

PANDIT DEENDAYAL PETROLEUM UNIVERSITY
SCHOOL OF TECHNOLOGY
COURSE STRUCTURE FOR B.TECH. ELECTRICAL ENGINEERING

SEMESTER I			B.TECH. ELECTRICAL ENGG.										
Sr · No	Course Code	Course Name	Teaching Scheme					Exam Scheme					Total Mark s
			L	T	P	C	Hrs/w k	Theory			Practical		
								MS	ES	IA	LW	LE/Vi va	
1	CE 105T	Elements of Civil Engg	3	1	-	7	4	30	60	10	-	-	100
2	EE 105T	Elements of Electrical Engg	3	1	-	7	4	30	60	10	-	-	100
3	MA 101T	Mathematics I	3	1	-	7	4	30	60	10	-	-	100
4	ME/IE 102T	Engineering Material	2	-	-	4	2	30	60	10	-	-	100
5	ME 105T	Elements of Mechanical Engg	3	1	-	7	4	30	60	10	-	-	100
6	HS 103T	Communication Skills	1	-	-	2	1	30	60	10	-	-	100
	HS 103P		-	-	2	1	2	-	-	-	25	25	50
7	SC 102T	Physics	3	1	-	7	4	30	60	10	-	-	100
	SC 102P		-	-	2	1	2	-	-	-	25	25	50
Total			18	5	04	43	27						800

IA = Internal assessment (like quiz,
assignments etc)
LW = Laboratory work; LE = Laboratory
Exam

CE105T Elements of Civil Engineering										
Teaching Scheme				Examination Scheme						
L	T	P	C	Hrs/Week	Theory			Practical		Total marks
					MS	ES	IA	LW	LE/Viva	
3	1	-	7	4	30	60	10	-	-	100
<p>UNIT I</p> <p>Introduction of Civil Engineering: Civil engineering and basic human needs, Role of civil engineer, Branches of civil engineering, Interdisciplinary approach in civil engineering</p> <p style="text-align: right;">16</p> <p>UNIT II</p> <p>Basics of Surveying: Introduction to surveying: Definition, object, uses, classification of survey, principles of surveying, scales and types of scale, map and plan Linear Measurement: Types of chains, tapes, Instruments used in chaining, methods of measurement, errors in measurement Angular Measurement: Compass, uses, types of compass, numerical Elevation Measurement: Definitions, Types of levels, methods of leveling, Booking of level books and R.L. computations</p> <p style="text-align: right;">12</p> <p>UNIT III</p> <p>Elements of building construction: (A) Principals, basic requirement, Building Planning, Drawing, lay-out. (B) Construction Material, purpose of Various Material, Brick, cement, concrete, green materials & technologies (C) Role of foundation in building, different types of foundations</p> <p style="text-align: right;">06</p> <p>UNIT IV</p> <p>Water Resources Development: Hydrological cycle, Source of water, Water conveyance system, Water requirement. Transportation engineering: Necessarily of Transportation, Suitability and requirement of Different modes of transport, typical PPP Models</p> <p style="text-align: right;">Approximate Total : 39 Hrs</p> <p>Reference Books:</p> <ol style="list-style-type: none"> 1. Surveying Vol .I & II, B. C. Punamia, Laxmi Publication, Delhi 2. Surveying Vol. I and II, S. K. Duggal, Tata Macgraw Hill Publication, New Delhi 3. Building Construction, Dr. B. C. Punamia, Laxmi Publication, Delhi 4. Civil Engineering Material, Jakson and Dhir, ELBS Publishing, London 5. Highway Engineering, Khanna S. K. and Justo C. Publisher: Nemchand and Brothers 6. Irrigation Engineering and Hydraulic Structures, S K Garg, Khanna Publishers, Delhi 										

