E.G.S.PILLAYENGINEERINGCOLLEGE

(Autonomous)

Approved byAICTE,New Delhi|Affiliated to AnnaUniversity, Chennai
AccreditedbyNAAC with „A“Grade|Accredited byNBA (CSE, EEE, MECH, ECE, CIVIL, IT) NAGAPATTINAM–611002

B.E. Biomedical Engineering

FullTime Curriculum and Syllabus

First Year – Second Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1901MA204	Engineering Mathematics–II (Calculus, Ordinary Differential Equations and Complex Variable)	3	2	0	4	40	60	100
1901PH202	Semiconductor Physics and Optoelectronics	3	0	0	3	40	60	100
1901GEX01	Basic Electrical and Electronics Engineering	3	0	0	3	40	60	100
1901GEX02	Engineering Graphics	2	2	0	3	50	50	100
1901GE201	Engineering Exploration	2	0	0	2	40	60	100
Laboratory Course								
1901GE254	Computer Hardware and IT Essentials Lab	0	0	2	1	50	50	100
1901GE252	Engineering Intelligence - II	0	0	2	1	100	0	100
1901GEX51	CAD Lab	0	0	2	1	50	50	100
1901GEX53	Basic Electrical and Electronics Engineering Lab	0	0	2	1	50	50	100
1901PHX51	Engineering Physics Lab	0	0	2	1	50	50	100

L – Lecture | T – Tutorial | P – Practical | CA – Continuous Assessment | ES – End Semester

1901MA204	ENGINEERING MATHEMATICS – II (Calculus, Ordinary Differential Equations and Complex Variable)	L	T	P	C
		3	2	0	4

Aim of the course: This course focuses on acquiring sound knowledge of techniques involved in application of differentiation, form through Laplace transforms acquaint with the concepts of multiple integrals, needed for problems in all engineering disciplines, develop an understanding of the standard techniques of Analytic functions by satisfying CR equations so as to enable the student to apply them with confidence, in application areas such as Computer Graphics, Robotic Automations, Computer Vision Problems, Simulations and also make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

PREREQUISITES: Laplace Transforms, solving differential equations

MODULE I LAPLACE TRANSFORM 12Hours

Laplace Transform – Conditions for existence – Transform of Elementary Functions – Basic Properties – Transform of Unit step function and Impulse function – Transform of Periodic function – Inverse Laplace Transform – Convolution Theorem (excluding Proof) – Initial and Final value Theorems – Solution of Linear ODE of Second order with constant coefficient using Laplace Transform techniques.

MODULE II VECTOR CALCULAS 12 Hours

Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration: Green‟s theorem in a plane, Gauss divergence theorem and Stokes‟ theorem (excluding proofs) –Applications of the above theorems to find surface area of a closed region and volume of cube and parallel piped.

MODULE III ORDINARY DIFFERENTIAL EQUATIONS 12 Hours

Second order linear differential equations with variable coefficients, method of variation of parameters.

MODULE IV COMPLEX VARIABLE – DIFFERENTIATION 12 Hours

Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; Conformal mappings, Mobius transformations.

MODULE V COMPLEX VARIABLE– INTEGRATION 12 Hours

Contour integrals, Cauchy Integral formula (without proof), Taylor‟s series, zeros of analytic functions, singularities, Laurent‟s series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals using the Bromwich contour**.** **TOTAL: 60 HOURS**

COURSE OUTCOMES

CO1 : Apply Laplace Transform in solving Boundary value problems of second order ODE(K3)
CO2 :Compute surface and volume integral in vector field (K3)
CO3 : Solve the higher order differential equations (K3)
CO4 : Construct Analytic functions and trace the image of a region using transformation (K3)
CO5 : Solve complex integrals (K3

TEXT BOOKS:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
4. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
5. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGraw Hill, 2004.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

1901PH202	SEMICONDUCTOR PHYSICS AND OPTOELECTRONICS (for ECE and BME)	L	T	P	C
		3	0	0	3

Aim of the course: To make students understand the importance of semiconductor physics and optoelectronics in engineering applications

PREREQUISITES:

Electronic materials

Free electron theory, Density of states and energy band diagrams, Energy bands in solids, E-k diagram, Direct and indirect bandgaps, Types of electronic materials: metals, semiconductors and insulators, Occupation probability, Fermi level

Semiconductors

Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier- concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Metal- semiconductor junction (Ohmic and Schottky)

Semiconductor lasers

Optical transitions in bulk semiconductors: absorption, spontaneous emission, and stimulated emission; Density of states for photons, Transition rates (Fermi's golden rule), Optical loss and gain. Semiconductor laser (GaAs): materials, device characteristics, figures of merit and Vertical-Cavity Surface-Emitting Lasers (VECSEL), Tunable semiconductor lasers.

