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COLLEGE of
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(AN AUTONOMOUS INSTITUTE)

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F. Y. B. Tech. Curriculum
w.e.f. 2020-2021

DY PATIL
COLLEGE of
ENGG. & TECH
KOLHAPUR

D. Y. Patil College of Engineering and Technology

Kasaba Bawada, Kolhapur

(An Autonomous Institute)

Accredited by NAAC with 'A' Grade

B. Tech Programme Structure

F. Y. B. Tech.

(Common to all programmes)

(To be implemented from academic year **2020-21**)

D. Y. PATIL COLLEGE OF ENGG. & TECH. ★ KOLHAPUR ★
Dept. of Gen. Engg.

HEAD
Dept. of General Engg.
D. Y. Patil College of Engg. & Tech.,
Kasaba Bawada, Kolhapur

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Instructions :

There are two groups of courses in each semester :

1. Physics Sub Group and

2. Chemistry Sub Group

Allotment of groups to students:

In First Year Engineering & Technology, total students will be Divided into two groups namely Group-A and Group-B

Group-A students will appear for

Physics sub group courses in Semester-I and

Chemistry sub group courses in Semester-II

Group-B students will appear for

Chemistry sub group courses in Semester-I and

Physics sub group courses in Semester-II

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Group A: Semester-I (Physics Sub-Group)

Sr. No.	Course Code	Course Type	Name of the Course	Teaching Scheme per Week				Total Marks	Evaluation Scheme			
				Lecture	Tutorial	Practical	Credits		Type	Max. Marks	Min. Marks for Passing	
	Induction Program as per the guidelines of AICTE model curriculum.											
1	201GEL101	BSC	Engineering Mathematics – I	3	1		4	100	ISE MSE ESE	20 30 50	20 20	40
2	201GEL103	BSC	Engineering Physics	3			3	100	ISE MSE ESE	20 30 50	20 20	40
3	201GEL104	ESC	* Engineering Graphics and Design	3			3	100	ISE MSE ESE	20 30 50	20 20	40
4	201GEL105	ESC	Fundamentals of Computer and Programming	3			3	100	ISE MSE ESE	20 30 50	20 20	40
5	201GEL110	HSMC	# Professional Communication - I	1			1	50	ESE	50	20	
6	201GEP103	BSC-LC	Engineering Physics Laboratory			2	1	25	ISE	25	10	
7	201GEP104	ESC-LC	Engineering Graphics & Design Laboratory			2	1	25	ISE	25	10	
8	201GEP105	ESC-LC	Fundamentals of Computer and Programming Laboratory			2	1	25	ISE	25	10	
9	201GEP110	HSMC- LC	Professional Communication - I - Laboratory			2	1	25	ISE	25	10	
10	201GEP112	ESC-LC	Workshop Practice - I			2	1	50	ISE	20	20	
11	201GEMC113	MC	****Yoga And Physical Management Skills (Non Credit Mandatory Course)**									
			Total:	**13**	**1**	**10**	**19**	**600**		**600**		
				24								

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Group A : Semester-II (Chemistry Sub-Group)

Sr. No.	Course Code	Course Type	Name of the Course	Teaching Scheme per Week				Total Marks	Evaluation Scheme			
				Lecture	Tutorial	Practical	Credits		Type	Max. Marks	Min. Marks for Passing	
12	201GEL102	BSC	Engineering Mathematics– II	3	1		4	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
13	201GEL106	BSC	Engineering Chemistry	3			3	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
14	201GEL107	ESC	Fundamentals of Civil Engineering	3			3	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
15	201GEL108	ESC	Fundamentals of Electrical and Electronics Engineering	3			3	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
16	201GEL109	ESC	Fundamentals of Mechanical Engineering	1			1	50	ISE	20	20	
									MSE	30		
17	201GEL111	HSM C	# Professional Communication - II	1			1	50	ESE	50	20	
18	201GEP106	BSC- LC	Engineering Chemistry Laboratory			2	1	25	ISE	25	10	
19	201GEP107	ESC- LC	Fundamentals of Civil Engineering Laboratory			2	1	25	ISE	25	10	
20	201GEP108	ESC- LC	Fundamentals of Electrical and Electronics Engineering Laboratory			2	1	25	ISE	25	10	
21	201GEP111	HSMC-LC	Professional Communication - II – Laboratory			2	1	25	ISE	25	10	
22	201GEMC114	MC	**** Democracy, Elections and Good Governance (Non Credit Mandatory Course)**									
			Total:	14	1	8	19	600		600		
				23								

