PEOPLE'S UNIVERSITY, BHOPAL

Programme: **B. Tech. (Electrical Engineering)**

Semester: **V**

Subject Title	Subject Code	Credits			Theory		
		L	T	P	Externals (70)	Internals (30)	Total (100)
Entrepreneurship & IPR	**BT- 501**	3	1	0	Min: 28	Min: Nil	Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal - Max Marks: 30

Best of Two Mid Semester Test –Max Marks: 20

Assignment / Quiz – Max. Marks: 10

Unit	Contents (Theory)
I	Entrepreneurship : definition and functions of an entrepreneur, qualities of a good entrepreneur; Role of Entrepreneur in economic development; theories of entrepreneur, socio, economic, cultural and psychological; entrepreneur traits and behavior, roles in economic growth, employment, social stability, export promotion and indigenization, creating a venture, opportunity analysis competitive and technical factors, sources of fund. Forms of business organisations/ownership - formation of a Company - procedures and formalities for setting up of new industry-sources of information to contact for what and where.
II	**Management:** Importance, definition and functions; dimensions of organizations, size/specialization, behavior formalization, authority centralization, departmentalization, spam and line of control, technology and Minzberg organization typology, line, staff & matrix organization. Motivation theories - Maslow, McCllend - Motivation model - need, want, motive and behaviour – attitude towards work - self assessment and goal setting - Achievement, motivation and behaviour measurement, SWOT analysis, TA analysis - Stress and conflict management; coping with uncertainty; creativity and innovation.
III	**Marketing:** Importance, definition, core concepts of need want and demand, Project identification and formulation: Sources of information - opportunity guidance - choice of technology and its evaluation; consumer behaviour; market survey and research; preliminary project report, detailed project report, assessing viability and feasibility of a report. exchange &relationships, product value, cost and satisfaction (goods and services) marketing environment; selling, marketing and societal marketing concepts; four P's, product, price, placement, promotion.**Finance:** Nature and scope, forms of business ownerships, balance sheet, profit and loss account, fund flow and cash flow statements, breakeven point (BEP) and financial ratio analysis, pay-back period, NPV and capital budgeting. Subsidies and concessions for SSI - role of State and Central Government Agencies in promotion of Small Scale Industry
IV	Concept of Property and Theories of Property, Types of Intellectual Property- Origin and Development, Theories of Intellectual Property Rights, Need for Protecting Intellectual Property, Commercialisation of Intellectual Property Rights by Licensing, Determining Financial Value of Intellectual Property Rights, Negotiating Payments Terms in Intellectual Property Transaction
V	Introduction to Patent Law, (a) Paris Convention , (b) Patent Cooperation Treaty, (c) WTO- TRIPS , Indian Patent Law, The Patents Act, 1970, Patentable Subject Matter, Patentability Criteria, Procedure for Filing Patent Applications, Patent Granting Procedure, Revocation, Patent Infringement and Remedies, Relevant Provisions of the Biological Diversity Act, 2002, Access and Benefit Sharing Issues

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References:

1. Handbook for New Entrepreneurs, EDII, Ahmadabad.
2. Entrepreneurial Development by P.Saravanavel.
3. Entrepreneurship of Small Scale Industries – Deshpande Manohar D. (Asian Publishers, New Delhi)
4. Environment and Entrepreneur – Tandon B.C. (Asian Publishers, New Delhi).
5. The Industrial Economy of India – Kuchhal S.C. (Chaitanya, Allahabad).
6. Emerging Trends in Entrepreneurship Development Theories & Practices – Singh P.Narendra
7. Entrepreneur, Banker & Small Scale Industries – Bhattacharya Hrisnikes.
8. Entrepreneurship & Growth of Enterprise in Industrial Estates – Rao Gangadhara N.

