EQUATIONS  12
Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy’s and Legendre’s linear equations – Simultaneous first order linear equations with constant coefficients.

UNIT II  VECTOR CALCULUS  12

UNIT III  ANALYTIC FUNCTIONS  12
Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy – Riemann equation and Sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping : w= z+c, cz, 1/z, and bilinear transformation.

UNIT IV  COMPLEX INTEGRATION  12

UNIT V  LAPLACE TRANSFORM  12
Definition of Inverse Laplace transform as contour integral – Convolution theorem (excluding proof) – Initial and Final value theorems – Solution of linear ODE of second order with constant coefficients using Laplace transformation techniques.

TOTAL : 60 PERIODS

TEXT BOOK:

REFERENCES
UNIT I CONDUCTING MATERIALS

UNIT II SEMICONDUCTING MATERIALS

UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS
Superconductivity : properties - Types of super conductors – BCS theory of superconductivity(Qualitative) - High Tc superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

UNIT IV DIELECTRIC MATERIALS

UNIT V MODERN ENGINEERING MATERIALS
Metallic glasses: preparation, properties and applications.
Shape memory alloys (SMA): Characteristics, properties of NiTi alloy, application, advantages and disadvantages of SMA

TOTAL : 45 PERIODS

TEXT BOOKS
2. Charles P. Poole and Frank J.Ownen, ‘Introduction to Nanotechnology’, Wiley India(2007) (for Unit V)

REFERENCES
AIM
To impart a sound knowledge on the principles of chemistry involving the different application-oriented topics required for all engineering branches.

OBJECTIVES
- The student should be conversant with the principles of electrochemistry, electrochemical cells, emf and applications of emf measurements.
- Principles of corrosion control
- Chemistry of Fuels and combustion
- Industrial importance of Phase rule and alloys
- Analytical techniques and their importance.

UNIT I  ELECTROCHEMISTRY
Electrochemical cells – reversible and irreversible cells – EMF – measurement of emf – Single electrode potential – Nernst equation (problem) – reference electrodes – Standard Hydrogen electrode – Calomel electrode – Ion selective electrode – glass electrode and measurement of pH – electrochemical series – significance – potentiometer titrations (redox - \( \text{Fe}^{2+} \text{ vs dichromate and precipitation - Ag}^+ \text{ vs Cl}^- \text{ titrations} \) ) and conduct metric titrations (acid-base – HCl vs, NaOH) titrations,

UNIT II  CORROSION AND CORROSION CONTROL

UNIT III  FUELS AND COMBUSTION

UNIT IV  PHASE RULE AND ALLOYS

UNIT V  ANALYTICAL TECHNIQUES

TOTAL: 45 PERIODS

TEXT BOOKS:
REFERENCES:

ME2151 ENGINEERING MECHANICS

L T P C
3 1 0 4

OBJECTIVE
At the end of this course the student should be able to understand the vectorial and scalar representation of forces and moments, static equilibrium of particles and rigid bodies both in two dimensions and also in three dimensions. Further, he should understand the principle of work and energy. He should be able to comprehend the effect of friction on equilibrium. He should be able to understand the laws of motion, the kinematics of motion and the interrelationship. He should also be able to write the dynamic equilibrium equation. All these should be achieved both conceptually and through solved examples.

UNIT I BASICS & STATICS OF PARTICLES

UNIT II EQUILIBRIUM OF RIGID BODIES

UNIT III PROPERTIES OF SURFACES AND SOLIDS

UNIT IV DYNAMICS OF PARTICLES

UNIT V FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS
Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion.

TOTAL: 60 PERIODS
TEXT BOOK:

REFERENCES:

EE2151 CIRCUIT THEORY

L T P C
3 1 0 4

(Common to EEE, EIE and ICE Branches)

UNIT I BASIC CIRCUITS ANALYSIS

UNIT II NETWORK REDUCTION AND NETWORK THEOREMS FOR DC AND AC CIRCUITS
Network reduction: voltage and current division, source transformation – star delta conversion. Thevenin’s and Norton & Theorem – Superposition Theorem – Maximum power transfer theorem – Reciprocity Theorem.

UNIT III RESONANCE AND COUPLED CIRCUITS

UNIT IV TRANSIENT RESPONSE FOR DC CIRCUITS
Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and A.C. with sinusoidal input.

UNIT V ANALYSING THREE PHASE CIRCUITS
Three phase balanced / unbalanced voltage sources – analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced & un balanced – phasor diagram of voltages and currents – power and power factor measurements in three phase circuits.

TOTAL :60 PERIODS

TEXT BOOKS:
REFERENCES:

EC2151 ELECTRIC CIRCUITS AND ELECTRON DEVICES L T P C
3 1 0 4
(For ECE, CSE, IT and Biomedical Engg. Branches)

UNIT I CIRCUIT ANALYSIS TECHNIQUES 12

UNIT II TRANSIENT RESONANCE IN RLC CIRCUITS 12

UNIT III SEMICONDUCTOR DIODES 12

UNIT IV TRANSISTORS 12
Principle of operation of PNP and NPN transistors – study of CE, CB and CC configurations and comparison of their characteristics – Breakdown in transistors – operation and comparison of N-Channel and P-Channel JFET – drain current equation – MOSFET – Enhancement and depletion types – structure and operation – comparison of BJT with MOSFET – thermal effect on MOSFET.

UNIT V SPECIAL SEMICONDUCTOR DEVICES (Qualitative Treatment only) 12

TOTAL : 60 PERIODS

TEXT BOOKS:
REFERENCES:

GE2151 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

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(Common to branches under Civil, Mechanical and Technology faculty)

UNIT I ELECTRICAL CIRCUITS & MEASUREMENTS

12

Operating Principles of Moving Coil and Moving Iron Instruments (Ammeters and Voltmeters), Dynamometer type Watt meters and Energy meters.

UNIT II ELECTRICAL MECHANICS

12

UNIT III SEMICONDUCTOR DEVICES AND APPLICATIONS

12


UNIT IV DIGITAL ELECTRONICS

12
Binary Number System – Logic Gates – Boolean Algebra – Half and Full Adders – Flip-Flops – Registers and Counters – A/D and D/A Conversion (single concepts)

UNIT V FUNDAMENTALS OF COMMUNICATION ENGINEERING

12

Communication Systems: Radio, TV, Fax, Microwave, Satellite and Optical Fibre (Block Diagram Approach only).

TOTAL : 60 PERIODS

TEXT BOOKS:
REFERENCES:

GE2152 BASIC CIVIL & MECHANICAL ENGINEERING  L T P C  4 0 0 4
(Common to branches under Electrical and I & C Faculty)

A – CIVIL ENGINEERING

UNIT I SURVEYING AND CIVIL ENGINEERING MATERIALS  15

UNIT II BUILDING COMPONENTS AND STRUCTURES  15
Foundations: Types, Bearing capacity – Requirement of good foundations.

TOTAL : 30 PERIODS

B – MECHANICAL ENGINEERING

UNIT III POWER PLANT ENGINEERING  10

UNIT IV I C ENGINES  10
Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Boiler as a power plant.

UNIT V REFRIGERATION AND AIR CONDITIONING SYSTEM  10

TOTAL: 30 PERIODS
REFERENCES:

GE2155 COMPUTER PRACTICE LABORATORY – II L T P C 0 1 2 2

LIST OF EXPERIMENTS

1. UNIX COMMANDS 15
   Study of Unix OS - Basic Shell Commands - Unix Editor

2. SHELL PROGRAMMING 15
   Simple Shell program - Conditional Statements - Testing and Loops

3. C PROGRAMMING ON UNIX 15
   Dynamic Storage Allocation-Pointers-Functions-File Handling

TOTAL : 45 PERIODS

HARDWARE / SOFTWARE REQUIREMENTS FOR A BATCH OF 30 STUDENTS

Hardware
   1 UNIX Clone Server
   33 Nodes (thin client or PCs)
   Printer – 3 Nos.

Software
   OS – UNIX Clone (33 user license or License free Linux)
   Compiler - C

GS2165 PHYSICS LABORATORY – II L T P C 0 0 3 2

LIST OF EXPERIMENTS

1. Determination of Young’s modulus of the material – non uniform bending.
2. Determination of Band Gap of a semiconductor material.
3. Determination of specific resistance of a given coil of wire – Carey Foster Bridge.
5. Spectrometer dispersive power of a prism.
6. Determination of Young’s modulus of the material – uniform bending.
• A minimum of FIVE experiments shall be offered.
• Laboratory classes on alternate weeks for Physics and Chemistry.
• The lab examinations will be held only in the second semester.

GS2165 CHEMISTRY LABORATORY – II

LIST OF EXPERIMENTS
1. Conduct metric titration (Simple acid base)
2. Conduct metric titration (Mixture of weak and strong acids)
3. Conduct metric titration using \( \text{BaCl}_2 \) vs \( \text{Na}_2 \text{SO}_4 \)
4. Potentiometric Titration (\( \text{Fe}^{2+} / \text{KMnO}_4 \) or \( \text{K}_2\text{Cr}_2\text{O}_7 \))
5. PH titration (acid & base)
6. Determination of water of crystallization of a crystalline salt (Copper sulphate)
7. Estimation of Ferric iron by spectrophotometry.