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Group B: Semester-I (Chemistry Sub-Group)

Sr. No.	Course Code	Course Type	Name of the Course	Teaching Scheme per Week				Total Marks	Evaluation Scheme			
				Lecture	Tutorial	Practical	Credits		Type	Max. Marks	Min. Marks for Passing	
	Induction Program as per the guidelines of AICTE model curriculum.											
1	201GEL101	BSC	Engineering Mathematics – I	3	1		4	100	ISE MSE ESE	20 30 50	20 20	40
2	201GEL106	BSC	Engineering Chemistry	3			3	100	ISE MSE ESE	20 30 50	20 20	40
3	201GEL107	ESC	Fundamentals of Civil Engineering	3			3	100	ISE MSE ESE	20 30 50	20 20	40
4	201GEL108	ESC	Fundamentals of Electrical and Electronics Engineering	3			3	100	ISE MSE ESE	20 30 50	20 20	40
5	201GEL109	ESC	Fundamentals of Mechanical Engineering	1			1	50	ISE MSE	20 30	20	
6	201GEL110	HSMC	# Professional Communication- I	1			1	50	ESE	50	20	
7	201GEP106	BSC- LC	Engineering Chemistry Laboratory			2	1	25	ISE	25	10	
8	201GEP107	ESC- LC	Fundamentals of Civil Engineering Laboratory			2	1	25	ISE	25	10	
9	201GEP108	ESC- LC	Fundamentals of Electrical and Electronics Engineering Laboratory			2	1	25	ISE	25	10	
10	201GEP110	HSM C-LC	Professional Communication- I - Laboratory			2	1	25	ISE	25	10	
11	201GEMC113	MC	****Yoga And Physical Management Skills (Non Credit Mandatory Course)**									
			Total:	**14**	**1**	**8**	**19**	**600**		**600**		
				23								

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Group B : Semester-II (Physics Sub-Group)

Sr. No.	Course Code	Course Type	Name of the Course	Teaching Scheme per Week				Total Marks	Evaluation Scheme			
				Lecture	Tutorial	Practical	Credits		Type	Max. Marks	Min. Marks for Passing	
12	201GEL102	BSC	Engineering Mathematics – II	3	1		4	100	ISE MSE ESE	20 30 50	20 20	40
13	201GEL103	BSC	Engineering Physics	3			3	100	ISE MSE ESE	20 30 50	20 20	40
14	201GEL104	ESC	* Engineering Graphics and Design	3			3	100	ISE MSE ESE	20 30 50	20 20	40
15	201GEL105	ESC	Fundamentals of Computer and Programming	3			3	100	ISE MSE ESE	20 30 50	20 20	40
16	201GEL111	HSMC	# Professional Communication - II	1			1	50	ESE	50	20	
17	201GEP103	BSC-LC	Engineering Physics Laboratory			2	1	25	ISE	25	10	
18	201GEP104	ESC-LC	Engineering Graphics & Design Laboratory			2	1	25	ISE	25	10	
19	201GEP105	ESC-LC	Fundamentals of Computer and Programming Laboratory			2	1	25	ISE	25	10	
20	201GEP111	HSMC- LC	Professional Communication - II - Laboratory			2	1	25	ISE	25	10	
21	201GEP112	ESC-LC	Workshop Practice – I			2	1	50	ISE	50	20	
22	201GEMC114	MC	** Democracy, Elections and Good Governance (Non Credit Mandatory Course)									
			Total:	**13**	**1**	**10**	**19**	**600**		**600**		
				24								

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Industry Visit and Study (Mandatory course)

Objective: To understand the work culture of the Industry and explore various skills required for the Industry.

