ANNA UNIVERSITY : : CHENNAI – 600 025

UNIVERSITY DEPARTMENTS

R - 2008

B.E. GEOINFORMATICS

I & II SEMESTERS CURRICULUM AND SYLLABI

SEMESTER - I

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
HS9111	Technical English - I	3	1	0	4
MA9111	Mathematics - I	3	1	0	4
PH9111	Engineering Physics	3	0	0	3
CY9111	Engineering Chemistry	3	0	0	3
GE9111	Engineering Graphics	2	0	3	4
GE9112	Fundamentals of Computing	3	0	0	3
PRACTICAL					
PH9112	Physics Laboratory	0	0	2	1
CY9112	Chemistry Laboratory	0	0	2	1
GE9113	Engineering Practices Laboratory	0	0	3	2
GE9114	Computer Practices Laboratory	0	0	3	2
	TOTAL	**17**	**2**	**13**	**27**

SEMESTER II

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
HS9161	Technical English - II	2	0	2	3
MA9161	Mathematics - II	3	1	0	4
PH9162	Physics for Geoinformatics	3	0	0	3
CY9161	Chemistry for Civil Engineering	3	0	0	3
GE 9151	Engineering Mechanics	3	1	0	4
EC9168	Basic Electronics Engineering	3	0	0	3
GI9151	Remote Sensing	3	0	0	3
PRACTICAL					
GE9161	Unix Programming Laboratory	0	0	4	2
GI9152	Remote Sensing Laboratory	3	0	2	1
	TOTAL	**23**	**2**	**7**	**26**

HS 9111	TECHNICAL ENGLISH I	L	T	P	C
	(Common to all branches of B.E. / B.Tech. Programmes)	3	1	0	4

AIM:

To help students specialising in the field of Engineering and Technology develop their proficiency in oral and written communication in Technical English.

OBJECTIVES:

- To enable students improve their vocabulary and employ the words appropriately in different academic and professional contexts.
- To make students comprehend classroom lectures and technically oriented passages.
- To enable students develop suitable reading strategies that could be adopted while reading science related texts.
- To enable students acquire the ability to speak effectively in English in real life situations and work-related situations.
- To train students in academic and professional writing.

UNIT I **9+3**

Vocabulary - using words in context - use of suffixes to form nouns from verbs and adjectives – adjectives, adverbs - matching words with meanings - Active and passive voices – tenses - simple present, present continuous - comparative adjectives – adverbial forms - Reading text: skimming for general information - specific details - note making - cloze reading – Listening and transferring of information from text to graphic forms - bar charts, flow-charts - Paragraph writing - descriptions using descriptive words and phrases - organising information - Role play - conversational techniques – discussions - oral reporting.

UNIT II **9+3**

Vocabulary items - words with prefixes (“multi-“, “under-“) - Asking and answering questions, error correction - spelling and punctuation - Reading Comprehension - scanning for information – inferring meaning from context - Listening and guided note-taking - paragraph writing - using notes – giving suitable headings / subheadings for paragraphs – Comparing and contrasting using expressions of comparison - Discussion using creative ideas

UNIT III **9+3**

Compound nouns - negative prefixes – antonyms – Use of modal verbs – making sentences using phrases – tenses – simple past and present perfect - Reading and guessing meanings in context - Listening and note taking - Channel conversion from text to chart - Writing comparisons - making recommendations - coherence using discourse markers - Discussion - role-play (explaining and convincing)

UNIT IV **9+3**

Expanding nominal compounds – words with multiple meanings – Error correction - prepositions - use of the prefix “trans-“ - compound adjectives - modal verbs to express probability - simple past and present prefect - Reading – prediction of content - understanding advertisements - scanning the text and comprehension check - Listening

for details - Writing definitions – expression of use and purpose - Role-play – discussion - speculating about the future

UNIT V **9+3**

Formation of nouns, verbs and adjectives from root words – some useful phrases and expressions - cloze exercises - 'If' conditional clauses – gerunds (verbal nouns) - Reading for comprehension - intensive reading - Accuracy in listening – listening to discussion on specific issues - Group discussion - role-play (stating, discussing problems and proposing solutions) - Planning a tour - Writing an itinerary - Writing formal letters - letter to the editor

LECTURE – 45 TUTORIAL – 15 TOTAL – 60 PERIODS

TEXTBOOKS

1. Department of Humanities and Social Sciences, Anna University, **English for** Engineers and Technologists, Vol. I and II (Combined Edition), Orient Longman, Pvt. Ltd., 2006.Themes 1 to 4.

REFERENCES

1. Day, R.A, Scientific English, Second Edition, Hyderabad: Universities Press, 2000.
2. Mitra, B.K, Effective Technical Communication: A Guide for Scientists & Engineers, New Delhi: Oxford University Press, 2006.
3. Website: www.uefap.co.uk

MA 9111	MATHEMATICS – I	L	T	P	C
	(Common to all branches of B.E. / B.Tech. Programmes)	3	1	0	4

AIM:

To make available the basic concepts of engineering mathematics, to prepare the student for new concepts to be introduced in the subsequent semesters and to provide the necessary mathematical skills that are needed in modeling physical processes by an engineer.

OBJECTIVES:

- To develop the use of matrix algebra techniques this is needed by engineers for practical applications.
- To make the student knowledgeable in the area of infinite series and their convergence so that he/ she will be familiar with limitations of using infinite series approximations for solutions arising in mathematical modeling
- To familiarize the student with functions of several variables which is needed in many branches of engineering
- To introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage

UNIT I MATRICES 9+3

Characteristic equation – Eigenvalues and Eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors – Cayley-Hamilton Theorem – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

UNIT II INFINITE SERIES 9+3

Sequences – Convergence of series – General properties – Series of positive terms – Tests of convergence (Comparison test, Integral test, Comparison of ratios and D'Alembert's ratio test) – Alternating series – Series of positive and negative terms – Absolute and conditional convergence – Power Series – Convergence of exponential, logarithmic and Binomial Series.

