ANNA UNIVERSITY : : CHENNAI – 600 025

UNIVERSITY DEPARTMENTS

R - 2008

B.TECH. PHARMACEUTICAL TECHNOLOGY

I & II SEMESTERS CURRICULA & 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					
HS 9161	Technical English II	2	0	2	3
MA 9161	Mathematics II	3	1	0	4
PH 9164	Physics of Materials	3	0	0	3
EE 9168	Basic Electrical and Electronics Engineering	3	0	0	3
GE 9151	Engineering Mechanics	3	1	0	4
IB 9151	Biochemistry – I	3	0	0	3
PRACTICAL					
GE 9161	Unix Programming Lab	0	0	4	2
IB 9152	Biochemistry Lab	0	0	4	2
	TOTAL	**17**	**2**	**10**	**24**

HS 9111 **TECHNICAL ENGLISH I** **L T P C**
3 1 0 4

(Common to all branches of B.E. / B.Tech. Programmes)

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

L : 45 T : 15 TOTAL : 60 PERIODS

TEXTBOOK

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**
3 1 0 4

(Common to all branches of B.E. / B.Tech. Programmes)

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
3 0 0 3

(Common to ALL Branches of B.E. / B.Tech. Programmes)

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 LT P C
3 0 0 3

(Common to all branches of Engineering and Technology)

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
2 0 3 4

(Common to all branches of B.E. / B.Tech. Programmes)

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 CURVES 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**
3 0 0 3

(Common to all branches of B.E. / B.Tech. Programmes)

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**
0 0 2 1

(Common to all Branches of B.E. / B.Tech. Programmes)

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**
0 0 2 1

(Common to all branches of Engineering and Technology)

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 Hendersonequation.

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

REFERENCES

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
0 0 3 2

(Common to all Branches of B.E. / B.Tech. Programmes)

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
0 0 3 2

(Common to all branches of B.E. / B.Tech. Programmes)

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
2 0 2 3

(For all branches of B.E. / B.Tech. Programmes)

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)

REFERENCE BOOKS

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

MA9161 **MATHEMATICS – II** **L T P C**
3 0 0 3

(Common to all branches of B.E. / B.Tech Programmes)

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).

PH9164 PHYSICS OF MATERIALS L T P C
3 0 0 3

OBJECTIVE

To introduce the essential principles of physics for chemical and related engineering applications.

UNIT I MATERIALS PREPARATION AND PROCESSING 9

Gibbs phase Rule – Phase Diagram – One component and multi component systems – eutectic – peritectic – eutectoid – peritectoid – invariant reactions – Lever Rule – Nucleation – homogeneous and heterogeneous nucleation – Free energy of formation of a critical nucleus – Nucleation rate – Experimental techniques of crystal growth – Czochralski Bridgman, Flux, Solution, Vapour, Sol-gel - hydrothermal – Epitaxy.

UNIT II CONDUCTING MATERIALS 9

Classical free electron theory of metals - Schrödinger wave equation - Time independent and time dependent equations. Physical significance of wave function, particle in a box (in one dimension) – electrons in a metal - Fermi distribution function – Density of energy states – effect of temperature on Fermi energy, Superconducting Phenomena, Properties of superconductors – Meissner effect and Isotope effect. Type I and Type II superconductors, High Tc superconductors – Magnetic levitation and SQUIDS.

UNIT III SEMICONDUCTING MATERIALS 9

Origin of band gap in solids (qualitative) - Concept of effective mass of electron and hole – carrier concentration in an intrinsic semiconductor (derivation) – Fermi level – Variation of Fermi level with temperature – electrical conductivity – band gap determination – carrier concentration in n-type and p-type semiconductors (derivation) – variation of Fermi level with temperature and impurity concentration – Compound semiconductors – Hall effect – Determination of Hall coefficient – Solar cells.

UNIT IV MAGNETIC AND DIELECTRIC MATERIALS 9

Introduction to magnetic materials - Domain theory of ferromagnetism, Hysteresis, Soft and Hard magnetic materials – Anti-ferromagnetic materials – Ferrites, Giant Magneto Resistance materials, Electronic, Ionic, Orientational and space charge polarization – Internal field and deduction of Clausius Mosotti equation – dielectric loss – different types of dielectric breakdown – classification of insulating materials and their applications.

UNIT V NEW MATERIALS AND APPLICATIONS 9

Introduction to Ceramics and its applications - Ceramic Fibres - Fibre reinforced Plastics – Fibre reinforced Metal – Metallic glasses – Shape memory alloys – Copper base alloys – Nickel – Titanium alloys - Sensors and Actuators – Range - Accuracy Determination –- Photo detectors, Bio-sensors, Scintillation detectors (Position sensitive) – Renogram – Computed Tomography Scan (CT Scan) - Magnetic Resonance Imaging (MRI) - Performance and Reliability testing.