ME2155 COMPUTER AIDED DRAFTING AND MODELING LABORATORY

List of Exercises using software capable of Drafting and Modeling
1. Study of capabilities of software for Drafting and Modeling – Coordinate systems (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general multi-line figures.
2. Drawing of a Title Block with necessary text and projection symbol.
3. Drawing of curves like parabola, spiral, involute using B spline or cubic spline.
4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder, cone, etc, and dimensioning.
5. Drawing front view, top view and side view of objects from the given pictorial views (eg. V-block, Base of a mixie, Simple stool, Objects with hole and curves).
6. Drawing of a plan of residential building ( Two bed rooms, kitchen, hall, etc.)
7. Drawing of a simple steel truss.
8. Drawing sectional views of prism, pyramid, cylinder, cone, etc,
10. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from 3-D model.
Note: Plotting of drawings must be made for each exercise and attached to the records written by students.

**List of Equipments for a batch of 30 students:**

1. Pentium IV computer or better hardware, with suitable graphics facility – 30 No.
2. Licensed software for Drafting and Modeling – 30 Licenses
3. Laser Printer or Plotter to print / plot drawings – 2 No.

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**EE2155 ELECTRICAL CIRCUIT LABORATORY**

(Common to EEE, EIE and ICE)

**LIST OF EXPERIMENTS**

1. Verification of ohm’s laws and kirchoff’s laws.
2. Verification of Thevenin’s and Norton’s Theorem
3. Verification of superposition Theorem
4. Verification of maximum power transfer theorem.
5. Verification of reciprocity theorem
6. Measurement of self inductance of a coil
7. Verification of mesh and nodal analysis.
8. Transient response of RL and RC circuits for DC input.
10. Frequency response of single tuned coupled circuits.

**TOTAL: 45 PERIODS**

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**EC2155 CIRCUITS AND DEVICES LABORATORY**

1. Verification of KVL and KCL
2. Verification of Thevenin and Norton Theorems.
3. Verification of superposition Theorem.
4. Verification of Maximum power transfer and reciprocity theorems.
5. Frequency response of series and parallel resonance circuits.
6. Characteristics of PN and Zener diode
7. Characteristics of CE configuration
8. Characteristics of CB configuration
9. Characteristics of UJT and SCR
10. Characteristics of JFET and MOSFET

**TOTAL : 45 PERIODS**
ENGLISH LANGUAGE LABORATORY (Optional)

1. Listening: 5
   Listening & answering questions – gap filling – Listening and Note taking- Listening to telephone conversations

2. Speaking: 5
   Pronouncing words & sentences correctly – word stress – Conversation practice.

Classroom Session 20

1. Speaking: Introducing oneself, Introducing others, Role play, Debate- Presentations:
   Body language, gestures, postures.
   Group Discussions etc
2. Goal setting – interviews – stress time management – situational reasons

Evaluation

(1) Lab Session – 40 marks
   Listening – 10 marks
   Speaking – 10 marks
   Reading – 10 marks
   Writing – 10 marks

(2) Classroom Session – 60 marks
   Role play activities giving real life context – 30 marks
   Presentation – 30 marks

Note on Evaluation

1. Examples for role play situations:
   a. Marketing engineer convincing a customer to buy his product.
   b. Telephone conversation – Fixing an official appointment / Enquiry on availability of flight or train tickets / placing an order. etc.

2. Presentations could be just a Minute (JAM activity) or an Extempore on simple topics or visuals could be provided and students could be asked to talk about it.

REFERENCES:

LAB REQUIREMENTS:
1. Teacher – Console and systems for students
2. English Language Lab Software
3. Tape Recorders.
OBJECTIVES
The course objective is to develop the skills of the students in the areas of Transforms and Partial Differential Equations. This will be necessary for their effective studies in a large number of engineering subjects like heat conduction, communication systems, electro-optics and electromagnetic theory. The course will also serve as a prerequisite for post graduate and specialized studies and research.

UNIT I  FOURIER SERIES  9+3

UNIT II  FOURIER TRANSFORMS  9+3

UNIT III  PARTIAL DIFFERENTIAL EQUATIONS  9+3
Formation of partial differential equations – Lagrange’s linear equation – Solutions of standard types of first order partial differential equations - Linear partial differential equations of second and higher order with constant coefficients.

UNIT IV  APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS  9+3
Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two-dimensional equation of heat conduction (Insulated edges excluded) – Fourier series solutions in cartesian coordinates.

UNIT V  Z -TRANSFORMS AND DIFFERENCE EQUATIONS  9+3

TOTAL (L:45+T:15): 60 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVE:
The main objective of this course is to introduce the rudiments of Land Survey methods and principles to Geoinformatics Engineers. This is the correct term and it falls under the general title of Land Surveying.

UNIT I  FUNDAMENTALS OF SURVEYING  4

UNIT II  CHAIN SURVEYING  9

UNIT III  COMPASS SURVEYING AND PLANE TABLE SURVEYING  12

UNIT IV  LEVELLING  14

UNIT V  AREAS AND VOLUMES  6

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVE
At the end of the course the student will possess knowledge about Cartographic Concepts.

UNIT I  INTRODUCTION
Cartography today - Nature of Cartography - History of Cartography - Graticules - Cartometry.

UNIT II  EARTH

UNIT III  SOURCES OF DATA

UNIT IV  PERCEPTION AND DESIGN
Cartographic design - Color theory and models - Color and pattern creation and specification - Color and pattern - Typography and lettering the map - Map compilation.

UNIT V  CARTOGRAPHY ABSTRACTION

TOTAL: 45 PERIODS

TEXT BOOKS

GI3203  PHOTOGRAMMETRY I
OBJECTIVE:
The objective of this course is to introduce basics and concepts of optics, Aerial photography acquisition and mapping from aerial photographs.

UNIT I  BASIC OPTICS AND PRINCIPLES OF PHOTOGRAPHY
UNIT II CAMERAS AND CO-ORDINATE MEASUREMENT

UNIT III STEREOSCOPIC AND PLANIMETRIC MAPPING WITH VERTICAL, TILTED AND OBLIQUE PHOTOGRAPHS

UNIT IV PROJECT PLANNING AND GROUND CONTROL SURVEY

UNIT V PHOTO INTERPRETATION

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

TEXTBOOKS:

REFERENCES:

GI3204 DATABASE SYSTEMS

OBJECTIVE:
The objective of this course is to introduce the students to basic concepts of database, file systems and organization, Database Management System (DBMS) and .Net for database.

UNIT I INTRODUCTION
Data – Information - File system vs DBMS – Data models – Hardware and software requirements – Database Management Systems – Database languages, Database Architecture, users and administrators – Classification of Database Management Systems
UNIT II  RELATIONAL DATA MODEL  
Relational model – Data Structure – Constraints – Keys – Codd’s Rule – Relational Algebra – Fundamental operations - Additional operations – Extended operations – Null values

UNIT III  SQL  
SQL – Data Definition - Basic structure of SQL queries – Set operations – Aggregate Functions – Null values – Nested sub queries – Complex queries – Views – Embedded SQL – Dynamic SQL – Triggers

UNIT IV  DATABASE DESIGN AND MANAGEMENT  

UNIT V  ACCESSING DATA USING ADO.NET AND VB.NET  
ADO.Net Object Model using OLE DB managed provider – Other data providers – Accessing XML data – Building Windows application using VB.Net – Programming web applications with web form

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:

AG2211  APPLIED GEOLOGY  
3 0 0 3

OBJECTIVE
At the end of this course the student shall be able to understand about geological formations, classification and morphology of rocks, and the importance of the study of geology for civil engineers with regard to founding structures like dams, bridges, buildings, etc. The student shall also be able to appreciate the importance of geological formation in causing earthquakes and land slides.

UNIT I  GENERAL GEOLOGY  
UNIT II   MINERALOGY
Elementary knowledge on symmetry elements of important crystallographic systems – physical properties of minerals – study of the following rock forming minerals – Quartz family. Feldspar family, Augite, Hornblende, Biotite, Muscovite, Calcite, Garnet – properties, behaviour and engineering significance of clay minerals – Fundamentals of process of formation of ore minerals – Coal and petroleum – Their origin and occurrence in India.

UNIT III   PETROLOGY
Classification of rocks – distinction between igneous, sedimentary and metamorphic rocks. Description occurrence, engineering properties and distribution of following rocks. Igneous rocks – Granite, Syenite, Diorite, Gabbro, Pegmatite, Dolerite and Basalt Sedimentary rocks sandstone, Limestone, shale congl, Conglomerate and breccia. Metamorphic rocks. Quartzite, Marble, Slate, Phyllite, Gniess and Schist.

UNIT IV   STRUCTURAL GEOLOGY AND GEOPHYSICAL METHOD

UNIT V   GEOLOGICAL INVESTIGATIONS IN CIVIL ENGINEERING

TEXT BOOKS:

REFERENCES:

GI3206     SURVEY PRACTICAL I     L T P C
0 0 4 2

OBJECTIVE:
The objective of this course is to introduce the principles of surveying, instruments and various methods.