UNIT III FUNCTIONS OF SEVERAL VARIABLES 9+3

Limit and Continuity – Partial derivatives – Homogeneous functions and Euler's theorem – Total derivative – Differentiation of implicit functions – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Errors and approximations – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNIT IV IMPROPER INTEGRALS 9+3

Improper integrals of the first and second kind and their convergence – Evaluation of integrals involving a parameter by Leibnitz rule – Beta and Gamma functions – Properties – Evaluation of integrals using Beta and Gamma functions – Error functions.

UNIT V MULTIPLE INTEGRALS 9+3

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of Solids – Change of variables in double and triple integrals – Area of a curved surface.

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

TEXT BOOKS

1. Grewal B.S., Higher Engineering Mathematics (40th Edition), Khanna Publishers, Delhi (2007).
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill Co. Ltd., New Delhi (2007).

REFERENCES

1. Jain R.K. and Iyengar S.R.K., Advanced Engineering Mathematics (3rd Edition), Narosa Publications, Delhi (2007).
2. Bali N., Goyal M. and Watkins C., Advanced Engineering Mathematics (7th Edition), Firewall Media, New Delhi (2007).
3. Greenberg M.D., Advanced Engineering Mathematics (2nd Edition), Pearson Education, New Delhi (1998).

PH 9111	ENGINEERING PHYSICS	L	T	P	C
	(Common to ALL Branches of B.E. / B.Tech. Programmes)	3	0	0	3

OBJECTIVE:

To introduce the basic physics concepts relevant to different branches of Engineering and Technology

UNIT I PROPERTIES OF MATTER 9

Elasticity – Poisson's ratio and relationship between moduli (qualitative) – Stress-strain diagram – factors affecting elasticity – bending of beams – cantilever – bending moment – theory and experiment of Young's modulus determination – Uniform and non-uniform bending – I shaped girders – twisting couple – hollow cylinder – shaft – torsion pendulum – determination of rigidity modulus – moment of inertia of a body (regular and irregular).

UNIT II ACOUSTICS AND ULTRASONICS 9

Classification of sound – loudness and intensity – Weber-Fechner Law – standard Intensity and Intensity level – decibel – reverberation – reverberation time –– rate of growth and decay of sound intensity - derivation of Sabine's formula – absorption coefficient and its determination – factors affecting acoustics of buildings : focussing, interference, echo, Echelon effect, resonance – noise and their remedies. Ultrasonics – production – magnetostriction and piezoelectric methods – detection of ultrasound – acoustic grating – Industrial applications – NDT - Ultrasonic method: scan modes and practice.

UNIT III THERMAL PHYSICS 9

Thermal expansion - thermal stress – expansion joints – bimetallic strips - thermal conductivity – conductions in solids – Forbe's and Lees' disc methods – thermal insulation of buildings – Laws of thermodynamics – Otto and diesel engines and their efficiency – entropy – entropy of Carnot's cycle – reverse Carnot's cycle – refrigerator.

UNIT IV APPLIED OPTICS 9

Interference - Michelson interferometer: construction, working, determination of wave length and thickness – anti-reflection coating – air wedge and its application – Lasers – Einstein's coefficients – CO_2, Nd:YAG and semiconductor lasers - construction and working – applications – Optical fibres – classification (index & mode based) – principle and propagation of light in optical fibres – acceptance angle and numerical aperture – fibre optic communication system - active and passive sensors.

UNIT V SOLID STATE PHYSICS 9

Nature of bonding – growth of single crystals (qualitative) - crystal systems - crystal planes and directions – expressions for interplanar distance – coordination number and packing factor for simple structures: SC, BCC, FCC and HCP – structure and significance of NaCl, ZnS, diamond and graphite – crystal imperfections: point defects, dislocations and stacking faults.

TOTAL : 45 PERIODS

TEXT BOOKS:

1. Palanisamy, P.K., Engineering Physics, Scitech Publications (P) Lt, 2006.
2. Arumugam, M., Engineering Physics, Anuradha Publ., 2000.

REFERENCES:

1. Gaur R.K., and Gupta, S.L Engineering Physics, Dhanpat Raj Publ., 2003.
2. Sankar B.N., Pillai.S.O., Engineering Physics, New age International (P) Ltd, 2007

CY9111 ENGINEERING CHEMISTRY L T P C
(Common to all branches of Engineering and Technology) 3 0 0 3

AIM:

To gain a sound knowledge of thermodynamics, phase rule, surface chemistry and catalysis, basic organic reaction mechanisms and principles and applications of spectroscopy and nanochemistry.

OBJECTIVES:

To make the student conversant with the

- Applications of second law of thermodynamics.
- Phase rule and various types of alloys
- Surface chemistry and its importance in adsorption and catalysis.
- Basic principles in organic reaction mechanisms and principles and applications of spectroscopy
- Nanochemistry and its applications

UNIT I THERMODYNAMICS 9

Statement of second law of thermodynamics – Clausius and Kelvin – definition of entropy – entropy change for a reversible process – entropy change for flow of heat in an irreversible process – entropy change for an isothermal expansion of an ideal gas – problems – entropy of phase transitions- problems – definition of free energy and work function – Gibbs Helmholtz equation – applications – problems – derivation of Maxwell relations – van't Hoff isotherm and isochore – applications – problems – chemical potential – variation of chemical potential with temperature and pressure - significance.

UNIT II PHASE RULE 9

Phase rule – statements and explanation of the terms involved – condensed phase rule – construction of phase diagram – water system – sulphur system – phase rule for two component alloy systems- thermal analysis – eutectic system - Lead-Silver system – simple eutectic formation – Zinc-Magnesium alloy system – Iron-Carbon alloy system-solved examples.

