

Civil, Electrical & Mechanical Engg. Department

Semester : 2

Teaching Scheme

Course Code	Course Name	Lecture hours	Tutorial hours	Practical hours	Credit
HS 1002	English Course	3	0	0	4
PH 1002	Physics-II	3	2	0	4
PH 1101	Physics Lab	0	0	3	2
MA 1002	Mathematics - II (Linear Algebra and ODE)	3	2	0	4
GE 1002	Manufacturing Science and Workshop	2	0	3	4
GE 1003	Introduction to Infrastructure	2	0	2	4
EE 1001	Electrical Engineering	3	1	0	4
EE 1101	Electrical Engineering Lab	0	0	3	2
	Total	16	5	11	28

I	Course Code	HS 1002			
II	Course Title	English Course			
III	Credit Structure	L	P	T	C
		3	0	0	4
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	<p>To enhance the LSRW skills, To empower students with rich vocabulary, To provide them a practice of oral presentations, To develop their analytical thinking through articles of their relative subjects, To cultivate their language related reasoning, To make them practice speaking in real life situations, To help them removing stage fear.</p> <p>Contents:</p> <p>Part 1 Text Book</p> <p>Different textual contents based on the technical writing/periodicals/current events/best passages from the text books available in the IITRAM library will be selected and uploaded on MOODLE based on the level and the interests of the students. Individual content in the Text Book will be used keeping in mind the following points:</p> <ol style="list-style-type: none"> 1. Vocabulary 2. Grammar 3. Reading 4. Oral Fluency 5. Writing Practice <p>Part 2 Technical Writing Skill</p> <ol style="list-style-type: none"> 1. Journal Writing 2. Technical Report Writing 3. Fax and Email in Business Correspondence 4. Dialogue Writing 5. Notice Making 6. Preparing Minutes of Meeting 7. Technical Proposal Writing 8. News <ol style="list-style-type: none"> a. Event converted to news writing b. Note Making & Commentary <p>Part 3 Language Lab Practice (Listening and Speaking) / Classroom Presentation</p> <p>Presentation Skills(Based on any Clip; News events; Technical subjects etc.), Greeting and introducing, Practicing Short Dialogues(Under Theatre Club), Group Discussions, Seminars, Paper-Presentations, Listening News/Conversations/Telephonic Conversation.</p>			

VI	Text/References	<ol style="list-style-type: none"> 1. Sethi, J & et al. A Practice Course in English Pronunciation. New Delhi: Princeton Hall of India. (Latest Edition) 2. Sen, Leena. Communication Skills. Prentice Hall of India New Delhi. (Latest Edition) 3. Prasad, P. Communication Skills. S.K. Kataria & Sons. (Latest Edition) 4. Bansal, R.K. and J.B. Harrison. Spoken English: Manual of Speech and Phonetics. Orient Blackswan. (Latest Edition) 5. A.S. Hornby. Oxford Advanced Learners Dictionary of Current English. 7th Edition. Written Communication (Paper-II: Theory) 6. Banerji, Meera and Krishna Mohan. Developing Communication Skills. Macmillan Publication. (Latest Edition) 7. Bretag, Tracey; Crossman, Joanna and Sarbari Bordia. Communication Skills. Tata MacGraw Hill Pvt. Ltd. (Latest Edition) 8. Adler, Ronald and Proctor. Communication: Goals and Approaches. Cengage Learning. (Latest Edition) 9. Dutt, Sasikumar V., Kirmani & Geetha Rajeevan. A Course in Listening and Speaking. Foundation Books. (Latest Edition) 10. Laxminarayan, K. R. English for Technical communication. Scitech Publications Pvt. Ltd. 11. Handbook of English Grammar and Usage. Tata MacGraw Hill Edition. 12. Department of Humanities and Social Sciences. Combined Edition Volumes 1 and 2. English for Engineers and Technologists. Orient Black Swan. (Latest Edition) 13. Kumar, E. Suresh, Sreehari and Savithri. Effective English. Pearson. (Latest Edition)
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I	Course Code	MA 1002			
II	Course Title	Mathematics- II (Linear Algebra and ODE)			
III	Credit Structure	L	P	T	C
		3	0	2	4
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	<p>Linear Algebra: Vectors in R^n; Vector subspaces of R^n; Basis of vector subspace; Systems of Linear equations; Matrices and Gauss elimination; Determinants and rank of a matrix; Abstract vector spaces, Linear transformations, Matrix of a linear transformation, Change of basis and similarity, Rank-nullity theorem; Inner product spaces, Gram-Schmidt process, Orthonormal bases; Projections and leastsquares approximation; Eigenvalues and eigenvectors, Characteristic polynomials, Eigenvalues of special matrices; Multiplicity, Diagonalization, Spectral theorem, Quadratic forms. Differential Equations: Exact equations, Integrating factors and Bernoulli's equation; Orthogonal trajectories; Lipschitz condition, Picards theorem; Wronskians; Dimensionality of space of solutions, Abel-Liouville formula; Linear ODEs with constant coefficients; Cauchy- Euler equations; Method of undetermined coefficients; Method of variation of parameters; Laplace transforms, Shifting theorems, Convolution theorem.</p>			
VI	Text/References	<ol style="list-style-type: none"> 1. Anton, H., Elementary linear algebra with applications, 8th edition, John Wiley & Sons, 1995. 2. Apostol, T.M., Calculus, Volume 2, 2nd Edition, Wiley Eastern, 1980. 3. Boyce, W.E., and DiPrima, R., Elementary Differential Equations, 8th Edition, John Wiley & Sons, 2005. 4. Kreyszig, E., Advanced Engineering Mathematics, 8th Edition, John Wiley & Sons, 1999. 5. Kumaresan, S., Linear algebra A Geometric approach, Prentice Hall of India, 2000. 6. Strang, G., Linear algebra and its applications, 4th Edition, Thomson, 2006. 			

