

Civil, Electrical & Mechanical Engineering Department

Semester : 1

Teaching Scheme

Course Code	Course Name	Lecture hours	Tutorial hours	Practical hours	Credit
CH 1001	Chemistry	3	1	0	4
PH 1001	Physics-I	3	2	0	4
HS 1001	English Communication	3	1	0	4
MA 1001	Mathematics - I (Calculus)	3	2	0	4
CH 1101	Chemistry Lab	0	0	3	2
GE 1001	Engineering Graphics	2	0	3	4
CS 1001	Computer Programming	2	0	3	4
	Total	16	6	9	26

Civil, Electrical & Mechanical Engineering Department

Semester : 1

I	Course Code	PH 1001			
II	Course Title	Physics -1			
III	Credit Structure	L	P	T	C
		3	0	2	4
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	<p>Review of particle dynamics: Inertial and Non-inertial frames of reference, Centrifugal and Coriolis Forces. Conservative force, Work-Energy Theorem. Centre of mass, conservation of momentum, Collision in one and two dimensions. Small oscillations, free, forced and damped oscillations.</p> <p>Dynamics of rigid bodies: Moments and products of inertia, conservation of angular momentum, Simple gyroscope.</p> <p>Thermodynamic: Kinetic theory of gases, equipartition principle, Maxwellian velocity distribution, First and the Second law of thermodynamics, Adiabatic and isothermal processes, Carnot cycle, Entropy. Entropy as a measure of disorder.</p> <p>Quantum Mechanics: Photoelectric effect, Wave nature of matter, de Broglie hypothesis, Davisson Germer Experiment, Heisenbergs uncertainty principle, Schrodinger equation, application to one dimensional problems, particle in a box, potential barrier, tunneling through a barrier.</p> <p>Solid State Physics: Free electron model of metals, Band theory of solids, Koenig-Penny model, Intrinsic and extrinsic semiconductors, p-n junction diode</p> <p>Materials: Superconductors, nano-structures, polymers, soft matter, smart materials</p>			
VI	Text/References	<ol style="list-style-type: none"> 1. D. Klepner and R. J. Kolenkow, An Introduction to Mechanics, Tata-McGraw Hill (2007) 2. H.S. Mani and G.K. Mehta, Introduction to Modern Physics, 1st Edition, East-west Press Pvt. Ltd.-New Delhi, 2000 3. A. Beiser, Concepts of Modern Physics, 6th Edition, Tata McGraw Hill Education Pvt. Ltd., 2009 			

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Semester : 1

I	Course Code	CH 1001			
II	Course Title	Chemistry			
III	Credit Structure	L	P	T	C
		3	0	1	4
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	<p>Unit 1: Periodic properties: trends in size, electron affinity, ionization potential and electronegativity Chemical bonding Coupled reactions, Use of Ellingham diagram and thermodynamics in the extraction of elements Corrosion and passivation Water treatment Basics of spectroscopy (UV-Vis, IR and NMR)</p> <p>Unit 2: C 1 chemistry syn gas to industrially important organic molecules Liquid crystals, classification, synthesis, properties and applications Macromolecules, classification, molecular weight and MWD, thermal and mechanical properties. Polymer waste disposal Basics of chromatography</p> <p>Unit 3: Phase equilibria: Phase rule, one component systems, two component systems (simple eutectic, peritectic, solid solutions) Hume-Rothery rules. Complex reactions, Arrhenius parameters and collision theory. Catalysis (homogeneous and heterogeneous), biocatalysts. Important Industrial applications (at least Three)</p> <p>Unit 4: Special topics:1. Fuel cells 2. Catalytic converter 3. Nano materials 4. Dye-sensitized solar cells 5. Green chemistry</p>			
VI	Text/References	<p>Text Books</p> <ol style="list-style-type: none"> 1. Elements of Physical Chemistry, P.W. Atkins & De Paula, Oxford 2. Fundamentals of Physical Chemistry, S.H. Maron & J.B. Lando, Macmillan, 3. Basic Inorganic Chemistry : Cotton and Wilkinson. 4. Heterogeneous Catalysis, D. K. Chakravarty & B. Vishwanathan, New Age International. 5. Liquid Crystals, S. Chandrasekhar, Cambridge University Press 6. Polymer Science - V. R. Gowarikar, N. V. Viswanathan & Jayadev Sreedhar <p>Reference Books: 1. Concise Inorganic Chemistry (ELBS, 5th Edition), J. D. Lee.</p> <ol style="list-style-type: none"> 2. Organic Chemistry, R. T. Morrison & R. N. Boyd 3. Spectroscopy of Organic compounds,P. S. Kalsi. 5. Fundamentals of molecular spectroscopy, C. N. Banwell & Mc Cash 6. Green Chemistry : Environment Friendly alternatives, Rashmi Sanghi & M. Srivastava (Eds) 7. Physical Chemistry, G. M. Barrow, 5th Ed. Tata McGraw Hill, New Delhi. 8. Physical Chemistry A Molecular Approach,D. A. McQuarrie & J. D. Simon, Viva Books. 9. General Chemistry, B. H. Mahan, Pearson 10.General Chemistry, D. D. Ebbing:, Houghton Mifflin Co. 11.J. C. Kuriacose and J. Rajaram: Chemistry in Engineering and Technology, Vol. I & II, Tata McGraw-Hill, New Delhi. 12.Heterogeneous Catalysis:Principles & Applications,G.C.Bond,Clarendon Press,Oxford. 13.Methods and Reagents for Green Chemistry: An Introduction, Pietro Tundo,Alvise Perosa & Fulvio Zecchini,Wiley Interscience. 14.Fundamental Principles of Polymeric Materials, Christopher S. Brazel & Stephen L. Rosen 			