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Subject Title	Subject Code	Credits			Theory		
		L	T	P	Externals (70)	Internals (30)	Total (100)
Electro Magnetic Field	BT- 522	3	1	0		Min: Nil	Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours
Theory Internal - Max Marks: 30
Best of Two Mid Semester Test –Max Marks: 20
Assignment / Quiz – Max. Marks: 10

Section	Contents (Practical)
I	**Coordinate systems and transformation:** Cartesian coordinates, circular cylindrical coordinates, spherical coordinates Vector calculus: Differential length, area and volume, line surface and volume integrals, Del operator, gradient of a scalar, divergence of a vector and divergence theorem, curl of a vector and Stoke's theorem, Laplacian of a scalar.
II	**Electrostatics:** Electrostatic fields, Coulombs law and field intensity, Electric field due to charge distribution, Electric flux density, Gausses's Law – Maxwell's equation, Electric dipole and flux lines, energy density in electrostatic fields. Electric field in material space: Properties of materials, convection and conduction currents, conductors, polarization in dielectrics, dielectric constants, continuity equation and relaxation time, boundary condition. Electrostatic boundary value problems: Poission's and Laplace's equations, general procedures for solving Poission's or Laplace's equations, resistance and capacitance, method of images
III	**Magneto-statics**: Magneto-static fields, Biot-Savart's Law, Ampere's circuit law, Maxwell's equation, application of ampere's law, magnetic flux density, Maxwell's equation, Maxwell's equation for static fields, magnetic scalar and vector potential. Magnetic forces, materials and devices: Forces due to magnetic field, magnetic torque and moment, a magnetic dipole, magnetization in materials, magnetic boundary conditions, inductors and inductances, magnetic energy
IV	**Waves and applications:** Maxwell's equation, Faraday's Law, transformer and motional electromotive forces, Displacement current, Maxwell's equation in final form. Electromagnetic wave propagation: Wave propagation in lossy dielectrics, plane waves in lossless dielectrics, plane wave in free space, plain waves in good conductors, power and the pointing vector, reflection of a plain wave in a normal incidence
V	**Transmission lines**: Transmission line parameters, Transmission line equations, input impedance standing wave ratio and power, The Smith chart, some applications of transmission lines

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REFERENCES:

1. Kaduskar, Principles of Electromagnetics, Wiley India
2. Hyat, W.H. and Buck, J.A. "Engineering Electromagnetics" Tata McGraw Hill Publishing Co. Ltd.
3. Jorden E.C. and Balmain K.G. "Electromagnetic" wave radiating systems. PHI Second edition.
4. Ramo S, Whinnery T.R and Vanduzer T, Field and Waves in Communication Electronics'
5. JohnWiley and Sons.
6. Mathew N.O Sadiku; Elements of Electromagnetic; Oxford.
7. P.V. Gupta; Electromagnetic Fields; Dhanpat Rai.
8. N.N. Rao; Element of Engineering Electromagnetic; PHI.
9. William H. Hayt; Engineering Electromagnetic; TMH.
10. John D. Kraus; Electromagnetic; TMH.
11. Jordan Balmian; Electromagnetic wave & Radiating System; PHI.
12. David K. Cheng; Fields and Wave Electromagnetic; Addison Wesley.
13. S.P. Seth; Electromagnetic Field ;Dhanpat Rai & Sons.

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Semester: **V**

Subject Title	Subject Code	Credits			Theory			Practical		
		L	T	P	Externals (70)	Internals (30)	Total (100)	Externals (35)	Internals (15)	Total (50)
Transmission & Distribution of Electrical Power	**EET-503**	3	1	2		Min: Nil	Min: 40 (D Grade)	Min: 14	Min: Nil	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal - Max Marks: 30