EE 105T ELEMENTS OF ELECTRICAL ENGINEERING										
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	1	--	7	4	30	60	10	--	--	100
<p>UNIT I 10</p> <p>GENERAL: Concepts of E.M.F., P.D. and current, resistance, effect of temperature on resistance, Resistance temperature coefficient, and insulation resistance. S.I. units of work, power and energy. Conversion of energy from one form to another in electrical, mechanical and thermal systems. batteries and cells, their types, primary cells and secondary cells, Lead Acid, Ni-Cd and Ni-MH batteries, current capacity and cell ratings. Charging, methods and maintenance procedure.</p> <p>D.C. CIRCUITS: Classification of electrical networks, Ohm's law, Kirchhoff's law and their applications for network solutions. Simplifications of networks using series and parallel combinations and star-delta conversions.</p>										
<p>UNIT II 10</p> <p>ELECTROMAGNETISM: Magnetic effect of an electric current, cross and dot conventions, right hand thumb rule and cork screw rule, nature of magnetic field of long straight conductor, solenoid and toroid. Concept of m.m.f., flux, flux density, reluctance, permeability and field strength, their units and relationships. Simple series and parallel magnetic circuits, comparison of electrical and magnetic circuit, force on current carrying conductors placed in magnetic field, Fleming's left hand rule. Faradays laws of electromagnetic induction, statically and dynamically induced E.M.F., self and mutual inductance, coefficient of couplings. Energy stored in magnetic field. Charging and discharging of inductor and time constant.</p> <p>ELECTROSTATICS AND AC FUNDAMENTALS: Electrostatics field, electric flux density, electric field strength, absolute permittivity, relative permittivity, capacitance and capacitor, composite dielectric capacitors, capacitors in series and parallel, energy stored in capacitors, charging and discharging of capacitors and time constant. Sinusoidal voltages and currents, their mathematical and graphical representation, Concept of instantaneous, peak (maximum), average and R.M.S. values, frequency, cycle, period, peak factor and form factor, phase difference, lagging, leading and in phase quantities and phasor representation. Rectangular and polar representation of phasors.</p>										
<p>UNIT III 09</p> <p>SINGLE PHASE A.C. CIRCUITS: Study of A.C. circuits consisting of pure resistance, pure inductance, pure capacitance and corresponding voltage-current phasor diagrams and waveforms. Development of concept of reactance, study of series R-L, R-C, R-L-C circuit and resonance, study of parallel R-L, R-C and R-LC circuit, concept of impedance, admittance, conductance and susceptance in case of above combinations and relevant voltage-current phasor diagrams, concept of active, reactive and apparent power and power factor.</p> <p>POLYPHASE A.C. CIRCUITS AND SINGLE PHASE TRANSFORMERS: Polyphase A.C. Circuits: Concept of three-phase supply and phase sequence. Voltages, currents and power relations in three phase balanced star-connected loads and delta-connected loads along with phasor diagrams. Single phase transformers: Construction, principle of working, E.M.F. equation,</p>										

voltage and current ratios. Losses, definition of regulation and efficiency, determination of these by direct loading method. Descriptive treatment of autotransformers and dimmer stats.

UNIT IV

10

Electrical Wiring: Connectors and switches, system of wiring, domestic wiring installation, sub circuits in domestic wiring, simple control circuit in domestic installation, industrial electrification.

ILLUMINATION: Types of lamps, fixtures and reflectors, illumination schemes for domestic, industrial and commercial premises, Lumen requirements for different categories.

SAFETY and PROTECTION: Safety, electric shock, first aid for electric shock other hazards of electrical laboratories and safety rules, use of multi-meters, grounding, importance of grounding, equipment of grounding for safety. Circuit protection devices, fuses, MCB, ELCB and relays.

