

**AFFILIATED INSTITUTIONS**

**ANNAUNIVERSITY, 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)

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
<b>THEORY</b>						
1.	HS2161	<a href="#">Technical English – II*</a>	3	1	0	4
2.	MA2161	<a href="#">Mathematics – II*</a>	3	1	0	4
3.	PH2161	<a href="#">Engineering Physics – II*</a>	3	0	0	3
4.	CY2161	<a href="#">Engineering Chemistry – II*</a>	3	0	0	3
5. a	ME2151	<a href="#">Engineering Mechanics</a> (For non-circuit branches)	3	1	0	4
5. b	EE2151	<a href="#">Circuit Theory</a> (For branches under Electrical Faculty)	3	1	0	4
5. c	EC2151	<a href="#">Electric Circuits and Electron Devices</a> (For branches under I & C Faculty)	3	1	0	4
6. a	GE2151	<a href="#">Basic Electrical &amp; Electronics Engineering</a> (For non-circuit branches)	4	0	0	4
6. b	GE2152	<a href="#">Basic Civil &amp; Mechanical Engineering</a> (For circuit branches)	4	0	0	4
<b>PRACTICAL</b>						
7.	GE2155	<a href="#">Computer Practice Laboratory-II*</a>	0	1	2	2
8.	GS2165	<a href="#">Physics &amp; Chemistry Laboratory - II*</a>	0	0	3	2
9. a	ME2155	<a href="#">Computer Aided Drafting and Modeling Laboratory</a> (For non-circuits branches)	0	1	2	2
9. b	EE2155	<a href="#">Electrical Circuits Laboratory</a> (For branches under Electrical Faculty)	0	0	3	2
9. c	EC2155	<a href="#">Circuits and Devices Laboratory</a> (For branches under I & C Faculty)	0	0	3	2
<b>TOTAL : 28 CREDITS</b>						
10.	-	<a href="#">English Language Laboratory</a> <sup>+</sup>	0	0	2	-

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

+ Offering English Language Laboratory as an additional subject (with no marks) during 2<sup>nd</sup> 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)
6. B.Tech. Petroleum Engineering
7. B.Tech. Plastics Technology

### SEMESTER – III

CODE NO	COURSE TITLE	L	T	P	C
<b>THEORY</b>					
MA3201	<a href="#">Mathematics – III</a>	3	1	0	4
GI3201	<a href="#">Surveying I</a>	3	0	0	3
GI3202	<a href="#">Cartography</a>	3	0	2	4
GI3203	<a href="#">Photogrammetry I</a>	3	1	0	4
GI3204	<a href="#">Database Systems</a>	3	0	0	3
AG2211	<a href="#">Applied Geology</a>	3	0	0	3
<b>PRACTICAL</b>					
GI3206	<a href="#">Survey Practical I</a>	0	0	4	2
GI3207	<a href="#">Photogrammetry Laboratory I</a>	0	0	2	1
GI3208	<a href="#">Database System Laboratory</a>	0	0	4	2
<b>TOTAL</b>		<b>18</b>	<b>2</b>	<b>12</b>	<b>26</b>

### SEMESTER – IV

CODE NO	COURSE TITLE	L	T	P	C
<b>THEORY</b>					
MA3211	<a href="#">Probability and Statistics</a>	3	1	0	4
GI3209	<a href="#">Surveying II</a>	3	0	0	3
GI3210	<a href="#">Digital Image Processing</a>	3	0	0	3
GI3211	<a href="#">Object Oriented Programming</a>	3	0	2	4
GI3212	<a href="#">Electronic Surveying</a>	3	0	2	4
GE3213	<a href="#">Environmental Science and Engineering</a>	3	0	0	3
<b>PRACTICAL</b>					
GI3214	<a href="#">Surveying Practical II</a>	0	0	4	2
GI3215	<a href="#">Digital Image Processing Laboratory I</a>	0	0	4	2
<b>TOTAL</b>		<b>18</b>	<b>1</b>	<b>12</b>	<b>25</b>

### SEMESTER V

CODE	COURSE TITLE	L	T	P	C
<b>THEORY</b>					
GI3301	<a href="#">Surveying III</a>	3	0	0	3
GI3302	<a href="#">Microwave Remote Sensing</a>	3	0	0	3
GI3303	<a href="#">Cadastral Surveying</a>	3	0	0	3
GI3304	<a href="#">Geodesy</a>	2	2	0	4
GI3305	<a href="#">Geographical Information System I</a>	3	0	0	3
	Elective - I	3	0	0	3
<b>PRACTICAL</b>					
GI3307	<a href="#">Survey Practical III</a>	0	0	4	2
GI3308	<a href="#">GIS Laboratory I</a>	0	0	4	2
GE3318	<a href="#">Communication Skills and Soft Skills</a>	0	0	2	1
<b>TOTAL</b>		<b>17</b>	<b>2</b>	<b>10</b>	<b>24</b>

### SEMESTER VI

CODE NO.	COURSE TITLE	L	T	P	C
<b>THEORY</b>					
GI3309	<a href="#">Satellite Geodesy</a>	3	0	2	4
GI3310	<a href="#">Survey Adjustment</a>	3	0	0	3
GI3311	<a href="#">Geographical Information System II</a>	3	0	0	3
GI3312	<a href="#">Photogrammetry II</a>	3	1	0	4
	Elective – II	3	0	0	3
	Elective – III	3	0	0	3
<b>PRACTICAL</b>					
GI3315	<a href="#">Survey Camp (During Winter)</a>	0	0	4	2
GI3316	<a href="#">Photogrammetry Laboratory II</a>	0	0	2	1
GI3317	<a href="#">GIS Laboratory II</a>	0	0	4	2
GI3318	<a href="#">Technical Seminar</a>	0	0	2	1
	<b>TOTAL</b>	<b>18</b>	<b>1</b>	<b>14</b>	<b>26</b>

### SEMESTER VII

CODE	COURSE TITLE	L	T	P	C
<b>THEORY</b>					
MG2351	<a href="#">Principles of Management</a>	3	0	0	3
GI3401	<a href="#">Thermal and Hyper Spectral Remote Sensing</a>	2	0	2	3
GI3402	<a href="#">Digital Photogrammetry</a>	3	0	0	3
GI3403	<a href="#">Geographical Information System Applications</a>	3	0	0	3
GI3404	<a href="#">Operations Research for Geoinformatics</a>	3	0	0	3
	Elective – IV	3	0	0	3
<b>PRACTICAL</b>					
GI3406	<a href="#">Digital Photogrammetry Laboratory</a>	0	0	4	2
GI3407	<a href="#">Digital Image Processing Laboratory II</a>	0	0	4	2
	<b>TOTAL</b>	<b>17</b>	<b>0</b>	<b>1</b>	<b>22</b>

### SEMESTER VIII

CODE	COURSE TITLE	L	T	P	C
<b>THEORY</b>					
	Elective – V	3	0	0	3
	Elective – VI	3	0	0	3
<b>PRACTICAL</b>					
GI3410	<a href="#">Project Work</a>	0	0	12	6
	<b>TOTAL</b>	<b>6</b>	<b>0</b>	<b>12</b>	<b>12</b>

### LIST OF ELECTIVES

CODE NO.	COURSE TITLE	L	T	P	C
GI3001	<a href="#">Close Range Photogrammetry</a>	3	0	0	3
GI3002	<a href="#">Advanced Cartography</a>	3	0	0	3
GI3003	<a href="#">Advanced Survey Adjustment</a>	3	0	0	3
GI3004	<a href="#">Airborne Laser Terrain Mapping</a>	3	0	0	3
GI3005	<a href="#">Remote Sensing and GIS for Hydrology and Water</a>	3	0	0	3
GI3006	<a href="#">Remote Sensing and GIS for Ocean Engineering and Coastal Zone Management</a>	3	0	0	3
GI3007	<a href="#">Remote Sensing and GIS for Environmental Monitoring</a>	3	0	0	3
GI3008	<a href="#">Remote Sensing and GIS for Urban and Regional Planning</a>	3	0	0	3
GI3009	<a href="#">Remote Sensing and GIS for Earth Sciences</a>	3	0	0	3
GI3010	<a href="#">Remote Sensing and GIS for Agriculture and Forestry</a>	3	0	0	3
GI3011	<a href="#">Remote Sensing and GIS for Meteorology</a>	3	0	0	3
GI3012	<a href="#">Remote Sensing and GIS for Transportation Planning</a>	3	0	0	3
GI3013	<a href="#">Remote Sensing and GIS for Disaster Mitigation and Management</a>	3	0	0	3

<b>CODE NO.</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
GE2071	<a href="#">Intellectual Property Rights (IPR)</a>	3	0	0	3
GE2072	<a href="#">Indian Constitution and Society</a>	3	0	0	3
GE2073	<a href="#">Contract Laws and Regulations</a>	3	0	0	3
GE3403	Total Quality Management	3	0	0	3
GE3022	Professional Ethics in Engineering	3	0	0	3
GE3023	Fundamentals of Nanoscience	3	0	0	3

**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****12**

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
4. and predicting the content – Reading advertisements and interpretation.
5. Writing extended definitions – Writing descriptions of processes – Writing paragraphs based on discussions – Writing paragraphs describing the future.

**UNIT II****12**

Phrases / Structures indicating use / purpose – Adverbs-Skimming – Non-verbal communication - Listening – correlating verbal and non-verbal communication -Speaking in group discussions – Formal Letter writing – Writing analytical paragraphs.

**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 categorise 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****12**

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.
3. Sequencing of jumbled sentences using connectives – Writing different types of reports like industrial accident report and survey report – Writing recommendations.

#### **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.
5. Writing descriptions, expanding hints – Writing argumentative paragraphs – Writing formal letters – Writing letter of application with CV/Bio-data – Writing general and safety instructions – Preparing checklists – Writing e-mail messages.

#### **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**

1. Chapters 5 – 8. Department of Humanities & Social Sciences, Anna University, ‘English for Engineers and Technologists’ Combined Edition (Volumes 1 & 2), Chennai: Orient Longman Pvt. Ltd., 2006. Themes 5 – 8 (Technology, Communication, Environment, Industry)

#### **REFERENCES**

1. P. K. Dutt, G. Rajeevan and C.L.N Prakash, ‘A Course in Communication Skills’, Cambridge University Press, India 2007.
2. Krishna Mohan and Meera Banerjee, ‘Developing Communication Skills’, Macmillan India Ltd., (Reprinted 1994 – 2007).
3. Edgar Thorpe, Showick Thorpe, ‘Objective English’, Second Edition, Pearson Education, 2007.