Guidelines :

1. This activity is mandatory for each first year student of Engineering programmes.

2. Every student should undergo at least three (3) days of visit to anyone Industry during the summer vacations, after completion of the second-semester examination and should study and understand the processes, different departments/sections, working environment, discipline, technology being used, automation process, problems/issues, etc.

3. The students can approach and choose any Industry or Small / Medium Enterprise or Govt/Semi-Govt/Private Organisation or NGOs or Medium / Large Malls or Research/Health Care/Agriculture Institutes, etc with permission from the III Cell.

4. Every student has to prepare a report on the visited Industry, mentioning details of whatever he/she has understood from the three days visit, work assigned if any during the visit by the Industry representative/supervisor, problems/issues identified if any, suggestions/observations that he/she would like to put, benefits of his/her visit, a brief presentation on these and conclusion.

5. The evaluation of the visit, report and presentation will be done in the college by Industry Institute Interaction (III) Cell before the commencement of the third semester as per the schedule displayed by III Cell. The evaluation will be done by a team of Industry experts, T&P and III Cell faculty Co-ordinators. The appropriate rubrics should be used during the evaluation process.

6. This entire activity will be coordinated by III Cell, T&P Cell with the help of First Year Engineering Department.

7. Evaluation will be done for 25 marks and minimum marks for passing are 10 .

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Note 1:

**** Mandatory Courses (Non-Credit):**

1. **Yoga and Physical Management Skills**
2. **Democracy, Elections and Good Governance course**

Mandatory Courses will be of self study type and will be assessed by conducting objective type examination for 50 marks. Criteria for passing is 40% (20 marks). Result of student will be declared only if the student passes Mandatory courses.

Note 2: Tutorials and practicals shall be conducted in batches with batch size of 20 students.

Note 3: Student Induction Program as per AICTE guidelines will be conducted at the start of Semester-I

Evaluation Scheme:

1) In Semester Evaluation (ISE-Theory) 20 marks

ISE-1 and ISE-2 is to be done by using different modes for both ISEs from the following modes:

• Online test	• Case study
• Surprise test	• Demonstrations
• Open book test	• Seminars
• Self Study	• Assignments
• Self learning topic	• Active learning methods

ISE (Lab) 25 marks : Lab assessment is to be done using continuous assessment method in which faculty has to evaluate student's performance based upon defined rubrics only and shown to the students.

2) Mid Semester Examination (MSE) will be conducted for 30 marks.

3) End Semester Examination (ESE) 50 marks :- ESE will be conducted on entire syllabus for 100 marks (excluding Engineering Graphics and Design, Professional communication) for 3 hours duration and converted to 50 marks.

* **Engineering Graphics and Design** course ESE will be of 3 hours duration and for 50 marks.

Professional Communication course ESE will be of 2 hours duration and for 50 marks.

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Course Title : **Engineering Mathematics-I**	
Course Code : **201GEL101**	**Semester : I**
Teaching Scheme : L-T-P : **3-1-0**	Credits : **4**
Evaluation Scheme : ISE + MSE Marks : **20 + 30**	ESE Marks : **50**

Course Description:

Engineering Mathematics-I plays important role in all Engineering branches and generally taught in first year of courses. This course provides fundamentals of Mathematics required for all Engineering streams. This course focuses on Linear Algebra, Complex Numbers, Expansion of Functions and Indeterminate forms, Partial Differentiation and its applications, Numerical Solutions of Algebraic & Transcendental equations.

Course Objective:

1) To teach mathematical methodology and models.
2) To develop mathematical skills and enhance logical thinking power of students.
3) To provide students with skills in Linear Algebra and Differential calculus and numerical techniques.
4) To imbibe graduates with mathematical knowledge, computational skills and the ability to deploy these skills effectively in solution of engineering problems.

Course Outcomes (COs) : At the end of the course the student will be able to:

101.1	**Apply** the knowledge of matrices to find rank, solutions of Simultaneous Linear Equations, Eigen values &Eigen vectors.
101.2	**Calculate** the roots of Complex numbers and use in engineering applications.
101.3	**Apply** the numerical techniques to solve Algebraic &Transcendental equations.
101.4	**Use** knowledge of derivative for Expansion of functions, Indeterminate form, Partial differentiation & its applications.