I	Course Code	GE 1003			
II	Course Title	Introduction to Infrastructure			
III	Credit Structure	L	P	T	C
		2	2	0	4
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	<p>The course on Introduction to Infrastructure is designed to provide a birds eye-view of the core components of infrastructure to the first year students. This includes transportation systems (railways and roadways), electric power generation, transmission and distribution systems, Information and Communication, environmental aspects, energy considerations, Mechanical infrastructure, water resources, civil infrastructure, urban planning and aspects of sustainability. The lecture component of the course is designed to provide introductory theoretical background on relevant topics and the practical component involves field visits to industrial establishments such as power plants, wherein students will be exposed to the harmonious functioning of various engineering disciplines. During these field visits, the students will appreciate how core branches of engineering, such as electrical, mechanical, and chemical and civil engineering complement each other in the development of industrial facilities that are key to the infrastructure of any nation. Moreover, the field visits are also expected to enhance and build engineering aptitude of the students. The theoretical component is necessary to equip the students with relevant tools required for their critical observations during the field visits.</p>			
VI	Text/References	Nil			

I	Course Code	PH 1002			
II	Course Title	Physics- II			
III	Credit Structure	L	P	T	C
		3	0	2	4
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	Coulomb's law; Gauss' law; Conductors; Capacitors; Electrostatic Fields in Matter; Dielectrics; Bound charges, Electric Displacement, Linear Dielectrics; Lorentz force law; Continuity equation; The BiotSavart law, Amperes law; Magnetic vector potential, Magnetostatic boundary conditions; Magnetic Fields in Matter; Bound currents, Auxiliary field H; Electrodynamics, Electromotive force; Faradays law; Inductance; Displacement current; Maxwells equations; Poynting vector; Electromagnetic waves; Wa veguides, Simple antenna.			
VI	Text/References	<ol style="list-style-type: none"> 1. D. J. Griffiths: Introduction to electrodynamics, 3rd Edition, Phi Learning, 2009 Reference Books 2. J.R. Reitz, F.J. Milford, R.W. Christy: Foundations of Electromagnetic Theory, 4th Edition, Pearson Addison Wesley, 2009 3. A. Mahajan, A. Rangwala: Electricity and Magnetism, 1st Edition, Tata McGraw Hill, 1988 4. E.M. Purcell: Berkeley Physics Course: Electricity and Magnetism, Volume 2, 2nd Edition, Tata McGraw Hill, 2007 5. R.P. Feynman, R.B. Leighton, M.Sands: The Feynman Lectures on Physics -Vol II, Narosa Publishing House, 2010. 			