UNIT III SURFACE CHEMISTRY AND CATALYSIS 9

Adsorption – types of adsorption – adsorption of gases on solids – adsorption isotherm – Freundlich and Langmuir isotherms – adsorption of solutes from solutions – applications – role of adsorption in catalytic reactions – ion exchange adsorption – basic principles in adsorption chromatography – Catalysis – classification – characteristics of catalysis - auto catalysis – enzyme catalysis – Michaelis – Mention equation – solid acid catalysis.

UNIT IV ORGANIC REACTIONS AND SPECTROSCOPY 9

Electrophilic and nucleophilic, substitution and elimination reactions mechanisms – SN^1, SN^2, E^1, E^2 reactions – Electromagnetic spectrum – absorption of radiation – electronic transition – vibrational transition – rotational transition – intensities of spectral lines – beer-lamberts law –type of instrument used for absorption measurements –UV & visible spectroscopy, IR spectroscopy – principles of instrumentation and applications.

UNIT V NANOCHEMISTRY 9

Introduction to nanochemistry – preparations and properties of nanomaterials - nanorods – nanowires – nanotubes – carbon nanotubes and their applications – nanocomposites – sensors and electronic devices – nanochemistry in biology and medicines – nanocatalysis.

TOTAL : 45 PERIODS

TEXT BOOKS:

1. Puri B.R., Sharma L.R. and Madhan S. Pathania, Principles of Physical Chemistry, Shoban Lal Nagin Chand & Co. Jalandar –2000.
2. Jain P.C. and Renuka Jain, Physical Chemistry for Engineers, Dhanpet Rai &Sons, New Delhi, 2001.

REFERENCES

1. Bahl B.S., Tuli G.D., and Arun Bahl, Essentials of Physical Chemistry, S. Chand & Company Ltd., New Delhi, 2004.
2. Morrison R.T., & Boyd R.N., Organic chemistry, Prentice-Hall of India Private Limited, New Delhi, 1992.
3. Sanyal S.N., Reactions, Rearrangements and Reagents Bharati Bhawan Publishers & Distributors New Delhi, 2006.
4. G. B. Sergeev, Nanochemistry, Elsevier Science, New York, 2006

GE 9111 ENGINEERING GRAPHICS L T P C

(Common to All branches of B.E. / B.Tech. Programmes) 2 0 3 4

OBJECTIVES:

To develop in students the graphic skills that would enable them to communicate the concepts, ideas and design of engineering products

To provide an exposure to the national/international standards related to technical drawings

INTRODUCTION **2**

Importance of graphics in engineering applications – use of drafting instruments – BIS specifications and conventions – size, layout and folding of drawing sheets – lettering and dimensioning

UNIT I FREE HAND SKETCHING OF ENGG OBJECTS AND CONSTRUCTION OF PLANE CURVE 3+9=12

Pictorial representation of engineering objects – representation of three dimensional objects in two dimensional media – need for multiple views – developing visualization skills through free hand sketching of three dimensional objects.

Polygons & curves used in engineering practice– methods of construction– construction of ellipse, parabola and hyperbola by eccentricity method – Cycloidal and involute curves- construction - drawing of tangents to the above curves.

UNIT II ORTHOGRAPHIC PROJECTION: PROJECTION OF POINTS, LINES AND PLANE SURFACES 6+9=15

General principles of orthographic projection – first angle projection – layout of views – projections of points, straight lines located in the first quadrant – determination of true lengths of lines and their inclinations to the planes of projection – traces – projection of polygonal surfaces and circular lamina inclined to both the planes of projection

UNIT-III ORTHOGRAPHIC PROJECTION: PROJECTION OF SOLIDS AND SECTIONS OF SOLIDS 6+9=15

Projection of simple solids like prism, pyramid, cylinder and cone when the axis is inclined to one plane of projection –change of position & auxiliary projection methods-sectioning of above solids in simple vertical positions by cutting plane inclined to one reference plane and perpendicular to the other and above solids in inclined position with cutting planes parallel to one reference plane – true shapes of sections

UNIT IV DEVELOPMENT OF SURFACES AND INTERSECTION OF SOLIDS 6+9=15

Need for development of surfaces – development of lateral surfaces of simple and truncated solids – prisms, pyramids, cylinders and cones – development of lateral surfaces of the above solids with square and circular cutouts perpendicular to their axes. Intersection of solids and curves of intersection –prism with cylinder, cylinder & cylinder, cone & cylinder with normal intersection of axes and with no offset.

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS 4+9=13

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones – principles of perspective projections – projection of prisms, pyramids and cylinders by visual ray and vanishing point methods.

COMPUTER AIDED DRAFTING (DEMONSTRATION ONLY) **3**

Introduction to computer aided drafting software packages and demonstration of their use.

L=30 P=45 TOTAL: 75 PERIODS

TEXT BOOKS

1. Bhatt,N.D, “Engineering Drawing”, Charotar Publishing House, 46th Edition-2003
2. Natarajan,K.V, “ A Textbook of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2006 .

REFERENCES

1. Shah,M.B and Rana,B.C.,”Engineering Drawing”, Pearson Education,2005,
2. Gopalakrishnan.K.R,. “Engineering Drawing I & II”, Subhas Publications 1998.
3. Dhananjay,A.J., “Engineering Drawing with Introduction to AutoCAD”, Tata McGraw-Hill Publishing Company Ltd., 2008.
4. Venugopal,K. and Prabhu Raja, V., “Engineering Graphics”, New Age International(P) Ltd.,2008.

Codes from Bureau of Indian Standards

1. IS 10711-2001: Technical Products Documentation – Size and Layout of Drawing Sheets
2. IS 9609 (Parts 0 & 1)-2001: Technical Products Documentation – Lettering
3. IS 10714(Part 20)-2001 & SP 46 -2003: Lines for Technical Drawings
4. IS 11669-1986 & SP 46-2003: Dimensioning of Technical Drawings
   IS 15021(Parts 1 to 4)-2001: Technical Drawings-Projection Methods

Special points applicable to University Examinations on Engineering Graphics:

1. There will be five questions one from each unit covering all units of the syllabus
2. All questions will carry equal marks of 20 each making a total of 100
3. Answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solutions within A3 size
4. The examination will be conducted in appropriate sessions on the same day

GE 9112	FUNDAMENTALS OF COMPUTING	L	T	P	C
	(Common to all branches of B.E. / B.Tech. Programmes)	3	0	0	3

AIM:

To introduce the basics of computing and the fundamentals of C programming.

