PEOPLE'S UNIVERSITY, BHOPAL
(Applicable for Admitted from Academic Session 2019-20 onwards)

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

Subject Code	Subject Title	Credit			Theory			Practical		
		L	**T**	**P**	**External (70)**	**Internal (30)**	**Total (100)**	**External**	**Internal**	**Total**
BT-1501	**Entrepreneurship & IPR**	3	1	-			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	Nil	
Course Outcome	1.	Students will be able to define, identify and/or apply the principles of entrepreneurial and family business.
	2.	Students will be able to define, identify and/or apply the principles of viability of businesses, new business proposals, and opportunities within existing businesses.
	3.	Students will be able to define, identify and/or apply the principles of developing pro forma financial statements.

Unit	Contents (Theory)	Marks Weightage
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 organizations/ownership - formation of a company - procedures and formalities for setting up of new industry-sources of information to contact for what and where.	14
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, Mc Cullen - motivation model - need, want, motive and behavior – attitude towards work - self assessment and goal setting - achievement, motivation and behavior measurement, swot analysis and analysis - stress and conflict management; with uncertainty; creativity and innovation.	14
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 behavior; 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	14

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IV	**Concept of Property:** Theories of property, types of intellectual property- origin and development, theories of intellectual property rights, need for protecting intellectual property, commercialization of intellectual property rights by licensing, determining financial value of intellectual property rights, negotiating payments terms in intellectual property transaction	**14**
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	**14**

Text Book/References Books/ Websites:

1. Tandon B.C.; Environment and Entrepreneur; Asian Publishers, New Delhi.
2. P. C. Jain ; Handbook for New Entrepreneurs; Oxford University Press
3. Baporikar, N; Entrepreneurship and Small Industry; Himalaya Publishing House

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

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	**T**	**P**	**External (70)**	**Internal (30)**	**Total (100)**	**External**	**Internal**	**Total**
BT-1522	**Electromagnetic Theory**	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	To understand, develop and design various applications involving electromagnetic fields.
Course Outcome	1. Apply vector calculus to static electric-magnetic fields.
	2. Analyze Maxwell's equation in different forms
	3. Analyze the nature of electromagnetic wave propagation in guided medium.

Unit	Contents (Theory)	Marks Weightage
I	**Coordinate System and Vector Fields:** Cartesian coordinate system, Cylindrical Coordinate System , Spherical Coordinate System, Transformation of Coordinate system, vector algebra, Line integral, Surface integral and volume integral,Gradient,Divergence,Curl,Green's theorem, Divergence theorem, Stoke's theorem.	
II	**Electrostatic Fields:** Coulomb's law, Gauss's law and its application, Electric Field Intensity, Electric Flux Density, Electrostatic Potential and work, Line Charge, Surface Charge, Volume Charge, Poisson's and Laplace's equations ,Equation of continuity, Conductors,Dieletrics, Capacitance,Boundary conditions for Electrostatic field.	**14**
III	**Static Magnetic Fields:** Biot-Savart Law and its Application, Ampere's Law and its Application, Magnetic Field intensity,Magnetic field due to straight conductor, circular loop, infinite sheet Magnetic Flux Density, Scalar and Vector Potential, Magnetic forces, Magnetic Torque, Magnetic Dipole Moment, Energy stored in Magnetic field, Inductance and Mutual Inductance Boundary conditions for magnetic field.	
IV	**Time Varying Fields and Maxwell's Equations:** Faraday's law of electromagnetic, Displacement Current, , Maxwell's equations in Differential and Integral Form, Maxwell's equations in free space, Maxwell's equations for harmonically varying, static and steady field, time-harmonic fields.	**14**
V	**Wave Equation and Plane Waves:** Helmholtz wave equation, Solution to wave equations and plane waves, Wave polarization, Poynting vector and Poynting Theorem, power flow in electromagnetic fields,Electromagnetic wave generation and equations – Wave parameters; velocity, intrinsic impedance, propagation constant – Waves in free space, lossy and lossless dielectrics, conductors, skin depth ,Plane wave reflection and refraction, Standing Wave , Applications.	**14**

Text Book/References Books/ Websites:

1. Mathew N. O. Sadiku; Principles of Electromagnetics; Oxford University Press Inc.
2. D. K. Cheng; Field and Wave Electromagnetics; Pearson.
3. Ashutosh Pramanik; Electromagnetism – Theory and Applications; PHI.