#### **Extensive Reading:**

1. Robin Sharma, ‘The Monk Who Sold His Ferrari’, Jaico Publishing House, 2007

#### **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.

**MA2161**

**MATHEMATICS – II**

**L T P C**

**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**

Gradient Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green's theorem in a plane, Gauss divergence theorem and Stokes' theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelepipeds.

**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**

Complex integration – Statement and applications of Cauchy's integral theorem and Cauchy's integral formula – Taylor and Laurent expansions – Singular points – Residues – Residue theorem – Application of residue theorem to evaluate real integrals – Unit circle and semi-circular contour(excluding poles on boundaries).

**UNIT V            LAPLACE TRANSFORM            12**

Laplace transform – Conditions for existence – Transform of elementary functions – Basic properties – Transform of derivatives and integrals – Transform of unit step function and impulse functions – Transform of periodic functions.

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:**

1. Bali N. P and Manish Goyal, "Text book of Engineering Mathematics", 3<sup>rd</sup> Edition, Laxmi Publications (p) Ltd., (2008).
2. Grewal. B.S, "Higher Engineering Mathematics", 40<sup>th</sup> Edition, Khanna Publications, Delhi, (2007).

**REFERENCES**

1. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, (2007).
2. Glyn James, "Advanced Engineering Mathematics", 3<sup>rd</sup> Edition, Pearson Education, (2007).
3. Erwin Kreyszig, "Advanced Engineering Mathematics", 7<sup>th</sup> Edition, Wiley India, (2007).
4. Jain R.K and Iyengar S.R.K, "Advanced Engineering Mathematics", 3<sup>rd</sup> Edition, Narosa Publishing House Pvt. Ltd., (2007).

**UNIT I CONDUCTING MATERIALS 9**

Conductors – classical free electron theory of metals – Electrical and thermal conductivity – Wiedemann – Franz law – Lorentz number – Draw backs of classical theory – Quantum theory – Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states – carrier concentration in metals.

**UNIT II SEMICONDUCTING MATERIALS 9**

Intrinsic semiconductor – carrier concentration derivation – Fermi level – Variation of Fermi level with temperature – electrical conductivity – band gap determination – extrinsic semiconductors – carrier concentration derivation in n-type and p-type semiconductor – variation of Fermi level with temperature and impurity concentration – compound semiconductors – Hall effect – Determination of Hall coefficient – Applications.

**UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS 9**

Origin of magnetic moment – Bohr magneton – Dia and para magnetism – Ferro magnetism – Domain theory – Hysteresis – soft and hard magnetic materials – anti – ferromagnetic materials – Ferrites – applications – magnetic recording and readout – storage of magnetic data – tapes, floppy and magnetic disc drives.

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 9**

Electrical susceptibility – dielectric constant – electronic, ionic, orientational and space charge polarization – frequency and temperature dependence of polarisation – internal field – Clausius – Mosotti relation (derivation) – dielectric loss – dielectric breakdown – uses of dielectric materials (capacitor and transformer) – ferroelectricity and applications.

**UNIT V MODERN ENGINEERING MATERIALS 9**

Metallic glasses: preparation, properties and applications.

Shape memory alloys (SMA): Characteristics, properties of NiTi alloy, application, advantages and disadvantages of SMA

Nanomaterials: synthesis – plasma arcing – chemical vapour deposition – sol-gels – electrodeposition – ball milling - properties of nanoparticles and applications.

Carbon nanotubes: fabrication – arc method – pulsed laser deposition – chemical vapour deposition - structure – properties and applications.

**TOTAL : 45 PERIODS****TEXT BOOKS**

1. Charles Kittel ‘ Introduction to Solid State Physics’, John Wiley & sons, 7<sup>th</sup> edition, Singapore (2007)
2. Charles P. Poole and Frank J.Owren, ‘Introduction to Nanotechnology’, Wiley India(2007) (for Unit V)

**REFERENCES**

1. Rajendran, V, and Marikani A, ‘Materials science’ Tata McGraw Hill publications, (2004) New delhi.
2. Jayakumar, S. ‘Materials science’, R.K. Publishers, Coimbatore, (2008).
3. Palanisamy P.K, ‘Materials science’, Scitech publications(India) Pvt. LTd., Chennai, second Edition(2007)
4. M. Arumugam, ‘Materials Science’ Anuradha publications, Kumbakonam, (2006).

**CY2161****ENGINEERING CHEMISTRY – II****L T P C**

**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 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 9**

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 -  $\text{Fe}^{2+}$  vs dichromate and precipitation –  $\text{Ag}^+$  vs  $\text{Cl}^-$  titrations) and conduct metric titrations (acid-base – HCl vs, NaOH) titrations,

**UNIT II CORROSION AND CORROSION CONTROL 9**

Chemical corrosion – Pilling – Bedworth rule – electrochemical corrosion – different types – galvanic corrosion – differential aeration corrosion – factors influencing corrosion – corrosion control – sacrificial anode and impressed cathodic current methods – corrosion inhibitors – protective coatings – paints – constituents and functions – metallic coatings – electroplating (Au) and electroless (Ni) plating.

**UNIT III FUELS AND COMBUSTION 9**

Calorific value – classification – Coal – proximate and ultimate analysis metallurgical coke – manufacture by Otto-Hoffmann method – Petroleum processing and fractions – cracking – catalytic cracking and methods-knocking – octane number and cetane number – synthetic petrol – Fischer Tropsch and Bergius processes – Gaseous fuels- water gas, producer gas, CNG and LPG, Flue gas analysis – Orsat apparatus – theoretical air for combustion.

**UNIT IV PHASE RULE AND ALLOYS 9**

Statement and explanation of terms involved – one component system – water system – condensed phase rule – construction of phase diagram by thermal analysis – simple eutectic systems (lead-silver system only) – alloys – importance, ferrous alloys – nichrome and stainless steel – heat treatment of steel, non-ferrous alloys – brass and bronze.

**UNIT V ANALYTICAL TECHNIQUES 9**

Beer-Lambert's law (problem) – UV-visible spectroscopy and IR spectroscopy – principles – instrumentation (problem) (block diagram only) – estimation of iron by colorimetry – flame photometry – principle – instrumentation (block diagram only) – estimation of sodium by flame photometry – atomic absorption spectroscopy – principles – instrumentation (block diagram only) – estimation of nickel by atomic absorption spectroscopy.

**TOTAL: 45 PERIODS****TEXT BOOKS**

1. P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi (2002).
2. S.S.Dara "A text book of Engineering Chemistry" S.Chand & Co.Ltd., New Delhi (2006).

**REFERENCES**



1. Beer, F.P and Johnson Jr. E.R. "Vector Mechanics for Engineers", Vol. 1 Statics and Vol. 2 Dynamics, McGraw-Hill International Edition, (1997).

## REFERENCES

1. Rajasekaran, S, Sankarasubramanian, G., "Fundamentals of Engineering Mechanics", Vikas Publishing House Pvt. Ltd., (2000).
2. Hibbeler, R.C., "Engineering Mechanics", Vol. 1 Statics, Vol. 2 Dynamics, Pearson Education Asia Pvt. Ltd., (2000).
3. Palanichamy, M.S., Nagam, S., "Engineering Mechanics – Statics & Dynamics", Tata McGraw-Hill, (2001).
4. Irving H. Shames, "Engineering Mechanics – Statics and Dynamics", IV Edition – Pearson Education Asia Pvt. Ltd., (2003).
5. Ashok Gupta, "Interactive Engineering Mechanics – Statics – A Virtual Tutor (CDROM)", Pearson Education Asia Pvt., Ltd., (2002).

**EE2151**

**CIRCUIT THEORY**

**L T P C**  
**3 1 0 4**

(Common to EEE, EIE and ICE Branches)

**UNIT I BASIC CIRCUITS ANALYSIS 12**

Ohm's Law – Kirchoffs laws – DC and AC Circuits – Resistors in series and parallel circuits – Mesh current and node voltage method of analysis for D.C and A.C. circuits.

**UNIT II NETWORK REDUCTION AND NETWORK THEOREMS FOR DC AND AC CIRCUITS 12**

Network reduction: voltage and current division, source transformation – star delta conversion. Thevenins and Novton & Theorem – Superposition Theorem – Maximum power transfer theorem – Reciprocity Theorem.

**UNIT III RESONANCE AND COUPLED CIRCUITS 12**

Series and paralld resonance – their frequency response – Quality factor and Bandwidth - Self and mutual inductance – Coefficient of coupling – Tuned circuits – Single tuned circuits.

**UNIT IV TRANSIENT RESPONSE FOR DC CIRCUITS 12**

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 12**

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

1. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", Tata McGraw Hill publishers, 6<sup>th</sup> edition, New Delhi, (2002).
2. Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis", Tata McGraw Hill, (2007).

## REFERENCES

1. Paranjothi SR, "Electric Circuits Analysis," New Age International Ltd., New Delhi, (1996).
2. Joseph A. Edminister, Mahmood Nahri, "Electric circuits", Schaum's series, Tata McGraw-Hill, New Delhi (2001).
3. Chakrabati A, "Circuits Theory (Analysis and synthesis), Dhanpath Rai & Sons, New Delhi, (1999).
4. Charles K. Alexander, Mathew N.O. Sadik, "Fundamentals of Electric Circuits", Second Edition, McGraw Hill, (2003).

**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**

Kirchoff's current and voltage laws – series and parallel connection of independent sources – R, L and C – Network Theorems – Thevenin, Superposition, Norton, Maximum power transfer and duality – Star-delta conversion.

**UNIT II           TRANSIENT RESONANCE IN RLC CIRCUITS**

**12**

Basic RL, RC and RLC circuits and their responses to pulse and sinusoidal inputs – frequency response – Parallel and series resonances – Q factor – single tuned and double tuned circuits.

**UNIT III          SEMICONDUCTOR DIODES**

**12**

Review of intrinsic & extrinsic semiconductors – Theory of PN junction diode – Energy band structure – current equation – space charge and diffusion capacitances – effect of temperature and breakdown mechanism – Zener diode and its characteristics.

**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**

Tunnel diodes – PIN diode, varactor diode – SCR characteristics and two transistor equivalent model – UJT – Diac and Triac – Laser, CCD, Photodiode, Phototransistor, Photoconductive and Photovoltaic cells – LED, LCD.