UNIT I   CHAIN SURVEYING
a) Study of chain and its accessories b) Ranging, chaining and Pacing
c) Chain traversing without cross staff
d) Chain traversing with cross staff

UNIT II   COMPASS SURVEYING
e) Study of Prismatic and Surveyor’s Compasses f) Triangulation problem
g) Compass traversing
UNIT III  PLANE TABLE SURVEYING
h) Study of plane table and its accessories i) Radiation
j) Intersection: Triangulation problem
k) Resection – Three point problem l) Mechanical method
m) Trial and error method n) Graphical solution
o) Resection – Two Point problem p) Plane table traversing

UNIT IV  STUDY OF MINOR INSTRUMENTS

TOTAL : 60 PERIODS

GI3207  PHOTOGRAMMETRY LABORATORY I  L T P C
        0 0 2 1

OBJECTIVES:
1. To determine the stereoscopic acquity for stereo measurement,
2. To provide exposure in handling basic equipment like stereoscope, parallax bar
3. To provide details about project planning activities and selection of Ground Control Points.

EXERCISE DESCRIPTION
1. Testing Stereovision with test card
2. Finding stereoscopic acquity
3. Determination of photo scale
4. Mirror Stereoscope – Base lining and Orientation of Aerial Photographs
5. Use of parallax bar to find the height of point
6. Determination of slope using parallax point
7. Aerial photograph i) direct tracing of features for Urban planning and Highway planning ii) Radial line triangulation
8. Study of Aerial camera / Terrestrial camera
9. Preparation of flight plan
10. Selection of ground control point (horizontal & vertical)
11. Introduction to Analytical Stereo plotting instrument

TOTAL : 30 PERIODS

GI3208  DATABASE SYSTEMS LABORATORY  L T P C
        0 0 4 2

OBJECTIVE:
To get practical experience on the server – client setup on the database management
1. Server / client operations
   The server / client – Starting / Shutdown of server - Configuring client over network
2. Data Definition of Tables and Views
   Exercises on Creation, Deletion and Modification of definition
3. Data Manipulation of Tables and views
   Exercises on queries and to insert, delete and modify rows
4. Data Control of Tables and Views
   Exercises on control of tables and views
5. Database triggers
   Use of queries on complex integrity constraints
6. Forms designing
   Designing of forms for input/output
7. Menu designing
   Designing of user menus for database interactions
8. Report preparations
   Generating formatted reports
9. Front end tool – applications
   Designing of database application with any front end tool

TOTAL: 60 PERIODS

MA3211 PROBABILITY AND STATISTICS

AIM:
This course aims at providing the required skill to apply the statistical tools in engineering problems.

OBJECTIVES:
- The students will have a fundamental knowledge of the concepts of probability.
- Have knowledge of standard distributions which can describe real life phenomenon.
- Have the notion of sampling distributions and statistical techniques used in management problems.

UNIT I RANDOM VARIABLES 9+3
Discrete and Continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions - Functions of a random variable.

UNIT II TWO-DIMENSIONAL RANDOM VARIABLES 9+3
Joint distributions – Marginal and Conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT III TESTING OF HYPOTHESIS 9 + 3
UNIT IV DESIGN OF EXPERIMENTS 9 + 3
Completely randomized design – Randomized block design – Latin square design – factorial design.

UNIT V STATISTICAL QUALITY CONTROL 9 + 3
Control charts for measurements (X and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits – Acceptance sampling.

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

TEXT BOOKS:

REFERENCES:

GI3209 SURVEYING II L T P C 3 0 0 3

OBJECTIVE:
This subject deals with angular measurements, distance measurements and Control Survey methodology. The student is introduced briefly to Hydrographic Survey operations also.

UNIT I THEODOLITE SURVEYING 10

UNIT II TACHEOMETRIC SURVEYING 8
Tacheometric systems – Tangential, Stadia and Subtense methods – Stadia systems – Horizontal and inclined sights, vertical and normal staffing, fixed and movable hairs – stadia constants – Anallactic lens – Subtense bar.

UNIT III CONTROL SURVEYING 15

UNIT IV HYDROGRAPHIC SURVEYING 7
UNIT V  TOPOGRAPHIC SURVEYING
Scale and Precision—Methods of Representation—Planning—Instruments—
Location of details–Electronic positioning system–Uses of Digital Terrain Model (DTM)
and Digital Elevation Model (DEM)—Modern Trends.

TOTAL: 45 PERIODS

TEXT BOOKS:
1. Kanetkar T.P. Surveying and Levelling, Vols I and II, United Book Corporation, Pune,
   1994

REFERENCES:
1. James M. Anderson and Edward M. Mikhail, Surveying, Theory and Practice,

GI 3210  DIGITAL IMAGE PROCESSING  L T P C
                                                3 0 0 3

OBJECTIVE:
To make the undergraduate students gain knowledge and learn analytic background of
digital image processing system to enable them in building one.

UNIT I  FUNDAMENTALS
Computers imaging systems, image representation- colour space, image sampling-
quantization – quality measurement-data products – storage and retrieval- Photowite
systems- dip systems and software.

UNIT II  PREPROCESSING
Encoding and decoding- sources of image degradation – atmospheric, radiometric and
gEometric errors – systematic and non-systematic correction – image geometry operations

UNIT III  IMAGE ENHANCEMENT
Image characters – histogram, scatter plots, statistics and spatial statistics for
processing –image models, spatial transforms – enhancements: radiometric and
gEometric operators- Fourier transforms, scale space transforms, image fusion, texture
analysis

UNIT IV  IMAGE CLASSIFICATION
Spectral discrimination pattern matching –Baye’s theorem- signature and feature
extraction- training and classification – supervised an d unsupervised methods – error
matrix and accuracy estimates

UNIT V  IMAGE ANALYSIS
Concept of uncertainty- fuzzy partitioning – neural nets - sub-pixel classification concept
– pattern recognition - feature descriptors – representations schemes – multi-scale edge
detection – expert systems

TOTAL: 45 PERIODS
TEXT BOOKS:

REFERENCES:

GI3211 OBJECT ORIENTED PROGRAMMING L T P C 3 0 2 4

OBJECTIVE:
This course will facilitate the student to develop Object Oriented Programming and GIS Customisation programming using Visual Basic.

UNIT I CONCEPTS OF OBJECT ORIENTED PROGRAMMING 12

UNIT II C++ PROGRAMMING 14
Introduction to C++ - Keywords, Identifiers – Data types – Variables – Operators – Manipulators – Operator Overloading – Operator Precedence – Control Statements – Functions – Call by Reference – Arguments – Function Overloading – Exercises

UNIT III CLASSES AND OBJECTS 17
Classes and Objects – Member Functions – Private and Public Member function – Nesting of Member Functions – Array of Objects – Pointer to Members – Constructors – Destructors – Type Conversions – Exercises

UNIT IV INHERITANCE AND POLYMORPHISM 16

UNIT V GIS CUSTOMISATION PROGRAMMING USING VISUAL BASIC 16

L: 45 + P: 30, TOTAL : 75 PERIODS
TEXT BOOKS:

REFERENCES:

GI3212 ELECTRONIC SURVEYING L T P C
3 0 2 4

OBJECTIVE:
To understand the working of EDM equipment and solve the surveying problems with an EDM equipment.

UNIT I FUNDAMENTALS 5
Methods of Measuring Distance, Basic Principles of EDM, Historical Development Classifications, applications and comparison with conventional surveying.

UNIT II BASIC ELECTRONICS 10
Oscillators (Crystal controlled and Gunn diode) - Kerrcell / Pocket's modulator-Frequency mixing - modulation and Demodulation - Measurement of phase differences - reflectors (Corner, Antenna) - Transducers and power sources.

UNIT III ELECTROMAGNETIC WAVES 20
Classification and applications of Electromagnetic waves, Propagation properties, wave propagation at lower and higher frequencies. Refractive index, factors affecting RI, Computation of group refractive index for light and near infrared waves at standard conditions and ambient conditions. Computation of RI for microwaves. Reference refractive index. Real time application of first velocity correction. Measurement of atmospheric parameters. Mean refractive index, Second velocity correction, Total atmospheric correction, Use of temperature and pressure transducers.

UNIT IV ELECTROMAGNETIC DISTANCE MEASURING SYSTEM 10

UNIT V FIELD WORK 30
Study of different EDM instruments and Total station - Setting out works - Base line Measurement - EDM traversing: observations and computation of area - Trilateration.

L: 45 + P: 30 TOTAL : 75 PERIODS
TEXTBOOKS:

REFERENCES:

GE 2021 ENVIRONMENTAL SCIENCE AND ENGINEERING L T P C 3 0 0 3

AIM
• The aim of this course is 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 14
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 – solid 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

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


UNIT V  HUMAN POPULATION AND THE ENVIRONMENT


TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES BOOKS:
OBJECTIVE:
The objective of this course is to train the students to acquire skill in making precise
measurements and obtaining accurate results.