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

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	**T**	**P**	**External (70)**	**Internal (30)**	**Total (100)**	**External (35)**	**Internal (15)**	**Total (50)**
EET-1503	**Transmission and Distribution of Electrical Power**	3	1	1			Min: 40 (D Grade)			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 of electrical terminologies.
Course Outcome	1. Knowledge of basic power system elements.
	2. Ability to understand Transmission Line parameters.
	3. Acquire knowledge of various losses in different transmission lines.

Unit	Contents (Theory)	Marks Weightage
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.	14
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.	14
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**.**	14
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.	14
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**.**	14

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Text Book/References Books/ Websites

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";S Chand.

Suggested List of Laboratory Experiments :- (Expandable):

1. Determination of line parameters and sequence impedances of transmission lines.
2. Steady state operation of transmission lines.
3. Symmetrical and Unsymmetrical power system faults.
4. To study current time characteristics of fuses.
5. Conventional and renewable energy sources.
6. Distribution system design.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100) Min: 40 (D Grade)	External (35)	Internal (15)	Total (50) Min: 20 (D Grade)
EET-1504	Digital Electronics	3	1	1						

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 Basic Electronics Engineering.	
Course Outcome	1.	Knowledge about basic digital electronics.
	2.	Ability to design basic logic circuits, combinational and sequential circuits.
	3.	Understand the basic digital circuits and to verify their operation.

Unit	Contents (Theory)	Marks Weightage
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.	14
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.	14
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.	14
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.	14
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.	14

Text Book/References Books/ Websites

1. V. raja Raman and T. Radhakrishnan; "An Introduction to Digital Computer Design"; 3rd Edn. PHI.
2. A.P. Malvino and B.P. Leach ;"Digital Principles and Applications"; 4th Edn. McGraw Hill.
3. T.C. Bratee ;"Digital computer Fundamentals"; 6th Edn. McGraw Hill.

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Suggested List of Laboratory Experiments :- (Expandable):

1. Study of following combinational circuits: Multiplexer, De Multiplexer 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.To study various types of registers and counters.
5. To study Schmitt trigger circuit.
6. To study transistor astable Multivibrato.
7. Experimental study of characteristics of CMOS integrated circuits.
8. Interfacing of CMOS to TTL and TTL to CMOS.
9. BCD to binary conversion on digital IC trainer.
10. Testing of digital IC by automatic digital IC trainer.
11. To study OP-AMP as Current to Voltage & Voltage to Current converters & comparator.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total Min: 40 (D Grade)	External (35)	Internal (15)	Total (50) Min: 20 (D Grade)
EET-1505	Control Systems	3	1	1						

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 Laplace, Fourier transform, and Differential equations etc.	
Course Outcome	1.	Understand the stability concepts of various systems.
	2.	Knowledge about the basic techniques to make any system stable.
	3.	Analyze system response and evaluate error dynamics in time domain.

Unit	Contents (Theory)	Marks Weightage
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: DC motor or equivalent), Block diagram algebra.	14
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.	14
III	Stability: Routh Hurwitz Criteria and Nyquist stability criterion, Relative stability: Significance of Gain margin and phase margin, Construction of Root locus, Bode plots and Polar plots, Minimum/Non-minimum phase systems, Transportation lag, Pade approximation.	14
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.	14
V	Control system components: Potentiometers, Synchros, Tachogenrators, A.C. and D.C. Servomotors, Gyroscope.	14

Text Book/References Books/ Websites

1. M. Gopal; "Control Systems Principles and Design"; Second Edition, Tata McGraw Hill.
2. Benjamin C. Kuo;"Automatic Control Systems" 7th Edition, Prentice Hall of India.
3. Naresh K. Sinha; "Control Systems"; CBS college Publishing.
4. A. Anand Kumar; "Control Systems" 2nd Edition, Kindle Edition.
5. I.J. Nagrath; "Control Systems Engineering" (Multi Colour Edition) New Age international Publisher.

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Suggested List of Laboratory Experiments :- (Expandable):

1. Introduction to MATLAB Computing Control Software.
2. Defining Systems in Transfer Function form.
   (a) Plot step response of a given Transfer Function and system in state-space. Take different values of damping ratio and natural undammed 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 observes 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 transient response for step input and following cases.
   (a) Undammed system.
   (b) Under damped system.
   (c) Over damped System.
   (d) 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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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total			Total (50)
EET-1506	Electrical Software Lab – II	-	-	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/Attendance - Max. Marks:-05

Pre-Requisite	Knowledge about circuits.
Course Outcome	1. Knowledge about various waveforms generated using different circuits.
	2. Knowledge about frequency response of circuits.
	3. Analyzing and understanding different circuits.