OBJECTIVES:

- To introduce the fundamentals of computing systems.
- To introduce the concepts of internet and WWW.
- To teach programming in C.

UNIT I **9**

Computer systems – Exploring computers – Inside the system – Processing data – CPUs – Types of storage devices - Operating systems basics – Networking basics.

UNIT II **9**

The internet and the WWW – Internet services – connecting to the internet - Working with applications software – productivity software – graphics and multimedia – Data base Management systems – Creating computer program.

UNIT III **9**

C programming fundamentals – compilation process – variables – Data types – Expressions – looping – decisions.

UNIT IV **9**

Arrays - Working with functions – structures – character strings – pre processor.

UNIT V **9**

Pointers – Dynamic memory allocation – linked list - Applications

TOTAL: 45 PERIODS

TEXT BOOKS

1. Peter Norton, "Introduction to Computers", Sixth Edition, Tata McGraw Hill, 2007.
2. Stephen G. Kochan, "Programming in C", Third Edition, Pearson Education, 2007.

REFERENCES

1. Kernighan,B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2006
2. Ashok N. Kamthane, "Computer programming", Pearson Education, 2007.
3. Kenneth A. Reek, "Pointers on C", Pearson Education, 2007.
4. Dromey,R.G, "How to solve it by Computer", Pearson Education, 2007.

PH 9112	PHYSICS LABORATORY	L	T	P	C
	(Common to ALL Branches of B.E. / B.Tech. Programmes)	0	0	2	1

1. Torsional Pendulum- Determination of rigidity modulus of wire and moment of Inertia of disc.
2. Non-uniform bending - Determination of Young's modulus.
3. Lees' disc- Determination of thermal conductivity of a bad conductor.
4. Potentiometer - Determination of thermo e.m.f of thermocouple
5. Air wedge- Determination of thickness of a thin sheet of paper.
6. i. Optical fibre - Determination of Numerical Aperture and

acceptance angle

ii. Compact disc - Determination of width of the groove using laser.

7. Acoustic grating - Determination of velocity of ultrasonic waves in liquids.
8. Post office box - Determination of Band gap
9. Spectrometer - Determination of wavelength using grating
10. Viscosity of liquid- Determination of co-efficient of viscosity of a liquid by Poiseuille's flow.

TOTAL: 30 PERIODS

CY9112	CHEMISTRY LABORATORY	L	T	P	C
	(Common to all branches of Engineering and Technology)	**0**	**0**	**2**	**1**

I. WEIGHING AND PREPARATION OF STANDARD SOLUTIONS

i) Preparation of molar and normal solutions of the following substances oxalic acid, sodium carbonate, sodium hydroxide, and hydrochloric acid.
ii) Preparation of buffer solutions: borate buffer, phosphate buffer using Henderson equation.

2. WATER ANALYSIS

i) Determination of total hardness, temporary & permanent hardness of water by EDTA method.
i) Determination of DO content by Winkler's method.
ii) Determination of alkalinity in a water sample.
iii) Determination of chloride content of water sample by argentometric method.

3. PH-METRY

To find out the strength of given hydrochloric acid by sodium hydroxide.

4. CONDUCTOMETRY

i) Conductometric titration of mixture of acids
ii) Conductometric precipitation titration using $BaCl_2$- Na_2SO_4

5. POTENTIOMETRY

i) Redox titration – Iron Vs. dichromate

6. SPECTROPHOTOMETRY

i) To determine λmax of a colored solution such as potassium permanganate.
ii) To determine the iron content of an unknown solution (1,10- phenanthroline/ thiocyanate method)

7. FLAME PHOTOMETRY

i) To determine sodium and potassium in water.

8. VISCOMETRY

i) Determination of molecular weight of a polymer

9. WATER POLLUTION

i) COD analysis of a waste water by dichromate method.

10. KINETICS

i) Determination of reaction rate constant of acid catalyzed hydrolysis of ester.

11. ADSORPTION

i) Adsorption of acetic acid on activated charcoal.

TOTAL: 30 PERIODS

REFERENCE BOOKS

1. A text of quantitative Inorganic Analysis, A. L. Vogel , ELBS London. 1995.
2. Experiments in physical chemistry, D.P. Shoemarker and C.W. Gardad, McGraw Hill, London, 2001.

GE 9113 ENGINEERING PRACTIES LABORATORY L T P C
(Common to all Branches of B.E. / B.Tech. Programmes) 0 0 3 2

OBJECTIVE

To provide exposure to the students with hands-on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP – A (CIVIL & ELECTRICAL)

1. CIVIL ENGINEERING PRACTICE 12

Plumbing

Basic pipe connections involving the fittings like valves, taps, coupling, unions, reducers, elbows and other components used in household fittings. Preparation of plumbing line sketches.

Laying pipe connection to the suction side of a pump – inlet.

Laying pipe connection to the delivery side of a pump – out let.

Practice in mixed pipe connections: Metal, plastic and flexible pipes used in household appliances.

Wood Work

Sawing, planning and making common joints: T-Joint, Mortise and Tennon joint, Dovetail joint.

Study

Study of joints in door panels, wooden furniture

Study of common industrial trusses using models.

2. ELECTRICAL ENGINEERING PRACTICE **9**

Basic household wiring using switches, fuse, indicator – lamp etc.,

Preparation of wiring diagrams

Stair case light wiring

Tube – light wiring

Study of iron-box, fan with regulator, emergency lamp

GROUP – B (MECHANICAL AND ELECTRONICS) **15**

3. MECHANICAL ENGINEERING PRACTICE

Welding

Arc welding of butt joints, lap joints, tee joints

Gas welding Practice.