**TOTAL : 60 PERIODS**

**TEXT BOOKS**

1. Joseph A. Edminister, Mahmood, Nahri, "Electric Circuits" – Shaum series, Tata McGraw Hill, (2001)
2. S. Salivahanan, N. Suresh kumar and A. Vallavanraj, "Electronic Devices and Circuits", Tata McGraw Hill, 2<sup>nd</sup> Edition, (2008).
3. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 5<sup>th</sup> Edition, (2008).

**REFERENCES**



## REFERENCES

1. Muthusubramanian R, Salivahanan S and Muraleedharan K A, "Basic Electrical, Electronics and Computer Engineering", Tata McGraw Hill, Second Edition, (2006).
2. Nagsarkar T K and Sukhija M S, "Basics of Electrical Engineering", Oxford press (2005).
3. Mehta V K, "Principles of Electronics", S.Chand & Company Ltd, (1994).
4. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, (2002).
5. Premkumar N, "Basic Electrical Engineering", Anuradha Publishers, (2003).

**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**

**Surveying:** Objects – types – classification – principles – measurements of distances – angles – leveling – determination of areas – illustrative examples.

**Civil Engineering Materials:** Bricks – stones – sand – cement – concrete – steel sections.

**UNIT II BUILDING COMPONENTS AND STRUCTURES 15**

**Foundations:** Types, Bearing capacity – Requirement of good foundations.

**Superstructure:** Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering – Mechanics – Internal and external forces – stress – strain – elasticity – Types of Bridges and Dams – Basics of Interior Design and Landscaping.

**TOTAL : 30 PERIODS**

#### **B – MECHANICAL ENGINEERING**

**UNIT III POWER PLANT ENGINEERING 10**

Introduction, Classification of Power Plants – Working principle of steam, Gas, Diesel, Hydro-electric and Nuclear Power plants – Merits and Demerits – Pumps and turbines – working principle of Reciprocating pumps (single acting and double acting) – Centrifugal Pump.

**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**

Terminology of Refrigeration and Air Conditioning. Principle of vapour compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room Air conditioner.

**TOTAL: 30 PERIODS**

## REFERENCES

1. Shanmugam G and Palanichamy M S, "Basic Civil and Mechanical Engineering", Tata McGraw Hill Publishing Co., New Delhi, (1996).
2. Ramamrutham. S, "Basic Civil Engineering", Dhanpat Rai Publishing Co. (P) Ltd. (1999).
3. Seetharaman S. "Basic Civil Engineering", Anuradha Agencies, (2005).
4. Venugopal K and Prahu Raja V, "Basic Mechanical Engineering", Anuradha Publishers, Kumbakonam, (2000).
5. Shantha Kumar S R J., "Basic Mechanical Engineering", Hi-tech Publications, Mayiladuthurai, (2000).

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

## 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.
4. Determination of viscosity of liquid – Poiseuille's method.
5. Spectrometer dispersive power of a prism.
6. Determination of Young's modulus of the material – uniform bending.
7. Torsional pendulum – Determination of rigidity modulus.

- 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.

## 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.

- 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.

**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 Bspline 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,
9. Drawing isometric projection of simple objects.
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.

(Common to EEE, EIE and ICE)

**LIST OF EXPERIMENTS**

1. Verification of ohm's laws and kirchoff's laws.
2. Verification of Thevemin'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.
9. Frequency response of series and parallel resonance circuits.
10. Frequency response of single tuned coupled circuits.

**TOTAL: 45 PERIODS**

**EC2155**

**CIRCUITS AND DEVICES LABORATORY**

**L T P C**  
**0 0 3 2**

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
11. Characteristics of Diac and Triac.
12. Characteristics of Photodiode and Phototransistor.

**TOTAL : 45 PERIODS**

**ENGLISH LANGUAGE LABORATORY (Optional)**

**L T P C**  
**0 0 2 -**

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**

1. Hartley, Peter, Group Communication, London: Routledge, (2004).
2. Doff, Adrian and Christopher Jones, Language in Use – (Intermediate level), Cambridge University Press, (1994).
3. Gammidge, Mick, Speaking Extra – A resource book of multi-level skills activities , Cambridge University Press, (2004).
4. Craven, Miles, Listening Extra - A resource book of multi-level skills activities, Cambridge, Cambridge University Press, (2004).
5. Naterop, Jean & Rod Revell, Telephoning in English, Cambridge University Press, (1987).

**LAB REQUIREMENTS**

1. Teacher – Console and systems for students
2. English Language Lab Software
3. Tape Recorders.

**MA3201**

**MATHEMATICS-III**

**L T P C  
3 1 0 4**

**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



<b>UNIT II</b>	<b>CHAIN SURVEYING</b>	<b>9</b>
Equipment – ranging and chaining – reciprocal ranging – well conditioned triangles – Errors in linear measurement and their corrections – Fieldwork – Office work – Obstacles.		
<b>UNIT III</b>	<b>COMPASS SURVEYING AND PLANE TABLE SURVEYING</b>	<b>12</b>
Compass – Types – Bearing – systems – Local attraction – Magnetic declination – Dip – Traversing – Plotting – Adjustment of error – Plane table – Instruments and accessories – Merits and demerits – Methods – Radiation – intersection – resection – traversing.		
<b>UNIT IV</b>	<b>LEVELLING</b>	<b>14</b>
Level line – Horizontal line – Datum – Levels and staves – Bench marks – temporary and permanent adjustments – Fly levelling – Check levelling – Procedure in leveling – Booking – Reduction – Curvature and refraction Reciprocal levelling – Longitudinal and Cross section – Plotting – Contouring – Methods – Characteristics and uses of contours – Plotting.		
<b>UNIT V</b>	<b>AREAS AND VOLUMES</b>	<b>6</b>
The Planimeter – Areas enclosed by straight lines – Irregular figures – Volumes – Earthwork calculations – Capacity of reservoirs – Mass haul diagrams.		
		<b>TOTAL : 45 PERIODS</b>

**TEXT BOOKS:**

1. James M. Anderson and Edward M. Mikhail, Surveying, Theory and Practice, Seventh Edition, Mc Graw Hill 2001.
2. Bannister and S. Raymond, Surveying, Seventh Edition, Longman 2004.
3. S.K. Roy, Fundamentals of Surveying, Second Edition, Prentice' Hall of India 2004.

**REFERENCES:**

1. A.M. Chandra, Plane Surveying, New Age International Publishers 2002.
2. Alak De, Plane Surveying, S. Chand & Company Ltd., 2000.

<b>GI3202</b>	<b>CARTOGRAPHY</b>	<b>L T P C</b>
		<b>3 0 2 4</b>

**OBJECTIVE:**

The main objective of this course is to introduce Cartography and its elements as the Art and Science of Map Making. The course also describes its connections with the Communication Science and Digital Computer as structured and need based information of Spatial Data.

<b>UNIT I</b>	<b>FUNDAMENTALS OF CARTOGRAPHY</b>	<b>9</b>
Cartography today – Nature of Cartography – History of Cartography – Cartographic Visualization – Web Cartography – Graticules – Cartometry –Map Characteristics – Modern Trends.		

<b>UNIT II</b>	<b>EARTH</b>	<b>9</b>
Earth-Map Relations – Basic Geodesy – Map Projections – Scale – Reference and Coordinate system – Transformation – Basic Transformation – Affine Transformation.		

**UNIT III SOURCES OF DATA 9**

Sources of data – Ground Survey and Positioning – Remote Sensing data collection – Census and sampling – data – Models for digital cartographic information – Map digitising.

**UNIT IV PERCEPTION AND DESIGN 9**

Cartographic design – Colour theory and models – Colour and pattern creation and specification – colour and pattern – Typography and lettering the map – Map compilation – Demography and Statistical mapping.

**UNIT V CARTOGRAPHY ABSTRACTION 9**

Selection and Generalisation Principles – Symbolisation – Topographic and thematic maps – Map production and Reproduction – Map series.

**TOTAL : 45 PERIODS**

**TEXT BOOKS:**

1. R.W. Anson and F.J. Ormeling, Basic Cartography for students and Technicians. Vol.I, II and III, Elsevier Applied Science Publishers, 3<sup>rd</sup> Edition, 2004.
2. Arthur, H. Robinson et al, Elements of Cartography, Seventh Edition, John Wiley and Sons, 2004.
3. John Campbell, Introductory Cartography, Wm.C. Brown Publishers, Third Edition, 2004.

**REFERENCES:**

1. Menno Jan Kraak & Ferjan Ormeling, Cartography Visualization of Geospatial Data, Second Edition, Pearson Education, 2004

**GI3203**

**PHOTOGRAMMETRY I**

**L T P C  
3 1 0 4**

**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 15**

History of Photogrammetry – Definition, Applications – Types of Photographs, Classification – Photographic overlaps – Use of mirror, prism, wedges, lens formula, Scheimpflug condition, and lens aberration – lens resolving power – light distribution over image plane – Filters used – fiber optics. Principles of photographic process – relationship of aperture and shutter speed – contact printing - projection printing.

**UNIT II CAMERAS AND CO-ORDINATE MEASUREMENT 8**

Types of Aerial cameras – Construction – Camera accessories – Camera calibration – Terrestrial Metric cameras. Coordinate measurement using comparators – Two dimension coordinate transformation – refinement of photo coordinates.

**UNIT III STEREOSCOPIC AND PLANIMETRIC MAPPING WITH VERTICAL, TILTED AND OBLIQUE PHOTOGRAPHS 20**

Stereoscopic depth perception – Different types of stereoscopes vertical exaggeration – base lining and orientation – principle of floating mark – methods of parallax measurement – vertical photographs – geometry, scale, parallax equations, planimetric mapping – Tilted photograph – Geometry, Coordinate system, Scale, Planimetric mapping – Rectification – Geometry, Graphical and Analytical methods – Mosaics.

**UNIT IV PROJECT PLANNING AND GROUND CONTROL SURVEY 8**

Flight Planning – Crab & Drift – Computation of flight plan – Specification for Aerial photography – Basic horizontal and vertical control – Pre pointing and Post pointing – Planning for Ground Control – Cost estimates.

**UNIT V PHOTO INTERPRETATION 9**

Basic characteristics of Photographic images – Interpretation keys – Visual interpretation – Basic elements in Photographic interpretation – Example – Equipments for interpretation.

