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. Civil Engineering
FullTime Curriculum and Syllabus

First Year – First Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1901MA101	Engineering Mathematics – I (Matrices andCalculus)	3	1	0	4	40	60	100
1901PH101	Introduction to Mechanics	3	0	3	4	50	50	100
1901GEX01	Basic Electrical and Electronics Engineering	3	0	0	3	40	60	100
1901GEX02	Engineering Graphics	2	0	2	3	50	50	100
Laboratory Course								
1901GEX51	CAD Lab	0	0	2	1	50	50	100
1901GEX52	Basic Electrical and Electronics Engineering Lab	0	0	2	1	50	50	100
1901PHX51	Engineering Physics Lab	0	0	2	1	50	50	100
1901HS151	Communication Skills	0	0	2	1	100	0	100
		11	1	13	18	430	370	800

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

1901MA101	ENGINEERING MATHEMATICS - I (MATRICES AND CALCULUS) (for Civil Engineering)	L	T	P	C
		3	2	0	4

Aim of the course: This course focuses on developing a solid understanding of the methods used in the application of differentiation, Eigen values, and Eigen vectors and using Cayley-Hamilton theorem, transformation of quadratic form into canonical form through orthogonal transformation, becoming familiar with the ideas of vector calculus, which are necessary for problems in all engineering disciplines, and developing an understanding of the common methods of complex variable theory so as to: Additionally, it helps the learner understand how transforms may be used to establish a new domain where the issue under investigation is simpler to manage.

PREREQUISITES: Basic Knowledge In Matices And Determinants, Series, Integration And Vector Calculus.

MODULE-I MATRICES

Algebra of matrices , Inverse and rank of a matrix: Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, Orthoganal transformation and quadratic to canonical forms.

MODULE-II SEQUENCES AND SERIES

Convergence of sequence and series - Tests for convergence - Power series - Taylor's series, Series for exponential – trigonometric and logarithm functions.

MODULE-III DIFFERENTIAL CALCULUS

Curvature in Cartesian Co-ordinates – Centre and radius of curvature – Circle of curvature – Evolutes and involutes

MODULE-IV INTEGRAL CALCULUS

Double integration – Cartesian and polar cordianates – Change the order of integration – Applications: Area of a curved surface using double integral – Triple integration in Cartesian co-ordiantes – Volume as triple integral

MODULE-V VECTOR CALCULUS

Gradient , Divergene and Curl – Diretioanal derivate – Irrotational and Solendial vector fields – Vector integration: Green's Theorem in a plane, Gauss divergence theorem and Stoke's theorem(excluding proofs) – Applications of the above theorems to find surface area of a closed region and volume of cube and parallelepiped.

For further reading:

nptel.ac.in/courses/111105035, www.nptelvideos.in/2012/11/Mathematics.html

COURSE OUTCOMES

After completion of the course, the student will be able to

CO1: Apply the nature of the matrix using Orthogonal Transformation & Calculate the inverse and positive powers of a square matrix

CO2: Relate the nature of series using comparison, Ratio, Leibnitz tests

CO3: Develop the evolutes and envelopes of given curves by means of radius and centre of curvature

CO4: Solve the area and volume of a curve using double and triple integration.

CO5: Make use of vector concepts to estimate the area, surface and volume of planes.

TEXT / REFERENCE BOOKS:

1. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2018.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
4. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
5. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition,2010.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.

1901PH101	INTRODUCTION TO MECHANICS (for Civil and Mechanical Engineering)	L	T	P	C
		3	0	0	3

Aim of the course: To make students understand and apply the knowledge in mechanics for engineering applications

PREREQUISITES:

Introduction to mechanics
Forces in Nature; Newton's laws and its completeness in describing particle motion; Solving Newton's equations of motion in polar coordinates and related problems

Vector mechanics of particles
Central forces: Conservation of Angular Momentum; Energy equation and energy diagrams; Elliptical, parabolic and hyperbolic orbits, Application: Satellite manoeuvres

Five-term acceleration formula — Centripetal and Coriolis accelerations; Applications: Weather systems, Foucault pendulum; Harmonic oscillator; Damped harmonic motion

Rigid body mechanics
De*finition and motion of a rigid body in the plane; Rotation in the plane; Kinematics in a* coordinate system rotating and translating in the plane; Angular momentum about a point of a rigid body in planar motion;

Euler's laws of motion, their independence from Newton's laws, and their necessity in describing rigid body motion; Examples; Introduction to three-dimensional rigid body motion — (a) Angular velocity vector, and its rate of change and (b) Moment of inertia tensor

Statics
Free body diagrams with examples on modelling of typical supports and joints; Condition for equilibrium in three- and two- dimensions; Friction: limiting and non-limiting cases.

COURSE OUTCOMES

Upon completion of this course, students will be able to

CO1: Apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems

CO2: Extend all of concepts of linear kinetics to systems in general plane motion

CO3: Apply basic dynamics concepts of force, momentum, work and energy to apply in Newton's laws of motion

CO4: Apply Euler's Equation and considering energy of a system in general plane motion, and the work of couples and moments of forces

CO5: Apply the concepts of friction and conditions of equilibrium in two and three dimensions.