TOTAL HOURS

39

Text and References:

- 1** B. L. Theraja, "*Electrical Technology*", Vol.1, S. Chand Publication, New Delhi
- 2** V. N. Mittal, "*Basic Electrical Engineering*", TMH Publication, New Delhi
- 3** Surjitsingh, "*Electrical Estimating and Costing*", Dhanpat Rai and Co.
- 4** V. K. Mehta, "*Basic Electrical Engineering*", S. Chand and Company Ltd., New Delhi
- 5** Edward Hughes, "*Electrical Technology*", Seventh Edition, Pearson Education
- 6** H. Cotton, "*Elements of Electrical Technology*", C.B.S. Publications
- 7** John Omalley Shawn, "*Basic Circuits Analysis*", Mc Graw Hill
- 8** Del. Toro, "*Principles of Electrical Engineering*", Prentice Hall of India

HS-103T COMMUNICATION SKILLS

Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
1			2	1	30	60	10		--	100

UNIT I (3 hrs)

Communication Skills:

Process, Types and Levels of Communication. Technical communication and General Communication. Factors to be considered in technical communication. Verbal and Non-Verbal communication (Kinesics):
Components of non-verbal communication. Barriers to effective communication. Communication across culture.

UNIT II (3 hrs)

Listening Skills:

Types of Listening. Barriers in Effective Listening. Tips for effective listening. Barriers to effective communication

UNIT III (2 hrs)

Interview:

Introduction. General preparation for an interview. Types of questions generally asked in interview. Types of interviews. Importance of non-verbal aspects in an interview.

UNIT IV (6 hrs)

Letter Writing, Technical Proposals and Job Applications:

Business Letters, Structures and Types of Business Letters, Letters of Inquiry, Complaint, Regret and Adjustment
Definition of technical proposal, Purpose, Types, characteristics, Structure, Style and Appearance. Essential Parts of Application. Cover Letter and the Resume. Types of Resume. Chronological Resume, Functional Resume.

Approximate Total : 14 Hrs

Reference Books:

1. Meenakshi Raman & Sharma, Technical Communication Principles and Practice by Oxford University Press, New Delhi.
2. Basic Communication Skills for Technology, Andrea J. Rutherford (Pearson Education)
3. Communication Skills for Engineers, Sunita Mishra, C. Murali Krishna (Pearson Education)
4. Business Communication Strategies. Matthukutty M. Monipally (Tata-McGraw-Hills)

HS 103P COMMUNICATION SKILLS

Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/VIVA	
--	--	2	1	2	--	--	--	25	25	50

Practicle Sessions

1. Effective Presentation Strategies:

Defining purpose, Analysis of Audience, Organising Contents, Preparing an Outline of the Presentation, Visual Aids, Nuances of Delivery, Body Language and Effective Presentation.

2. Group Discussion:

Introduction, GD as a part of selection Process, Guidelines, Role Functions and Practice of GD with current topics.

3. Creative Writing Task:

Developing /Completing a story, developing/ completing a poem.

4. Learning English from songs:

Listening to the selected songs and exercise of grammar based on those songs will be given to students.

5. Listening to BBC and Voice of America

Special English Lessons. Etymology of many words as well as current colloquial expressions and their meanings. Audio clips with text are both BBC and VOA—reputed resources for English

6. Article Writing:

Reading and Analysing a selected article. Writing an article on a given topic.