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Semester : 1

I	Course Code	HS 1001			
II	Course Title	English Communication			
III	Credit Structure	L	P	T	C
		3	0	1	4
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	<p>English Usage and Vocabulary development:Prepositions; Articles; Reported Speech; Tenses; Modals; Concord; Conditionals; Parallelism;modification.Idioms and phrases; phrasal verbs; Synonyms; Antonyms; words often confused; homophones;Vocabulary Extension Methods; Word formation prefixes; suffixes.</p> <p>Language Comprehension through reading and listening :Reading process; purposeful reading; reading for vocabulary development; Eclectic Reading;active and passive reading; Intensive Reading Skills.Speed Reading; Eye Span and Fixation Points; Skimming and Scanning; Passage based reading;Understanding various types of Questions based on Reading Comprehension Passages. Listening Process; Types of Listening; Purposeful Listening; Understanding and removing Barriers to Listening. Listening Comprehension; Practical Lab Based exercises; Effective Listening Techniques; Listening for correct accent and pronunciation.Speaking Strategies and Professional Speaking: Understanding Speech Sounds: English Pronunciation, Vowel and consonant sounds and pronunciation guidelines related to vowel and consonant sounds.Improving Fluency: Articulation, good Pronunciation; voice quality; accent, stress and intonation patterns. Public Speaking: Making Formal Speeches; Understanding and delivering Oral Presentations;Understanding and participating in Group Discussions; Situational Role plays etc.Projecting a Positive Image: Understanding Non Verbal Communication; eye contact; Facial Expressions; Paralanguage and Physical appearance; Following Etiquettes; removing any Bias from Language.Writing Strategies and Skills: Role of language for effective writing; strategies to ensure effective writing; Formal and Informal writing. Letters: Enquiry, complaints and Claims; Request Letters; appointment Letters; Apology Letters; Condolence Letters etc.E mails; notices; circulars; memorandums; Resume; advertisements etc.Descriptive and Narrative Prose: Passages; Profile Sketches; Note making; paraphrasing and summarizing Use of Technology in Communication: Facsimile; Telex; Multimedia; Internet; Teleconference; Videoconference; weblogging; podcasting.</p>			

VI	Text/References	<ol style="list-style-type: none"> 1. Odell and McCarthy: English Phrasal Verbs in Use, Cambridge University Press, 2004 Ed. 2. Odell and Mc Carthy: English Vocabulary in Use, Cambridge University Press, 2002 Ed. 3. Thomson and Martinet: A practical English Grammar, Oxford India, Rev. Ed. 2009 4. Lester and Beason: The McGraw Hill Handbook of English Grammar and Usage, Tata McGraw Hill Education Private Limited, 2010 Ed. 5. K.R. Laxminarayanan: Advanced English Communication Skills Lab, SCITECH Publications, 2009 Ed. 6. K.R. Laxminarayanan: English for Technical Communication, vol. 1&2, SCITECH Publications, 2009 Ed. 7. K.R. Laxminarayanan: Effective Technical English, SCITECH Publications, 2009 Ed. 8. Sasikumar, Dutt and Rajeevan: Listening and Speaking, Foundation books; 2007 Rev. Ed. 9. Adler. Proctor: Communication Goals and Approaches, Cenage Learning, 2008 Ed. 10. Pal and Korlahalli: Essentials of Business Communication: Sultan Chand and Sons, 2008 Rev. Ed. 11. M. Ashraf Rizvi: Effective Technical Communication: Tata McGraw Hill Education Private Limited, 2010 Ed. 12. John Seely: Oxford Guide to Effective Writing and Speaking, Oxford University Press, 2009 Ed.
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Semester : 1