UNIT I  LEVELLING
a) Study of levels and levelling staves .
b) Taking spot levels
c) Fly levelling using Dumpy level
d) Fly levelling using Tilting level
e) Check levelling
f) Permanent adjustment of levels
g) Contouring
h) LS and CS
i) Computation of volume of earth work from contours

UNIT II  THEODOLITE SURVEYING
j) Study of theodolite and its accessories
k) Measurement of horizontal angles
l) Measurement of vertical angles m) Traversing

UNIT III  HEIGHTS AND DISTANCES
n) Triangulation problem
o) Single plane method

TOTAL: 60 PERIODS

OBJECTIVE:
To familiarize the undergraduate level students in the regular Image Processing
software with respect to basic processing required to generate thematic maps from Satellite
date.

1. Study of image file formats and organisation
2. Loading, import and display image
3. Display, zoom, panning of Image
4. Pixel locators and DN enumeration
5. Enhancement of image
6. Filters & edge enhancement
7. Designing of spatial filters
8. Thresholding and Density slicing
9. Band ratioing and NDVI
10. Principle Component Analysis
11. Look Up Table/PCT Manipulation
12. Bitmap generation & Conversion
13. Vector layer Manipulation
14. Symbol Manipulation
15. Reprojection to different co-ordinate systems

TOTAL : 60 PERIODS
OBJECTIVE:
The Subject of Surveying, astronomy, and setting out works have also acquired a special significance in the context of an unprecedented explosion of knowledge; thereby making radical changes in the concept of previously acknowledged thinking. The last Chapter deals with modern systems in Surveying and Mapping. It presents an overview of the latest techniques in the field of instrumentation and methodologies being employed in Geomatics.

UNIT I ASTRONOMICAL SURVEYING 16
Celestial sphere – Astronomical terms and definitions – Motion of sun and stars – Apparent altitude and corrections – Celestial coordinate systems – Different time systems – Nautical Almanac – Star constellations – Practical astronomy – Field observations and calculations for azimuth, time, longitude and latitude.

UNIT II ROUTE SURVEYING 4
Reconnaissance – Route surveys for highways, railways and waterways.

UNIT III CURVE RANGING 10

UNIT IV MINE SURVEYING 5

UNIT V MODERN SYSTEMS IN SURVEYING AND MAPPING 10

TOTAL : 45 PERIODOS

TEXTBOOKS:

REFERENCES:
OBJECTIVE:
To impart the knowledge in Microwave Remote Sensing and its application

UNIT I  FUNDAMENTALS AND RADIOMETRY  9
Introduction - plane waves - antenna systems – radiometry - microwave interaction with atmosphere constituents - Earth’s surface and vegetation - Physical mechanisms and empirical models for scattering and emission - Radiometric systems – Sensors - Data product and applications.

UNIT II  RADAR REMOTE SENSING  9
Radar interaction with Earth surface and vegetation - Surface scattering theory - RADAR equation - Fading concept - Measurement and discrimination - Physical mechanisms and empirical models for scattering - Geometry of RADAR images - Radar return and image signature - Resolution concepts

UNIT III  REAL AND SYNTHETIC APERTURE RADARS  9
Airborne – Spaceborne - different platforms and sensors - Data products and selection procedure - SEASAT, SIRA, SIRB, ERS , JERS, RADARSAT missions.

UNIT IV  APPLICATION OF RADAR REMOTE SENSING  9

UNIT V  SPECIAL TOPICS IN RADAR REMOTE SENSING  9
SAR  Interferometry – Basics- Differential SAR Interferometry - Polarimetry-Radargrammetry- applications - Altimeters.

TOTAL: 45 PERIODS

TEXTBOOKS:

REFERENCES:

OBJECTIVE:
The Objective of this course is to introduce the students to the cadastral survey methods and its applications in generation of Land Information System. Cadastral surveys are those classes of land surveys which are executed for the purpose of systematically recording the land rights, producing register of land holdings or an inventory of land areas, land use and determining land tax.
UNIT I  INTRODUCTION  8
Graphical and Numerical Cadastre.

UNIT II  METHODS OF SURVEYING  12
Cadastral Survey Methods – Steps in survey of a village – Instruments used for
cadastral survey & mapping – Orthogonal, Polar survey methods – Boundary survey –
Rectangulation – Calculation of area of Land.

UNIT III  MAINTENANCE AND MEASUREMENTS  10
Cadastral survey maintenance – Resurveys – Measurement of sub-division –
Measurement of obstructed lines – Survey of urban areas – Control requirement for Urban
survey

UNIT IV  PHOTOGRAMMETRIC METHODS  5
Photogrammetric for cadastral surveying and mapping – Ortho photo map – GPS for
cadastral survey.

UNIT V  MAPPING PROCEDURES AND MODERN TRENDS  10
Cadastral map reproduction – Map projection for cadastral maps – Conventional
symbols – map – reproduction processes – Automated cadastral map. LIS/GIS
Organisation of cadastral offices in Tamil Nadu/India – Recent Developments & Modern
Trends.

TOTAL: 45 PERIODS

TEXT BOOKS:
1. James, M. Anderson and Edward N. Mikhail, Introduction to Surveying, McGraw
   Hill Book Co, 1985

REFERENCES:
2. Survey of India, Hand book of Topography

GI3304  GEODESY  L T P C
        2 2 0 4

OBJECTIVE:
To understand the concept of Geodetic Surveying and solve the geodetic problems.

UNIT I  FUNDAMENTALS  5
Definitions, Classifications, and Problem of Geodesy. Historical development and
Engineering, Lunar and Planetary Geodesy.
UNIT II GEOMETRIC GEODESY
Geodetic, Geocentric and Reduced latitudes and their relationship. Ellipsoidal Co-
ordinates in terms of Reduced, Geodetic and geocentric latitude. Radius of curvature in the
meridian & prime vertical and their relationship. Radius of curvature in any azimuth,
Length of the meridian arcs and arcs of parallel and Area of trapezium on the ellipsoid.
Curves on the ellipsoid, properties of Geodesic and Everest ellipsoid. Natural or
method of determining the reference Spheroid. Geodetic Control (Horizontal and
Vertical)- Standards and Methods.

UNIT III PHYSICAL GEODESY
Gravity field of earth, Concept of equipotential, Geopotential and Spheropotential
Surface - Normal gravity, The Significance of gravity measurements, Measurements of
Absolute and Relative gravity, Reduction of gravity measurements, Isostasy. Gravity
networks. Gravity anomaly and Gravity disturbance - Fundamental equation of Physical
Geodesy. Determination of Geoid and Deflection of Vertical, Orthometric height, Normal
height, Dynamic height and their corrections, Ellipsoidal height and geoidal height.

UNIT IV GEODETIC ASTRONOMY
Horizon, Hour Angle, Right Ascension and Ecliptic co-ordinate System, relationship with
Cartesian System, Transformation between them. Special star positions, Major
constellations, Rising and setting of Stars with respect to Declination, hour angle and
Azimuth, Culmination, Prime Vertical Crossing and Elongation - Variation in celestial co –
ordinates, Sidereal time, Universal time, Zone time and Atomic time. Determination
of Astronomical Azimuth, latitude and longitude. Star catalogues, Ephemerides and
Almanacs.

UNIT V GEODETIC COMPUTATION
Rectangular and Polar Co – ordinates - First and Second geodetic problem -
Similarity and Helmert’s transformation, Point determination by Intersection -
Resection and Arc Section

L: 30 + T: 30 TOTAL : 60 PERIODS

TEXT BOOK:

REFERENCES:
3. Petr Vanicek and Edward J. Krakiwsky, Geodesy: The concepts, North-Holland
4. Herbert kahmen and Wolfgang Faig, Surveying, Walter De Gruyter, Berlin,
5. Schwarze, V.S. Geodesy: The challenge of the 3rd millennium, Springer verlag, and
2002.
OBJECTIVE:
To introduce the fundamentals of Geographic Information System. To provide details about Spatial data, Spatial data base structures, Data structures and their utility in GIS

UNIT I  FUNDAMENTALS OF GIS  9

UNIT II  DATA AND DATA BASE STRUCTURE  9

UNIT III  DATA STRUCTURE/ DATA MODEL  9

UNIT IV  DATA INPUT  9

UNIT V  CONTINUOUS SURFACE REPRESENTATION  9

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:
1. Peter A. Burrough, Rachael A. McDonnell, Principles of GIS, Oxford University Press, 2000
OBJECTIVE:
The objective of this course is to train the students to acquire skill in using the instruments for various applications.