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

**TEXTBOOKS:**

1. Paul. R Wolf., Bon A.DeWitt, Elements of Photogrammetry with Application in GIS– McGraw Hill International Book Co., 3<sup>rd</sup> Edition, 2000

**REFERENCES:**

1. E.M.Mikhail, J.S.Bethel, J.C.McGlone, Introduction to Modern Photogrammetry, Wiley Publisher, 2001.
2. Gollfried Konecny, Geoinformation: Remote Sensing, Photogrammetry and Geographical Information Systems, CRC Press, 1<sup>st</sup> Edition, 2002
3. Manual of Photogrammetry, American Society of Photogrammetry, 5<sup>th</sup> Edition 2004.

**GI3204**

**DATABASE SYSTEMS**

**L T P C  
3 0 0 3**

**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 7**

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 9**

Relational model – Data Structure – Constraints – Keys – Codd's Rule – Relational Algebra – Fundamental operations - Additional operations – Extended operations – Null values

**UNIT III SQL 9**  
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 10**  
Design process – Entity Relationship Model – Constraints – EER – Diagrams – Atomic domain and First Normal Form - Functional Dependency – Decomposition using Functional dependencies – Normalization using Multi-Valued Dependencies and Join Dependencies – Basic concepts of file organizations, indexing and hashing - Database recovery techniques – Database Security – Handling Spatial Database

**UNIT V ACCESSING DATA USING ADO.NET AND VB.NET 10**  
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:**

1. Abraham Silberschatz, Henry F. Korth and S.Sudharshan, "Database System Concepts", Fifth edition, Tata McGraw Hill, 2005
2. Ramez Elmasri and Shamkant B.Navathe, "Fundamentals of Database Systems" Fourth edition, Pearson Education (Singapore) Pvt. Ltd. 1<sup>st</sup> Indian Reprint, 2004

**REFERENCES:**

1. Raghu Ramakrishnan and Johannes Gehrke, "Database Management Systems", 3<sup>rd</sup> Edition, , McGraw Hill Publishers, 2003
2. Paul J. Deitel and Harvey M. Deital "Visual Basic 2005 for Programmers", 2<sup>nd</sup> Edition, Pearson Education, 2007.

**AG2211**

**APPLIED GEOLOGY**

**L T P C  
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 9**  
Geology in Civil Engineering – Branches of geology – Earth Structures and composition – Elementary knowledge on continental drift and plate technologies. Earth processes – Weathering – Work of rivers, wind and sea and their engineering importance – Earthquake belts in India. Groundwater – Mode of occurrence – prospecting – importance in civil engineering

**UNIT II MINERALOGY 9**

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 9**

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 9**

Attitude of beds – Outcrops – Introduction to Geological maps – study of structures – Folds, faults and joints – Their bearing on engineering construction. Seismic and Electrical methods for Civil Engineering investigations

**UNIT V GEOLOGICAL INVESTIGATIONS IN CIVIL ENGINEERING 9**

Remote sensing techniques – Study of air photos and satellite images – Interpretation for Civil Engineering projects – Geological conditions necessary for construction of Dams, Tunnels, Buildings, Road cuttings, Land slides – Causes and preventions. Sea erosion and coastal protection.

**TOTAL: 45 PERIODS**

**TEXT BOOKS**

1. Parbin Singh, "Engineering and General Geology", Katson Publication House, 1987.
2. Krynine and Judd, "Engineering Geology and Geotechniques", McGraw-Hill Book Company, 1990

**REFERENCES**

1. Legeet, "Geology and Engineering", McGraw-Hill Book Company 1998
2. Blyth, "Geology for Engineers", ELBS, 1995

**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 acuity 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 acuity
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**

**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**

**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 THEODOLITE SURVEYING 10**  
 Theodolite – Types – Description and uses – Temporary and Permanent adjustments of vernier transit - Horizontal angles vertical angles – Heights and distances – Traversing – Closing error and distribution – Gale’s tables - Omitted measurements – Laser attachment.
- 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**  
 Horizontal and Vertical control – Methods – Triangulation – Signals – Base line – Instruments and accessories – Corrections – Satellite station – Reduction to centre – Trigonometric levelling – Single and reciprocal observations – Precise levelling – Types of instruments – Adjustments – Field procedure.
- UNIT IV HYDROGRAPHIC SURVEYING 7**  
 Tides – MSL – Sounding and methods – Location of Soundings and methods – Three-point problem – Strength of fix – Sextants and station pointer – River Surveys – Measurement of current and discharge.
- UNIT V TOPOGRAPHIC SURVEYING 5**  
 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
2. Punmia V.C. Surveying, Vols I, II and III Laxmi Publications, 1989.

**REFERENCES:**

1. James M. Anderson and Edward M. Mikhail, Surveying, Theory and Practice, Seventh Edition, Mc Graw Hill 2001.
2. Bannister and S. Raymond, Surveying, Seventh Edition, Longman 2004.
3. S.K. Roy, Fundamentals of Surveying, Second Edition, Prentice’ Hall of India 2004.
4. A.M. Chandra, Plane Surveying, New Age International Publishers 2002.
5. Alak De, Plane Surveying, S. Chand & Company Ltd., 2000.

**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****6**

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****6**

Encoding and decoding- sources of image degradation – atmospheric, radiometric and geometric errors – systematic and non-systematic correction – image geometry operations

**UNIT III IMAGE ENHANCEMENT****15**

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****9**

Spectral discrimination pattern matching –Baye's theorem- signature and feature extraction- training and classification – supervised and unsupervised methods – error matrix and accuracy estimates

**UNIT V IMAGE ANALYSIS****9**

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:**

1. John A. Richards and Xiuping Jia , “ Remote sensing digital Image Analysis – an introduction” Fourth edition, Springer Verlag, 2005.
2. Robert A. Schowengerdt, “ Remote Sensing: Models and Methods for Image Processing - Third Edition”, Academic Press, 2006.
3. Rafeal C. Gonzalez and Richards E. Woods, “ ,Digital Image Processing - 2nd Edition, Addison-Wesley Inc, 2004

**REFERENCES:**

1. Anil K. Jain , “Fundamentals of Digital Image Processing “ Prentice Hall, 1989.
2. John Jenson, “ Introductory Digital Image Processing: a remote sensing perspective – second edition”, Prentice Hall, 1995.

**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**  
Abstract Data types – Inheritance – Polymorphism – Object Identity – Object Modeling – Object Oriented Programming Languages – Object Oriented Databases – Object Oriented user Interfaces – Object Oriented GIS – Object Oriented Analysis – Object Oriented Design – Examples
- 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**  
Inheritance – Base class – Derived Class – Visibility modes – Single Inheritance – Multilevel Inheritance – Multiple Inheritance – Nesting – Polymorphism – File – Opening and Closing – File Modes – File Pointers – Random Access – Error Handling – Exercises.
- UNIT V GIS CUSTOMISATION PROGRAMMING USING VISUAL BASIC 16**  
Accessing databases with the Data Controls – ADO Object Model – ODBC and data access Objects – ODBC using DAO and Remote Data Objects – Data Environment and Data Report – ActiveX Controls – GIS Customisation – Case studies.

**L: 45 + P: 30, TOTAL : 75 PERIODS**

**TEXT BOOKS:**

1. Balagurusamy.E., Object Oriented Programming with C++, Tata Mc.Graw Hill Publications, 2001
2. Stanley B.Lippman, A C++ Primer, 2<sup>nd</sup> Edition, Addison Wesley Publications, Second Edition 2000.

**REFERENCES:**

1. Bjarne Stroustrup, The C++ Programming Language, Addison Wesley Publications, Third Edition, 2000.
2. Tony Stevenson, Visual Basic 6: The Complete Reference, Osborne/ McGraw- Hill, 2000.
3. David S. Platt, Introducing Microsoft .NET Microsoft Press, Saarc Edition, 2001.

**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 / Pockel'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**

Electro-optical system: Measuring principle ,Working principle, Sources of Error, Infrared and Laser EDM instruments. Microwave system: Measuring principle, Working principle, Sources of Error, Microwave EDM instruments. Comparison between Electro-optical and Microwave system. Total station and its applications. Care and maintenance of EDM instruments. Modern positioning systems.

**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:**

1. Rueger, J.M. Electronic Distance Measurement, Springer-Verlag, Berlin, 1990.
2. Laurila, S.H. Electronic Surveying in Practice, John Wiley and Sons Inc, 1993.

**REFERENCES:**

1. Burnside, C.D. Electromagnetic distance measurement Crosby Lock wood staples, U.K. 1991..
2. Soastamoinen, J.J. Surveyor's guide to Electro-magnetic Distance Measurement, Adam Hilger Ltd., 1997.

**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****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 – 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 programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

**TOTAL: 45 PERIODS**

#### **TEXT BOOKS**

1. Gilbert M.Masters, "Introduction to Environmental Engineering and Science", 2<sup>nd</sup> edition, Pearson Education, 2004.
2. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2006.

#### **REFERENCE BOOKS**

1. R.K. Trivedi, "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media.
2. Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi, 2007.
4. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press, 2005.

**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 data.

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



**TEXTBOOKS:**

1. Kanetkar T.P. Surveying and Levelling, Vols I and II, United Book Corporation, Pune, 1994
2. Punmia V.C. Surveying, Vols I, II and III Laxmi Publications, 1989.

**REFERENCES:**

1. James M. Anderson and Edward M. Mikhail, Surveying, Theory and Practice, Seventh Edition, Mc Graw Hill 2001.
2. Bannister and S. Raymond, Surveying, Seventh Edition, Longman 2004.
3. S.K. Roy, Fundamentals of Surveying, Second Edition, Prentice' Hall of India 2004.
4. A.M. Chandra, Plane Surveying, New Age International Publishers 2002.
5. Alak De, Plane Surveying, S. Chand & Company Ltd., 2000.

**GI3302****MICROWAVE REMOTE SENSING****L T P C  
3 0 0 3****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**

Application in Agriculture – Forestry – Geology – Hydrology - ice studies – landuse-mapping and ocean related studies.

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

**TOTAL: 45 PERIODS**

**TEXTBOOKS:**

1. Ulaby, F.T., Moore, R.K, Fung, A.K, Microwave Remote Sensing; active and passive, Vol. 1,2 and 3, Addison – Wesley publication company 2001
2. Woodhouse Iain.H, Introduction to Microwave Remote Sensing Taylor & Francis 2005.