TOTAL : 45 PERIODS

TEXT BOOKS

1. Kumar.J, Moorthy Babu. S and Vasudevan. S., Engineering Physics, Vijay Nicole Imprints, 2006.
2. Palanisamy. P.K., Materials Science, Scitech., 2003.

REFERENCES

1. Gaur. R.K. and Gupta. S.L., Engineering Physics, Dhanpat Rai Publication., 2003.
2. Raghavan. V. Materials Science and Engineering, Prentice Hall of India, 2002.
3. Arumugam, M, Biomedical Instrumentation, 2nd Edition, Anuradha Agencies, 2003.

EE9168 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING L T P C
3 0 0 3

AIM

To provide knowledge in the basic concepts of circuits, electrical machines, electronics and measurement techniques.

OBJECTIVE

- To impart knowledge on
- Electric circuit laws
- Principle of Electrical Machines
- Basics of different electronic components
- Various measuring instruments

UNIT I ELECTRICAL CIRCUITS 9

Basic principles involved in power generation, transmission and use – Ohms Law – Kirchoff's Law – steady state solution of DC circuits – Theorem: Thevinin's, Norton's and Superposition Theorems.

UNIT II AC CIRCUITS 9

Introduction to AC circuits – waveforms and RMS value – power and power factor, single phase and three-phase balanced circuits, housing wiring, industrial wiring materials of wiring.

UNIT III ELECTRICAL MACHINES 9

Principles of operation and characteristics of DC machines. Transformers (single and three-phase) – synchronous machines – three-phase and single-phase induction motors – (op. Principles).

UNIT IV ELECTRONIC DEVICES & CIRCUITS 9

Types of Materials –Silicon & Germanium- N type and P type materials – PN Junction – Forward and Reverse Bias –Semiconductor Diodes –Rectification – Bipolar Junction Transistor – Characteristics – transistor as an Amplifier –Introduction to operational Amplifier –Inverting Amplifier –Non Inverting Amplifier –DAC – ADC .

UNIT V MEASUREMENTS & INSTRUMENTATION 9

Introduction to transducers: pressure, temperature, position, electrical measurements - Classification of instruments – moving coil and moving iron ,Ammeter and Voltmeter – multimeters – dynamometer type Wattmeter – three-phase power measurements – energy meter – megger – instrument transformer (CT and PT).

TOTAL : 45 PERIODS

TEXT BOOKS

1. Del Toro 'Electrical Engineering Fundamentals' Pearson Education, New Delhi, 2007.
2. John Bird 'Electrical Circuit theory and technology' Elsevier, First Indian Edition, 2006.
3. Allan S Moris 'Measurement and Instrumentation Principles' Elseveir ,First Indian Edition ,2006.

REFERENCES

1. Rajendra Prasad 'Fundamentals of Electrical engineering' Prentice Hall of India, 2006.
2. Thereja .B.L 'Fundamentals of Electrical Engineering and Electronics' S chand & Co Ltd, 2008.
3. Sanjeev Sharma 'basics of Electrical Engineering' S.K International Publishers, New Delhi 2007.
4. V.K Mehta and Rohit Mehta ' Principle of Electrical Engineering' S Chand & Company,2008

GE9151 ENGINEERING MECHANICS L T P C
3 1 0 4

OBJECTIVE

At the end of this course the student should be able to understand the vectorial and scalar representation of forces and moments, static equilibrium of particles and rigid bodies both in two dimensions and also in three dimensions. Further, he should understand the principle of work and energy. He should be able to comprehend the effect of friction on equilibrium. 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 DYNAMICS12

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. Karige, 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.

IB 9151 BIOCHEMISTRY I L T P C
3 0 0 3

(Common for IBT, Food and Pharmaceutical Technology)

AIM

To enable students learn the basic fundamental of biochemical Processes and biomolecules.

OBJECTIVES

- To ensure students have a strong grounding in structures and reactions of biomolecules.
- To introduce them to metabolic pathway of the major biomolecules and relevance to clinical conductors.
- To correlate biochemical processes with biotechnology applications.

UNIT I INTRODUCTION TO BIOMOLECULES 5

Basic principles of organic chemistry, types of functional groups, biomolecules, chemical nature, water, pH and biological buffers.

UNIT II STRUCTURE AND PROPERTIES OF IMPORTANT BIOMOLECULES15

Carbohydrates (mono, di, oligo & polysaccharides) Proteoglycans, glucosaminoglycans. mutarotation, glycosidic bond, reactions of monosaccharides, reducing sugars

Lipids**:** fatty acids, glycerol, saponification, iodination, hydrogenation, phospholipids, glycolipids, sphingolipids, cholesterol, steroids, prostaglandins.