UNIT I  SETTING OUT WORKS
a) Foundation marking
b) Simple curve using chain and tape only c) Simple curve by Rankine method
d) Transition curve

UNIT II  TACHEOMETRIC SURVEYING
a) Stadia method
b) Tangential method c) Subtense method

UNIT III  FIELD ASTRONOMY
a) Study of motion of the Sun
b) Determination of azimuth using known latitude c) Determination of azimuth using hour angle
d) Determination of watch error
e) Determination of latitude

UNIT IV  MEASUREMENT OF BASE LINE

TOTAL : 60 PERIODS

OBJECTIVE:
To provide practical and hands on exercises on Data Input, Data storage, Data Retrieval and Data output capabilities of GIS

1. Data Input – Digitizer, Scanning and On Screen digitization – Creation of Point, Line, Polygon and Surface Data - Data Editing – Editing digitizing errors
2. Building Topology – Measurement: Distance, Area
3. Linking Spatial and Non-spatial data – Adding Attribute data
4. Tabular data analysis- SQL, Select, Edit, Delete, Explore, Modify, Merge, Join and Descriptive Statistics from Tables
5. Generating various types of Charts from Tabular data
6. Other Data Base Connectivity: Linking external data base
7. Data Conversion – Vector to Raster, Raster to Vector
8. Data Interchange – Conversion of raster and vector to different interchange formats
Globalisation has brought in numerous opportunities for the teeming millions, with more focus on the students’ overall capability apart from academic competence. Many students, particularly those from non-English medium schools, find that they are not preferred due to their inadequacy of communication skills and soft skills, despite possessing sound knowledge in their subject area along with technical capability. Keeping in view their pre-employment needs and career requirements, this course on Communication Skills Laboratory will prepare students to adapt themselves with ease to the industry environment, thus rendering them as prospective assets to industries. The course will equip the students with the necessary communication skills that would go a long way in helping them 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 job.
- To enhance the performance of students at Placement Interviews, Group Discussions and other recruitment exercises.

### I. PC based session (Weightage 40%) 24 periods

**A. ENGLISH LANGUAGE LAB** (18 Periods)

1. **LISTENING COMPREHENSION:** (6)
   Listening and typing – Listening and sequencing of sentences – Filling in the blanks -Listening and answering questions.

2. **READING COMPREHENSION:** (6)
   Filling in the blanks - Close exercises – Vocabulary building - Reading and answering questions.

3. **SPEAKING:** (6)
   Conversations: Face to Face Conversation – Telephone conversation – Role play activities (Students take on roles and engage in conversation)
B. DISCUSSION OF AUDIO-VISUAL MATERIALS  
(6 PERIODS)  
(Samples are available to learn and practice)

1. **RESUME / REPORT PREPARATION / LETTER WRITING**  
(1)  
Structuring the resume / report - Letter writing - Email Communication - Samples.

2. **PRESENTATION SKILLS:**  
(1)  
Elements of effective presentation – Structure of presentation – Presentation tools – Voice Modulation – Audience analysis - Body language – Video samples

3. **SOFT SKILLS:**  
(2)  
Time management – Articulateness – Assertiveness – Psychometrics – Innovation and Creativity - Stress Management & Poise - Video Samples

4. **GROUP DISCUSSION:**  
(1)  
Why is GD part of selection process ? - Structure of GD – Moderator – led and other GDs - Strategies in GD – Team work - Body Language - Mock GD -Video samples

5. **INTERVIEW SKILLS:**  
(1)  
Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews - Video samples.

<table>
<thead>
<tr>
<th>II. Practice Session</th>
<th>(Weightage – 60%)</th>
<th>24 periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Resume / Report Preparation / Letter writing: Students prepare their own resume and report.</td>
<td>(2)</td>
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<tr>
<td>2. Presentation Skills: Students make presentations on given topics.</td>
<td>(8)</td>
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<tr>
<td>3. Group Discussion: Students participate in group discussions.</td>
<td>(6)</td>
<td></td>
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<tr>
<td>4. Interview Skills: Students participate in Mock Interviews</td>
<td>(8)</td>
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</tr>
</tbody>
</table>

**TEXT BOOKS:**


**REFERENCES**


**LAB REQUIREMENT**

1. Teacher console and systems for students.

2. English Language Lab Software

3. Career Lab Software
### Requirement for a batch of 60 students

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Description of Equipment</th>
<th>Quantity required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>Server</strong></td>
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<tr>
<td></td>
<td>o PIV system</td>
<td>1 No.</td>
</tr>
<tr>
<td></td>
<td>o 1 GB RAM / 40 GB HDD</td>
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<tr>
<td></td>
<td>o OS: Win 2000 server</td>
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<tr>
<td></td>
<td>o Audio card with headphones (with mike)</td>
<td></td>
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<tr>
<td></td>
<td>o JRE 1.3</td>
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<tr>
<td>2.</td>
<td><strong>Client Systems</strong></td>
<td>60 No.</td>
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<tr>
<td></td>
<td>o PIII or above</td>
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<tr>
<td></td>
<td>o 256 or 512 MB RAM / 40 GB HDD</td>
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<td>o OS: Win 2000</td>
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<td></td>
<td>o Audio card with headphones (with mike)</td>
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<td>o JRE 1.3</td>
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<td>3.</td>
<td><strong>Handicam Video Camera (with video lights and mic input)</strong></td>
<td>1 No.</td>
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<td>4.</td>
<td><strong>Television - 29&quot;</strong></td>
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<td>5.</td>
<td>Collar mike</td>
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<td>6.</td>
<td>Cordless mikes</td>
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<td>7.</td>
<td>Audio Mixer</td>
<td>1 No.</td>
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<tr>
<td>8.</td>
<td>DVD Recorder / Player</td>
<td>1 No.</td>
</tr>
</tbody>
</table>

**OBJECTIVE:**
This subject deals with satellites in space, which are used for the geodetic applications. Several satellites launched will transmit the carrier signal, by receiving the ground position are determined.
UNIT I  FUNDAMENTALS  15
Definition – Fundamental goals of Geodesy – Definitions – basic concepts –
Historical perspective - development applications in Satellite Geodesy – Geoid and
Ellipsoid satellite orbital motion – Keplerian motion – Keplers Law – Perturbing forces
– Geodetic satellite

UNIT II  DIFFERENT TECHNIQUES  15
Determination of direction by photography – SECOR – Electronic observation
techniques – Doppler effect – Positioning concept – Development of TRANSIT
satellites.

UNIT III  SATELLITE SYSTEM  15
GPS – Different segments – space, control and user segments – satellite
configuration – GPS signal structure – Orbit determination and Orbit representation Anti
Spoofing and Selective availability – Task of control segment – GPS receivers – main
receiver components – Example of GPS receivers.

UNIT IV  GPS DATA PROCESSING  15
GPS observables - code and carrier phase observation – linear combination and derived
observables – concept of parameter estimation – data processing – software modules –
solutions of cycle slips, ambiguities, RINEX format – Concepts of rapid static methods
with GPS semi Kinematic and pure Kinematic methods -basic constellation of satellite
geometry & accuracy measures.

UNIT V  APPLICATIONS OF SATELLITE GEODESY  15
Geodetic control surveys, Cadastral surveying, Photogrammetry & Remote Sensing,
Engineering and Monitoring GIS - GLONASS satellite configuration comparison – Satellite
Laser Ranging and Applications – Concepts of satellite altimetry.

L: 45 + P: 30  TOTAL: 75 PERIODOS

TEXT BOOKS:

REFERENCES:
2. Guocheng Xu, GPS Theory, Algorithms and Applications, Springer – Verlag, Berlin,
2003.

GI3310  SURVEY ADJUSTMENTS  L T P C
3 0 0 3

OBJECTIVE
To impart skills in survey calculation and adjustment to suit field conditions

UNIT I  MEASUREMENT AND ERROR  9
Concepts of measurement and Error - Types of errors - Elementary concepts in
probability - Reliability of measurement – significant figures - Error Propagation –
linearisation - Multivariate distribution - Error ellipse - Weights and cofactors - Non-linear
stochastic variables.
UNIT II  THE CONCEPT OF ADJUSTMENT  9
Introduction - simple adjustment methods - Least squares method - Examples of least squares problems.

UNIT III  LEAST SQUARES ADJUSTMENT  9
Techniques of least squares - concept of weight - least squares adjustment of indirect Observations - least squared adjustment of observations only.

UNIT IV  ELEMENTARY PROBABILITY THEORY  9
Random events and probability - Random variables - continuous probability distributions - normal distribution - Expectation – measures of precision and accuracy - covariance and correlation, covariance, cofactor and weight matrices - Introduction to sampling.

UNIT V  VARIANCE COVARIANCE PROPAGATION  9
Introduction – Derivation of the propagation laws - Examples - stepwise propagation - propagation of least squares - adjustment of indirect observations

TOTAL: 45 PERIODS

TEXT BOOKS:

GI3311  GEOGRAPHICAL INFORMATION SYSTEM II  L T P C
3 0 0 3

OBJECTIVES:
• To provide exposure to Raster and Vector Analysis Capabilities of GIS.
• To introduce GIS modeling concepts with applications

UNIT I  RASTER DATA ANALYSIS  9

UNIT II  VECTOR DATA ANALYSIS  9
UNIT III SPATIAL MODELLING AND APPLICATIONS

UNIT IV DATA QUALITY AND ERROR PROPAGATION IN GIS
Data Quality – Accuracy, Precision, Error – Sources of Error – Components of Data Quality: Lineage, Positional Accuracy, Attribute accuracy, Logical Consistency, Completeness – Assessment of Positional and Attribute Accuracy – Error Propagation, Meta data - Spatial Data Transfer Standards – Interoperability of GIS.