Prerequisite:	Basic knowledge of Matrices, Formulae of Derivatives.

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Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	BTL
101.1	3	2	-	-	1	-	-	-	2	-	-	1	3
101.2	3	2	-	-	1	-	-	-	2	-	-	1	3
101.3	3	2	-	-	1	-	-	-	2	-	-	1	3
101.4	3	2	-	-	1	-	-	-	2	-	-	1	3

Contents	Hours
Unit 1. Simultaneous Linear Equations 1. Rank of Matrix, Normal form. 2. Solution of Simultaneous linear Non-homogenous equations. 3. Solution of Simultaneous linear homogenous equations. 4. Gauss-elimination method. 5. Gauss Seidel method.	6
Unit 2. Eigen Values and Eigen vectors 1. Dependence and Independence of Vectors. 2. Eigen values and properties. 3. Eigen vectors and properties. 4. Eigen vectors by Power method. 5. Cayley Hamilton's Theorem	6
Unit 3. Complex Numbers 1. De'Moivre's Theorem. 2. Roots of complex numbers. 3. Expansion of sinnθ, cosnθ, tannθ in powers of sinθ, cosθ, tanθ. 4. Expansion of $\sin^n\theta$, $\cos^n\theta$ in terms of sines or cosines of multiples of θ. 5. Introduction to Circular functions, Hyperbolic and Inverse hyperbolic functions.	6

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Unit 4. Expansion of Functions and Indeterminate forms 1. Taylor's theorem, expansions and approximate value of functions. 2. Standard expansion by Maclaurin's theorem. 3. Expansion of $\sin^{-1}x$, $\cos^{-1}x$ & $\tan^{-1}x$ and related expansions. 4. Indeterminate forms and L'Hospital's rule.	6
Unit 5. Partial Derivatives and its Applications 1. Partial derivatives. 2. Total derivatives. 3. Differentiation of implicit functions. 4. Euler's theorem on homogeneous functions. 5. Jacobian and its Properties. 6. Maxima and Minima of functions of two variables.	6
Unit 6. Numerical Solutions of Algebraic & Transcendental equations 1. Bisection method. 2. Newton-Raphson method. 3. Regula falsi method. 4. Secant method.	6

Note-Minimum 10 Tutorials should be conducted covering all units.

Text Books:

1) P.N.Wartikar, J.N.Wartikar, A Text Book of Applied Mathematics, Pune Vidyarthi Griha Prakashan, Pune.
2) Dr. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi.
3) H.K.Dass, Advanced Engineering Mathematics, S.Chand Publications, New Delhi.
4) Peter V.O'Neil, Advanced Engineering Mathematics, Cengage learning.

Reference Books:

1) Erwin Kreyszig, Advanced Engineering Mathematics, India Pvt, Ltd.
2) B.V.Ramana, Higher Engineering Mathematics, Tata M/c Graw-Hill Publication
3) M.K.Jain, Numerical methods for Scientific and Engineering Computation, New Age International Pvt. Ltd New Delhi.
4) N.P.Bali, Iyengar, A Textbook of Engineering Mathematics, Laxmi Publication.

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Course Title : **Engineering Physics**	
Course Code : **201GEL103**	**Semester : I / II**
Teaching Scheme : L-T-P : **3-0-0**	Credits : **3**
Evaluation Scheme : ISE + MSE Marks : **20 + 30**	ESE Marks : **50**

Course Description:

Engineering Physics plays the primary role in the professional courses of all Engineering branches and generally taught in first year of courses. Engineering Physics course provides fundamental principles of physics, using calculus for Engineering Sciences. Students will learn the perception of optics, semiconductors, acoustics and nanomaterials in different engineering applications.

Course Objectives:

1. To provide basic concept of modern optics.
2. To expose electrical properties of materials for semiconductors from quantum mechanical point of view
3. To perceive the concepts of acoustics, ultrasonic and nanomaterials for their applications in engineering fields.
4. To make the students grasp the working principles of Laser and optical fibre.