Semiconductor Photodetectors

Types of semiconductor photodetectors -p-n junction, PIN, and Avalanche and their structure, working principle, and characteristics, Noise limits on performance; Solar cells.

Nano- optoelectronic devices

Quantum well, quantum wire, and -dot based LEDs, white light LED lasers, and photodetectors.

COURSE OUTCOMES

Upon completion of this course, students will be able to

CO1: apply the conditions of energy states of electrons and energy band of materials and its Fermi level

CO2: determine the type of semiconducting material, its energy gap and carrier concentration

CO3: apply the conditions for semiconductor lasers in GaAs and other tunable lasers

CO4: experiment with PN junctions and its applications in solar cells

CO5: apply quantum confinement concepts to QD based LEDs and Lasers

REFERENCES (BOOKS):

1. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc. (1995).
2. B. E. A. Saleh and M. C. Teich, Fundamentals of Photonics, John Wiley & Sons, Inc., (2007).
3. S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley (2008).
4. A. Yariv and P. Yeh, Photonics: Optical Electronics in Modern Communications, Oxford University Press, New York (2007).
5. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).
6. Online course: “Semiconductor Optoelectronics” by M R Shenoy on NPTEL
7. Online course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Gupta on NPTEL

REFERENCES (WEBSITES):

1. https://www.daenotes.com/electronics/microwave-radar/semiconductor-laser
2. https://iopscience.iop.org/article/10.1088/0957-0233/12/5/703
3. https://www.elprocus.com/photodiode-working-principle-applications/
4. https://www.azoquantum.com/Article.aspx?ArticleID=31
5. https://www.understandingnano.com/quantum-dots-applications.html

1901GEX01	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (Common for all UG programmes, except BE- EEE)	L	T	P	C
		3	0	0	3

Aim of the course: To study about the fundamentals of Electrical, Electronics and Communication Engineering

PREREQUISITES:

COURSE CONTENTS

Introduction to DC and AC circuits: Ohms law - Kirchhoff's laws - Mesh analysis - Nodal analysis - Generation of AC waveforms - Analysis of R-L, R-C, R-L-C circuits - Introduction to three phase systems - Types of connections.

Electrical Machines: DC Generator, DC Motor, Transformer, Induction Motor: Working principle, construction and applications.

Measuring instruments: Classification of instruments; Voltmeter, Ammeter, Wattmeter, Energy meter, Multimeter, CRO: Principles and operation.

Semiconductor devices: V-I characteristics of PN junction diode and Zener diode; Rectifiers - Half wave and full wave rectifiers; BJT - configurations; Amplifiers & Oscillators: classification, operation and applications; SCR: Construction and V-I characteristics; Basic power converters (Block diagram approach only).

Digital systems: Boolean algebra - Reduction of Boolean expressions - De-Morgan's theorem - Logic gates - Implementation of Boolean expressions.

Communication Systems: Model of communication system - Analog and digital, Wired and wireless channel - Block diagram of various communication systems - Microwave, satellite, optical fiber and cellular mobile system.

Electrical safety and wiring: Safety measures in electrical system - Safety devices - types of wiring - Wiring accessories-staircase, fluorescent lamps and corridor wiring - Basic principles of earthing - Types of earthing - layout of generation, transmission and distribution of power (Single line diagram).

COURSE OUTCOMES

Upon completion of this course, students will be able to

1.Solve very simple problems in DC and AC circuits
2.Explain the construction and principle of operation of DC and AC machines
3.Describe the operation of simple electrical measuring instruments
4.Elucidate the characteristics of diode, Zener diode, BJT, SCR and their applications
5.Implement Boolean expressions using logic gates
6.Explain the operation of functional blocks of various communication systems
7.Summarize the electrical safety systems and electrical wiring procedures

REFERENCES (BOOKS):

1. Smarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", 2nd Edition, PHI Learning, 2010.
2. R. Muthusubramaniam, S. Salaivahanan and K.A. Mureleedharan, "Basic Electrical Electronics and Computer Engineering", Tata McGraw Hill, 2004.
3. D.P. Kothari and I.J. Nagrath, "Theory and Problems of Basic Electrical Engineering", PHI learning, New Delhi, 2004.
4. J.B. Gupta, "Fundamentals of Electrical Engineering and Electronics", S.K. Kataria and Sons, Reprint 2012 Edition.
5. R.L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", Pearson, 11th Edition, 2013.
6. George Kennedy and Bernard Davis, "Kennedy's Electronic communication Systems", McGraw Hill Education, 5th Edition, 2011.
7. Donald P. Leach, Albert Paul Malvino and Goutam Saha, "Digital Principles and Applications", McGraw-Hill Education, 8th Edition, 2014.