Best of Two Mid Semester Test –Max Marks: 20

Assignment / Quiz – Max. Marks: 10

Practical Internal - Max Marks: 15

Lab work & Sessional –Max Marks: 10

Assignment / Quiz – Max. Marks: 05

Unit	Contents (Theory)
I	**Supply systems**: - Basic network of power system. Transmission and distribution voltage, effect of system voltage on size of conductor and losses. Comparison of DC 2- wire, DC wire, 1- phase AC and 3- phase AC (3- wire and 4- wire) systems. **Distribution Systems:** Primary and secondary distribution systems, feeder, distributor and service mains. Radial and ring- main distribution systems. Kelvin's law for conductor size.
II	**Mechanical features of overhead lines:** Conductor material and types of conductor. Conductor arrangements and spacing. Calculation of sag and tension supports at different levels, effect of wind and ice loading, stringing chart and sag template. Conductor vibrations and vibration dampers
III	**Parameters of Transmission Lines:** Resistance inductance and capacitance of overhead lines, effect of earth, line transposition. Geometric mean radius and distance. Inductance and capacitance of line with symmetrical and unsymmetrical spacing Inductance and capacitance of double circuit lines. Skin and proximity effects. Equivalent circuits and performance of short and medium transmission lines**.**
IV	**Generalized ABCD line constants**, equivalent circuit and performance of long transmission line. Ferranti effect. Interference with communication circuits. Power flow through a transmission line **(ii) Corona:** Electric stress between parallel conductors. Disruptive critical voltage and visual critical voltage, Factors affecting corona. Corona power loss. Effects of corona.
V	**Insulators:** Pin, shackle, suspension, post and strain insulators. Voltage distribution across an insulator string, grading and methods of improving string efficiency**.** **Underground Cables:** Conductor, insulator, sheathing and armoring materials. Types of cables. Insulator resistance and capacitance calculation. Electrostatic stresses and reduction of maximum stresses, Causes of breakdown. Thermal rating of cable. Introduction to oil filled and gas filled cables

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REFERENCES:

1. Nagrath IJ and Kothari DP; "Power System Engineering", Tata McGraw Hill
2. John S. Grainger and W. D. Stevenson Jr.," Power System Analysis", McGraw Hill.
3. Deshpande MV; "Electric Power System Design", TMH.
4. Central Electricity Generating Board; "Modem Power System Practice", Vol 1-8, Pergamon Oxfd
5. James J. Burke," Power Distribution Engineering: Fundamentals & Applications"; Marcel Dekker
6. Westinghouse Electric Corp; Electric Transmission & Distribution Reference Book; East Pittsbrg
7. Wadhwa CL;" Electric Power Systems"; Wiley Eastern Limited.
8. Ashfaq Hussain;"Electrical Power System
9. Gupta BR;"Power System Analysis and Design"

PRACTICALS

1. Determination of line parameters and sequence impedances of transmission lines.
2. Line loadability.
3. Steady state operation of transmission lines.
4. Symmetrical and Unsymmetrical power system faults.
5. To study current time characteristics of fuses.
6. Technical visit to a substation/generating station, Load Dispatch Centre and preparation of a technical report for the same
7. Conventional and renewable energy sources
8. Distribution system design

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Programme: **B. Tech. (Electrical Engineering)**

Semester: **V**

Subject Title	Subject Code	Credits			Theory			Practical		
		L	T	P	Externals (70)	Internals (30)	Total (100)	Externals (35)	Internals (15)	Total (50)
Digital Electronics	EET-504	3	1	2	Min:	Min: Nil	Min: 40 (D Grade)	Min: 14	Min: Nil	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal - Max Marks: 30

Best of Two Mid Semester Test –Max Marks: 20
Assignment / Quiz – Max. Marks: 10

Practical Internal - Max Marks: 15

Lab work & Sessional –Max Marks: 10
Assignment / Quiz – Max. Marks: 05

Unit	Contents (Theory)
I	Number Systems and Codes**:** Radix and Radix conversions, sign, magnitude & complement notation. Weighted and non-weighted codes, BCD codes, self-complementing codes, cyclic codes, error detecting and correcting codes, ASCII & EBCDIC codes. Alphanumeric codes. Fixed point and floating point arithmetic. BCD arithmetic
II	Boolean Algebra and Digital Logic Gates: Features of Boolean algebra, postulates of Boolean algebra, theorems of Boolean algebra. Fundamental logic gates, derived logic gates, logic diagrams and Boolean expressions. Converting logic diagrams to universal logic. Positive, negative and mixed logic. Minimization Techniques: Minterm, Maxterm, Karnaugh's maps, simplification of logic functions with K-map, conversions of truth tables in SOP & POS forms, incompletely specified functions, variable mapping, and Quinn-Mcklusky method.
III	Switching Circuits And Logic Families: Diode, BJT, and FET as switch. Different types of logic families: RTL, TTL, open collector TTL, three state output logic, TTL subfamilies, MOS, CMOS, ECL IIL
IV	Combination Systems: Combinational logic circuit design, Half and full adder & subtractors Binary serial and parallel adders, BCD adder. Binary multiplier, comparator, decoders, encoders, multiplexer, de-multiplexer, Code converters.
V	Sequential Systems: Latches, Flip-Flop: R-S, D, J-K, T, Master slave. Flip-flop conversions. Counters: asynchronous & synchronous counter. Counter design, counter applications. Registers: buffer & shift register