Amino Acids, Peptides, Proteins, measurement, structures, hierarchy of organization primary, secondary, tertiary and quaternary structures, glycoproteins, lipoproteins. Determine of primary structure.

Nucleic acids: purines, pyrimidines, nucleoside, nucleotide, RNA, DNA reactions, properties, measurement, nucleoprotein complexes

UNIT III METABOLISM CONCEPTS 5

Functions of Proteins, Enzymes, introduction to biocatalysts, metabolic pathways, primary and secondary metabolites.

UNIT IV INTERMEDIARY METABOLISM AND REGULATION 15

Glycolysis, TCA cycle, gluconeogenesis, pentose phosphate shunt, glyoxalate shunt, fatty acid synthesis and oxidation, reactions of amino acids, deamination, transamination and decarboxylation, urea cycle, interconnection of pathways and metabolic regulation. Case study on overproduction of glutamic acid, threonine , lysine, methionine, isoleucine and ethanol.

UNIT V BIOENERGETICS 5

High energy compounds, electronegative potential of compounds, respiratory chain, ATP cycle, calculation of ATP yield during oxidation of glucose and fatty acids.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Nelson, D.L. and M.M. Cox, "Lehninger's Principles of Biochemsitry", 4th Edition, W.H. Freemen & Co., 2005.
2. Satyanarayana, U. and U. Chakerapani, "Biochemistry" 3rd Rev. Edition, Books & Allied (P) Ltd., 2006.
3. Rastogi, S.C. "Biochemistry" 2nd Edition, Tata McGraw-Hill, 2003.

4. Conn, E.E., etal., “Outlines of Biochemistry” 5th Edition, John Wiley & Sons, 1987.

REFERENCES

1. Berg, Jeremy M. et al. “Biochemsitry”, 6th Edition, W.H. Freeman & Co., 2006.
2. Voet, D. and Voet, J.G., “Biochemistry”, 3rd Edition, John Wiley & Sons Inc.,2004.
3. Murray, R.K., etal “Harper’s Illustrated Biochemistry”, 27th Edition, McGraw-Hill, 2006.

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.

IB 9152 BIOCHEMISTRY LAB L T P C
(Common for IBT, Food and Pharmaceutical Technology) **0 0 4 2**

1. General guidelines for working in biochemistry lab (theory)
2. Units of volume, weight, density and concentration measurements and their range in biological measurements. Demonstration of proper use of volume and weight measurement devices.
3. Accuracy, precision, sensitivity and specificity (theory)
4. Preparation of buffer –titration of a weak acid and a weak base.
5. Qualitative tests for carbohydrates – distinguishing reducing from non-reducing sugars and keto from aldo sugars.

6. Quantitative method for amino acid estimation using ninhydrin – distinguishing amino from imino acid.
7. Protein estimation by Biuret and Lowry's methods.
8. Protein estimation by Bradford and spectroscopic methods.
9. Extraction of lipids and analysis by TLC.
10. Estimation of nucleic acids by absorbance at 260 nm and hyberchromic effect (demo).
11. Enzymatic assay: phosphatase from potato.
12. Enzymatic assay: estimation of glucose by TGO method after hydrolysis of starch with acid and specificity of the enzymatic method.

TOTAL : 60 PERIODS

LIST OF EQUIPMENT

Sl.No.	Description of Equipments	Quantity required
1.	pH meter	2
2.	Colorimeter	3
3.	Water bath (Dry bath 40°C - 120°C preferred)	3
4.	Balance (500 g – 0.1 g)	1
5.	Balance (0.1 mg)	1
6.	Table top Centrifuge Remi R-24	1
7.	Microfuge	2
8.	Micropipettes 20 µl - 200 µl; 1 µl – 20 µl	3 3
9.	Oven	1
10.	UV – vis spectrometer	1
11.	Vortexer	4
12.	Magnetic Stirrer	2
13.	Fume hood	1
14.	Bunsen Burner	4
15.	Microplate Reader (vis-range) (300-700 nm)	1

REFERENCES

1. Wilson, Keith and John Walker, "Principles and Techniques of Biochemistry and Molecular Biology", 6th Edition, Cambridge University Press, 2006.
2. Segel, Irwin H. "Biochemical Calculations", 2nd Edition., John Wiley & Sons,2004.
3. Plummer, D.T. "An Introduction to Practical Biochemistry", 3rd Edition, Tata McGraw-Hill, 1988.
4. Jayaraman, J. "Laboratory Manual in Biochemistry" New Age International Publishers, 1981.