REFERENCES (WEBSITES):

1. https://nptel.ac.in/courses/108108076/
2. https://nptel.ac.in/downloads/108105053/
3. https://nptel.ac.in/courses/117103063/
4. https://nptel.ac.in/courses/117102059/

1901GEX02	ENGINEERING GRAPHICS	L	T	P	C
		2	0	2	3

COURSE OBJECTIVES:

1. To develop in students, graphic skills for communication of concepts, ideas and design ofEngineering products.
2. To expose them to existing national standards related to technical drawings

MODULE I	CONCEPTS AND CONVENTIONS (Not for Examination)		5 Hours

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

MODULEII	PLANE CURVES AND FREE HAND SKETCHING			9 Hours

Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves.

Visualization concepts and Free Hand sketching: Visualization principles –Representation of Three-Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of Objects.

MODULEIII	PROJECTION OF POINTS, LINES AND PLANE SURFACES		9 Hours

Orthographic projection- principles-Principal Planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

MODULEIV	PROJECTION OF SOLIDS			9 Hours

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method.

MODULE V	PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES	9 Hours

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones.

MODULE VI	ISOMETRIC AND PERSPECTIVE PROJECTIONS		9 Hours

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method.

TOTAL: 45+5 HOURS

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1: Perform free hand sketching of basic geometrical constructions and multiple views of objects.
CO2: Do orthographic projection of lines and plane surfaces.
CO3: Draw projections and solids and development of surfaces.
CO4: Prepare isometric and perspective sections of simple solids.
CO5: Demonstrate computer aided drafting

REFERENCES:

1. Gopalakrishna K.R., “Engineering Drawing” (Vol. I&II combined), Subhas Stores, Bangalore,2016.

2.	Luzzader, Warren.J. and Duff,John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
3.	Shah M.B., and Rana B.C., "Engineering Drawing", Pearson, 2nd Edition, 2015.
4.	Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2017.
5.	Natrajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2015.
6.	Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
7.	Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 50th Edition,2016.

		L	T	P	C
1901GE201	**ENGINEERING EXPLORATION**	**2**	**0**	**0**	**2**

COURSE OBJECTIVES:

1.Build mindsets & foundations essential for designers

2.Learn about the Human-Centered Design methodology and understand their real-world applications

3.Use Design Thinking for problem solving methodology for investigating ill-definedproblems.

4.Undergo several design challenges and work towards the final design challenge

5.Apply Design Thinking on the following Streams to

Project Stream 1: Electronics, Robotics, IOT and SensorsProject
Stream 2: Computer Science and IT ApplicationsProject Stream
3: Mechanical and Electrical tools

Project Stream4: Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources, Agriculture, Environmental science and other fields of engineering.

HOW TO PURSUE THE PROJECT WORK?

a. The first part will be learning-based-masking students to embrace the methodology byexploring all the phases of design thinking through the wallet/ bag challenge and podcasts.
b. The second part will be more discussion-based and will focus on building some necessaryskills as designers and learning about complementary material for human-centered design.
c. The class will then divide into teams and they will be working with one another for about 23 weeks. These teams and design challenges will be the basis for the final project and finalpresentation to be presented.
d. The teams start with **Design Challenge** and go through all the phases more in depth fromcoming up with the right question to empathizing to ideating to prototyping and to testing.
e. Outside of class, students will also be gathering the requirements, identifying the challenges,usability, importance etc
f. At the end, Students are required to submit the final reports, and will be evaluated by thefaculty.

TASKS TO BE DONE:

Task 1: Everyone is a Designer

g. Understand class objectives & harness the designer mindset

Task 2: The Wallet/Bag Challenge and Podcast

h. Gain a quick introduction to the design thinking methodology
i. Go through all stages of the methodology through a simple design challenge
j. Podcast: Observe, Listen and Engage with the surrounding environment and identify adesign challenge.