Course Outcomes (COs):

At the end of the course the student will be able to:

103.1	**Use** the principles of diffraction, polarization in thin Diffraction grating, polarimeter.
103.2	**Apply** the knowledge of architectural acoustics for acoustically good hall
103.3	**Explain** electronic properties of materials, many electron systems, semiconductors from a quantum mechanical point of view and Fundamentals of quantum mechanics
103.4	**Describe** the basics of LASER, optical fibre and synthesis methods for nanoparticles & size dependent properties

Prerequisite	Fundamentals of optics, semiconductors , sound, fibres and Nano science

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Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	BTL
103.1	3	1	-	-	1	-	-	-	-	-	-	1	2
103.2	3	1	-	-	1	-	-	-	1	-	-	1	3
103.3	3	1	-	-	1	-	-	-	-	-	-	1	3
103.4	3	1	-	-	1	-	-	-	1	-	-	1	3

Contents	Hours
Unit 1. Physics of optics Interference pattern, review of geometric path, optical path, path difference, phase difference, Interference due to parallel and wedge shaped film, theory of plane diffraction grating, resolving power of grating, Double refraction, Huygens theory for double refraction, difference between positive and negative crystals	6
Unit 2. Ultrasonics & Oscillations Ultrasonic: properties of ultrasonic waves-ultrasonic production-magnetostriction method-piezoelectric method, applications (determination of depth of the sea- measurement of velocity of ultrasonic wave) Free oscillations, damped oscillations, Free oscillations and resonance, differential wave equation **Self-learning topic**- NDT of materials, Acoustic Design of hall.	6
Unit 3. Solid State Physics Energy Band structure of solids, band formation in Lithium and diamond solid, Fermi direct distribution, Fermi energy in intrinsic and extrinsic semiconductors, dependence of Fermi with temperature, numerical, Hall effect.	6

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Unit 4. Quantum physics De Broglie hypothesis and wavelength of matter waves, Heisenberg uncertainty principle, Schrodinger wave equations (Time dependent and independent), energy of particle in 1-D potential well, physical significance wave function	6
Unit 5. LASERS AND FIBRE OPTICS Einstein's coefficients, absorption, spontaneous emission, stimulated emission, population inversion, properties of LASER, Types of LASER (He-Ne laser), and Applications of LASER, TIR in fibre, expression for acceptance angle, NA, Fractional R.I. **Self-learning topic:** Optical fibre as Sensors	6
Unit 6. Nano Physics Introduction to nanotechnology, Properties of nanoparticles, Top down process- Ball milling method, Bottom up Approach- SILAR method, Applications of nanomaterials	6

Text Books:

1) M. N. Avadhanulu, P. G. Kshirasagar. A text book of Engineering Physics, S. Chand Publishing, 2014
2) V. Rajendran, Engineering Physics, Tata McGraw Hill, 2010
3) L.N.Singh, Engineering Physics, Synergy knowledge ware, 2016
4) H.K.Malik, Engineering Physics, Tata McGraw Hill Education
5) R.K. Gaur, S.L.Gupta, Engineering Physics, Dhanpat Rai publications, 1993

Reference Books:

1) S.K.Kulkarni, Nanotechnology, principles & Practices, Capital Publication Co. New Delhi,2007
2) C.Kittel, Introduction to solid state physics, John Willey and Sons,2019
3) B.K. Pandey and Chaturvedi, Engineering Physics, Cengage learning publications, 2012
4) J.Walker, D.Halliday, R.Resnick, Fundamentals of Physics, Wiley publication, 2012
5) S.O.Pillai, Solid State Physics, New edge internationals, 2009

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Course Title : **Engineering Physics Laboratory**	
Course Code : **201GEP103**	**Semester : I / II**
Teaching Scheme : L-T-P : **0-0-2**	Credits : **1**
Evaluation Scheme : ISE Marks : **25**	

Course Description: The course includes experiments based on optics, semiconductors, and acoustics. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list or otherwise.