Basic Machining

Simple turning, drilling and tapping operations.

Machine assembly Practice.

Study and assembling the following:

Centrifugal pump, mixies and air conditioners.

Demonstration on

(a) Smithy operations like the production of hexagonal bolt.

(b) Foundry operation like mould preparation for grooved pulley.

4. ELECTRONIC ENGINEERING PRACTICE 9

Soldering simple electronic circuits and checking continuity.

Assembling electronic components on a small PCB and testing.

Study of Telephone, FM radio, low-voltage power supplies.

TOTAL: 45 PERIODS

GE 9114	COMPUTER PRACTICE LABORATORY	L	T	P	C
	(Common to all branches of B.E. / B.Tech. Programmes)	**0**	**0**	**3**	**2**

AIM:

The aim is to teach the use of computer applications related to office automation and to teach implementation of C programs.

OBJECTIVES:

- To introduce office automation software packages.
- To teach the fundamentals in C programming.

1. Simple OS commands and simple editors for file operations.
2. Word processors for more complex operations, like formatting documents, creating tables and so on.
3. Simple data base packages for creating and manipulating databases.
4. Spread sheet packages for data preparation and analysis.
5. Preparation of reports involving mathematical functions (Income Tax Statement, Mark sheets, Payroll etc.,)
6. C Programs using one dimensional arrays.
7. C Programs using multi-dimensional arrays and pointer data types.
8. Programs using structures, nested structures and union.
9. Programs using functions- recursive, non-recursive and Library functions.
10. Programs for passing aggregate data types as parameters between functions.

11. Programs for dynamic memory allocation / deallocation.

12. Programs for self-referential structure – Implementing linked list.

TOTAL: 45 PERIODS

HS 9161	TECHNICAL ENGLISH II	L	T	P	C
	(For all branches of B.E. / B.Tech. Programmes)	**2**	**0**	**2**	**3**

AIM:

To help students specialising in the field of Engineering and Technology develop their proficiency in oral and written communication in Technical English.

OBJECTIVES:

- To enable students develop their critical thinking skills.
- To enable students develop higher order reading skills such as interpreting, evaluating and analysing.
- To enable students develop their active listening skills.
- To enable students participate successfully in Group Discussions.

UNIT I **6**

Word formation using prefixes 'self' – modified cloze – contextual meanings - Sequencing words - future simple passive form - Predicting content – Intensive reading – interpreting advertisements – Listening and completing table – Writing extended definition – describing a process using sequence words – developing ideas into paragraphs – writing about the future.

UNIT II **6**

Identifying objects and their use – word puzzles using words with suffixes – Prepositions – adverbs – structures that express purpose - adjectives – group discussion – Reading - skimming for content and analysis of style – modes of non verbal communication – Listening and categorising data in tables – Writing formal letter – writing paragraphs on various issues.

UNIT III **6**

Stress and intonation - Cause and effect expressions - Tense forms - simple past and past continuous - Different grammatical forms of the same word - Critical reading - guided note-making and evaluating content - Listening – guided note-taking – completing a table – Role-play – group discussion techniques - discussing an issue – offering suggestions – Sequencing jumbled sentences using coherence markers– Writing a report – Writing recommendations – Writing a letter of complaint.

UNIT IV **6**

Numerical adjectives - Prepositions – use of intensifying prefixes – phrasal verbs - different grammatical forms of the same words – cloze exercise - Reading a text and evaluating the content - advertisements – analysing style and language - Listening and

entering classified information – Intensive listening and completing the steps of a process - Role-play - Group discussion expressing opinions and convincing (agreeing and disagreeing) - Giving oral instructions – Descriptive writing - writing based on hints – writing argumentative paragraphs – formal letter writing – letter of application with biodata / CV Writing safety instructions - warnings and notices – preparing checklist – email communication.

UNIT V **6**

Identifying problems, their causes and finding solutions using case studies – creative and critical thinking – levels of thinking – thinking strategies – brainstorming - analytical reasoning skills – evaluative essay – decision making – conflict resolution

English Language Lab **(30 Periods)**

1. Listening: **(10)**

Recognising English sounds – accents - listening & answering questions - gap filling - listening & note making - listening to telephonic conversations - listening to speeches.

2. Speaking: **(10)**

Pronouncing words & sentences correctly - word stress - conversation practice.

3. Reading: **(5)**

Cloze test - Reading and answering questions - sequencing of sentences.

4. Writing: **(5)**

Correction of errors - Blogging.

TOTAL : 60 PERIODS

TEXTBOOK

1. Department of Humanities & Social Sciences, Anna University. English for Engineers and Technologists, Combined edition Vols. I & II. Chennai: Orient Longman, Pvt. Ltd. 2006, Themes 5 to 8 (for Units 1 – 4)
2. Sunita Mishra & C. Muralikrishna, Communication Skills for Engineers, Pearson Education, Second Impression, 2007. (for Unit 5)

REFERENCES

1. Ashraf, R.M, Effective Technical Communication, New Delhi: Tata McGraw Hill, 2007.
2. Thorpe, E & Thorpe, S, Objective English, New Delhi : Pearson Education, 2007.
3. Joan Van, Emden, A Handbook of writing for Engineers, Cambridge University Press, 1997
4. Website: www.englishclub.com

LAB REQUIREMENTS

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

MA 9161	MATHEMATICS - II	L T P C
	(Common to all branches of B.E. / B.Tech Programmes)	**3 1 0 4**

AIM:

To introduce the effective mathematical tools needed for solving engineering problems and to emphasize the underlying mathematical principles in specific situations confronting practicing engineers.