REFERENCES (BOOKS):

(i) Engineering Mechanics, 2nd ed. — MK Harbola
(ii) Introduction to Mechanics — MK Verma
(iii) An Introduction to Mechanics — D Kleppner & R Kolenkow
(iv) Principles of Mechanics — JL Synge & BA Gri*_ths*
(v) Mechanics — JP Den Hartog
(vi) Engineering Mechanics - Dynamics, 7th ed. - JL Meriam
(vii) Mechanical Vibrations — JP Den Hartog
(viii) Theory of Vibrations with Applications — WT Thomson
(ix) An Introduction to the Mechanics of Solids, 2nd ed. with SI Units — SH Crandall, NC Dahl & TJ Lardner
(x) Engineering Mechanics: Statics, 7th ed. — JL Meriam
(xi)Engineering Mechanics of Solids — EP Popov

REFERENCES (WEBSITES):

1. https://www.edx.org/course/introduction-mechanics-part-1-ricex-phys-101-1x
2. https://learn.saylor.org/course/PHYS101
3. https://www.slideshare.net/KhanSaif2/1-introduction-to-mechanics-71503843

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 (Common to all B.E./B.Tech. Programmes)	L	T	P	C
		2	0	2	3

MODULE I	CONCEPTS AND CONVENTIONS (Not for Examination)	

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

MODULE II	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.

MODULE III	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.

MODULE IV	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 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.

1901GEX51   **CAD (COMPUTER AIDED DRAFTING) LAB**   **L T   P C**

List of Experiments: **0   0   2 1**

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: 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.

1901GEX52	BASIC ELECTRICAL AND ELECTRONICS ENGINEERINGLABORATORY (Common for all UG programmes)	L	T	P	C
		0	0	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)
2. „B.Sc. Practical Physics", C.L Arora, S. Chand &Co. (2012)

1901HSX51	COMMUNICATION SKILLS LAB (Common for all B.E./B.Tech. Programme)	L	T	P	C
		0	0	2	1

Course Overview: English- being the foremost global language has its domination in internationally sensitive domains such as science and technology, business and commercial relation, education and diplomatic relationships, politics and administration and so on. It is the language of corporate India, a passport for better career, better pay, and advanced knowledge and for communication with the entire world. In higher education, English is the prevalent prestigious language. Careers in any area of business communication or within the government, or in science and technology require fluency in English

The basic idea behind offering English as a practical subject at the undergraduate level is to acquaint students with a language that enjoys currency as a lingua franca of the globe. For prospective engineers nothing could be more useful or productive than being able to reach out to the world of technology. In the ELCS lab the students are trained in Communicative English Skills, phonetics, word accent, word stress, rhythm and intonation, making effective oral presentations - both extempore and Prepared- seminars, group discussions, presenting techniques of writing, role play, telephonic skills, asking and giving directions, information transfer , debates, description of person, place, objects etc; . The lab encourages students to work in a group, engage in peer-reviews and inculcate team spirit through various exercises on grammar, vocabulary, listening and pronunciation games, etc

Objectives :

1.To facilitate computer-aided multi-media instruction enabling individualized and independent language learning

2.To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking.

3.To train students to use language appropriately for interviews, group discussion and public speaking

4.To help the students to cultivate the habit of reading passages from the computer monitor, thus provides them the required facility to face computer-based competitive exams such as GRE, TOEFL, GMAT etc.

5.To train them to face interviews with confidence and enable them to prepare resume with cover letter.

6.To prepare them to use communicative language and participate in public speaking.

7.To initiate them into greater use of the computer in power point presentation preparation, report Writing and e-mail writing etc.

8.To initiate them into greater use of the computer in power point presentation preparation, report Writing and e-mail writing etc.

9.To expose the Students to participate in group discussions, debates with ease.

List of Exercises :

I	Activities on Fundamentals of Listening and Inter-personal Communication	6 Hours
	Listening to conversation, listening to technical presentation- listening to online video conferencing ,interviews and webinars -starting a conversation - responding appropriately and relevantly - using appropriate body language - Role Play in different situations & Discourse Skills- using visuals.	
II	Activities on Reading Comprehension	6 Hours
	General Vs Local comprehension- reading for facts- guessing meanings from context-Scanning-skimming and inferring meaning- critical reading & effective googling- TOFEL,IELTS-reading online journals.	
III	Activities on Writing Skills	6 Hours
	Structure and presentation of different types of writing - letter writing - Resume writing- e- correspondence - Proposal writing - Technical report writing - Portfolio writing - planning for writing - improving one's writing.	
IV	Activities on Presentation Skills	6 Hours
	Oral presentations (individual and group) through JAM sessions – presentation on online platform (webinars, online meeting) - seminars -PPTs and written presentations through posters- projects-report- e-mails- assignments etc.- creative and critical thinking.	
V	Activities on Soft Skills	6 Hours

Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation-Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conferencing and Mock Interviews-Time management-stress management –paralinguistic features-Multiple intelligences – emotional intelligence – spiritual quotient (ethics) – intercultural communication – creative and critical.

TOTAL: 30 HOURS

Course Outcomes (COs):

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

CO1: Compose grammatically correct sentences for oral as well as written communication.
CO2: Interpret perfectly after paying attention to an audio on any theme.
CO3: Organize formal presentations effectively.
CO4: Explain the content of any written or visual material.
CO5: Generate technical and non-technical documents with appropriate contents and context.
CO6: Monitor, analyse and adjust their own communication.

REFERENCES:

1. Raman, Meenakshi and Sangeetha Sharma, ―Technical Communication: Principles and Practice‖, Oxford University Press, New Delhi, 2011.
2. Sudha Rani, D , ―Advanced Communication Skills Laboratory Manual‖ , Pearson Education 2011.
3. Paul V. Anderson ,―Technical Communication‖,. Cengage Learning pvt. Ltd. New Delhi, 2007.
4. ―English Vocabulary in Use series‖, Cambridge University Press 2008.
5. ―Management Shapers Series‖ ,Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.
6. Rizvi and Ashraf M., ‒Effective Technical Communication‖, Tata McGrawHill, New Delhi, 2005.
7. Jones, D, ‒The Pronunciation of English‖, CUP, . Cambridge,2002.