MA 101 T MATHEMATICS I										
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs./Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	1	---	7	4	30	60	10	---	---	100
UNIT I					8					
<p>Calculus for single variable: Successive differentiation, Leibnitz theorem (without proof), Taylor's and Maclaurin's expansion of functions of single variable. Fundamental theorem of Integral calculus, Application of integrals to length, area, volume and surface area of revolution.</p> <p>Curve Tracing: Asymptotes, Cartesian, polar and parametric forms.</p>										
UNIT II					11					
<p>Calculus of Several variables: Partial derivatives, Euler's theorem, directional derivative and gradient, Taylor's and Maclaurin's expansion of functions of several variables, Maxima and minima of functions of several variables, Lagrange's method of undetermined multipliers, Multiple Integrals – double and triple, Jacobian, Change of order of integration, change of coordinates, evaluation of area, volumes of solids, Mass, center of gravity and moment of inertia.</p>										
UNIT III					11					
<p>Infinite Series & Improper Integrals: Convergence and divergence of Infinite series. Comparison test, D'Alembert's ratio test, Raabe's test, logarithmic test, Cauchy's nth root test. Alternating series; Leibnitz test, power series. Convergence of improper integrals, Beta and Gamma functions and its properties.</p>										
UNIT IV					9					
<p>Vector Calculus: Scalar and vector fields, Line and surface Integrals, Gradient, divergence and curl, Green's Theorem, Stoke's and Gauss Divergence theorem (without proof) with application and physical significance.</p>										
APPROXIMATE TOTAL										39 Hours
Texts and References										
<ol style="list-style-type: none"> 1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers (2013). 2. James Stewart, Calculus, 5th Ed., Thomson (2003). 3. R. K. Jain & S. R. K. Iyengar, Higher Engineering Mathematics, 3rd Ed., Narosa (2007). 4. George B. Thomas Jr., Maurice D. Weir, Joel R. Hass, Thomas' Calculus, 12th Ed., Pearson (2010). 5. E. Kreyszig, Advanced Engineering Mathematics, 8th Ed., John Wiley (1999). 6. Michael D. Greenberg, Advanced Engineering Mathematics, 2nd Ed., Pearson (1998). 										

ME/IE-102T ENGINEERING MATERIALS*										
					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
2	0	--	4	2	30	60	10	--	--	100
*Department of Sciences will be the teaching department										
UNIT I					6					
<p>Introduction: Historical perspective of Materials Science. Classification of materials. Advanced Materials, Future materials and modern materials & their needs</p> <p>Atomic structure. Atomic bonding in solids, Crystal structures, Crystalline and non- crystalline materials. Crystal systems, Crystallographic directions and Crystallographic planes. Point defects. Line defects and dislocations. Interfacial defects. Bulk or volume defects.</p>										
UNIT II					6					
<p>Point defects. Line defects and dislocations. Interfacial defects. Bulk or volume defects.</p> <p>Mechanical Properties of Metals: Elastic deformation. Plastic deformation. Interpretation of tensile stress-strain curves, Yielding under multiaxial stress. Yield criteria and macroscopic aspects of plastic deformation.</p>										
UNIT III					7					
<p>Basic Eng. Materials related to civil, electrical and mechanical industries includes application and types., plastics.Applications and Processing of Metals, Alloys and Engineering materials: Types of metals and alloys. Fabrication of metals. Thermal processing of metals. Heat treatment. Precipitation hardening.</p> <p>Types and applications of ceramics, glasses. Fabrication and processing of ceramics.</p> <p>Mechanical behavior of polymers,rubbers, Mechanisms of deformation and strengthening of polymers. Applications of composite materials, Particle reinforced composites. Fiber reinforced composites.</p>										
UNIT IV					7					
<p>Properties of Materials: Electrical Properties: Electrical conduction. Semi conductivity. Super conductivity. Electrical conduction in ionic ceramics and in polymers. Dielectric behavior. Ferroelectricity. Piezoelectricity</p> <p>Thermal Properties: Heat capacity. Thermal expansion. Thermal conductivity. Thermal stresses</p> <p>Magnetic Properties: Diamagnetism and paramagnetism, Ferromagnetism, Antiferromagnetism and ferrimagnetisms.</p>										
Approximate Hours: 26 Hrs										
Texts and References										
<ol style="list-style-type: none"> 1. W.D. Callister, Material Science and Engineering: An Introduction John Wiley 1997 2. James F. Shackelford and Madanapalli K. Muralidhara, Introduction to Materials Science for Engineers 6th Ed. 2010. 3. O.P. Khanna, Material Science, Dhanpat Rai Publication, 1987. 4. B C Punmia , Building Materials 										