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.

Suggested List of Laboratory Experiments :- (Expandable):

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.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total			Total (100)
EET-1507	Industrial Training-I	-	-	2	External (Nil)	Internal (Nil)	Nil	External (70)	Internal (30)	Min: 40 (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: 30	Lab work & Sessional – Max Marks: 20	Assignment / Quiz/ Attendance Max. Marks: 10

Pre-Requisite	Fundamental Engineering concepts of concern discipline.
Course Outcome	1. Enrich their practical learning and they will be better equipped to integrate the practical experiences with the classroom learning process. 2. Interact with real World of Work and should try to learn as much as possible from real life experiences by involving with industry staff.

Unit	Contents (Theory)	Marks Weightage
I	The objective of undertaking industrial training is to provide work experience so that student's engineering knowledge is enhanced and employment prospects are improved. Industrial training of the students is essential to bridge the wide gap between the classroom and industrial environment. As a part of B. Tech. curriculum, EET1507, Industrial Training -I is a Practical course, which the students should undergo in reputed Private / Public Sector / Government organization / companies as industrial training of minimum two weeks to be undergone by the student in the semester break after IV semester theory examinations. **Training period**: Minimum of two weeks or 15 (Fifteen) Days. **Evaluation:** Fifth semester **Companies / Areas covered**: Any field related to concern branch / discipline of Engineering. **Grading**: As per Scheme. **Note:** Presentation will take place the following week after completion your training. The presentation is evaluated by your class in charge. Report must be submitted during power point presentation. A Viva voce comprising comprehensive questions based on your presentation and training undergone. **Etiquettes:** Dress properly, Behave well, Portray good image as a university student, Be punctual, Observe work ethics, Concern for safety, Be professional.	100

Text Book/References Books/ Websites: Nil
Suggested List of Laboratory Experiments :- (Expandable): Nil

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	**T**	**P**	**External (35)**	**Internal (15)**	**Total (50)**	**External**	**Internal**	**Total**
BT-1508	**Indian Constitution**	2	-	-			Min: 20 (D Grade)	Nil	Nil	Nil

Duration of Theory (Externals): 2 Hours

Theory Internal- Max Marks: 15	Best of Two Mid Semester Test – Max Marks: Nil	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	**Nil**	
Course Outcome	1. Understand the functions of the Indian government.	
	2. Understand and abide the rules of the Indian constitution.	

Unit	Contents (Theory)	Marks Weightage
I	**Introduction:** Constitution' meaning of the term; Indian Constitution: Sources and constitutional history; Features: Citizenship; Preamble; Fundamental Rights and Duties; Directive Principles of State Policy.	**07**
II	**Union Government and its Administration:** Structure of the Indian Union: Federalism; Centre- State relationship; President: Role; power and position; PM and Council of ministers; Cabinet and Central Secretariat; Lok Sabha; Rajya Sabha.	**07**
III	**State Government and its Administration:** Governor: Role and Position; CM and Council of ministers; State Secretariat: Organization; Structure and Functions.	**07**
IV	**Local Administration:** District's Administration head: Role and Importance; Municipalities: Introduction; Mayor and role of Elected Representative; CEO of Municipal Corporation; Pachayati raj: Introduction; PRI; Zila Pachayat; Elected officials and their roles; CEO Zila Pachayat: Position and role; Block level: Organizational Hierarchy (Different departments); Village level: Role of Elected and Appointed officials; Importance of grass root democracy.	**07**
V	**Election Commission:** Role and Functioning; Chief Election Commissioner and Election Commissioners; State Election Commission: Role and Functioning; Institute and Bodies for the welfare of SC/ST/OBC and women.	**07**

 # Mandatory (Non Credit) subject according to AICTE. Non University Examination; End Sem marks not to be included in total marks and credit. Students must pass in this subject.

Text Book/References Books/ Websites:
1. Indian Polity by Laxmikanth.
2. 'Indian Administration' by Subhash Kashyap.
3. 'Indian Constitution' by D.D. Basu.
4. 'Indian Administration' by Avasti and Avasti.

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

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