**REFERENCES:**

1. Floyd, M., Handerson and Anthony J.Lewis, Principles and application of Imaging RADAR, Manual of Remote Sensing, Third edition, Vol.2, ASPRS, John Wiley and Sons Inc., 1998
2. Charles Elachi and Jakob Van Zy, Introduction to the Physics and Techniques of Remote Sensing, Wiley Interscience, A John Wiley and sons Inc., 2006

**GI3303**

**CADASTRAL SURVEYING**

**LT PC  
3 0 0 3**

**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**

History of cadastral survey – Types of survey – Tax – Real Property – Legal cadastre – 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-ivision – 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
2. Kahmen & Faig, Surveying, Walter de Gruyter, Berlin, 1993.
3. Peter F. Dall, John D. McLaughlin, Land information management, Oxford Press.

**REFERENCES:**

1. Chain Survey and Land records Manuals I & II of Government of Tamil Nadu.
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 Organization of Geodesy. Reference Surfaces and their relationship. Applications. Engineering, Lunar and Planetary Geodesy.

**UNIT II GEOMETRIC GEODESY 20**

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 Astronomical Co-ordinate System, Geodetic or Geographical co-ordinate System, Rectangular or Cartesian Co-ordinate System and relationship between them. Curvilinear Co-ordinate System. Deflection of Vertical, Spherical excess. Astro- Geodetic method of determining the reference Spheroid. Geodetic Control (Horizontal and Vertical)- Standards and Methods.

**UNIT III      PHYSICAL GEODESY      10**

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      15**

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      10**

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 PERIDOS**

**TEXT BOOK:**

1 James R.Smith, Introduction to Geodesy, John wiley&Sons Inc. 1997.

**REFERENCES:**

1. Wolfgang Torge, Geodesy, Walter De Gruyter Inc., Berlin, 2001.
2. Bomford, G. Geodesy, Clarendon press, Oxford, 1980.
3. Petr Vanicek and Edward J. Krakiwsky, Geodesy: The concepts, North-Holland Publications Co., Amsterdam, 1991.
4. Heribert kahmen and Wolfgang Faig, Surveying, Walter De Gruyter, Berlin, 1988.
5. Schwarze, V.S. Geodesy: The challenge of the 3<sup>rd</sup> millennium, Springer verlag, and 2002.

**GI3305**

**GEOGRAPHICAL INFORMATION SYSTEM I**

**L T P C  
3 0 0 3**

**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



**GI3307**

**SURVEY PRACTICAL III**

**L T P C**  
**0 0 4 2**

**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**

**GI3308**

**GIS LABORATORY I**

**L T P C**  
**0 0 4 2**

**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
9. Generation of DEM: from contours, spot heights
10. DEM display: Gridded DEM and TIN
11. DEM analysis: Derivation of Slope, Aspect Map
12. Data Output: Map compilation for Point, Line and Polygon data

**TOTAL : 60 PERIDOS**

<b>GE3318</b>	<b>COMMUNICATION SKILLS AND SOFT SKILLS LAB</b>	<b>L T P C</b>
		<b>0 0 2 1</b>

**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 job.
- To enhance the performance of students at Placement Interviews, Group Discussions and other recruitment exercises.

**I. PC based session**

**A. Career Lab (15 periods) Viewing and discussing audio-visual materials**

1. **Resume / Report Preparation / Letter Writing:** (3)  
Letter writing – Job application with Resume - Project report - Email etiquette.
2. **Presentation skills:** (3)  
Elements of effective presentation – Structure of presentation - Presentation tools – Body language.
3. **Soft Skills:** (3)  
Time management – Stress management – Assertiveness – Negotiation strategies, Psychometrics - Analytical and logical reasoning.
4. **Group Discussion:** (3)  
Group discussion as part of selection process, Structure of group discussion – Strategies in group discussion – Mock group discussions.

- 5. Interview Skills:** (3)  
Kinds of interviews – Interview techniques – Corporate culture – Mock interviews.

**TOTAL 30 PERIODS**

**II. Class Room Session**

1. **Resume / Report Preparation / Letter writing:** Students prepare their own resume and report. (9)
2. **Presentation Skills:** Students make presentations on given topics. (12)
3. **Group Discussion:** Students participate in group discussions. (12)
4. **Interview Skills:** Students participate in Mock Interviews (12)

**Note:** Classroom sessions are practice sessions.

**REFERENCES:**

1. Prakash P, Verbal and Non-Verbal Reasoning, Macmillan India Ltd., 2<sup>nd</sup> Edition, New Delhi, 2004.
2. John Seely, The Oxford Guide to Writing and Speaking, Oxford University Press, New Delhi 2004.
3. Paul V Anderson, Technical Communication, Thomson Wadsworth , 6<sup>th</sup> Edition, New Delhi, 2007.
4. Edgar Thorpe and Showick Thorpe, Objective English, Pearson Education, 2<sup>nd</sup> Edition, New Delhi 2007.
5. David Evans, Decision maker, CUP, 1997

**Lab Requirement:**

1. Teacher console and systems for students.
2. English Language Lab Software
3. Tape recorders

**GI3309**

**SATELLITE GEODESY**

**LT P C  
3 0 2 4**

**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 PERIDOS**

**TEXT BOOK:**

1. Seeber G, Satellite Geodesy, Walter De Gruyter, Berlin, 1998

**REFERENCES:**

1. Alfred Leick, GPS satellite surveying, John Wiley & Sons Inc., 3<sup>rd</sup> Edition, 2004.
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:**

1. Mikhail, E.M. and Gracie G., Analysis and adjustment of Survey measurements, Van Nostrand Reinhold, New York, 1981
- 2 Paul.R.Wolf and Charles. D.Ghilani, Adjustment Computations –Statistics and least squares in surveying and GIS, John Wiley and sons inc., 1996.

**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**

Local operations: Reclassification, Logical and Arithmetic Overlay operations – Neighbourhood operations: Aggregation, Filtering, Slope and Aspect Map – Extended Neighbourhood operations: Statistical Analysis, Proximity and Connectivity operations, Buffering, Viewshed Analysis – Regional Operations: Area, Perimeter, Shape, Identification of Region and Reclassification – Map Algebra.

**UNIT II VECTOR DATA ANALYSIS 9**

Non-topological analysis: Attribute database query, Structured Query Language, Summary Statistics, Address geocoding, Calculation of Area, Perimeter and distance, Co-ordinate transformation, Surface interpolation – Topological Analysis: Reclassification, Aggregation, Overlay analysis, Point-in-polygon, Line-in-Polygon, Polygon-on-Polygon: Clip, Erase, Identify, Union, Intersection - Network Analysis, Buffering

**UNIT III SPATIAL MODELLING AND APPLICATIONS 9**

Modelling – Definition – Spatial Modelling – External Model, Conceptual Model, Logical Model, Internal Model – GIS applications - Resource Management: – AM/FM Application: Electrical Utility - Land Parcel based application: Land Information System, Tax mapping - Crime Mapping -Business application

**UNIT IV DATA QUALITY AND ERROR PROPAGATION IN GIS 9**

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 9**

Customisation of GIS: Need, Uses - 3D data visualization - Object Oriented GIS - Web GIS: Web GIS Architecture, Applications, Mobile Mapping

**TOTAL : 45 PERIODS**

**TEXT BOOK:**

1. Lo, C.P. and Yeung, Albert K.W., Concepts and Techniques of Geographic Information Systems Prentice Hall, 2002.

**REFERENCES:**

1. Peter A. Burrough, Rachael A. McDonnell, Principles of GIS, Oxford University Press, 2000
2. Robert Laurini and Derek Thompson, Fundamentals of Spatial Information Systems, Academic Press, 1996
3. Paul A Longley, Michael F Goodchild, David J Maguire, David W Rhind, Geographical Information Systems, Volume I and II, John Wiley and Sons, Inc., 1999.

**GI3312**

**PHOTOGRAMMETRY 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 17**

Inner orientation – Relative orientation – Numerical relative orientation – Absolute orientation – Model deformation - Projection – Viewing – Measuring – Tracing system – Optical projection equipments – Mechanical projection equipments – Zeiss parallelogram – Analytical plotters – Automatic image Correlation – Map compilation – Principle of Digital Photogrammetric Plotting.

**UNIT II ORTHOPHOTOGRAPHY****9**

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**

Definitions of Digital Photogrammetric image – Creation of digital images – Automatic measurements of fiducial marks – Automated Photogrammetric point measurement – Creation of digital Photogrammetric image – Automated surface modelling – Digital Photogrammetric Workstation

**L: 45 + T: 15 TOTAL : 60 PERIODS****REFERENCES:**

1. Paul. R Wolf, Bon A.DeWitt, Elements of Photogrammetry with application in GIS– McGraw Hill International Book Co., 3<sup>rd</sup> Edition, 2000
2. E.M.Mikhail, J.S.Bethel, J.C.McGlone, Introduction to Modern Photogrammetry, Wiley Publisher, 2001
3. Gollfried Konecny, Geoinformation: Remote Sensing, Photogrammetry and Geographical Information Systems, CRC Press, 1<sup>st</sup> Edition, 2002
- 4 Manual of Photogrammetry, American Society of Photogrammetry, 5<sup>th</sup> Edition, 2004.

**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**

**L T 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
3. Interior Orientation, Relative Orientation, Absolute Orientation and Mapping using Semi Analytical Stereo Plotter
4. Measurement of model coordinates using Analytical Stereo Plotter
5. Mapping using Analytical Stereo Plotter

**TOTAL: 30 PERIDOS**

**GI3317**

**GIS LABORATORY II**

**L T 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
  4. Vector Analysis – Topological Overlay — Logical Operators – Union, Intersection, Identity Operations with Point, Line and Polygon
  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.

**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**

Organization - Management - Role of managers - Evolution of Management thought - Organization and the environmental factors - Managing globally - Strategies for International Business.

**UNIT II PLANNING**

**9**

Nature and purpose of planning - Planning process - Types of plans – Objectives - Managing by objective (MBO) Strategies - Types of strategies - Policies - Decision Making - Types of decision - Decision Making Process - Rational Decision Making Process - Decision Making under different conditions.

**UNIT III ORGANIZING**

**9**

Nature and purpose of organizing - Organization structure - Formal and informal groups / organization - Line and Staff authority - Departmentation - Span of control - Centralization and Decentralization - Delegation of authority - Staffing - Selection and Recruitment - Orientation - Career Development - Career stages – Training - Performance Appraisal.

**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**

1. Stephen P. Robbins and Mary Coulter, 'Management', Prentice Hall of India, 8th edition.
2. Charles W L Hill, Steven L McShane, 'Principles of Management', Mcgraw Hill Education, Special Indian Edition, 2007.