UNIT V MISCELLANEOUS TOPICS

TOTAL : 45 PERIODS

TEXT BOOK:

REFERENCES:
1. Peter A. Burrough, Rachael A. McDonnell, Principles of GIS, Oxford University Press, 2000

GI3312 PHOTOGRAHMETRY II
L T P C
3 1 0 4

OBJECTIVES:
• To introduce the principle and concepts of Interior, Relative and Absolute Orientation for mapping using Stereoplotters.
• To introduce basics of Digital and Non-topographic photogrammetry

UNIT I STEREO PLOTTERS AND TECHNIQUES OF ORIENTATION

UNIT II ORTHOPHOTOGRAPHY
Classification of Orthophoto systems – Online and Offline instruments – Automatic Contouring – Instruments for Orthophoto productions – Orthophotos by Digital Image Processing
UNIT III AERIAL TRIANGULATION PRINCIPLES AND ADJUSTMENTS 15
Basic concepts of strips and blocks photographic aerial triangulation – Analog triangulation – Independent Model Triangulation – Strip formation, graphical strip adjustment – polynomial strip adjustment – Analytical aerial triangulation, adjustment of blocks of aerial photographs – Three-dimensional coordinate transformation

UNIT IV NON TOPOGRAPHIC PHOTOGRAMMETRY 9
Applications – terrestrial cameras – stereometric cameras – horizontal and vertical angles from terrestrial photographs – Camera azimuth – analytical determination of horizontal position of a point from Photographic measurement – graphical method – use of plotting equipments – control consideration for terrestrial Photogrammetry – X-ray Photogrammetry

UNIT V DIGITAL PHOTOGRAMMETRY 10

L: 45 + T: 15 TOTAL : 60 PERIODS

REFERENCES:

GI3315 SURVEY CAMP (DURING WINTER) LT P C
0 0 4 2

Two weeks Survey Camp will be conducted during winter in the following activities

1. Triangulation
2. Trilateration
3. Star observation to determine Azimuth
4. Rectangulation
5. GPS Surveying

GI3316 PHOTOGRAMMETRY LABORATORY II LT P C
0 2 1 2

OBJECTIVE:
To acquire knowledge about Interior, Relative and Absolute Orientation using Analog and Analytical Stereoplotters.
1. Interior Orientation, Relative Orientation, Absolute Orientation and Mapping using Analog Stereo Plotter
2. Interior Orientation, Relative Orientation, Absolute Orientation and Mapping using Analog Stereo Plotter
4. Measurement of model coordinates using Analytical Stereo Plotter
5. Mapping using Analytical Stereo Plotter

TOTAL: 30 PERIDOS

GI3317 GIS LABORATORY II LT P C 0 0 4 2

OBJECTIVES:
• To understand raster and vector analytical capabilities of GIS.
• To develop problem-solving skills using GIS

1. Raster Analysis - Local operators: Arithmetic overlaying, Logical Overlaying –
   Neighbourhood Operators: Sum, Mean, Slope
2. Map Algebra
3. Cost Surface Analysis
5. Clip, Dissolve, Buffering: - Point, Line and Polygon
6. Network Analysis: Creation of network data - Address Geocoding
7. Network analysis – One origin and One destination - Finding the shortest path to
   between given origin and destination
8. Network analysis – One Origin and several destination - Determining a
   garbage collection route/ courier delivery applications
9. Perspective Visualization – DEM – Draping with other themes
10. DEM – Volume calculation, Profile analysis, View shed analysis
11. Demo on Web based GIS applications

TOTAL: 60 PERIODS

GI3318 TECHNICAL SEMINAR LT P C 0 0 2 1

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.

49
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.

MG2351 PRINCIPLES OF MANAGEMENT (Common to all Branches) L T P C 3 0 0 3

OBJECTIVE
Knowledge on the principles of management is essential for all kinds of people in all kinds of organizations. After studying this course, students will be able to have a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling. Students will also gain some basic knowledge on international aspect of management.

UNIT I OVERVIEW OF MANAGEMENT 9

UNIT II PLANNING 9

UNIT III ORGANIZING 9

UNIT IV DIRECTING 9
Creativity and Innovation - Motivation and Satisfaction - Motivation Theories Leadership - Leadership theories - Communication - Hurdles to effective communication - Organization Culture - Elements and types of culture - Managing cultural diversity.

UNIT V CONTROLLING 9
Process of controlling - Types of control - Budgetary and non-budgetary control techniques - Managing Productivity - Cost Control - Purchase Control - Maintenance Control - Quality Control - Planning operations.

TOTAL: 45 PERIODS

TEXT BOOKS:
REFERENCES:

GI3401 THERMAL AND HYPERSPECTRAL REMOTE SENSING L T P C
2 0 2 3

OBJECTIVE:
To make the undergraduate students understand principles, processed mad applications of thermal and hyper spectral remote sensing for earth resources.

UNIT I FUNDAMENTALS 5
Radiation science basics - Thermal radiation principles, thermal interaction behavior of terrain elements, thermal sensors and specifications – aerial thermal images

UNIT II THERMAL IMAGE AND INTERPRETATION 12
Image character, spatial and radiometry- sources of image degradation – radiometric and geometric errors and correction – interpretation of thermal image- applications and case studies.

UNIT III FIELD SPECTROMETRY 6
Diffraction principles- experimental design and instrumentation – factors affecting the field spectrum – imaging spectrometry – BDRF and hemispherical reflectance - Sensors and platform systems, including field spectroradiometers – data characteristics

UNIT IV ANALYSIS 12

UNIT V APPLICATIONS 10
Application to forestry, agriculture, geology, ecology, atmosphere, environmental and resource management.

L: 30 + P: 15, TOTAL: 45 PERIODS

TEXT BOOKS:
REFERENCE:

WEB REFERENCES:
1. www.oksi.com
2. ccrs.nrcan.gc.ca/optic/hyper

GI3402 DIGITAL PHOTOGRAMMETRY LT P C
3 0 0 3

OBJECTIVE:
The main objective is focused on the large-scale mapping using the aerial and high-resolution satellite data in digital format. The natural resources of the terrain will also be extracted for developmental planning.

UNIT I FUNDAMENTALS
Evaluation of Digital Photogrammetry – Comparison of Analog, Analytical and Digital
– Advantages – Automation – Accuracy – Representation of Digital images BW – RGB, HIS. Image source – Analog and Digital cameras

UNIT II DIGITAL CAMERA

UNIT III SCANNERS

UNIT IV DIGITAL PHOTOGRAMMETRIC WORKSTATION

UNIT V APPLICATIONS

TOTAL: 45 PERIDOS
REFERENCES:
1. Eilifried Linder, Digital Photogrammetry, Theory & Application, Springer – Verlag,
  Berlin, 2003

GI3403 GEOGRAPHICAL INFORMATION SYSTEM APPLICATIONS
L T P C
3 0 0 3

OBJECTIVE:
To provide exposure to applications of GIS in various application domains through case
studies

UNIT I NATURAL RESOURCE MANAGEMENT APPLICATIONS 9
Forestry: Resource Inventory, Forest Fire Growth modelling – Land: Change
detection studies, Watershed Management studies – Water – Identification of Ground Water
Recharge- Resource Information System – Wet lands Management

UNIT II FACILITY MANAGEMENT APPLICATIONS 9
Spotting – Other utilities

UNIT III LOCATION BASED SERVICES APPLICATIONS 9
Vehicle Tracking: Automatic Vehicle Location (AVL), Components of AVL :In Vehicle
Equipment, Various Communication Channels, Web Server, Client – Vehicle
Tracking- Alarms used in Vehicle Tracking, Fleet Management - Vehicle Navigation –
Emergency Call: Distress Calls

UNIT IV LAND INFORMATION SYSTEM APPLICATIONS
AND ALIGNMENT STUDIES 9
Land Information System (LIS) – Tax Mapping – Other LIS applications – Pipe line routing,
Highway alignment

UNIT V MISCELLANEOUS TOPICS 9
Disaster Management Applications, Web GIS applications, Health applications

TOTAL: 45 PERIDOS

TEXT BOOKS:
1. Laura Lang, Managing Natural Resources with GIS,ESRI Press, 1998.
2. A. Van Dijk M. G. Bos, GIS and Remote Sensing Techniques in Land-And- Water-
3. Uzair M. Shamsi, U. M. Shamsi GIS Tools for Water, Wastewater, and
REFERENCES:
4. Laura Lang, GIS for Health Organizations, ESRI Press, 2000

GI3404 OPERATIONS RESEARCH FOR GEOINFORMATICS  LT P C  3 0 0 3

OBJECTIVE:
To impart knowledge in formulating the model and solving problems in Geoinformatics using Linear programming, Dynamic programming, Management tools and simulation Techniques.

UNIT I BASIC CONCEPTS  7
Origin, Nature and significance - Models and Modeling approach – Methodology – Applications and Scope - Basic operations research models – Computer Packages

UNIT II LINEAR PROGRAMMING  12

UNIT III DYNAMIC PROGRAMMING  8
Characteristics –models - Deterministic case - Bellman’s optimality criteria – problem formulation and solution – Forward and Backward recursive approaches

UNIT IV PROJECT MANAGEMENT  9
PERT and CPM – Network components and relationships – forward and Backward pass – critical path analysis - problems on crashing, Resource Leveling – Resource allocation

UNIT V SIMULATION  9

TOTAL: 45 PERIDOS

TEXT BOOK:

REFERENCES:
OBJECTIVE:
The objective of this Digital Photogrammetry Lab is to give hands on exercise to practice how to orient the digital data and how to prepare maps, to generate DEM and Digital Orthophotos.