Task 3: Teams & Problems

- Start Design Challenge and learn about teams & problems through this
- Foster team collaboration, find inspiration from the environment and learn how to identify problems

Task 4: Empathizing

- Continue Design Challenge and learn empathy
- Learn techniques on how to empathize with users
- Go to the field and interview people in their environments
- Submit Activity Card

Task 5: Ideating

- Continue Design Challenge and learn how to brainstorm effectively
- Encourage exploration and foster spaces for brainstorming
- Submit Activity Card

Task 6: Prototyping

- Continue Design Challenge and learn how to create effective prototypes
- Build tangible models and use them as communication tools
- Start giving constructive feedback to classmates and teammates
- Submit Activity Card

Task 7: Testing

- Finish Design Challenge and iterate prototypes and ideas through user feedback
- Evolve ideas and prototypes through user feedback and constructive criticism
- Get peer feedback on individual and group performance
- Submit Activity Card Task 8:
- Final Report Submission and Presentation

- Method of Evaluation: Same as Mini project category. Project exhibition may be conducted.

REFERENCES:

1. Tom Kelly, The Art of Innovation: Lessons in Creativity From IDEO, America's Leading Design Firm (Profile Books, 2002)
2. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation (HarperBusiness, 2009)
3. Jeanne Liedtka, Randy Salzman, and Daisy Azer, Design Thinking for the Greater Good: Innovation in the Social Sector (Columbia Business School Publishing, 2017)

OTHER USEFUL DESIGN THINKING FRAMEWORKS AND METHODOLOGIES:

1. Human-Centered Design Toolkit (IDEO); https://www.ideo.com/post/design-kit
2. Design Thinking Boot Camp Bootleg(Stanford D-School); https://dschool.stanford.edu/resources/the-bootcamp-bootleg
3. Collective Action Toolkit (frogdesign); https://www.frogdesign.com/wpcontent/ uploads/2016/03/CAT_2.0_English.pdf
4. Design Thinking for Educators (IDEO); https://designthinkingforeducators.com/

1901GE254	COMPUTER HARDWARE AND IT ESSENTIALS LAB	L	T	P	C
		0	0	2	1

List of Experiment

1. Study of hardware components (such as storage devices, I/O devices, CPU, Motherboard, other peripherals).
2. Installation of operating systems (Windows and Linux).
3. Other software installation.
4. Study of network components.
5. Network establishment(configuring IP address, Domain name system)
6. Study of Internet.
7. Introduction to Web.
8. Usage of internet services- Email, File Sharing, Social Media etc.
9. Study of firewalls and Antivirus.
10. Troubleshooting various problems.

TOTAL: 30 HOURS

REFERENCES:

1. Craig Zacker& John Rourke, “The complete reference:PC hardware”, Tata McGrawHill, New Delhi, 2001.
2. Mike Meyers, “Introduction to PC Hardware and Troubleshooting”, Tata McGrawHill, New Delhi, 2003.
3. B.Govindarajulu, “IBM PC and Clones hardware trouble shooting and maintenance”,
4. Tata McGraw-Hill, New Delhi, 2002
5. R. Kelly Rainer , Casey G. Cegielski , Brad Prince, Introduction to Information Systems, Fifth Edition, Wiley Publication, 2014.
6. James F. Kurose, ―Computer networking: A Top-Down Approach‖, Sixth Edition, Pearson, 2012.
7. R. Kelly Rainer , Casey G. Cegielski , Brad Prince, Introduction to Information Systems, Fifth Edition, Wiley Publication, 2014
8. Craig Zacker& John Rou ke, “The co plete reference:PC hardware”, Tata McGrawHill, New Delhi, 2001.

1901GE252	ENGINEERING INTELLIGENCE II	L	T	P	C
		0	0	2	1

Prerequisite: Engineering Intelligence - I

MODULE I	**VOCABULARY BULIDING**	**6 Hours**
Parts of Grammar- SVA- Art of Writing- word building activities		
MODULEII	**COMMUNICATION WORKSHOP**	**6 Hours**
Story Telling- Newspaper Reading-Extempore.		
MODULEIII	**INTERPERSONAL SKILLS**	**6 Hours**
Personality Development - Creativity and innovation –Critical Thinking and Problem Solving – Work Ethics-Technical Skill Vs Interpersonal Skills		
MODULEIV	**LEADERSHIP& EMPLOYABILITY SKILLS**	**6 Hours**
Levels of Leadership-Making of leader-Types of leadership-Transactions Vs Transformational Leadership – Exercises - Industry Expectations & Career Opportunities- Recruitment patterns.		
MODULE V	**RESUME BUILDING**	**6 Hours**
Importance of Resume- Resume Preparation - introducing onself		

TOTAL: 30 HOURS

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Understand various vocabulary building activites

CO2: Use various communication skill workshop for reading and writing.

CO3: Apply interpersonal skill to motivate creating and innovating skills

CO4: Apply various leadership and employability skill to get career opportunities

CO5: Prepare resume with necessary components

REFERENCES:

1. Barun K. Mitra; (2011), “Personality Development & Soft Skills”, First Edition; Oxfor Publishers.
2. Raymond Murphy, Essential English Grammar in Use, Cambridge University press, New Delhi, ThirdEdition , 2007.
3. Arun Sharma and Meenakshi Upadhyav, How to Prepare for Verbal Ability and Reading Comprehension for CAT, McGrawHill Publication, Seventh Edition 2017.

1901GEX51	CAD (COMPUTER AIDED DRAFTING) LAB	L	T	P	C
		0	0	2	1

List of Experiments:

Basics commands of a CAD software- two-dimensional drawing, editing, layering and dimensioning -coordinate Systems-Drawing practice - orthographic views of simple solids using CAD software.

1. Study of capabilities of software for Drafting and Modeling – Coordinate systems (absolute, relative,polar, etc.) – Creation of simple figures like polygon and general multi-line figures.
2. Drawing of a Title Block with necessary text and projection symbol.
3. Drawing of curves like parabola, spiral, involute using B-spline or cubic spline.
4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder, cone, etc, anddimensioning.
5. Drawing front view, top view and side view of objects from the given pictorial views (eg. V-block,Base of a mixie, Simple stool, Objects with hole and curves).
6. Drawing sectional views of prism, pyramid, cylinder, cone, etc,
7. Drawing isometric projection of simple objects.
8. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from 3-D model.

Total: 30 Hours

References:

1. N.D. Bhatt, Machine Drawing, Charotar Publishing House Pvt. Ltd., 2014.
2. P.S. Gill, A Textbook of Machine Drawing, Katson books, 2013.
3. R.K. Dhawan, A Textbook of Machine Drawing, S. Chand,2012.
4. K.C. John, Textbook of Machine Drawing, PHI Learning Pvt. Ltd.,2009.

Subject Code	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY (Common for all UG programmes)	L	T	P	C
		-	-	2	1

Aim of the course : To apply the fundamentals of Electrical and Electronics Engineering

PREREQUISITES:

1. Experiments related to verification of Ohm's law and Kirchhoff's laws
2. Experiments involving logic gates
3. Fan and light control using regulators
4. Design of 6V regulated power supply
5. Energy conservation demonstration experiment using energy meter
6. Waveform generation and calculation of rms and average values
7. IC 555 and IC 741 based experiments
8. Experiments in earthing
9. Staircase wiring and residential building wiring
10. Speed control of DC shunt motor

COURSE OUTCOMES

Upon completion of this course, students will be able to

CO1: Design and analyze electronic circuits
CO2: Test digital logic gates
CO3: Control lights and speed of motors
CO4: Measure electrical parameters using instruments
CO5: Generate waveforms
CO6: Construct different wiring schemes.

REFERENCES (BOOKS):

1. Edward Hughes, " Electrical Technology,", Pearson Education
2. D.P. Kothari and Nagrath " Basic Electronics",MH Education 2013.
3. Paul Scherz and Simon Monk "Practical Electronics for inventors" Mc Graw Hill Publications 2013.

REFERENCES (WEBSITES):

1. https://nptel.ac.in/courses/122106025/

1901PHX51	ENGINEERING PHYSICS LAB	L	T	P	C
		0	0	2	1

List of Experiments:

1. Determination of wavelength of various colours of mercury spectrum using Laser grating
2. Determination of velocity of liquids using ultrasonic interferometer
3. Determine the dispersive power of a prism using spectrometer
4. Determine the unknown resistance of the given wire using Carey-Foster‟s Bridge
5. Determine the band gap of the given semiconductor
6. Determine the acceptance angle and particle size using Laser
7. Torsional pendulum – Rigidity modulus of a steel wire
8. Thickness of a thin wire – Air Wedge
9. Measurement of Young‟s modulus – Uniform and Non-uniform bending
10. Thermal conductivity –Lee‟s Disc method

Total: 30 Hours

References:

1. „Practical Physics‟, R.K. Shukla, Anchal Srivastava, New age international (2011)
„B.Sc. Practical Physics‟, C.L Arora, S. Chand &Co. (2012