OBJECTIVES:

- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems
- To acquaint the student with the concepts of vector calculus, needed for problems in all engineering disciplines
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow the of electric current
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated

UNIT I DIFFERENTIAL EQUATIONS 9+3

Method of variation of parameters – Method of undetermined coefficients – Homogenous equation of Euler's and Legendre's type – System of Simultaneous linear differential equations with constant coefficients.

UNIT II VECTOR CALCULUS 9+3

Gradient and directional derivative – Divergence and Curl – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface Integral and Volume Integral - Green's, Gauss divergence and Stoke's theorems – Verification and Application in evaluating line, surface and volume integrals.

UNIT III ANALYTIC FUNCTION 9+3

Analytic functions – Necessary and sufficient conditions for analyticity - Properties – Harmonic conjugates – Construction of analytic function - Conformal Mapping – Mapping by functions $w = z + c$, az, $\frac{1}{z}$, z^2 - Bilinear transformation.

UNIT IV COMPLEX INTEGRATION 9+3

Line Integral - Cauchy's theorem and integral formula – Taylor's and Laurent's Series – Singularities – Residues – Residue theorem – Application of Residue theorem for evaluation of real integrals – Use of circular contour and semicircular contour with no pole on real axis.

UNIT V LAPLACE TRANSFORMS 9+3

Existence conditions – Transforms of elementary functions – Basic properties – Transforms of derivatives and integrals – Initial and Final value theorems – Inverse transforms – Convolution theorem – Transform of periodic functions – Application to solution of linear ordinary differential equations with constant coefficients.

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

TEXT BOOKS

1. Grewal, B.S. "Higher Engineering Mathematics", Khanna Publications (2007)
2. Ramana, B.V. "Higher Engineering Mathematics" Tata McGraw Hill (2007).

REFERENCES

1. Glyn James, "Advanced Modern Engineering Mathematics, Pearson Education (2007)
2. Jain R.K. and Iyengar S.R.K., Advanced Engineering Mathematics (3rd Edition) Narosa Publications, Delhi (2007).

PH9162 PHYSICS FOR GEOINFORMATICS L T P C
3 0 0 3

OBJECTIVE:

To make the students understand the basic concepts of physics related to geoinformatics.

UNIT I ELECTROMAGNETIC RADIATION 9

Electromagnetic Spectrum – radiation quantities – spectral quantities – relationship between luminous and radiant quantities – hemispherical reflectance, transmittance and atmosphere measurement of electromagnetic radiation – responsivity – normalization, radiating structures – thermal emission – fluorescent emission – Radiation principles – Planck's law, Stephens-Boltzmann law, Kirchoff's law.

UNIT II INTERACTION OF EMR WITH ATMOSPHERE AND EARTH'S SURFACE 9

EMR - atmospheric scattering, Raleigh scattering, Mie scattering, non-selective scattering – atmospheric absorption – atmospheric windows, refraction – interaction of EMR earth's surface – reflection – transmission – spectral signature – Reflectance

characteristics of Earth's cover type: Vegetation, water, soil – Interaction of microwave with atmosphere and Earth's surface – Radar operating principle – radar equation – Definitions: Incidence angle, look angle, depression angle, Azimuth angle – Spatial resolution in radar – Synthetic aperture – radar.

UNIT III OPTICS FOR REMOTE SENSING 9

Lenses, mirrors, prisms – Defects of lens - chromatic aberration – longitudinal chromatic aberration – achromatism of lenses – achromatism for two lenses in contact – separated by a distance – spherical aberration – minimization of spherical aberration – coma astigmatism – Principles of photography: Ariel cameras, black and white photography – sensitivity – speed – characteristic curve – developing and printing – basic colour photography – construction of colour films – film type – types of filter – and its uses.

UNIT IV GRAVITATION AND SATELLITES 9

Newton's law of gravitation – gravitational field and potential – determination of gravity, variation of acceleration due to gravity of the earth with depth and with altitude – Variation of acceleration due to gravity due to rotation of the earth – Escape velocity – Kepler's law of planetary motion – Satellites – types of satellites – Earth observation satellites, communications satellites, Navigation satellites, weather satellites, military satellites and scientific satellites.

UNIT V ELECTRO-OPTIC NON-IMAGING AND IMAGING SENSORS 9

Photomultipliers, photoresistors, photodiodes, nonselective detectors – Optical receivers, PIN and APD, optical preamplifiers, Detectors: Basic detector mechanisms, noise in detectors. Thermal and photoemissive detectors, Photoconductive and photovoltaic detectors, performance limits, Photographic – Sensitivity, time and frequency response – hybrid photodetectors – Imaging detectors – eye and vision, photographic film. Camera tubes, solid-state arrays, video, Detector electronics, detector interfacing – Different CCD cameras.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Manual of Remote Sensing, American Society of Photogrammetry - Third Edition, 1988.
2. Manual of Photogrammetry, American Society of Photogrammetry - Fifth Edition, 2004.

REFERENCES

1. Keyes, R.J., Optical and Infrared Detectors, Topics in Applied Physics, Springer, 1977.
2. Dereniak, E.L. and Crowe, D.G., Optical Radiation Detectors, John Wiely, 1984.

CY9161 CHEMISTRY FOR CIVIL ENGINEERING L T P C

(Common to Civil, Geoinformatics and Agriculture & Irrigation Engineering) **3 0 0 3**

AIM

- To impart knowledge on the Applied Chemistry topics important in Civil Engineering Practice.

OBJECTIVES

- The students should be conversant with
- Treatment of water for domestic and industrial purpose
- The formation of polymers and their compounding into different end-use products
- Types and mechanism of corrosion and control measures
- The chemical nature of building materials and composites
- Chemistry of adhesives and their applications.

UNIT I WATER TREATMENT 8

Disadvantages of hard water in industries – conditioning methods – external treatment methods –zeolite and ion exchange methods – internal treatment (colloidal, phosphate, calgon, carbonate methods) – desalination (reverse osmosis and electro-dialysis) – requisites of drinking water – treatment of domestic water (screening, sedimentation, coagulation, filtration, disinfection – by chlorination, UV treatment, ozonization).