Course Objectives:

1. To make the students understand the concept of physics for the effective application in the field of engineering and technology.
2. To use the knowledge of electron transport in semiconductors.
3. To summarize the factors affecting the speed of ultrasound through liquids.

Course Outcomes (COs):

At the end of the course the student will be able to

103.1	**Apply** knowledge related to optics, Fibre Optics, Lasers to use for suitable purposes in Engineering fields.
103.2	**Apply** the theory of semiconductors to calculate band gap energy and carrier concentration.
103.3	**Use** ultrasonic interferometer to calculate velocity of ultrasound in given liquid

Course Articulation Matrix: Mapping of Laboratory Outcomes (LOs) with Program Outcomes (POs)

Lab. Outcomes (COs) / Program Outcomes (POs)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**BTL**
103.1	3	-	-	-	1	-	-	-	-	-	-	1	3
103.2	3	-	-	-	1	-	-	-	-	-	-	1	3
103.3	3	-	-	-	1	-	-	-	-	-	-	1	3

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List of Experiments			
Expt. No.	**Name of Experiment**	**Type**	**Hours**
1	To Calculate specific rotation of sugar by using half shade polarimeter	O	2
2	To find diameter of cylindrical obstacle	O	2
3	To determine divergence of laser beam	O	2
4	To Decide band gap energy of p-n junction diode	O	2
5	To Compare inverse square law of intensity of light with distance	O	2
6	To determine wavelength of LASER using diffraction grating	O	2
7	To determine resolving power of diffraction grating	O	2
8	To determine resolving power of telescope	O	2
9	To determine the velocity of the ultrasonic wave in water using Ultrasonic Interferometer	O	2
10	To find radius of curvature using Newton's ring	O	2
11	To Recognize carrier concentration of semiconductor using Hall effect.	O	2
12	To find Hysteresis loss in magnetic materials using B-H-curve	S	2
13	To Recognize characteristics of CE, CB transistor	S	2
14	To determine the distance between two secondary source using Fresnel biprism	O	2

- S-STUDY, O-OPERATIONAL
- Minimum 10 Experiments should be conducted covering all units.

References:

1) J.Walker, D.Halliday, R.Resnick, Fundamentals of physics, Wiley publication, 2012

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Course Title : **Engineering Graphics and Design**	
Course Code : **201GEL104**	**Semester : I / II**
Teaching Scheme : L-T-P : **3-0-0**	Credits : **3**
Evaluation Scheme : ISE + MSE Marks : **20 + 30**	ESE Marks : **50**

Course Description:
Engineering Graphics Course is aimed at providing basic understanding of the fundamentals of engineering graphics, projection of solid, orthographic projections, isometric projections along with introduction and basics of computer aided drafting

Course Objectives:
1. Bring awareness that engineering drawing is the language of engineers.
2. To impart basic knowledge and skills required to prepare engineering drawings.
3. To visualize and present the orthographic and isometric views with proper dimension and scale.
4. Enable them to use computer aided drafting tools for the generation of drawing.

Course Outcomes (COs):
At the end of the course the student will be able to

CO104.1	**Interpret** basic concepts of engineering drawing. L2
CO104.2	**Prepare** projection of solid. L3
CO104.3	**Prepare** orthographic projection & isometric projection. L3
CO104.4	**Understand** modern engineering tools used for engineering drawing. L2

Prerequisite:	Fundamentals of drawings

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Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	BTL
CO104.1	3	2	-	-	-	-	-	-	-	-	-	-	2
CO104.2	3	2	-	-	-	-	-	-	-	-	-	-	3
CO104.3	3	2	-	-	-	-	-	-	-	-	-	-	3
CO104.4	3	2	-	-	3	-	-	-	-	-	-	-	2