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REFERENCES:

1. An Introduction to Digital Computer Design by V. raja Raman and T. Radhakrishnan, 3rd Edn. PHI.
2. Digital Principles and Applications by A.P. Malvino and B.P. Leach, 4th Edn. McGraw Hill.
3. Digital computer Fundamentals by T.C. Bratee, 6th Edn. McGraw Hill.
4. Pulse, Digital and switching circuits-Millman

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Programme: **B. Tech. (Electrical Engineering)**

PRACTICALS:

1. Study of following combinational circuits: Multiplexer, Demultimplexer and Encoder. Verify truth tables of various logic functions.
2. Study of various combinational circuits based on: AND/NAND Logic blocks and OR/NOR Logic blocks.
3. To study various waveforms at different points of a transistor bistable multivibrator and its frequency variation with different parameters.
4. To design a frequency divider using IC-555 timer.
5. To study various types of registers and counters.
6. To study Schmitt trigger circuit.
7. To study transistor astable multivibrator.
8. Experimental study of characteristics of CMOS integrated circuits.
9. Interfacing of CMOS to TTL and TTL to CMOS.
10. BCD to binary conversion on digital IC trainer.
11. Testing of digital IC by automatic digital IC trainer.
12. To study OP-AMP as Current to Voltage & Voltage to Current converters & comparator.

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Programme: **B. Tech. (Electrical Engineering)**

Semester: **V**

Subject Title	Subject Code	Credits			Theory			Practical		
		L	T	P	Externals (70)	Internals (30)	Total (100)	Externals (35)	Internals (15)	Total (50)
Control Systems	EET-505	3	1	2	Min: 28	Min: Nil	Min: 40 (D Grade)	Min: 12	Min: Nil	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal - Max Marks: 30

Best of Two Mid Semester Test –Max Marks: 20
Assignment / Quiz – Max. Marks: 10

Practical Internal - Max Marks: 15

Lab work & Sessional –Max Marks: 10
Assignment / Quiz – Max. Marks: 05

Unit	Contents (Theory)
I	Systems – Continuous/Discrete, Time-invariant/Time-varying, Linear/Nonlinear, Open loop/Closed loop, Effects of negative feedback, Transfer Functions – (example: R-L-C series circuit or equivalent), Order and type of transfer functions, Block diagram representation of systems (example: d.c. motor or equivalent), Block diagram algebra
II	Signal Flow graph, Time and frequency domain specifications, Transient Analysis of standard first and second order systems with unity feedback, Transient and steady state errors – definitions, Error constants
III	Stability: Routh Hurwitz Criteria and Nyquist stability criterion, Relative stability: Siginificance of Gain margin and phase margin, Construction of Root locus, Bode plots and Polar plots, Minimum/Non-minimum phase systems, Transportation lag, Pade approximation
IV	Case studies: Effect of P, PI, PD and PID control, Effects of Lead and lag compensation – time domain and frequency domain analysis, Effect of tacho-generator feedback
V	Control system components: Potentiometers, synchros, Tachogenrators, A.C. and D.C. Servomotors, Gyroscope

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REFERENCES:

1. M. Gopal, Control Systems Principles and Design, Second Edition, Tata McGraw Hill 2002.
2. Benjamin C. Kuo, Automatic Control Systems, 7th Edition, Prentice Hall of India, 1995.
3. Naresh K. Sinha, Control Systems, CBS college Publishing, 1986.

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PRACTICALS:

1. Introduction to MATLAB Computing Control Software.
2. Defining Systems in TF, ZPK form.

   (a) Plot step response of a given TF and system in state-space. Take different values of damping ratio and wn natural undamped frequency. (b) Plot ramp response.
3. For a given 2nd order system plot step response and obtain time response specification.
4. To design 1st order R-C circuits and observe its response with the following inputs and trace the curve.

   (a) Step (b) Ramp (c) Impulse
5. To design 2nd order electrical network and study its trarient response for step input and following cases.