I	Course Code	EE 1001			
II	Course Title	Electrical Engineering			
III	Credit Structure	L	P	T	C
		3	0	1	4
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	<p>Circuit elements active, passive, time-variant, time-invariant, linear, non-linear, unilateral, bilateral; Sources independent and dependent; Electric circuit and analysis Ohms law, Kirchhoffs laws, loop and node analyses, limitations of lumped circuit analysis; Network theorems Superposition, Thevenin, Norton, Maximum power transfer; Natural and forced responses to DC excitation RL, RC and RLC circuits; Sinusoidal steady state analysis; Polyphase circuits. Magnetic field Biot-Savart law, Amperes circuital law, Faradays laws, Lenz law; Magnetic materials, characteristics, losses, coupled circuits. Transformers single phase and three phase transformers, auto-transformers. Electromechanical energy conversion systems DC generator and DC motor; AC Machines synchronous generator and motor, three phase and single phase induction motors; Stepper motor. Power system-generation, transmission, distribution, costing of electricity.</p>			
VI	Text/References	<ol style="list-style-type: none"> 1. Hayt, W. H., Kemmerly, J. E., Durbin, S. M., Engineering Circuit Analysis, sixth edition, Tata Mc-Graw Hill, 2006. 2. Toro, V. D., Electrical Engineering Fundamentals, second edition, Prentice Hall India, 2009. 3. Wildi, T., Electrical Machines, Drives and Power Systems, sixth edition, Pearson Education, 2006. 			

I	Course Code	EE 1101			
II	Course Title	Electrical Engineering Lab			
III	Credit Structure	L	P	T	C
		0	3	0	2
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	Frequency response of RLC circuits; Power factor improvement; Power measurement in balanced and unbalanced three phase circuits; Modeling the magnetic system by an equivalent electric circuit; Performance of single phase induction motor; Speed control of stepper motor. Diode clipper, clamper and rectifier circuits; Transistor amplifier and oscillator; Operational amplifier circuits; Combinational digital circuits; Sequential digital circuits.			
VI	Text/References	Toro, V. D., Electrical Engineering Fundamentals, second edition, Prentice Hall India, 2009.			

I	Course Code	PH 1101			
II	Course Title	Physics Lab			
III	Credit Structure	L	P	T	C
		0	3	0	2
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	Error analysis and accuracy of measurement. Selected experiments from mechanics and heat (e.g. compound pendulum, centrifugal force, thermal conductivity, velocity of sound in air), electricity & magnetism (LCR circuit, Helmholtz coil), optics (interference and diffraction) and modern physics (specific charge of electron, hydrogen spectrum, photoelectric effect) etc.			
VI	Text/References	1. B. L. Worsnop and H. T. Flint: Advanced Practical Physics for students, Asia Publishing House, 1971. 2. G. L. Squires: Practical Physics, Cambridge University Press, 2001.			

I	Course Code	GE 1002			
II	Course Title	Manufacturing Science and Workshop			
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 Manufacturing. Historical perspective; Importance of manufacturing; Classification of manufacturing processes, Engineering materials. Woodwork. Fitting Basics of Casting, Metal Forming. Basic concepts of plastic deformation. Hot & cold working. Common bulk deformation processes (Rolling, Forging, Extrusion and Drawing). Common sheet metal forming processes. Machining. Chip formation and generation of machined surfaces. Tools-geometry, materials, Common machining operations (turning, milling drilling ,shaping etc). Grinding & other Finishing processes. Introduction to unconventional machining processes (EDM, ECM, UCM, CHM, LBM) etc., Welding & Other Joining Processes, Fundamentals & classification of Joining processes, Welding- Gas arc & resistance welding, Brazing and soldering, Adhesive bonding, Mechanical fastening, Principles of heat treating; annealing, normalizing, hardening and tempering, Manufacturing of Polymer and Powder Products, Classification of polymers, Introduction to extrusion, injection molding, blow molding, compression and transfer molding. Powders & Green compacts from powders including slip casting of ceramics. Sintering. Manufacturing for Electronics. Special Processes like Chemical Vapor Deposition, Etching, Physical Vapour Deposition. Modern Trends in Manufacturing.</p>			
VI	Text/References	<ol style="list-style-type: none"> 1. Schey, J. A., Introduction to Manufacturing Process, 3rd Edition, McGraw Hill, 2000. 2. Singh, D. K., Fundamentals Of Manufacturing Engineering, Ane Books Pvt Ltd, new Delhi, 2nd Ed., 2009. 3. Hajra Choudhary, S. K., Elements of Workshop Technology, Media Promoters & Publishers Pvt Ltd, 12th Edition, 2002. 			