UNIT II POLYMER CHEMISTRY 9

Monomers – functionality – polymer – degree of polymerization – classification based on source and applications – effect of polymer structure on properties – addition, condensation, co-polymerization and co-ordination polymerization – mechanism of addition – polymerization (free-radical mechanism) thermosetting and thermoplastics resins – preparation, properties and applications of polythene, polypropylene, TEFLON, polystyrene, polyvinyl chloride, PMMA, polyamides, polyesters, bakelite, epoxy resins, vulcanization of rubber – rubber blended plastics – laminated plastics – laminated glass – thermocole.

UNIT III CORROSION AND CORROSION INHIBITION 9

Corrosion – causes of corrosion – principles of chemical corrosion – Pilling – Bedworth rule – principles of electrochemical corrosion – difference between chemical and electrochemical corrosion – factors influencing corrosion – types of corrosion – galvanic corrosion – differential aeration corrosion – stress corrosion – soil corrosion – pitting corrosion, water line corrosion – corrosion control – cathodic protection – sacrificial anode – selection of materials and proper designing – corrosion inhibitors, protective coatings – paints – constituents – functions – mechanism of drying – varnishes and lacquers – special paints – fire retardant, water repellant, temperature indicating and luminous paints.

UNIT IV CHEMISTRY OF BUILDING MATERIALS 10

Cement – chemical composition – setting and hardening – concrete – weathering of cement and concrete and its prevention- special cements – high alumina cement, sorel cement, white Portland cement, water proof cement – lime – classification – manufacture, setting and hardening – refractories – requisites –classification – common refractory bricks – preparation, properties and uses of silica bricks, high alumina bricks,

magnesite bricks, carbon bricks, zirconia bricks and carborundum – composites – definition of composites – characteristics – constituents of composites – types – fibre reinforced plastic (FRP) – metal matrix composites (MMC) – ceramic matrix composites (CMC) – properties and applications.

UNIT V ADHESIVES 9

Definition – adhesive action – development of adhesive strength – physical and chemical factors influencing adhesive action – bonding process of adhesives – adhesives for building & construction: animal glues, casein glues, phenol formaldehyde resins, polyurethane, epoxy resins, urea formaldehyde

TOTAL : 45 PERIODS

TEXT BOOKS:

1. Jain P.C. and Monica Jain, Engineering Chemistry, Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2002.
2. Dara.S.S., A Textbook of Engineering Chemistry, S.Chand & Company Ltd., New Delhi, 2003.

REFERENCE S:

1. Nanjundan, S. and Sreekultan Unnithan, C., Applied Chemistry, Sree Lakshmi Publications, Chennai, 2001.
2. Sadasivam, V., Modern Engineering Chemistry – A Simplified Approach, Vol.I, Kamakya Publications, Coimbatore, 2003.

GE 9151 ENGINEERING MECHANICS L T P C

(Common to Civil, Geoinformatics and Agriculture & Irrigation Engineering) **3 1 0 4**

OBJECTIVE:

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

UNIT I BASICS & STATICS 12

Introduction - Units and Dimensions - Laws of Mechanics – Lame's theorem, Parallelogram and triangular Law of forces – Vectors – Vectorial representation of forces and moments – Vector operations on forces, dot product and cross product - Coplanar Forces – Resolution and Composition of forces – Equilibrium of a forces – Forces in space - Equilibrium in space - Equivalent systems of forces – Principle of transmissibility – Single equivalent force

UNIT II EQUILIBRIUM OF RIGID BODIES 12

Free body diagram – Types of supports and their reactions – requirements of stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon's theorem - Equilibrium of Rigid bodies in two dimensions – Equilibrium of Rigid bodies in three dimensions – Examples

UNIT III PROPERTIES OF SURFACES AND SOLIDS 12

Determination of Areas and Volumes – First moment of area and the Centroid of standard sections – T section, I section, Angle section, Hollow section – second and product moments of plane area – Rectangle, triangle, circle - T section, I section, Angle section, Hollow section – Parallel axis theorem and perpendicular axis theorem – Polar moment of inertia – Principal moments of inertia of plane areas – Principal axes of inertia - Mass moment of inertia – Derivation of mass moment of inertia for rectangular solids, prism, rods, sphere from first principle – Relation to area moments of inertia.

UNIT IV DYNAMICS OF PARTICLES 12

Displacements, Velocity and acceleration, their relationship – Relative motion – Curvilinear motion – Newton's law – Work Energy Equation of particles – Impulse and Momentum

UNIT V CONTACT FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS 12

Frictional force – Laws of Coloumb friction – simple contact friction – Rolling friction – Belt friction Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion – Impact of elastic bodies

L: 45+T=15 TOTAL : 60 PERIODS

TEXT BOOK

1. Beer,F.P and Johnson Jr. E.R, "Vector Mechanics for Engineers", Vol. 1 Statics and Vol. 2 Dynamics, McGraw-Hill International Edition, 2007.

REFERENCES

1. Irving H. Shames, Engineering Mechanics - Statics and Dynamics, IV Edition – PHI / Pearson Education Asia Pvt. Ltd., 2003
2. Hibbeller, R.C., Engineering Mechanics, Vol. 1 Statics, Vol. 2 Dynamics, Pearson Education Asia Pvt. Ltd., 2000.
3. Ashok Gupta, Interactive Engineering Mechanics – Statics – A Virtual Tutor (CDROM), Pearson Education Asia Pvt., Ltd., 2002
4. J.L. Meriam & L.G. Kraige, Engineering Mechanics Vol. I & Vol. II, V edition, John Wiley & Sons, 2006.
5. P. Boresi & J. Schmidt, Engineering Mechanics Statics & Dynamics, Micro Print Pvt. Ltec., Chennai, 2004.

EC9168 BASIC ELECTRONICS ENGINEERING L T P C
3 0 0 3

UNIT I SEMICONDUCTORS AND RECTIFIERS 9

Classification of solids based on energy band theory – Intrinsic semiconductors - Extrinsic semiconductors – P-type and N-type – P-N junction – VI Characteristics of PN junction diode – Zener effect – Zener diode – Zener diode Characteristics - Zener diode as a regulator – Half and Full wave rectifiers.

UNIT II TRANSISTOR AND AMPLIFIERS 9

Bipolar junction transistors – CB, CE, CC configurations and characteristics – Biasing circuits – Fixed bias, Voltage divider bias – Concept of feedback – Negative feedback – voltage series feedback amplifier – Current series feedback amplifier – Current series feedback amplifier – Principles of Tuned amplifiers.

UNIT III POWER AND CONTROL ELECTRONIC DEVICES 9

FET – Configuration and characteristics – FET amplifier – SCR, Diac, Triac, UJT – Characteristics and simple applications.

UNIT IV SIGNAL GENERATORS AND LINEAR ICs 9

Sinusoidal oscillators – Positive feedback – RC phase shift, Hartley, Colpitts, Wein bridge oscillators – Multivibrators – Operational amplifier – Adder, multipliers, integrator and differentiators.

UNIT V DIGITAL ELECTRONICS 9

Boolean algebra – Decoder, Encoder – Multiplexer, Demultiplexer – Half and full adders – Flip flops – Digital to Analog and analog to digital converters.

TOTAL : 45 PERIODS

TEXT BOOK

1. Malvino, ‘Electronic Principles’, McGraw Book Co., 1993.

REFERENCES

1. Grob. B and Schultz. M.E. ‘Basic Electronics’, Tata Mcgraw Hill, 2003.
2. Thomas L. Floyd, ‘Electronics Devices’, Pearson Education, 2002.
3. Thomas L. Floyd, ‘Digital Fundamentals’, Pearson Education, 2003.

GI 9151	REMOTE SENSING	L	T	P	C
		3	0	0	3

AIM:

- To introduce the concepts of remote sensing process and its components
- To expose the various remote sensing platform and sensors
- To introduce the elements of data interpretation

UNIT I REMOTE SENSING AND ELECTROMAGNETIC RADIATION (EMR) 9

Definition – components of RS – History of Remote Sensing – Merits and demerits of data collation between conventional and remote sensing methods - Electromagnetic Spectrum – wave theory, particle theory and Stefan – Boltzmann Law – visible and non-visible spectrum – Radiation sources: active & passive; Radiation Quantities.

UNIT II EMR INTERACTION WITH ATMOSPHERE 9

Standard atmospheric profile – main atmospheric regions and its characteristics – interaction of radiation with atmosphere - Scattering (Rayleigh, Mie, non-selective scattering) absorption and refraction – Atmospheric effects on visible, infrared, thermal and microwave spectrum – Atmospheric windows.

UNIT III EMR INTERACTION WITH EARTH MATERIAL 9

Energy balance equation – Specular and diffuse reflectors – Spectral reflectance & emittance – Spectroradiometer / Spectrophotometer – Spectral Signature concepts – Typical spectral reflectance curves for vegetation, soil and water body – Factors affecting spectral reflectance of vegetation, soil and water body.

UNIT IV PLATFORMS AND SENSORS 10

Ground based platforms –Airborne platforms – Space borne platforms – Classification of satellites – Sun – synchronous and Geosynchronous satellites – Resolution concepts – Scanners - Along and across track scanners – Orbital and sensor characteristics of different satellites – Airborne and Space borne TIR sensors – Calibration – S/N ratio – Passive/Active microwave sensing – Airborne and satellite borne RADAR –SAR –LIDAR – High Resolution Sensors

UNIT V DATA PRODUCTS AND VISUAL INTERPRETATION 8

Photographic (film and paper) and digital products – quick look products - High Resolution data products data - ordering – interpretation – basic characteristics of image elements – interpretation keys (selective and elimination) – visual interpretation of natural resources.

TOTAL : 45 PERIODS

TEXT BOOKS

1. Lillesand, T.M. and Kiefer R.W. Remote Sensing and Image interpretation, John Wiley and Sons, Inc, New York, 2002.
2. Paul Curran P.J. Principles of Remote Sensing. Longman, RLBS, 2003.

REFERENCES

1. Janza, F.Z., Blue H.M. and Johnson, J.E. Manual of Remote Sensing. Vol. I, American Society of Photogrametry, Virginia, USA, 2002.
2. Verbyla, David. Satellite Remote Sensing of Natural Resources. CRC Press, 1995

GE 9161 **UNIX PROGRAMMING LAB** **L T P C**
0 0 4 2

AIM:

The aim is to introduce working in UNIX environment.

OBJECTIVES:

- To introduce the basic commands in UNIX.
- To teach UNIX shell programming.
- To introduce programming in C with UNIX system calls.

1. Basic Unix commands
2. Simple editors for file operations.
3. Filters-Grep, sed, awk
4. Simple shell programming.
5. Shell programming using complex control structures.
6. C Programs using file system related system calls.
7. C Programs using process related system calls.
8. Programs for inter process communication using pipes, FIFOs.
9. Programs using signals.
10. Programs using shared memory.

TOTAL: 60 PERIODS

TEXT BOOK

1. Brain W. Kernighan and Rob Pike, “The programming Environment”, PHI, 2002.

GI9152 **REMOTE SENSING LABORATORY** **L T P C**
0 0 2 1

EXERCISE DESCRIPTION

1. Spectral reflectance observation of the Vegetation, Soil, Water, etc., using hand held Spectroradiometer.
2. Construction of spectral reflectance curve for vegetation, soil, water and other features
3. Ground truth observation with the help of GPS
4. Interpretation of topographic map
5. Base Map preparation using Survey of India Toposheet
6. Visual interpretation of different satellite data and aerial photographs for preparation of different thematic maps.

TOTAL: 30 PERIODS