   (a) Under damped system (b) Over damped System. (c) Critically damped system.
6. To Study the frequency response of following compensating Networks, plot the graph and final out corner frequencies. (a) Lag Network (b) Lead Network (c) Lag-lead Network.
7. To draw characteristics of a.c servomotor
8. To perform experiment on Potentiometer error detector.
9. Check for the stability of a given closed loop system.
10. Plot bode plot for a 2nd order system and find GM and PM.

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Semester: **V**

Subject Title	Subject Code	Credits			Practical		
		L	T	P	External	Internal	Total (50)
Dot Net	BT- 526	0	0	4	(35)	(15)	Min: 20 (D Grade)

Practical Internal - Max Marks: 15

Lab Performance, Lab Record & Viva –Max Marks: 10
Assignment / Quiz – Max. Marks: 05

Unit	Contents *(Practical)*
I	**Introduction:** Introduction to DOT NET Framework, its Architecture, Components, Languages, Application Development, Requirements and Features, Installation of DOT NET, IIS Server, Introduction to C#, Comparison of C, C++, Java and C#.
II	**C# Console:** Introduction to C# Program Structure, Tokens, Expressions, Data Types, Conditional Statements, Loops, Switch Case, Functions, Strings, Arrays, File Handling, Exception Handling, C# as Object Oriented Language, Classes & Objects, Constructors, Inheritance, Polymorphism, C# Packages and Namespaces.
III	**Windows Applications:** Introduction to HTML, HTML Tags, Introduction to CSS, Types, Introduction to Windows Applications, Use of C# Tools in Development of Windows Applications, Validation Controls, MDI Forms and Introduction to Crystal Reports.
IV	**Web Applications:** Introduction to ASP.NET, Introduction to Web Page Designing, Web Development, Static Pages, Dynamic Pages, Introduction to SQL, SQL Queries, SQL Server, Introduction to ADO.NET, Development of Applications with Data Base, Front End – Back End Connectivity, Types, Data Base Controls, Introduction to Content Management System and FCK Editor.
V	**Additional Technologies:** Introduction to XML, Structure and Syntax of XML, Introduction to Java Scripts, Using Java Scripts on Web Forms, Introduction to AJAX, Application of AJAX in Web Design Applications and Development of a Small Project in ASP.NET using C#.

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Subject Title	Subject Code	Credits			Practical		
Electrical Software Lab-II	EET-507	L	T	P	Externals (NIL)	Internals (50)	Total (50)
		-	-	2		Min: Nil	Min: 20 (D Grade)

Practical Internal - Max Marks: 50

Lab work & Sessional –Max Marks: 25
Assignment / Quiz – Max. Marks: 25

Contents (Practical)
Electrical Software Lab-II
Note: Experiments are to be performed from the following list using Matlab/Multisim any other simulation package 1. To obtain transient response of a series R-L-C circuit for step voltage input. 2. To obtain transient response of a parallel R-L-C circuit for step current input. 3. To obtain transient response of a series R-L-C circuit for alternating square voltage waveform. 4. To obtain frequency response of a series RLC circuit for sinusoidal voltage input 5. Determination of transient response of current in RLC circuit with step voltage input for under damp, critically damp and over damp cases 6. Determination of frequency response of current in RLC circuit with sinusoidal ac input

REFERENCES:

Matlab and simulink Malik SciTech

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Semester: V

Subject Title	Subject Code	Credits			Practical		
Industrial Training I	EET-508	L	T	P	Externals (Nil)	Internals (50)	Total (50)
		-	-	2	Min: Nil	Min: Nil	Min: 20 (D Grade)

Practical Internal - Max Marks: 25
Lab work & Sessional – Max Marks: 25
Assignment / Quiz – Max. Marks: 50

Contents (Practical)
Industrial Training
OBJECTIVE OF INDUSTRIAL TRAINING The objective of undertaking industrial training is to provide work experience so that student's engineering knowledge is enhanced and employment prospects are improved. The student should take this course as a window to the real World of Work and should try to learn as much as possible from real life experiences by involving and interacting with industry staff. Industrial training also provides an opportunity to students to select an engineering problem and possibly an industry guide for their Project in Pre final Year. Industrial training of the students is essential to bridge the wide gap between the classroom and industrial environment. This will enrich their practical learning and they will be better equipped to integrate the practical experiences with the classroom learning process.

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