ME 105T ELEMENTS OF MECHANICAL ENGINEERING										
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	1	--	7	4	30	60	10	--	--	100
UNIT I										13
<p>Introduction to Thermodynamics: Definition and its applications. Systems and control volumes, thermodynamic properties, state and equilibrium processes and cycles, temperature and Zeroth law of thermodynamics. Forms of Energy, energy transfer by work and heat, law of conservation of energy (First law of thermodynamics)</p> <p>Properties of Pure substances: Definition, examples and phases; Phase change processes, Property diagrams and tables, ideal gas equation of state</p>										
UNIT II										13
<p>Closed system analysis: Concept of moving boundary work, energy balance. Specific heats, internal energy and Enthalpy-expressions for ideal gas, liquids and gases</p> <p>Control volume analysis: Conservation of mass, flow work, energy analysis of steady flow systems and applications</p> <p>Introduction to II law of Thermodynamics: Limitations of First Law, Thermal Energy reservoirs, heat engines, Refrigerators and Heat pumps, Kelvin Plank and Clausius statement and their equivalence.</p>										
UNIT III										13
<p>Internal Combustion Engines: Introduction, classification and brief description of I.C. engines mechanism, 4-Stroke and 2-Stroke petrol, gas and diesel engines, Otto, Diesel and dual cycles and their air standard efficiencies and mean effective pressures.</p> <p>Pump and compressors: Classification of pumps and compressors, working principle, Theory of single stage reciprocating air compressor, effect of clearance, volumetric efficiency, concept of multistage compression.</p>										
UNIT IV										13
<p>Power transmission systems: Belts, gears, rope, couplings, clutches, brakes, and bearings</p> <p>Boilers: Classification, study of various types of boilers.</p>										
Approximate Total: 52 Hrs										
Texts and References										
<ol style="list-style-type: none"> 1. Yunus A. Cengel & Bole, Thermodynamics- An Engineering Approach by Tata Mcgraw Hill, New Delhi 2. P. K. Nag, Engineering Thermodynamics, Tata Mcgraw Hill, New Delhi 3. R.K.Rajput, Engineering Thermodynamics, EVSS Thermo Laxmi Publications 4. Rayner Joel, Engineering Thermodynamics, ELBS Longman. 5. R.Yadav, Fundamentals of Engineering Thermodynamics by, Central Publishing House, Allahabad 6. B L Singhal and R. Singhal, Elements of Mechanical Engineering, Tech-Max Publications, Pune. 										

SC 102T Physics										
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory		Tutorial	Term Work	Practical /Viva	Total Marks
					MS	ES				
3	1	--	7	4	40	60	25	--	--	125
UNIT I										
Vector concepts & applications in Physics:										[6]
Introduction to vector algebra, Physical concepts in vector fields and Scalar fields with examples, Physical and mathematical concepts of gradient, divergence and curl, Green's theorem, Gauss theorem, applications in gravitation and electrostatics. Stokes' theorem and its applications.										
Electrostatics and Electrodynamics:										[7]
Gauss's law in dielectric medium, Equation of continuity, Biot Savart law – Ampere's law – magnetization and magnetic intensity, Faraday's law of induction – generalization of Ampere's law, displacement current, Maxwell's equations, wave equation for electromagnetic radiation, electromagnetic wave propagation in free space and isotropic dielectric medium, Poynting theorem & Poynting vector.										
UNIT II										
Waves and oscillations:										[4]
Types of waves, Simple harmonic motion, Damped simple harmonic motion, types of damping, Forced oscillation, resonance, , Energy Transport in Wave motion.										
Acoustics & Ultrasonic:										[3]
Introduction to Sound, Sabine's reverberation theory, Acoustical defects and their remedies, Doppler Effect. Ultrasonic waves, methods of their generation and detection, properties and application of ultrasonic waves.										
UNIT III										
Optics:										[8]
Interference: Types of interferences, Thin film interference, Anti-reflecting films; wedge shape films; Newton's rings and its applications,. Diffraction: Diffraction of light waves, Fraunhofer diffraction at a single slit, Two slit Fraunhofer Diffraction Pattern, N- Slit Fraunhofer Diffraction Pattern, diffraction grating, resolving power, Rayleigh Criterion, Fresnel diffraction (Introduction). Polarization: Polarization of light, production of polarized light, types of polarization and their representation, Malus's law, polarizer and analyser, Double refraction, Interference of Polarized light: Quarter wave plates and Half wave plates										
UNIT IV										
Laser & Fibre Optics:										[8]
Concepts of maser and laser, Interaction of radiation of matter-quantum mechanical view, Einstein coefficients spontaneous and stimulated emission, principles involves in laser, Meta stable state, Population inversion, three and four level laser system, and optical amplification and optical resonator, characteristics of laser, Ruby, He-Ne and semiconductor lasers, Application of lasers, Optical Fiber, physical structure and basic theory, modes in optical fibers, step index and graded index fibers, losses in optical fibers, applications of optical fibers										