**REFERENCES**

1. Hellriegel, Slocum & Jackson, ' Management - A Competency Based Approach', Thomson South Western, 10th edition, 2007.
2. Harold Koontz, Heinz Wehrich and Mark V Cannice, 'Management – A global & Entrepreneurial Perspective', Tata Mcgraw Hill, 12<sup>th</sup> edition, 2007.
3. Andrew J. Dubrin, 'Essentials of Management', Thomson Southwestern, 7th edition, 2007.

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

To make the undergraduate students understand principles, processed and 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**

Virtual dimensionality-statistics for data reduction - data calibration, normalization – Hughes phenomenon –MNF transformation – kalman filters- library matching, spectral angle mapper, BBMLC-spectral mixture analysis – endmember extraction: PPI, PCA, spectral transformation - data compression

**UNIT V APPLICATIONS****10**

Application to forestry, agriculture, geology, ecology, atmosphere, environmental and resource management.

**L: 30 + P: 15, TOTAL: 45 PERIODS****TEXT BOOKS:**

1. John A. Richards and Xiuping Jia , “ Remote sensing digital Image Analysis – an introduction” Fourth edition, Springer Verlag, 2005.
2. Chein I Chang, “Hyperspectral Imaging: Techniques for Spectral Detection and Classification”, Kluwer Academic/Plenum Publishers, New York, N.Y., 2003. (ISBN: 0-306-47483-2)
3. Chein I Chang, “Hyperspectral Data Exploitation: Theory and Applications, Wiley Inter Science, 2006 (ISBN: 9780470124628 )

**REFERENCE:**

1. Chein I chang , “Recent advances in hyper spectral signal and image processing“, Transworld network, 2006 (ISBN: 81-7895-218-1)

**WEB REFERENCES:**

1. [www.oksi.com](http://www.oksi.com)
2. [ccrs.nrcan.gc.ca/optic/hyper](http://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****9**

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****9**

Digital Camera – CCD Camera – Full frame, Frame transfer, Interline CCD Cameras. Time delay integration – Spectral sensitivity of CCD sensor – Geometry problem of CCD image – line – filter, blooming, warm up effect – trailing - Types of CCD systems. Linear array line scanner – use of CCD scanners in high resolution satellites, SPOT, MOMS, IRS, IKONOS and Quickbird.

**UNIT III SCANNERS****9**

Analog to Digital conversion – Types of scanners – flat bed – drum type – sensor characteristics – scanner resolution. Geometric and Radiometric resolution – scanner calibration – Video camera – typical Photogrammetric scanners.

**UNIT IV DIGITAL PHOTOGRAMMETRIC WORKSTATION 9**

Merits and Demerits of Digital system – Stereo viewing – spatial – spectral – temporal methods – image measurement – coordinate system – image movement – fixed and moved image – image transformation – geometric and radiometric transformation - Concepts of interior, Relative and Absolute orientation – GCPs – use of GPS in Digital Photogrammetry.

**UNIT V APPLICATIONS 9**

Aerial Triangulation (ATM) – block adjustment – DEM generation – image matching – image correlation – Digital Orthophoto generation – Feature extraction – Image enhancement – Integration Remote Sensing, GPS and GIS applications in Terrestrial Photogrammetry

**TOTAL: 45 PERIDOS**

**REFERENCES:**

1. Eilifried Linder, Digital Photogrammetry, Theory & Application, Springer – Verlag, Berlin, 2003
2. Michel Kasse & Yves Egles, Digital Photogrammetry, Taylor & Francies, London & Newyork, 2001.
3. Edward M.Mikhail, Janan S.Bethel & Chris Mc Glone, J Introduction to Modern Photogrammetry, John Wiley & Sons Inc, New York 2000.

**GI3403 GEOGRAPHICAL INFORMATION SYSTEM L T P C**  
**APPLICATIONS 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**

Utilities – Water utility applications – Electric Utility Application – Telecommunication: Tower 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 PERIODS**

**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- Management, Kluwer Academic Publishers, 2001
3. Uzair M. Shamsi, U. M. Shamsi GIS Tools for Water, Wastewater, and Stormwater Systems, Asce Press, 2002.

**REFERENCES:**

1. Paul A Longley, Michael F Goodchild, David J Maguire, David W Rhind, Geographical Information Systems, Volume I and II, John Wiley and Sons, Inc., 1999.
2. Alan L., MD Melnick, Introduction to Geographic Information Systems for Public Health, Aspen Publishers, 1st edition, 2002.
3. Lisa Godin, GIS in Telecommunications Management, ESRI Press, 1st edition 2001.
4. Laura Lang, GIS for Health Organizations, ESRI Press, 2000
5. Amin Hammad, Hassan Karimi, Telegeoinformatics: Location-based Computing and Services, CRC Press, 1 edition, 2004.

**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**

Problem formulation – structure and assumptions - standard form – Graphical solution – solution by simplex method – Sensitivity Analysis – Duality – Formulations of Dual problem – primal and dual relationship - Geoinformatics problems & solutions

**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**

Introduction – Deterministic and Stochastic simulation – simulation of Inventory problems – Queuing problems – Investment – Maintenance – Role of computers in simulation.

**TOTAL: 45 PERIDOS**

**TEXT BOOKS:**

1. Hiller, P.S. and G.I. Lieberman, Operations Research, Holder – day Inc., 2001.

**REFERENCES:**

1. Hamdy A Taha, “An Introduction to Operations Research, Prentice Hall, Sixth edition,2000.
2. R. Panneerselvam, “Operations Research”, Prentice Hall of India, 2002.
3. Sharma, J.K., Operations Research Theory and Applications, Mac Millan India Limited, 2003.
4. Frank S. Budnick, Dennis Mcleavey and Richard Mojena, Principles of Operations Research for Management, All India Traveler Delhi, 1988.

**GI3406 DIGITAL PHOTOGRAMMETRY LABORATORY**

**L T P C  
0 0 4 2**

**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
4. Camera Calibration – Automatic and Manual Interior Orientation
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 PERIODS**

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.

**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 9**

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 9**

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 9**

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 9**

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 9**

Single and stereo photographs for forensic studies, investigation of criminal cases by black&white, ultra-violet, infrared and colour Photogrammetry, examples. Use of stereometric camera for crime detection, accident investigations. Mono or stereo camera for investigation. Anthropometry – Under water Photogrammetry – Electron microscopy, Hologrammetry – Moire topography – systems and applications – emerging trend.

**TOTAL: 45 PERIODS****TEXT BOOK:**

1. Atkinson, Development in Close Range Photogrammetry-I, Development series 1988

**REFERENCES:**

1. Bandekar, J., Photogrammetric surveys of monuments and sites, North Holland Publishing Co., American Elsevier Publishing Co., 1975
2. Karara, H.M., Non topographic Photogrammetry, Second Edition, American Society for Photogrammetry and Remote Sensing, 1989

**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**

Fundamentals of modelling, graph theory, topology – Digital planimetric modelling – Digital relief modelling – Quality of digital landscape models – Topographic model generalisation, Map revision – Web Cartography – Dynamic and Static Web Maps.

**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 9**

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 PERIDOS****TEXT BOOKS:**

1. Menno, Jan Kraak and Ferjan Ormeling, Cartography – Visualization of Geo spatial Data, PEARSON Education Second Edition 2004.
2. Arthur. H. Robinson et al, Elements of Cartography, Seventh Edition John Wiley and sons, 2004.
3. R.W. Anson And F.J. Ormeling, Basic Cartography for Students and Technicians Vol-I, II and III, Elsevier Applied Science Publishers 2<sup>nd</sup> Edition – 2002.
4. Menno, Jan Kraak and Allan Brown , Web Cartography developments and prospects, Taylor & Franics 2001.

**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 of 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:**

1. Mikhail, E.M. and Gracie.G. Analysis and adjustment of Survey measurements, Van Nostrand Reinhold, New York., 2002.

**REFERENCE:**

1. Paul.R.Wolf and Charles. D.Ghilani Adjustment Computations –Statistics and least squares in surveying and GIS, Jhon Wiley and sons inc., 2004.

**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:**

1. Yves Egels and Michel Kasser, Digital Photogrammetry, Taylor & Francis, 2001.
2. Lee-Leung Fu, Satellite Altimetry and Earth Sciences, A Hand Book of Techniques and Applications, Academic Press, 2000.
3. E.P. Baltsavias, Automatic Extraction Man Made Objects, Taylor & Francis, 1<sup>st</sup> edition 2001

**REFERENCES:**

1. ISPRS Journal of Photogrammetry and Remote Sensing, Special Issue on Airborne Laser Scanning and Mapping, Volume 54, Issue 2-3, 15-July-1999
2. Roger Read and Ron Graham, Manual of Aerial Survey: Primary Data Acquisition, Whittles Publishing, 2002.

**GI3005 REMOTE SENSING AND GIS FOR HYDROLOGY AND WATER RESOURCES L T P C  
3 0 0 3**

**OBJECTIVE :**

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

**UNIT I BASICS 9**  
Hydrologic cycle, estimation of various components of hydrologic cycle – clouds, rainfall – runoff – evaporation – transpiration - evapo–transpiration – interception - depression storage. Spectral properties of water - surface water modelling.

**UNIT II DRAINAGE BASIN 8**

Watershed divide, stream networks, Delineation and codification of watersheds morphometric analysis –linear, areal, relief aspects - Rainfall – runoff modelling - Stage discharge relationship – Hydrograph – unit hydrograph – urban hydrology.

**UNIT III AREAL ASSESSMENT 8**

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 10**

Origin – classification and properties of aquifer -Ground water potential – surface water indicators –aquifer parameters - Well hydraulics - estimation of ground water potential hydrologic budgeting - Mathematical and GIS modeling - modelling of sea water intrusion - Water quality parameters –. Water quality mapping and monitoring - Correlation model for pollution detection.