EXERCISES
1. Digital Photogrammetric Workstation – Data input and Creation of Project
2. Image import – Image Enhancement
3. Control point editing
5. Orientation Management – Camera Calibration – Editing the Scheme point file
6. Imagery import – Relative Orientation – Absolute Orientation
7. ATM Adjustment – Automatic Point Measurement
8. DTM creation – Automatic Terrain Extraction
9. Editing the DTM
10. DTM Terrain analysis
11. Mosaic – Generating Orthophoto – Mosaic sheet cutting
12. Planimetric Mapping

TOTAL: 60 PERIDOS

OBJECTIVE:
To familiarize the undergraduate level students in the regular IP software with respect to basic processing required to generate thematic maps from Satellite data.

1. To read and display image from CD
2. To Composite and extract sub area from full scene
3. To Georeference image to map
4. To Georeference image-to-image
5. To analysis the transformation errors
6. To mosaic two sub areas – colour balancing
7. To select features (bands) for classification and to form patterns
8. To generate base information using graphic planes (Vector & Raster)
9. To Convert vector information to graphic plane vice versa
10. To create and compute training set statistics
11. To apply classifiers
12. To assess the accuracy
13. To compose thematic map
14. Unsupervised classification
15. Theme merging & GIS data generation

TOTAL: 60 PERIDOS
The objective of project work is to enable the students to work in convenient groups of not more than four members in a group on a project involving theoretical and experimental studies related to Geoinformatics.

Every project work shall have a guide who is a member of the faculty of the University. Twelve periods per week shall be allotted in the Time Table and the time shall be utilized by the students to receive directions from the guide, library reading, laboratory work, computer analysis or field work and to present the progress made in the project.

Each student shall finally produce a comprehensive report covering background information, literature survey, problem statement, project work details and conclusions. This final report shall be typewritten form as specified in the guidelines.

The continuous assessment and semester evaluation may be carried out as specified in the guidelines to be issued from time to time.

GI3001       CLOSE RANGE PHOTOGRAMMETRY       LT P C

OBJECTIVE:
The objective of this subject is focused how the terrestrial objects can be mapped by taking photographs. This technique is used to study not only in engineering aspects but also in the Medicine, Forensic applications.

UNIT I    NON-TOPOGRAPHIC PHOTOGRAMMETRY
Introduction – Origin – basic Geometric concepts – Data acquisition – Camera systems – Metric - Non metric cameras – Analytic data reduction – Collinearity adjustment – Direct linear transformation – coordinate transformation – acquisition of digital imagery and processing – software modules for processing the data

UNIT II    STRUCTURAL STUDIES
Structural research: Deformation studies of deflection, buckling, – Advantages and disadvantages, Dam deformation, structural movement, Pavement yield. Hydraulic studies: Pipe surface roughness, shifting sand-bank, shoreline feature and coastal currents, experimental fluid mechanics.

UNIT III    MEDICINE
Monocular and binocular health studies, X-ray Photogrammetry, surface area and volume patients by Photogrammetry – merits over usual methods. Postural analysis – historical use of Photogrammetric methods – Study of body alignment and rate of body mechanics, remedial measures, advantages – Bio stereometrics.

UNIT IV    INDUSTRIAL PHOTOGRAMMETRY
Data acquisition systems - data reduction – deformation of engineering structures – pipe systems – measuring communication antennas – tunnel surveys – cooling towers and other applications – Applications in automobile industry – Architecture application: Drawing of details, monuments preservation and archaeological applications.
UNIT V CRIMINOLOGY

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:

GI3002 ADVANCED CARTOGRAPHY LT P C 3 0 0 3

OBJECTIVE:
This subject deals with the recent advancements in the field of digital cartography and the rapid technological development in the electronic dissemination of spatial information.

UNIT I MANAGING DATA BASES 9
Data organisation – Data compression – Data measurement – Basic statistical processing – Geographical Information System – The measuring of GIS to cartography.

UNIT II DATA PROCESSING 9
Computer system for the processing of graphic data – Hardware – Software - SICAD – Digitising cartographic presentation – Structuring and storage of data – Cartographic data processing – Output of cartographic presentation – Examples and applications

UNIT III MODELLING IN DIGITAL CARTOGRAPHY 9

UNIT IV MAP DESIGN 9
Theory of communication - information and signs - methods of computer assisted design of cartographic expressions, computer assisted evaluation of geo data for thematic maps - Cartographic aspects of GIS.
UNIT V  TECHNIQUES OF MAP PRODUCTION
Modern techniques in map production - Dynamic and interactive mapping, animation, navigation system, simulation, interactive cartography, map as interface - Trends for future developments - Expert systems and Web Maps.

TOTAL: 45 PERIODS

TEXT BOOKS:

GI3003 ADVANCED SURVEY ADJUSTMENT L T P C 3 0 0 3

OBJECTIVE:
To impart advanced skills in survey adjustment to suit field conditions

UNIT I  PRE ANALYSIS OF SURVEY MEASUREMENTS 9
Pre analysis procedure - Horizontal angle measurement with theodolite - Distance measurement by EDM - elevation difference by Direct leveling – Survey tolerances.

UNIT II  STATISTICAL ANALYSIS OF SURVEY MEASUREMENTS 9
Samples and statistics - The Chi-square distribution - the t-student distribution-common sample statistics - estimation of mean and variance - Confident interval for the mean and variance - statistical testing-Test or the mean of probability distribution - Test of the variance of a probability distribution. Bivariate normal distribution.

UNIT III  GENERAL LEAST SQUARES ADJUSTMENT 9
Introduction – Derivation - Precision estimation of special cases - Application of least squares adjustment in GIS and GPS.

UNIT IV  APPLICATION IN PLANE COORDINATE SURVEYS 9
Introduction - the distance condition and its linearization - azimuth condition and its linearization - angle condition and its linearization - position fixing by Distance - Two parameter similarity transformation - Four parameter similarity Transformation.

UNIT V  SPECIAL SUBJECTS OF STATISTICS 9
Theory of prediction and filtering - sequential adjustment (static and Kinematic Kalman-filter) Application of Kalman-filter in Geodesy; Goodness of fit - Test of any distribution.

TOTAL: 45 PERIODS
TEXT BOOK:

REFERENCE:

GI3004 AIRBORNE LASER TERRAIN MAPPING L T P C
3 0 0 3

OBJECTIVE:
To introduce the concepts of LASER Terrain mapping and modelling

UNIT I FUNDAMENTALS 9
Introduction - Principle and properties of LASER, LIDAR- Different LIDAR systems - Applications - Comparison - Airborne LIDAR missions - Typical parameters of a LIDAR system.

UNIT II LIDAR 9
Laser Altimetry System - Components of the system - GPS, IMU LASER, LIDAR data formats – LIDAR Systems specification and accuracy standards

UNIT III DATA PROCESSING 9
Data Processing - Strip Adjustment - Geometric Correction - Data quality enhancement - Filtering - Ground Point filtering – Digital Elevation Model

UNIT IV OVERVIEW OF APPLICATIONS 9
Overview of LIDAR Applications in various domains - Disaster Mitigation and Management - 3D city models - Telecommunication Modelling - Feature extraction, vectorisation - Surface and landuse classification

UNIT V LIDARGRAMMETRY 9
LIDAR for Orthophoto - Digital Photogrammetry software and LIDAR - Integration of LIDAR DEM with other hyperspectral data

TOTAL: 45 PERIDOS

TEXT BOOKS:

REFERENCES:
OBJECTIVE:
To impart knowledge in basics of Remote Sensing and GIS in various applications of hydrology and water resources.

UNIT I BASICS

UNIT II DRAINAGE BASIN

UNIT III AREAL ASSESSMENT
Mapping of snow covered area - snow melt runoff - flood forecasting and inundated area - soil moisture area - drought affected area - Drought prone area programme - Applications in aerial assessment.

UNIT IV GROUND WATER AND WATER QUALITY

UNIT V IRRIGATION AND WATERSHED
Project investigation, implementation, maintenance- location of storage/diversion works - capacity curve generation - conjunctive use of surface and ground water - Mapping and monitoring the catchment and command area - artificial recharge of groundwater - water harvesting structures - sediment yield, modelling of reservoir siltation - prioritization of watershed - sustainable development.

TOTAL: 45 PERIODS

REFERENCES:
OBJECTIVE:
To familiarize the students about the basics and application of Remote Sensing and GIS in the field of Ocean Engineering and Coastal Management.

UNIT I  OCEAN ENGINEERING

UNIT II  OCEAN GENERAL STUDIES

UNIT III  COASTAL ENGINEERING

UNIT IV  REMOTE SENSING APPLICATION FOR OCEAN

UNIT V  COASTAL Zone MANAGEMENT

TOTAL: 45 Periods

REFERENCES:
OBJECTIVE:
The objective of this course is to expose the students to the applications of Remote Sensing and GIS for water quality assessment, soil degradation assessment and monitoring pollution.