in communication.

Nuclear Science and Engineering:

[4]

Basics of Nuclear Physics, activation analysis, Q -Value, Carbon dating, fission and fusion; principle, effect of nuclear radiation on materials, radiation protection and environment.

Total: 40 Hrs

Texts Books

1. Resnick, Halliday and Krane, *Physics part I and II*, 5th Edition John Wiley (2002).
2. A. Ghatak, *Optics*, 3rd edition, Tata McGraw Hill (2005).

References books:

3. Kittel C., Knight W.O. and Ruderman M.A., *Mechanics - Berkeley Physics Course, Vol. 1*, Tata McGraw-Hill.
4. Purcell E.M. *Electricity and Magnetism - Berkeley Physics Course, Vol.2*, Tata McGraw-Hill.
5. Crawford F.S. - *Waves and Oscillations, Berkeley Physics Course, Vol. 3*, McGraw-Hill.
6. Feynman R.P., Leighton R.B. and Sands M. *The Feynman Lectures on Physics, Vol. 1*, Narosa Publication
7. Feynman R.P., Leighton R.B. and Sands M. *The Feynman Lectures on Physics, Vol. 2*. Narosa Publication
8. Griffith D.J.H., *Introduction to Electrodynamics* - Prentice Hall, India.
9. M. N. Avadhanulu, *A text book of engineering Physics*, S. Chand & Company, Ltd.
10. Brij Lal, N. Subrahmanyam, *Heat and Thermodynamics*, S. Chand & Company, Ltd.

SC 102P Physics Practical

Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory		Tutorial	Term Work	Practical/ Viva	Total Marks
					MS	ES				
--	--	2	1	2	--	-	--	--	100	100

List of Experiments

1. Study of Interference using Michelson's Interferometer.
2. Introduction to Oscilloscope.
3. Study of Interference using Newton's Ring experiment.
4. Experiment to determine volumetric coefficient of expansion of liquids.
5. Experiment to determine thermal conductivity of different solid bodies.
6. Experiment with solar collector.
7. Measurement of vapor pressure.
8. Experimental to determine linear thermal expansion coefficient of solid bodies.
9. Experiment on reflection of Ultrasonic waves.
10. Experiment to determine heat capacities.
11. Experiment to determine critical temperature.
12. Study of effect of electric force.
13. Experiments with hot air engine.
14. Experiments with heat pump.
15. Study of conducting electricity by means of electrolysis.
16. Measurement of viscosity.
17. Determining Plank's constant and Inverse square law.
18. Experiments on diffraction with He-Ne Laser Kit.
19. Study of Hall Effect.
20. Determining semiconductor energy band gap using four probe method.
21. Experiment to study forced oscillations.
22. Study of charging and discharging of capacitive plates.
23. Study of Bio-Savart's Law
24. Study of Kerr Effect.
25. Experiments on spectroscopy.
26. Experiments on Fiber Optics.
27. Study of Photoconductivity.
28. Study of Interference using ultrasonic Interferometer.
29. Determining e/m by Thomson's method.
30. Study of Polarization of light using LASER.
31. Millikan's oil drop experiment.
32. Study of Holography.