**UNIT V IRRIGATION AND WATERSHED 10**

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 PERIDOS**

**REFERENCES:**

1. Dr.David Maidment and Dr.Dean Djokic, Hydologic and hydraulic modeling support with GIS, ESRI press New York – 2000.
2. Gert A.Schulitz . Edwin T. Engman, Remote Sensing in hydrology and Water Management, Springer-verlay Barlin Heilelberg Germany – 2000.
3. Andy D. Ward William J. Elliot, Environmental Hydrology, Lewis publisher Bocaroton New York – 1995.
4. Eric C. Barrett, Clare H.Pawer, Satellite Remote Sensing for Hydrology and Water Management, Gordon @Breach Science publications – Newyork-1990

**GI3006 REMOTE SENSING AND GIS FOR OCEAN ENGINEERING AND COASTAL ZONE MANAGEMENT L T P C 3 0 0 3**

**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 9**

Coastal processes – Oceanic circulation – Upwelling and sinking – Waves – reflection, diffraction and refraction - wave generated currents - catastrophic waves - Tides – Tidal forces Bathymetry – sediment drift – navigation.

**UNIT II OCEAN GENERAL STUDIES 8**

Physical properties of sea water – chemistry of sea water - Biological parameters – Oceanographic instruments – collection of water samples – current measuring devices – deep sea coring devices.

**UNIT III COASTAL ENGINEERING 8**

Coastal Hydrodynamic – Coastal erosion - various protection structures - Estuaries and their impact on coastal processes – Hydrodynamic of pollution dispersion- Modelling of suspended sediment.

**UNIT IV REMOTE SENSING APPLICATION FOR OCEAN 10**

Various Satellite and sensors for Ocean and Coastal applications- Application of CZCS – chlorophyll and suspended sediment estimation – Retrieval of physical oceanographic parameters – sea surface temperature - significant wave height - wind speed and wind direction - coastal Bathymetry – sea level rise.

**UNIT V COASTAL ZONE MANAGEMENT 10**

Introduction – Major issues/problems – Thematic maps on coastal resources - wetland classification - mapping of shore line changes - creation of CZIS - Coastal aquifer modelling - Integrated coastal zone Management –Resolving conflict on resources utilization.

**TOTAL: 45 PERIODS**

**REFERENCES:**

1. Vasilis D. Valavanis, GIS in oceanography & Fisheries, Taylor & Francis London & New York, 2002
2. Alasdair J.Edward, Remote Sensing Handbook for Tropical Coastal Management, UNESCO publishing, 2000.
3. Grant Gross,M., Oceangraphy, Merrill Publishing company, Columbus, U.S.A., 2002.
4. Karsten Manager, Shoreline Management Guidelines, DHI Water & Environment, Denmark, 2004.
5. Dean, R.G. nd Dalrymple, R.A., Coastal Process with Engineering Application, Cambridge university press, Cambridge, 2006.
6. Paul D.Kumar, Beach process and sedimentation. Prentice – Hall Inc., New Jersey, 2002.

**GI3007 REMOTE SENSING AND GIS FOR ENVIRONMENTAL MONITORING L T P C 3 0 0 3**

**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**

Sources and demands of water - Characteristics of water- Point and non-point sources of water pollution – Spectral responses of clear and contaminated water – chlorophyll-biota- Remote Sensing of Water quality assessment - Runoff estimation- flood prediction modeling.

**UNIT II SOIL CONSERVATION AND MANAGEMENT 12**

Formation of Soils - land forms – soil erosion –factors influencing soil erosion, soil contamination- distribution and accumulation of contaminants such as toxic metals, synthetic chemicals in soil- disposal of solid waste - mining pollution- methods of conservation-afforestation- EMR responses with contaminated soil – modeling soil characteristics using satellite data- – soil degradation assessment using Remote Sensing and GIS. Land reclamation.

**UNIT III ECOLOGY AND ECOSYSTEM 8**

Conservation and resource management – spectral reflectance from vegetated surface – Stress monitoring – Land cover and Land use mapping - forest conservation – Biodiversity –biomonitoring of the environment - wild life studies – monitoring non point source pollution.

**UNIT IV SENSORS AND DATA FOR ENVIRONMENTAL MONITORING 5**

Sensors for environmental monitoring – LIDARS- LASER Remote Sensing -visible and outside visible wave length –absorption spectrometers – selection of ground truth sites – sea truth observation – Radar techniques for sensing ocean surface – thermal measurements – application of remote sensing for oil slicks mapping – Chlorophyll detection – Fisheries resources – Coastal marine studies – determination of temperature and sea state.

**UNIT V AIR POLLUTION AND GLOBAL CLIMATOLOGY 10**

Air Pollutants- Dispersion modeling -Air quality monitoring – case studies – climatology – emissivity characteristics – measurements of atmospheric temperature – composition – constituent distribution and concentration – wind flows and air circulation – Hurricane tracking – meteorological satellite systems.

**TOTAL: 45 PERIDOS**

**REFERENCES:**

1. Andrew N. Rencz, Manual of Remote Sensing: Remote Sensing for Natural Resource Management and Environmental Monitoring, John Wiley & Sons Inc, April 2004,
2. Baretl, E.C. and Culis I.F. Introduction to Environmental Remote Sensing, Second edition, Chapman and Hall, New York, 1993
3. Lintz, J.and Simonent,D.S.Remote sensing of environment Addison Wesley,Rading mars, 1976.

**GI3008 REMOTE SENSING AND GIS FOR URBAN AND REGIONAL PLANNING L T P C  
3 0 0 3**

**OBJECTIVE:**

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

**UNIT I FUNDAMENTALS 7**

Relevance of Remote Sensing – Scale and Resolution – Scope and Limitations – Characteristics of Settlements – Interpretation from Aerial and Satellite images – Digital Image Processing Techniques – Texture based analysis – Automated Feature extraction.





**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 9**

Introduction – leaf optical properties – identification of crops and crop inventorying – crop acreage estimation – vegetation indices – yield estimation – crop production forecasting through digital analysis – microwave and hyper spectral sensing for crop inventory – crop monitoring and condition assessment in command areas – case studies.

**UNIT II SOILS 9**

Introduction – soil survey, types of soil surveys – soil genesis and soil classification – soil taxonomy – soil reflectance properties – soil mapping using remote sensing – problem soils – saline, alkali soil characteristics – mapping of saline alkaline soils – soil erosion and sedimentation – assessment of soil erosion – estimation of reservoir capacity.

**UNIT III LAND EVALUATION AND MANAGEMENT 9**

Introduction – land use / land cover definition – land use / land cover classification – concepts and approaches of land evaluation – parametric methods – change detection in land uses – decision support system for land use planning – optimum land use planning for sustainable agriculture.

**UNIT IV DAMAGE ASSESSMENT 9**

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 9**

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 afforestation – forest fire mapping and damage assessment – sustainable development of forests.

**TOTAL: 45 PERIODS**

**REFERENCES:**

1. Srinivas, M.G., Remote Sensing Applications, Narosa Publishing House, New Delhi, 2001
2. Andrew Rencz, Manual of Remote Sensing. Vol.3. Edn.3. Remote Sensing for the Earth Sciences, American Society for Photogrammetry and Remote Sensing, John Wiley & Sons, New York, 1999
3. Jensen, J.R., Remote Sensing of the Environment – An Earth Resource Perspective. Dorling Kindersley (India) Pvt. Ltd., New Delhi, 2001
4. Agarwal, C.S. and P.K.Garg, Textbook on Remote Sensing in Natural Resources Monitoring and Management. Wheeler Publishing, New Delhi, 2000
5. Narayan, L.R.A., Remote Sensing and its Applications. Universities Press (India) Ltd., Hyderabad, 2001.

**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****9**

Weather and climate – composition of atmosphere – temperature and pressure distribution – Winds over the earth's atmosphere – scales of atmospheric processes - Land / Ocean coupling – Indian monsoons – other major weather systems of seasons – brief introduction to Indian Climatology - Radiative transfer – radiation spectrum – Absorption and emission of radiation by molecules – Radiative laws – scattering principles - Cloud physics – Mechanism of cloud formation – Types of clouds – precipitation processes – warm and cold cloud concepts and processes.

**UNIT II RADIO METEOROLOGY****9**

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****9**

Orbital dynamics of Satellites – Critical velocities – Polar and Geo stationary weather satellites - Active and passive sensors (Radars/Lidars/Radiometers) – Absorption bands of atmospheric gases -Design and characteristics of different types of sounders and imagers used in Meteorological satellites – Viewing geometry - INSAT Meteorological Data Processing System (IMDPS), IRS series – High Resolution Picture Transmission – APT – AVHRR - Need for Remote Sensing techniques in weather forecasting and Numerical Weather Prediction (NWP)

**UNIT IV SATELLITE METEOROLOGY APPLICATIONS – I****9**

Precipitation – Outgoing Longwave Radiation (OLR) and Sea Surface Temperature (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 – Volcanic ash clouds and fires

**UNIT V SATELLITE METEOROLOGY APPLICATIONS – II****9**

Identification – Tracking of weather systems – Derivation of cloud motion vector Dvorak's technique of cyclone intensity estimation – T number and current intensity No. – Application to storm surge estimation Satellite soundings – Tiros Operational and Vertical Sounder – Retrieval methods and algorithms.

**TOTAL: 45 PERIODS**

## REFERENCES:

1. Kidder and VonderHarr, "Satellite Meteorology: An introduction", Academic Press, San Diego, CA, 1995
2. Cracknell, "The Advanced Very High Resolution Radiometer (AVHRR)", Taylor and Francis Int. Ltd., Great Britain, 1997
3. Smith and Schreiner, "Advances in Remote Sensing", Deppak Publications
4. Asnani, G.C "Tropical Meteorology", Vol.I and II, 1993
5. Doviak and Zrnic, "Doppler Radar and Weather observations", Academic press, London, 1992
6. Ellingson, "Satellite Data Applications: Weather and Climate", Proc.Of AO ISymp., COSPAR, Birmingham, UK, Elsevier, MD, USA
7. Sauvageot, "Radar Meteorology", Artech House Publishers, Norwood, MA, 1992
8. S.R.Kalsi, "Use of Satellite Image in Tropical Cyclone Intensity Analysis and Forecasting", India Meteorological Department, New Delhi, Meteorological Monograph, Cyclone warning Division No.1/2002.

## **GI3012 REMOTE SENSING AND GIS FOR TRANSPORTATION PLANNING**

**L T P C  
3 0 0 3**

### 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**

**12**

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**

**10**

Study of geographic pattern of urban development using remote sensing data products – urban sprawl – parking studies using aerial photos – traffic analysis - accident analysis - site suitability analysis for transport infrastructure – population distribution studies – improvisation of rural road network – regional road network connectivity.

### **UNIT III GIS AND TRANSPORTATION ANALYSIS**

**11**

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 GIS-T DATA MODELS 6**  
GIS and Spatial analysis – coupling transportation models with GIS - TRANUS – UPLAN – MetroSIM – Modelling land use transport interaction.