UNIT I  WATER AND THE ENVIRONMENT  10

UNIT II  SOIL CONSERVATION AND MANAGEMENT  12

UNIT III  ECOLOGY AND ECOSYSTEM  8

UNIT IV  SENSORS AND DATA FOR ENVIRONMENTAL MONITORING  5

UNIT V  AIR POLLUTION AND GLOBAL CLIMATOLOGY  10

TOTAL: 45 PERIODS

REFERENCES:
OBJECTIVE:
To impart knowledge to the students to understand scope of Remote Sensing and GIS for Urban and Regional planning

UNIT I FUNDAMENTALS

UNIT II URBAN AND REGIONAL MAPPING

UNIT III URBAN AND REGIONAL PLANNING

UNIT IV URBAN ANALYSIS

UNIT V SYSTEMS AND MODELLING

TOTAL: 45 PERIODS

REFERENCES:
1. Jean-Paul Donnay, Mike J Barnsley and Paul A Longley, Remote Sensing and Urban Analysis, Taylor and Francis, 2001

OBJECTIVE:
The objective of this course is to impart knowledge to the students about the application potentials of Remote Sensing and GIS in earth science. The contents of this course enable the students to understand the controls of Earth Science on the occurrence and management of natural resources.
UNIT I REMOTE SENSING APPLICATIONS TO LITHOLOGY

UNIT II REMOTE SENSING APPLICATIONS TO GEOMORPHOLOGY
Introduction - Nature and type of different Landforms such as Structural, Denudational, fluvial, Aeolian, glacial and volcanic landforms – their pattern configuration. Mapping Geomorphic Landforms using satellite data - theory and Practical

UNIT III REMOTE SENSING APPLICATIONS TO STRUCTURAL ANALYSIS
Introduction - Different types and Geometry of folds, nature, mode of origin, and mode of occurrence of faults. Structural analysis and mapping using aerial and satellite data, theory and practicals – digital techniques for structural analysis.

UNIT IV SUB–SURFACE EXPLORATIONS
Different types of geophysical surveys, Electrical Resistivity surveys, aeromagnetic and Electromagnetic surveys for subsurface explorations. Planning geophysical field surveys using satellite data.

UNIT V REMOTE SENSING AND GIS APPLICATIONS IN GEOLOGICAL INVESTIGATIONS

TOTAL: 45 PERIODS

REFERENCES:
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

UNIT V FORESTRY

TOTAL: 45 PERIODS

REFERENCES:
OBJECTIVE:
The main objective of this subject is to give information of the climate, weather forecasting using RADAR and Geo stationary satellites. It deals with weather conditions, sensors, satellites and the data interpretation for various applications.

UNIT I  GENERAL CONCEPTS IN METEOROLOGY

UNIT II  RADIO METEROLOGY
Principles and classifications of Radar – components of Radar – Meteorological applications. Upper air temperature exploration of the atmosphere (Radio Sonde) – Upper air wind estimation through Pilot Balloon – Wind estimation through Radar (Rawin Sonde), Doppler technique - Precipitation estimation through Radar and problems associated with it – Precipitation Radar (PR) on-board satellites such as Tropical Rainfall Measuring Mission (TRMM), Global Precipitation Measurement (GPM) Ozone soundings – general principle and special satellite measurements of ozone – Aerosol soundings - Tracking of weather systems such as Thunderstorms, Tropical cyclones, Tornadoes through Radar – Structure of weather systems as observed by Radars – Hydro meteorological applications of Radar - Application to aviation meteorology.

UNIT III  INTRODUCTION TO SATELLITE METEOROLOGY

UNIT IV  SATELLITE METEROLOGY APPLICATIONS – I
Precipitation – Outgoing Longwave Radiation (OLR) and Sea Surface Temperture (SST) estimation and their applications – Normalised Digitised Vegetation Index – Ocean colour monitoring – coastal pollution Image interpretation - Satellite communication systems in operational meteorological application (Cyclone Warning Dissemination system / Automatic Weather stations – Meteorological data dissemination) - Estimation of snow and ice cover – Waterbody boundary mapping – Atmospheric aerosols – Dust storms – Velcanic ash clouds and fires

UNIT V  SATELLITE METEOREOLOGY APPLICATIONS – II

TOTAL: 45 PERIODS
REFERENCES:

GI3012 REMOTE SENSING AND GIS FOR TRANSPORTATION PLANNING

OBJECTIVE:
- This course intends to prepare students for the following:
- To develop an understanding of the issues and challenges facing mobility in urban areas.
- To understand the utility of Remote Sensing and GIS for transportation planning

UNIT I ELEMENTS OF TRANSPORTATION SYSTEMS AND PLANNING
Geographical perspective on transportation - Transportation and energy - Equity issues
- Urban transportation: policy alternatives - Transportation and the environment - Urban transport planning processes - Transportation agencies - Roles and responsibilities - Socio-demographic data and travel surveys - Transportation modeling - Traffic congestion - Plan evaluation and implementation - Planning and financing - Critiques of transportation modeling and forecasting – Web resources

UNIT II REMOTE SENSING IN TRANSPORTATION

UNIT III GIS AND TRANSPORTATION ANALYSIS
Transportation analysis in GIS: Introduction - network flows - shortest path algorithms - transportation databases: creation and maintenance - transportation analysis in GIS - facility location - vehicle routing – highway alignment – railway alignment
UNIT IV GIST DATA MODELS
GIS and Spatial analysis – coupling transportation models with GIS - TRANUS – UPLAN – MetroSIM – Modelling land use transport interaction.

UNIT V INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

REFERENCES:

GI3013 REMOTE SENSING AND GIS FOR DISASTER MITIGATION AND MANAGEMENT

OBJECTIVE:
To understand various technological options especially Remote Sensing and GIS in Disaster management.

UNIT I DISASTER PRINCIPLES
Basic concepts and principles – Hydrological and geological disasters, characteristics, crisis and consequences – Role of Government administration, University research organization and NGO’s – International disaster assistance – Sharing technology and technical expertise.

UNIT II LONG TERM MITIGATION MEASURES

UNIT III SAFETY RATING OF STRUCTURES
UNIT IV  SPACE SCIENCE INPUT IN DISASTER MANAGEMENT
assessment – Land use planning and regulation for sustainable development –
Communication satellite application- Network- Use of Internet – Warning system – Post
disaster review – Case studies.

UNIT V  EMERGENCY PLANNING USING SPATIAL AND NON
SPATIAL DATA
Information systems management – Spatial and non-spatial data bank creation –
Operational emergency management – Vulnerability analysis of infrastructure and
settlements – Pre-disaster and post disaster planning for relief operations – Potential of GIS
application in development planning – Disaster management plan – Case studies.

REFERENCES:
1. Bell, F.G. Geological Hazards: Their assessment, avoidance and mitigation. E & FN
2. David Alexander, Natural Disasters, UCL Press, London, Research Press, New Delhi,
   1993.
5. George G. Penelis and Andreas J. Kappos – Earthquake Resistant concrete

GE 2071  INTELLECTUAL PROPERTY RIGHTS (IPR)  L T P C

UNIT I
Introduction – Invention and Creativity – Intellectual Property (IP) – Importance – Protection of
IPR – Basic types of property (i. Movable Property ii. Immovable Property and iii. Intellectual
Property).

UNIT II
IP – Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark
registration – Definitions – Industrial Designs and Integrated circuits – Protection of
Geographical Indications at national and International levels – Application Procedures.

UNIT III
International convention relating to Intellectual Property – Establishment of WIPO – Mission and
Activities – History – General Agreement on Trade and Tariff (GATT).
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:
TEXT BOOKS:

REFERENCES:

GE2073 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

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<td>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.</td>
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TOTAL: 45 PERIODS

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**TEXT BOOK:**

**REFERENCES:**
UNIT I  ENGINEERING ETHICS

UNIT II  ENGINEERING AS SOCIAL EXPERIMENTATION
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

UNIT IV  RESPONSIBILITIES AND RIGHTS

UNIT V  GLOBAL ISSUES

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
UNIT I INTRODUCTION 10
Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering-Classifications of nanostructured materials- nano particles- quantum dots, nanowires-ultra-thinfilms-multilayered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study (qualitative only).

UNIT II PREPARATION METHODS 10
Bottom-up Synthesis-Top-down Approach: Precipitation, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.

UNIT III PATTERNING AND LITHOGRAPHY FOR NANOSCALE DEVICES 5
Introduction to optical/UV electron beam and X-ray Lithography systems and processes, Wet etching, dry (Plasma/reactive ion) etching, Etch resists-dip pen lithography

UNIT IV PREPARATION ENVIRONMENTS 10
Clean rooms: specifications and design, air and water purity, requirements for particular processes, Vibration free environments: Services and facilities required. Working practices, sample cleaning, Chemical purification, chemical and biological contamination, Safety issues, flammable and toxic hazards, biohazards.

UNIT V CHARACTERISATION TECHNIQUES 10
X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission Electron Microscopy including high-resolution imaging, Surface Analysis techniques- AFM, SPM, STM, SNOM, ESCA, SIMS-Nanoindentation

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES: