PEOPLE'S UNIVERSITY, BHOPAL

(Applicable for Admitted from Academic Session 2019-20 onwards)

Programme: **Bachelor of Technology** **Semester –IV**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total (100)	External	Internal	Total
BT-1401	Engineering Mathematics-III	3	1	-	External (70)	Internal (30)	Min: 40 (D Grade)	Nil	Nil	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks:-15	Assignment/Quiz/Attendance- Max. Marks:-15
Practical Internal Max Marks: Nil	Lab work & Sessional – Max Marks:-Nil	Assignment / Quiz/Attendance - Max. Marks:- Nil

Pre-Requisite	Fundamental knowledge of basic mathematics such as Algebra and Trigonometry.
Course Outcome	1. Experience mathematics outside of your regular course work.
	2. Use knowledge and skills necessary for immediate employment or acceptance into a graduate program.
	3. Maintain a core of mathematical and technical knowledge that is adaptable to changing technologies and provides a solid foundation for future learning.

Unit	Contents (Theory)	Marks Weightage
I	**Functions of Complex Variables :** Analytic functions, Harmonic Conjugate, Cauchy – Riemann Equations, Line integral, Cauchy's theorem, Cauchy's Integral formula, Singular points, Poles and Residues, Residue theorem and Evaluation of Real Integral	**14**
II	**Solution of Algebraic & Simultaneous Equations :** Solutions of algebraic and transcendental equations(Regula Falsi, Newton-Raphson, Iterative, Graffee's root squaring methods) and Solutions of simultaneous algebraic equations (Gauss Elimination, Gauss Jordan, Jacobi Iterative, ,Gauss Seidel and Crout's Traingularization).	**14**
III	**Numerical Analysis:** Difference operators, Errors and Approximations, Interpolation, Inverse interpolation, Numerical differentiation, Numerical Integration by using Simpson's method, Weddle's rule and Trapezoidal Rule.	**14**
IV	**Solution to Differential Equations:** Solutions of ordinary differential equations (Taylor's Series, Picard's Method, Euler's Method, Modified Euler's method, Runge Method and Runge Kutta Method).solve differential equation Milne's predictor and corrector method	**14**
V	**Concept of Probability:** Probability Mass function, Probability Density Function, Discrete Distribution: Binomial, Poisson's, Continuous Distribution: Normal Distribution, Exponential Distribution.Curve Fitting(method of least square)	**14**

Text Book/References Books/ Websites

1. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications
2. D.C. Aggarwal "Engineering Mathematics II
3. Mathematical Methods by KV Suryanarayan Rao, SCITECH Publication
4. Numerical Methods using Matlab by J.H.Mathews and K.D.Fink, P.H.I.
5. Numerical Methods for Scientific and Engg. Computation by MKJain, Iyengar and RK Jain, New Age International Publication
6. Numerical Methods using Matlab by Yang,Wiley India
7. Pobability and Statistics by Ravichandran ,Wiley India
8. Mathematical Statistics by George R., Springer

Suggested List of Laboratory Practical (Expandable): Nil

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total (100)	External	Internal	Total
EET-1402	Electrical Power Generation	3	1	-	External (70)	Internal (30)	Min: 40 (D Grade)	Nil	Nil	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks:-20	Assignment/Quiz/Attendance- Max. Marks:-10
Practical Internal Max Marks: Nil	Lab work & Sessional – Max Marks: - Nil	Assignment / Quiz/Attendance - Max. Marks: - Nil

Pre-Requisite	Knowledge of the basic electrical equipments and their related terminologies.
Course Outcome	1. Knowledge of electrical machines.
	2. Knowledge of electrical measurement and instrumentation.
	3. Knowledge of non conventional energy sources.

Unit	Contents (Theory)	Marks Weightage
I	**Choice of power station and unit:** Type of Generator, Size of Generator and number of units. Thermal Power Station: Main parts and working, Main flow circuits of Thermal Power Station, Power Station auxiliaries, Cooling system of alternators, Starting up procedure of thermal units.	**14**
II	**Nuclear Power Station:** Principles of Nuclear reaction, Layout of Nuclear Power Station, Types of power reactors, Main parts and Control reactors, Nuclear waste disposal, Radioactivity and Hazards.	**14**
III	**Hydroelectric Power Station:** Stream flow, Hydrographs, Flow duration curve, Arrangement and location of hydroelectric stations, Principle of working, Power station control, Pump and Storage system.	**14**
IV	**Advanced Direct Energy Conversion Systems**: Basic Principles of Design and Operation of Photovoltaic Energy Systems, Fuel Cells, Magneto-hydrodynamic Power Generators.	**14**
V	**Introduction of non-conventional energy sources:** Solar Energy, Wind electricity, Energy from Biomass gasifiers and Biogas reactors, Tidal energy, geothermal energy.	**14**

Text Book/References Books/ Websites

1. G. R. Nagpal; "Power Plant Engineering"; Khanna Publisher.
2. M.V. Deshpandey; Modern Design of Power Station.
3. K. K.Ramaligaum; Power Plant Engineering; SciTech.

Suggested List of Laboratory Experiments :- (Expandable): Nil

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Programme: **Bachelor of Technology** **Semester –IV**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total (50)
EET-1403	Electronic Device & Circuits	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	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/Attendance- Max. Marks:-10
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks:-10	Assignment / Quiz/Attendance - Max. Marks:-05

Pre-Requisite	Knowledge of the basic electronic devices and their working.
Course Outcome	1. Explain the structure and working operation of basic electronic devices.
	2. Analyze the characteristics of different electronic devices such as diodes and transistors.
	3. Choose and adapt the required components to construct an amplifier circuit.

Unit	Contents (Theory)	Marks Weightage
I	**PN Junction Devices:** PN junction diode –structure, operation and V-I characteristics, diffusion and transition capacitance – Rectifiers – Half Wave and Full Wave Rectifier,– Display devices- LED, Laser diodes, Zener diode characteristics- Zener Reverse characteristics – Zener as regulator.	**14**
II	**Transistors And Thyristors:** BJT, JFET, MOSFET- structure, operation, characteristics and Biasing UJT, Thyristors and IGBT – Structure and characteristics.	**14**
III	**Amplifiers** : BJT small signal model – Analysis of CE, CB, CC amplifiers- Gain and frequency response –MOSFET small signal model– Analysis of CS and Source follower – Gain and frequency response- High frequency analysis.	**14**
IV	**Multistage Amplifiers And Differential Amplifier**: BIMOS cascade amplifier, Differential amplifier – Common mode and Difference mode analysis – FET input stages – Single tuned amplifiers – Gain and frequency response Neutralization methods, Power amplifiers –Types (Qualitative analysis).	**14**
V	**Feedback Amplifiers And Oscillators**: Advantages of negative feedback – voltage/current, series, Shunt feedback– positive feedback – Condition for oscillations, phase shift – Wien bridge, Hartley, Colpitts and Crystal oscillators.	**14**

Text Book/References Books/ Websites

1. Balbir Kumar, Shail.B.Jain ; "Electronic devices and circuits" : PHI learning private limited, 2nd edition 2014.
2. Thomas L.Floyd ; "Electronic devices" ; Conventional current version, Pearson prentice hall, 10th Edition, 2017.
3. Donald A Neamen ; "Electronic Circuit Analysis and Design" ; Tata McGraw Hill, 3rd Edition, 2003.
4. Robert L.Boylestad; "Electronic devices and circuit theory"; 2002.
5. Robert B. Northrop; "Analysis and Application of Analog Electronic Circuits to Biomedical Instrumentation; CRC Press, 2004.

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Programme: **Bachelor of Technology** **Semester –IV**

Suggested List of Laboratory Experiments :- (Expandable):

1. To plot P-N Junction Diode Characteristics.
2. To plot Zener Diode Characteristics.
3. To plot BJT Characteristics.
4. To plot FET Characteristics.
5. To plot SCR Characteristics.
6. To plot UJT Characteristics.

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Programme: **Bachelor of Technology** **Semester –IV**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total (50)
EET-1404	Electrical Machine – II	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	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/Attendance Max. Marks:-10
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks:-10	Assignment / Quiz/Attendance - Max. Marks:-05

Pre-Requisite	Knowledge about the basic electrical circuits and basic electrical machines.
Course Outcome	1. Various basic concepts regarding AC machine and its comparision with the DC machine.
	2. Characteristics and behaviour of Induction Motor in starting and in running condition.
	3. Synchronous Motor basic concepts and other special machine and use in industries.

Unit	Contents (Theory)	Marks Weightage
I	**General equation of inducted E.M.F, AC armature windings:** concentric and Distributed winding, chording, skewing, effect on induced emf, Armature and field mmf, effect of power factor and current on armature mmf, harmonics. Rotating fields.	**14**
II	**Single phase Induction motors:** Construction, Theories of operation, Revolving Field Theory, Equivalent Circuit, Phasor diagram, Starting methods, Speed-torque characteristics, Cross-field theory.	**14**
III	**Three phase Induction motor:** Construction and types, Rotating Magnetic Field, Equivalent circuit, Phasor diagram, Speed-torque characteristics, Circle diagram, Deep bar rotor and Double cage rotor. Cogging and Crawling, Starting and Speed control of 3-phase induction motor, induction generator.	**14**
IV	**Synchronous Generator:** Constructions and types, Emf equation, Phasor diagram, Armature reaction, Characteristics, Voltage regulations, Synchronization, Parallel operation, Power angle characteristics, Excitation characteristics. Salient pole synchronous machine: Two-reaction theory, Phasor diagram and Voltage regulation.	**14**
V	**Synchronous Motor:** Expression for torque, Phasor diagram, Operating characteristics, Electrical and mechanical power, V-curves and O-curves, Starting, Hunting and Damper winding.	**14**

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Programme: **Bachelor of Technology** **Semester –IV**

Text Book/References Books/ Websites

1. Fitzgerald & Kingsley; " Electric Machinery" ; MGH.
2. A.S. Langsdorf; "Theory of alternating current machinery"; TMH.
3. P.S.Bhimbra; "Electrical Machines" ; Khanna Publishers Delhi.

Suggested List of Laboratory Experiments :- (Expandable):

1. To plot the O.C.C. & S.C.C. of an alternator and to determine its regulation by synchronous impedance method.
2. To synchronize an alternator across the infinite bus (RSEB) & summarize the effects of variation of excitation on load sharing.
3. To plot the V-curve for a synchronous motor for different values of loads.
4. To perform no load and blocked rotor test on a 3 phase induction motor and to determine the parameters of its equivalent circuits.
5. To perform the load test on a 3-phase induction motor and determine its performance characteristics (a) Speed vs load curve (b) P.F. vs load curve (c) Efficiency vs load curve (d) Speed vs torque curve.
6. Determination of losses and efficiency of an alternator.
7. To find X_d and X_q of a salient pole synchronous machine by slip test.
8. To perform no load test on a 3 phase alternator (cylindrical rotor).

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Programme: **Bachelor of Technology** **Semester –IV**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total (50)
EET-1405	Analog & Digital Communication	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	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/Attendance- Max. Marks: - 10
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks:-10	Assignment / Quiz/Attendance - Max. Marks:-05

Pre-Requisite	Basic knowledge about the signal and systems.
Course Outcome	1. Fundamentals of analog and digital communication systems.
	2. Familiarize students with various techniques for amplitude modulation and demodulation of analog signals
	3. Familiarize students with issues pertaining to the transmission of digital signals over bandwidth-limited communication channels.

Unit	Contents (Theory)	Marks Weightage
I	Time domain and frequency domain representation of signal, Fourier Transform and its properties, Transform of Gate, Periodic gate, Impulse periodic impulse sine and cosine wave, Concept of energy density and power density (Parseval's theorem), Power density of periodic gate and impulse function, impulse response of a system, convolutions, convolution with impulse function, causal and non causal system impulse response of ideal low pass filter, Correlation & Auto correlation.	**14**
II	Base band signal, need of modulation, Introduction of modulations techniques, Amplitude modulation, Equation and its frequency domain representation, Bandwidth, Power distribution. AM suppressed carrier waveform equation and frequency domain representation Generation (Balance/Chopper modulator) and synchronous detection technique, errors in synchronous detection, Introduction to SSB and VSB Transmission Angle modulation, Frequency and phase modulation equation and their relative phase and frequency deviations, modulation index frequency spectrum, NBFM and WBFM, Bandwidth comparison of modulation techniques	**14**
III	Sampling of signal, sampling theorem for low pass and Band pass signal, Pulse amplitude modulation (PAM), Time division, multiplexing (TDM). Channel Bandwidth for PAM-TDM signal Type of sampling instantaneous, Natural and flat top, Aperture effect, Introduction to pulse position and pulse duration modulations, Digital signal, Quantization, Quantization error, Pulse code modulation, signal to noise ratio, Companding, Data rate and Baud rate, Bit rate, multiplexed PCM signal, Differential PCM (DPCM), Delta Modulation (DM) and Adaptive Delta Modulation (ADM), comparison of various systems.	**14**
IV	Digital modulations techniques, Generation, detection, equation and Bandwidth of amplitude shift keying (ASK) Binary Phase Shift keying (BPSK), Differential phase shift keying (DPSK), offset and non offset quadrature phase shift keying (QPSK), M-Ary PSK, Binary frequency Shift Keying (BFSK), M-Ary FSK Quadrature Amplitude modulation (QAM), MODEM, Introduction to probability of error.	**14**

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Programme: **Bachelor of Technology** **Semester –IV**

V	Information theory and coding- Information, entropies (Marginal and conditional), Model of a communication system, Mathematical representation of source, channel and receiver characteristics, Mutual information, channel capacity efficiency of noise free channel Binary symmetric channel (BSC) Binary erasure channel (BEC), Repetition of signal, NM symmetric Binary channel, Shannon theorem, Shanon-Hartley theorem (S/N-BW trade off)Source encoding code properties; Shanon, Fano and Huffman coding methods and their efficiency error control coding, Minimum Hamming distance, Linear Block Code, Cyclic code and convolution codes.	**14**

Text Book/References Books/ Websites

1. Singh & Sapre; Communication System; TMH.
2. Taub & shilling; Communication System; TMH.
3. Hsu; Analog and digital communication (Schaum); TMH .
4. Martin S. Roden, Analog & Digital Communication System; Discovery Press.

Suggested List of Laboratory Experiments :- (Expandable):

1. Study of sampling process and signal reconstruction and aliasing.
2. Study of PAM PPM and PDM.
3. Study of PCM transmitter and receiver.
4. Time division multiplexing (TDM) and De multiplexing.
5. Study of ASK PSK and FSK transmitter and receiver.
6. Study of AM modulation and Demodulation techniques (Transmitter and Receiver) Calculate of parameter.
7. To construct and verify pre emphasis and de-emphasis and plot the wave forms.
8. Study of super heterodyne receiver and characteristics of ratio radio receiver.
9. To construct frequency multiplier circuit and to observe the waveform.
10. Study of AVC and AFC.

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Programme: **Bachelor of Technology** **Semester –IV**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total			Total (50)
EET-1406	PCB Lab	-	-	1	External (Nil)	Internal (Nil)	Nil	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks:-Nil	Assignment/Quiz/Attendance- Max. Marks:-Nil
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks:-10	Assignment / Quiz/Attendance - Max. Marks:-05

Pre-Requisite	Nil
Course Outcome	1. Students are able to design a schematic of their circuit.
	2. Students are able to design PCB layout of their design.
	3. Students are capable to produce PCB of their own circuit.

Unit	Contents(Theory)	Marks Weightage
I	Study of Transformer, Soldering shop, power supply, Bread board, Photo-resist slip coating machine. U.V exposer unit. Photo developer dye machine. Photo curing machine (oven). Etching and Drilling of PCB, Etching machine, Ferric chloride, Drilling Machine and Preparation and mounting components of P.C.B.	**50**

Text Book/References Books/ Websites

1. RS Khandpur; "Printed Circuit Boards"; Design, Fabrication, Testing & Assembly; Tata McGraw hill, New Delhi.
2. Brendon Parise and Scott Nance; "A Practical Guide To RF And Mixed Signal Printed Circuit Board Layout"; Kindle Edition
3. Walter C Boshart; "Printed Circuit Boards"; Design and Technology; Tata McGraw Hill Publishing Company Limited.

Suggested List of Laboratory Experiments :- (Expandable):

1. To study of Winding shop: Step down transformer winding of less than 5VA.
2. Soldering shop: Fabrication of DC regulated power supply.
3. PCB Lab: (a) Artwork & printing of a simple PCB. (b) Etching & drilling of PCB.
4. Wiring & fitting shop: Fitting of power supply along with a meter in cabinet.
5. Testing of regulated power supply fabricated.

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Programme: **Bachelor of Technology** **Semester –IV**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total			Total (50)
BT-1407	Social Engineering	-	-	1	External (Nil)	Internal (Nil)	Nil	External Nil	Internal (50)	Min: 20 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance Max. Marks: Nil
Practical Internal Max Marks: Nil	Lab work & Sessional – Max Marks: Nil	Assignment / Quiz/Attendance Max. Marks: 50

Pre-Requisite	**Nil**
Course Outcome	1. An outcome refers to psychological manipulation and human behavior of students into performing actions or divulging confidential information.

Unit	Contents (Theory)	Marks Weightage
	Social engineering is one of the most prolific and effective means of gaining access to secure systems and obtaining sensitive information yet requires minimal technical knowledge. Social engineering works by manipulating normal human behavioral traits and as such there are only limited technical solutions to guard against it. As a result, the best defense is to educate users on the techniques used by social engineers, and raising awareness as to how both humans and computer systems can be manipulated to create a false level of trust. This can be complemented by an organizational attitude towards security that promotes the sharing of concerns, enforces information security rules and supports users for adhering to them. Contents are as follows: Introduction of Social Engineering; Types; Psychology in Social Engineering; The Social Engineering Life Cycle; Human Behavior; Weapons of a Social Engineer; Defense against Social Engineering; Examples; Reverse Social Engineering.	**50**

Text Book/References Books/ Websites:

1. Kevin Mitnick; The book The Art Of Deception.
2. www.socialengineer.com/wpcontent/uploads/2017/02/AdvancedPracticalSocialEngineering-Syllabus.pdf.
3. www.youtube.com/watch?v=b-yqbNM3s7c&feature=related
4. **https://www.exploit-db.com/docs/english/18135-social-engineering---the-human-factor.pdf.**
5. **http://www.ittoday.info/AIMS/DSM/82-10-43.pdf**

Suggested List of Laboratory Experiments :- (Expandable):

Students should prepare a hand written report on social engineering as assigned by faculty.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total			Total (50)
EET-1408	Electrical Software Lab - I	-	-	1	External (Nil)	Internal (Nil)	Nil	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance Max. Marks: Nil
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment / Quiz Max. Marks: 05

Pre-Requisite	Basic knowledge of Programming.
Course Outcome	1. Familiarize the student in introducing and exploring MATLAB Softwares.
	2. Enable the student on how to approach for solving Engineering problems using MATLAB tools.
	3. Provide a foundation in use of this software for real time applications.

Unit	Contents(Theory)	Marks Weightage
I	Introduction, Branching statements, loops, functions, additional data types, plots, arrays, inputs/outputs etc, Introduction regarding usage of any Network Simulator. Practical Implementation of Queuing Models using C/C++.	**50**

Text Book/References Books/ Websites

1. Agam Kumar Tyagi; "Matlab and simulink for Engineers"; Oxford.
2. Shailendra Jain; Modeling and Simulation using MATLAB – Simulink; Willey.
3. Stormy Attaway; "A Practical Introduction to Programming and Problem solving"; Elsevier.

Suggested List of Laboratory Experiments :- (Expandable):

1. Introduction to MATLAB Computing Control Software and get a general understanding of the purpose of MATLAB.
2. Understand the MATLAB Workspace (a) start up MATLAB (b) type commands in main window (c) change current directory.
3. Programming in Matlab: Introduction, Branching statements, loops, functions, additional data types, plots, arrays, inputs/outputs e.t.c.
4. Program to display a Matrix.
5. Program to Addition of matrix.
6. Program to transpose of a Matrix.
7. Introduction regarding usage of any Network Simulator.
8. Practical Implementation of Queuing Models using C/C++.
9. Applications of MATLAB.