I	Course Code	MA 1001			
II	Course Title	Mathematics - 1 (Calculus)			
III	Credit Structure	L	P	T	C
		3	0	2	4
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	<p>The real number System; Review of limits, continuity, differentiability; Applications of the derivative; Successive derivatives and Leibnitz Theorem; Mean value theorems, LHospitals Rule; Fixed Point Iteration Method, Newtons method, Picards method; Sufficient conditions for Local Maximum, Points of Inflection; Taylors Theorem, Convergence of sequences and series, Power Series, Taylor Series; Curve sketching; Riemann integrals, Fundamental theorem of Calculus, Improper integrals, applications to area, volume, arc length; Review of vectors and Three dimensional geometry; Multi-variable functions, continuity and differentiability; Partial Derivatives, gradient and directional derivatives, chain rule, maxima and minima, Lagrange multipliers; Double and Triple integration, Jacobians and change of variables formula; Parameterization of curves and surfaces, vector fields, Line and surface integrals; Divergence and curl, Theorems of Green, Gauss, and Stokes.</p>			
VI	Text/References	<ol style="list-style-type: none"> 1. G. B. Thomas and R. L. Finney: Calculus and Analytic Geometry, 9th edition, Addison Wesley/Narosa, 1998. 2. S. R. Ghorpade and B. V. Limaye: A course in Calculus and Real Analysis, Springer, 2006 (Indian Reprint, 2010) Reference Books: 3. T.M. Apostol: Calculus, vol. 1, 2nd Ed., Wiley India, 2006. 4. T.M. Apostol: Calculus, Vol. II, Wiley India, 2007. 5. E. Kreyszig: Advanced Engineering Mathematics, 9th Ed. Wiley India, 2011. 			

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Semester : 1

I	Course Code	CH 1101			
II	Course Title	Chemistry Laboratory			
III	Credit Structure	L	P	T	C
		0	3	0	2
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	Experiments illustrating the concepts of 1) Complexometric Reaction, 2) Oxidation Reduction Reactions, 3) Spectrophotometry , 4) Electric Potential, 5) Chemical Kinetics, 6) Organic Synthesis, 7) Chromatography, 8) Packing Fraction, 9) Adsorption, 10) Catalysis, 11) Electrolytic Conductance			
VI	Text/References	1. D.P. Shoemaker, C.W. Garland and J.W. Nibler: Experiments in Physical Chemistry, McGraw Hill International Edition, 1996 2. V.D. Athawale and P. Mathur: Experimental Physical Chemistry, 1st Edition, New Age International Publication, New Delhi, 2001. 3. J.B. Yadav: Advanced Practical Physical Chemistry, Goel Pub., Meerut, 2003 4. S. M. Khopkar: Basic Concepts of Analytical Chemistry, 3rd Edition, New Age International Publication, New Delhi, 2008 5. P. Samnani: Experiments in Chemistry, Anmol Publication Pvt. Ltd. New Delhi, 2007			

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Semester : 1

I	Course Code	GE 1001			
II	Course Title	Engineering Graphics			
III	Credit Structure	L	P	T	C
		2	3	0	4
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	Introduction to the engineering design process and the importance of technical. Graphics/Drawings; Integrated design and 3D modelling, visualization - sketching & computer aided drawing, geometrics - geometry construction, shape description, multi-view drawings - orthographic projection, isometric views, axonometric projections, auxiliary & section views; Dimensioning; Assembly drawings.			
VI	Text/References	1. Ostrowsky, O., Engineering Drawing with CAD Applications, Elsevier Science & Technology, 1989 2. Banach, D. T., and Jones, T., Autodesk Inventor 2011 Essentials Plus, Cengage Learning, Inc, 2010 3. Jensen, C. H., Hesel, J. D., and Short, D. R., Engineering Drawing and Design, 7th edition, McGraw Hill, 2007			

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I	Course Code	CS 1001			
II	Course Title	Computer Programming			
III	Credit Structure	L	P	T	C
		2	3	0	4
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	<p>Introduction to the state of the art in computing focusing on hardware and its architecture, operating systems, memory management, standard programming language and programmable software environment (PSE); Machine representation of numbers and characters. IEEE Floating point numbers; ASCII characters. Variables and Types; I/O Functions and Formating; Arithmetic Operators; Forming Arithmetic Expressions; Using Variables and Arithmetic Operators and Built-In Library Functions; Operators for Implementing Decision Making; Logical expressions and control; Implementing Loops and Repetitive Processes; Tools for Modular Programming; Data Sharing/Passing Mechanisms; Functions, Pointers, Arrays, Structures Strings; File and Disk I/O Operations; Introduction to selected PSE platform, basic programming, execution and debugging; Iteration using variants of loops; Writing script Files and Creation of User-defined Functions; Flow control statements; Data Structures and Management; Scientific Visualization; Interfacing hardware with PSE; Notions of Parallel Processing</p>			
VI	Text/References	<ol style="list-style-type: none"> 1. Rajaraman, V., Computer Programming in C, 16th print, 2006, Prentice Hall India, 1994. 2. B. R. Hunt, R. L. Lipsman, J.M. Rosenburg, K. Coombes, J. Osborne and G. Stuck,A Guide to MATLAB for Beginners and Experienced Users, Cambridge University Press, 2nd Edition, 2006. 			