

# E.G.S. PILLAY ENGINEERING COLLEGE (Autonomous)

Approved by AICTE, New Delhi| Affiliated to Anna University, Chennai Accredited by NAAC with “A”  
Grade| Accredited by NBA (CSE, EEE, MECH, ECE, CIVIL, IT)  
NAGAPATTINAM-611002



## B.Tech. Artificial Intelligence and Data Science Full Time Curriculum and Syllabus First Year – **Second Semester**

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
<b>Theory Course</b>								
1901MA207	Engineering Mathematics-II (Statistics and Numerical Methods)	3	2	0	4	40	60	100
1901PH201	Physics for Information Science	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	0	0	4	2	100	-	100
<b>Laboratory Course</b>								
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
<b>Total Credits</b>		<b>11</b>	<b>4</b>	<b>14</b>	<b>20</b>	<b>570</b>	<b>430</b>	<b>1000</b>

**COURSE OBJECTIVES:**

- This course aims at providing the necessary basic concepts of a few statistical and numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology. To acquaint the knowledge of testing of hypothesis for small and large samples this plays an important role in real life problems. To introduce the basic concepts of solving algebraic and transcendental equations. To introduce the numerical techniques of interpolation in various intervals and numerical techniques of Differentiation and integration this plays an important role in engineering and technology disciplines. To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.

**MODULE I TESTING OF HYPOTHESIS****12 Hours**

Sampling distributions - Tests for single mean, proportion and difference of means (Large and small samples) – Tests for single variance and equality of variances – Chi square test for goodness of fit – Independence of attributes

**MODULE II DESIGN OF EXPERIMENTS****12 Hours**

One way and two way classifications - Completely randomized design – Randomized block design– Latin square design -  $2^2$  factorial design.

**MODULE III SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS****12 Hours**

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton Raphson method- Solution of linear system of equations - Gauss elimination method – Pivoting - Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel - Eigenvalues of a matrix by Power method and Jacobi's method for symmetric matrices.

**MODULE IV INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION****12 Hours**

Lagrange's and Newton's divided difference interpolations – Newton's forward and backward difference interpolation – Approximation of derivatives using interpolation polynomials – Numerical single and double integrations using Trapezoidal and Simpson's  $1/3$  rules..

**MODULE V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS****12 Hours**

Single step methods: Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first order differential equations - Multi step methods: Milne's and Adams - Bash forth predictor corrector methods for solving first order differential equations.

**Theory: 45 Hrs****Tutorial: 15 hours****Total Hours: 60 Hrs**

## **COURSE OUTCOMES:**

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

**CO1:** Make use of the concept of testing of hypothesis for small and large samples.

**CO2:** Determine the most important factor and the factorial design of experiments

**CO3:** Apply the basic concepts and techniques of solving algebraic and transcendental equations.

**CO4:** Organize the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.

**CO5:** Utilize various techniques and methods for solving first order ordinary differential equations.

## **TEXT BOOKS:**

1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10<sup>th</sup> Edition, New Delhi, 2015.
2. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8<sup>th</sup> Edition, 2015.

## **REFERENCES:**

1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9<sup>th</sup> Edition, Cengage Learning, 2016
2. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8<sup>th</sup> Edition, 2014.
3. Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7<sup>th</sup> Edition, 2007.
4. Gupta S.C. and Kapoor V. K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 12<sup>th</sup> Edition, 2020.
5. Spiegel. M.R., Schiller. J. and Srinivasan. R.A., "Schaum's Outlines on Probability and Statistics", Tata McGraw Hill Edition, 4<sup>th</sup> Edition, 2012.

<b>1901PH201</b>	<b>PHYSICS FOR INFORMATION SCIENCE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>(for CSE, IT and AIDS )</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**Aim of the course:** To make students understand the semiconductor physics and their applications in computer science and engineering.

**PREREQUISITES:** Basic concepts of Material Science.

**MODULE-I ELECTRONIC MATERIALS** **9 Hours**

Free electron theory, Density of states and energy band diagrams, Kronig-Penny model (to introduce origin of band gap), Energy bands in solids, E-k diagram, Direct and indirect bandgaps, Types of electronic materials: metals, semiconductors, and insulators, Occupation probability, Fermi level

**MODULE-II SEMICONDUCTORS** **9 Hours**

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)

**MODULE-III MAGNETIC PROPERTIES OF MATERIALS** **9 Hours**

Magnetic dipole moment - magnetic permeability and susceptibility - diamagnetism – paramagnetism – ferromagnetism – antiferromagnetism – ferrimagnetism – Ferromagnetism: origin and exchange interaction- saturation magnetization and Curie temperature – Domain Theory- M-H behaviour – Hard and soft magnetic materials – examples and uses— Magnetic principle in computer data storage – Magnetic hard disc (GMR sensor).

**MODULE-IV OPTICAL PROPERTIES OF MATERIALS** **9 Hours**

Classification of optical materials – carrier generation and recombination processes - Absorption emission and scattering of light in metals, insulators and semiconductors (qualitative approach only) - photo current in a P-N diode – solar cell - LED – Organic LED – Laser diodes – Optical data storage techniques.

**MODULE-V NANO DEVICES** **9 Hours**

Electron density in bulk material – Size dependence of Fermi energy – Quantum confinement – Quantum structures – Density of states in quantum well, quantum wire and quantum dot structure - Band gap of nanomaterials – Tunneling: single electron phenomena and single electron transistor – Quantum dot laser.FET from SWNT– Carbon nanotubes: Properties and applications.

**TOTAL = 45 HOURS**

**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 concepts domain theory of magnetism to practical storage applications
- CO4: Classify the types of optical materials and applications in LEDs and LASER diodes
- CO5: Apply quantum confinement concepts to QD based LEDs and Lasers .

**REFERENCES:**

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

	<b>BASIC ELECTRICAL AND ELECTRONICS ENGINEERING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>1901GEX01</b>	<b>(Common for MECH,CIVIL, CSE, ECE, IT, BME&amp; AIDS Programme)</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>

**MODULE I INTRODUCTION TO DC AND AC CIRCUITS 7 Hours**

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.

**MODULE II ELECTRICAL MACHINES 6 Hours**

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

**MODULE III MEASURING INSTRUMENTS 6 Hours**

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

**MODULE IV SEMICONDUCTOR DEVICES 7 Hours**

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).

**MODULE V DIGITAL SYSTEMS 6 Hours**

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

**MODULE VI COMMUNICATION SYSTEMS 6 Hours**

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.

**MODULE VII ELECTRICAL SAFETY AND WIRING 7 Hours**

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).

**TOTAL: 45 HOURS**

**Course Outcome**

- CO1** Apply the fundamental concepts to solve problems in DC circuits and AC circuits.
- CO2** Explain the construction and principle of operation of DC machines, AC machines and electrical measuring instruments.
- CO3** Elucidate the characteristics of Diode, Zener diode, BJT, SCR and their applications.
- CO4** Implement Boolean expressions using logic gates.
- CO5** Explain the operation of various communication system and electrical safety systems.

**REFERENCES:**

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.

**COURSE OBJECTIVES:**

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

<b>MODULE I</b>	<b>CONCEPTS AND CONVENTIONS (Not for Examination)</b>	<b>5 Hours</b>
Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.		
<b>MODULE II</b>	<b>PLANE CURVES AND FREE HAND SKETCHING</b>	<b>9 Hours</b>
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.		
<b>MODULE III</b>	<b>PROJECTION OF POINTS, LINES AND PLANE SURFACES</b>	<b>9 Hours</b>
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.		
<b>MODULE IV</b>	<b>PROJECTION OF SOLIDS</b>	<b>9 Hours</b>
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.		
<b>MODULE V</b>	<b>PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES</b>	<b>9 Hours</b>
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.		
<b>MODULE VI</b>	<b>ISOMETRIC AND PERSPECTIVE PROJECTIONS</b>	<b>9 Hours</b>
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.		
		<b>TOTAL: 45+5 HOURS</b>

**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.

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.

## 1901GE201-ENGINEERING EXPLORATION

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0 0 4 2

### COURSE OBJECTIVES:

- Build mindsets & foundations essential for designers
- Learn about the Human-Centered Design methodology and understand their real-world applications
- Use Design Thinking for problem solving methodology for investigating ill defined problems.
- Undergo several design challenges and work towards the final design challenge

### Apply Design Thinking on the following Streams to

Project Stream 1: Electronics, Robotics, IOT and Sensors

Project Stream 2: Computer Science and IT Applications

Project Stream 3: Mechanical and Electrical tools

Project Stream 4: 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?

- The first part will be learning-based-making students to embrace the methodology by exploring all the phases of design thinking through the wallet/ bag challenge and podcasts.
- The second part will be more discussion-based and will focus on building some necessary skills as designers and learning about complementary material for human-centered design.
- The class will then divide into teams and they will be working with one another for about 2 – 3 weeks. These teams and design challenges will be the basis for the final project and final presentation to be presented.
- The teams start with **Design Challenge** and go through all the phases more in depth from coming up with the right question to empathizing to ideating to prototyping and to testing.
- Outside of class, students will also be gathering the requirements, identifying the challenges, usability, importance etc
- At the end, Students are required to submit the final reports, and will be evaluated by the faculty.

### TASKS TO BE DONE:

#### Task 1: Everyone is a Designer

- Understand class objectives & harness the designer mindset

#### Task 2: The Wallet/Bag Challenge and Podcast

- Gain a quick introduction to the design thinking methodology
- Go through all stages of the methodology through a simple design challenge
- Podcast: Observe, Listen and Engage with the surrounding environment and identify a design 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
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**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](https://www.frogdesign.com/wpcontent/uploads/2016/03/CAT_2.0_English.pdf)
4. Design Thinking for Educators (IDEO); <https://designthinkingforeducators.com/>

<b>1901GE254</b>	<b>COMPUTER HARDWARE AND IT ESSENTIALS LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

**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 Approachl, 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.

<b>1901GE252</b>	<b>ENGINEERING INTELLIGENCE II</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

**Prerequisite:** Engineering Intelligence - I

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

**TOTAL: 30 HOURS**

**Course Outcomes:**

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

- CO1: Understand various vocabulary building activities
- 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; Oxford Publishers.
2. Raymond Murphy, Essential English Grammar in Use, Cambridge University press, New Delhi, Third Edition, 2007.
3. Arun Sharma and Meenakshi Upadhyav, How to Prepare for Verbal Ability and Reading Comprehension for CAT, McGrawHill Publication, Seventh Edition 2017.

<b>1901GEX51</b>	<b>CAD (COMPUTER AIDED DRAFTING) LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>(Common for all B.E./B.Tech. Programme)</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

### 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, and dimensioning.
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: 45 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.

<b>1901GEX53</b>	<b>BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		-	-	<b>2</b>	<b>1</b>

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

**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/>

<b>1901PHX51</b>	<b>ENGINEERING PHYSICS LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

**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)
2. "B.Sc. Practical Physics", C.L Arora, S. Chand &Co. (2012)