**UNIT V INTELLIGENT TRANSPORTATION SYSTEMS (ITS) 6**  
ITS development – architecture – integration with GIS – applications – case studies.

**TOTAL: 45 PERIODS**

**REFERENCES:**

1. Harvey J. Miller, Shih-Lung Shah, Geographic Information Systems for Transportation – Principles and Applications, Oxford University Press, 2001.
2. John Stillwell, Graham Clarke, Applied GIS and Spatial Analysis, John Wiley & Sons Ltd, 2004.
3. C.S. Papacostas, P.D. Prevedouros, Transportation Engineering and Planning, Prentice-Hall India, 2002.
4. Barry Boots, Atsuyuki Okabe and Richard Thomas, Modelling Geographical Systems – Statistical and computational applications, Kluwer Academic Publishers, 2002.

**GI3013 REMOTE SENSING AND GIS FOR DISASTER MITIGATION AND MANAGEMENT L T P C 3 0 0 3**

**OBJECTIVE:**

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

**UNIT I DISASTER PRINCIPLES 9**  
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 9**  
Needs and approach towards prevention – Principles and components of mitigation Disaster legislation and policy – Insurance – Cost effective analysis – Utilisation of resources – Training – Education – Public awareness – Roles of media.

**UNIT III SAFETY RATING OF STRUCTURES 9**  
Slope stability of Ghat roads –Structural safety of Dams, Bridges, Hospitals, Industrial structures, – Disaster resistant structures – Low cost housing for disaster prone areas – Cyclone shelter projects and their implications – Reconstruction after disasters: Issues of practices.

**UNIT IV SPACE SCIENCE INPUT IN DISASTER MANAGEMENT 9**

Remote sensing in Hazard evaluation – Zonation – Risk assessment – Damage 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 9**

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.

**TOTAL: 45 PERIDOS**

**REFERENCES:**

1. Bell, F.G. Geological Hazards: Their assessment, avoidance and mitigation. E & FN SPON Routledge, London. 1999.
2. David Alexander, Natural Disasters, UCL Press, London, Research Press, New Delhi, 1993.
3. Nick Carter. W. Disaster Management – A Disaster Manager’s Handbook. Asian Development Bank, Philippines. 1991.
4. Mitigating Natural Disasters, Phenomena, Effects and options, A Manual for policy makers and planners, United Nations. New York, 1991.
5. George G. Penelis and Andreas J. Kappos – Earthquake Resistant concrete Structures. E & FN SPAN, London, 1997.

**GE2071 INTELLECTUAL PROPERTY RIGHTS (IPR) L T P C  
3 0 0 3**

**UNIT I 5**

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 10**

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 10**

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

**UNIT IV** **10**  
 Indian Position Vs WTO and Strategies – Indian IPR legislations – commitments to WTO-  
 Patent Ordinance and the Bill – Draft of a national Intellectual Property Policy – Present  
 against unfair competition.

**UNIT V** **10**  
 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 PERIDOS**

**TEXT BOOKS:**

1. Subbaram N.R. "Handbook of Indian Patent Law and Practice ", S. Viswanathan  
 Printers and Publishers Pvt. Ltd., 1998.

**REFERENCES:**

1. Eli Whitney, United States Patent Number: 72X, Cotton Gin, March 14, 1794.
2. Intellectual Property Today: Volume 8, No. 5, May 2001, [www.iptoday.com].
3. Using the Internet for non-patent prior art searches, Derwent IP Matters, July  
 2000. [www.ipmatters.net/features/000707\\_gibbs.html](http://www.ipmatters.net/features/000707_gibbs.html).

**GE2072** **INDIAN CONSTITUTION AND SOCIETY** **L T P C**  
**3 0 0 3**

**UNIT I** **9**  
 Historical Background – Constituent Assembly of India – Philosophical foundations of the  
 Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State  
 Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens.

**UNIT II** **9**  
 Union Government – Structures of the Union Government and Functions – President – Vice  
 President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial  
 Review.

**UNIT III** **9**  
 State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State  
 Legislature – Judicial System in States – High Courts and other Subordinate Courts.

**UNIT IV** **9**  
 Indian Federal System – Center – State Relations – President's Rule – Constitutional  
 Amendments – Constitutional Functionaries - Assessment of working of the  
 Parliamentary System in India.

**UNIT V****9**

Society : Nature, Meaning and definition; Indian Social Structure; Caste, 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:**

1. Durga Das Basu, " Introduction to the Constitution of India ", Prentice Hall of India, New Delhi.
2. R.C.Agarwal, (1997) "Indian Political System", S.Chand and Company, New Delhi.
3. Maciver and Page, " Society: An Introduction Analysis ", Mac Milan India Ltd., New Delhi.
4. K.L.Sharma, (1997) "Social Stratification in India: Issues and Themes", Jawaharlal Nehru University, New Delhi.

**REFERENCES:**

1. Sharma, Brij Kishore, " Introduction to the Constitution of India., Prentice Hall of India, New Delhi.
2. U.R.Gahai, "Indian Political System ", New Academic Publishing House, Jalaendhar.
3. R.N. Sharma, "Indian Social Problems ", Media Promoters and Publishers Pvt. Ltd.

**GE2073****CONTRACT LAWS AND REGULATIONS****L T P C  
3 0 0 3****UNIT I CONSTRUCTION CONTRACTS****10**

Indian Contracts Act – Elements of Contracts – Types of Contracts – Features – Suitability – Design of Contract Documents – International Contract Document – Standard Contract Document – Law of Torts

**UNIT II TENDERS****10**

Prequalification – Bidding – Accepting – Evaluation of Tender from Technical, Contractual and Commercial Points of View – Contract Formation and Interpretation – Potential Contractual Problems – .

World Bank Procedures and Guidelines – Transparency in Tenders Act.

**UNIT III ARBITRATION****5**

Comparison of Actions and Laws – Agreements – Subject Matter – Violations – Appointment of Arbitrators – Conditions of Arbitration – Powers and Duties of Arbitrator – Rules of Evidence – Enforcement of Award – Costs

**UNIT IV LEGAL REQUIREMENTS****10**

Insurance and Bonding – Laws Governing Sale, Purchase and Use of Urban and Rural Land – Land Revenue Codes – Tax Laws – Income Tax, Sales Tax, Excise and Custom Duties and their Influence on Construction Costs – Legal Requirements for Planning – Property Law – Agency Law – Local Government Laws for Approval – Statutory Regulations

**UNIT V LABOUR REGULATIONS****10**

Social Security – Welfare Legislation – Laws relating to Wages, Bonus and Industrial Disputes, Labour Administration – Insurance and Safety Regulations – Workmen’s Compensation Act – Indian Factory Act – Tamil Nadu Factory Act – Child Labour Act  
- Other Labour Laws

**TOTAL: 45 PERIODS****REFERENCES:**

1. Gajaria G.T., Laws Relating to Building and Engineering Contracts in India, M.M.Tripathi Private Ltd., Bombay, 1982
2. Tamilnadu PWD Code, 1986
3. Jimmie Hinze, Construction Contracts, Second Edition, McGraw Hill, 2001
4. Joseph T. Bockrath, Contracts and the Legal Environment for Engineers and Architects, Sixth Edition, McGraw Hill, 2000.

**GE3403****TOTAL QUALITY MANAGEMENT****LT PC  
3 0 0 3****AIM**

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

**OBJECTIVES**

- To under 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****9**

Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of manufacturing and service quality - Basic concepts of TQM - Definition of TQM – TQM Framework - Contributions of Deming, Juran and Crosby – Barriers to TQM.

**UNIT II TQM PRINCIPLES****9**

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 9**

The seven traditional tools of quality – New management tools – Six-sigma: Concepts, methodology, applications to manufacturing, service sector including IT – Bench marking – Reason to bench mark, Bench marking process – FMEA – Stages, Types.

**UNIT IV TQM TOOLS & TECHNIQUES II 9**

Quality circles – Quality Function Deployment (QFD) – Taguchi quality loss function – TPM – Concepts, improvement needs – Cost of Quality – Performance measures.

**UNIT V QUALITY SYSTEMS 9**

Need for ISO 9000- ISO 9000-2000 Quality System – Elements, Documentation, Quality auditing- QS 9000 – ISO 14000 – Concepts, Requirements and Benefits – Case studies of TQM implementation in manufacturing and service sectors including IT.

**TOTAL: 45 PERIODS**

**TEXT BOOK**

1. Dale H.Besterfield, et al., “Total Quality Management”, Pearson Education Asia, Third Edition, Indian Reprint (2006).

**REFERENCES**

1. James R. Evans and William M. Lindsay, “The Management and Control of Quality”, 6<sup>th</sup> Edition, South-Western (Thomson Learning), 2005.
2. Oakland, J.S. “TQM – Text with Cases”, Butterworth – Heinemann Ltd., Oxford, 3<sup>rd</sup> Edition, 2003.
3. Suganthi, L and Anand Samuel, “Total Quality Management”, Prentice Hall (India) Pvt. Ltd., 2006.
4. Janakiraman, B and Gopal, R.K, “Total Quality Management – Text and Cases”, Prentice Hall (India) Pvt. Ltd., 2006.

**GE3022 PROFESSIONAL ETHICS IN ENGINEERING L T P C  
3 0 0 3**

**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.



**AIM**

To make the students understand the importance, relevance and potentialities of this emerging field of study.

**OBJECTIVES**

- Study the basic nano technology and nano science.
- Understand interdisciplinary nature of this field.
- Understand the importance role of physics, chemistry, biology.
- Recognize that the rules of nano science are fundamentally different than those we experience.
- Study the basic fabrication strategies of nano science.

**UNIT I INTRODUCTION 10**

Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering-Classifications of nano structured 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**

1. A.S. Edelstein and R.C. Cammearata, eds., "Nanomaterials: Synthesis, Properties and Applications", Institute of Physics Publishing, Bristol and Philadelphia, 1996.
2. N John Dinardo, "Nanoscale characterisation of surfaces & Interfaces", 2<sup>nd</sup> Edition, Weinheim Cambridge, Wiley-VCH, 2000

## **REFERENCES**

1. G Timp (Editor), "Nanotechnology", AIP press/Springer, 1999
2. Akhlesh Lakhtakia (Editor), "The Hand Book of Nano Technology, Nanometer Structure", Theory, Modeling and Simulations", Prentice-Hall of India (P) Ltd, New Delhi, 2007.