Content	Hours
Unit 1. Fundamental of Engineering Drawing Fundamental of Engineering Drawing: Principal of Engineering Graphics & their significance, usage of drawing instruments, Conics Sections: Construction of Ellipse, Parabola, Hyperbola (General Methods only) & Cycloid curves.	6
Unit 2. Orthographic views Principles of Orthographic Projections, types of orthographic projections–First angle and third angle projections, Obtaining orthographic projections of given pictorial views by using first angle projection method along with sectional views. BIS conventions used in drawing, dimensioning and sections.	6
Unit 3. Isometric projections Introduction to Isometric, Isometric scale, Isometric projections and Isometric views / drawings. Circles in isometric view. Isometric views of simple solids and objects.	5
Unit 4. Projections of solids Projection of solid when axis is perpendicular to one of the reference planes, when axis is inclined to one and parallel to other reference plane, When axis is inclined to both the reference planes, Projection of Prisms, Pyramids, Right circular cylinder, Right circular cone.	5
Unit 5. Overview of Computer Aided Drafting Introduction to CAD software, Graphical User interface of CAD software, Selection of Drawing size and scale. Standard Toolbars, Menus, Tabs, navigational tools and Basic Commands to draw 2D objects, Co-ordinate system and planes, Edit/Modify & Viewing Commands.	7

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Unit 6. Customization & Annotations Apply Dimensions, Lettering, and annotations as per BIS conventions, other graphic projection techniques, Changing length through modifying existing line, drawing sectional views, Surface and wire frame models, Introduction to Isometric drafting, Printing Documents to paper.	7

Textbooks:

1. N.D.Bhatt, Engineering Drawing, Charotor Publication House, Bombay, 2014
2. N.D.Bhatt, Machine Drawing, Charotor Publication House, Bombay, 46th Edition.
3. D.M.Kulkarni, A.P.Rastogi, Engineering Graphics with AutoCAD, (PHI)Publisher 2010.

Reference Books:

1. T.E.French, C.J.Vierck, Graphic Science, Mc-Graw Hill International.
2. Ajeet Sing, Working with AutoCAD 2000, Tata McGraw Hill.
3. K.L.Narayana, Machine Drawing, New Age Publication
4. K.Venugopal, Engineering Drawing and Graphics, New Age Publication
5. R.K.Dhawan, A text book of Engineering Drawing, S.Chand and Co.
6. W.J.Luzadder, Fundamentals of Engineering Drawing, Prentice Hall of India.
7. N.B.Shaha, B.C.Rana, Engineering Drawing, Pearson Education, 2nd Edition.

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Course Title : **Engineering Graphics and Design Laboratory**	
Course Code : **201GEP104**	**Semester : I / II**
Teaching Scheme : L-T-P : **0-0-2**	Credits : **1**
Evaluation Scheme : ISE Marks : **25**	

Course Description: Engineering Graphics Course includes the drawing sheets to be drawn with first angle method based on Projection of solids, orthographic projections, isometric projections along with introduction to computer aided sketching.

Course Objectives:

1. Bring awareness that engineering drawing is the language of engineers.
2. To impart basic knowledge and skills required to prepare engineering drawings.
3. To visualize and present the orthographic and isometric views with proper dimension and scale.
4. Enable them to use computer aided drafting tools for the generation of drawing.

Course Outcomes (COs):

At the end of the course the student will be able to:

GEP104.1	**Implement** knowledge of fundamentals of engineering graphics and follow basic drawing standards and conventions.
GEP104.2	To **visualize** and communicate three dimensional shapes by representing three-dimensional objects into two-dimensional views vice versa.
GEP104.3	**Develop** lateral surfaces of solids for various applications.
GEP104.4	**Use** modern engineering techniques, tools and skills for engineering practice.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12
GEP104.1	3	-	-	-	-	-	-	-	1	-	-	1
GEP104.2	3	-	-	-	-	-	-	-	1	-	-	1
GEP104.3	3	-	-	-	-	-	-	-	1	-	-	1
GEP104.4	3	-	-	-	3	-	-	-	1	-	-	1

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List of Assignments		
Sr. No.	**Details**	**Hours**
1	Draw problems based on Engineering curves	2
2	Draw problems based Orthographic projections	4
3	Draw problems based on Isometric projections	4
4	Draw problems based on Projections of Solid	4
5	Prepare two simple component (Using CAD software/package)	4
6	Orthographic views (Using CAD software/package)	4
7	Sectional Orthographic views (Using CAD software/package)	4

- S-STUDY, O-OPERATIONAL
- Minimum four drawing sheets should be drawn and three drawings using modern engineering tool to cover the entire curriculum of course.

Textbooks:

1. N.D.Bhatt, Engineering Drawing, Charotor Publication House, Bombay, 53rd Edition.
2. N.D.Bhatt, Machine Drawing, Charotor Publication House, Bombay, 46th Edition.
3. D.M.Kulkarni, A.P.Rastogi, Engineering Graphics with AutoCAD, (PHI)Publisher 2010.

Reference Books:

1. T.E.French, C.J.Vierck, Graphic Science, Mc-Graw Hill International.
2. Ajeet Sing, Working with AutoCAD 2000, Tata McGraw Hill.
3. K.L.Narayana, Machine Drawing, New Age Publication
4. K.Venugopal, Engineering Drawing and Graphics, New Age Publication
5. R.K. Dhawan, A text book of Engineering Drawing, S. Chand and Co.
6. W.J.Luzadder, Fundamentals of Engineering Drawing, Prentice Hall of India.
7. N.B.Shaha, B.C.Rana, Engineering Drawing, Pearson Education, 2nd Edition.

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Course Title : **Fundamentals of Computer and Programming**	
Course Code : **201GEL105**	**Semester : I / II**
Teaching Scheme : L-T-P : **3-0-0**	Credits : **3**
Evaluation Scheme : ISE + MSE Marks : **20 + 30**	ESE Marks : **50**

Course Description: This course provides a comprehensive introduction to computers and programming using C language which will be of help to all Engineering Streams. Course includes computer fundamentals, data representation and number systems, introduction to algorithms and C languages, operators and formatted I/O, control statements, functions and arrays. It also introduces object oriented paradigm, Artificial Intelligence and its applications. This course is of primitive nature and intends to develop programming logic, explore the knowledge and use of Computers in different fields.

Course Objective:

1. To provide basic knowledge of Computer and C Programming language.
2. To make students develop computer programming logic so as to help them write programs and applications in C.
3. To build the foundations required to learn other programming languages.
4. To introduce the concepts of Artificial intelligence, Machine Learning and their applications.

Course Outcomes (COs):

At the end of the course the student should be able to:

105.1	Identify computer system components and use programming constructs to solve numerical and engineering problems.
105.2	Use knowledge of C language to write simple application programs.
105.3	Draw flowcharts and implement the algorithms to solve mathematical and engineering problems.
105.4	Use the concepts of object oriented paradigm, artificial intelligence, machine learning and their applicability in real world scenarios.

Prerequisite:	Basic knowledge of computers

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Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	BTL
105.1	2	1	-	-	-	-	-	-	-	-	-	1	2
105.2	2	2	1	-	-	-	-	-	-	-	-	-	3
105.3	2	2	2	-	1	-	-	-	-	-	-	1	3
105.4	1	1	1	1	1	-	-	-	-	-	-	2	2

Content	Hours
Unit 1. Computer Fundamentals and Number Systems Definition, Components, Peripherals, Types of Software, Computer Networks, Internet. Bits, Bytes and words, Representation - characters, integer and fraction; Number System – Decimal, Binary, Octal and Hexadecimal, Conversions – Decimal to Binary, Binary to Decimal	6
Unit 2. Introduction to Algorithm and 'C' Language **Basics of Algorithm:** Idea of Algorithm: steps to solve logical and numerical problems, Representation of Algorithm: Flowchart / Pseudo code with examples. History of 'C' language, Importance of C, Sample 'C' program, Structure of 'C' Program, Executing a 'C' program, Character set, Tokens, Keywords and Identifiers, Constants, Variables, Data types.	6
Unit 3. Control Statements, Operators and Formatted I/O Control Statements: Decision making and branching, Decision making and Looping, Unconditional Control statements. Introduction, Operators, Read / Write file operations, Formatted input and Formatted output.	8
Unit 4-Function and Arrays **Function:** Function in C, Function Calling in C, return type in Function, Call by Value, User Defined Function, Predefined Functions. **Array:** Basics of Array, Array declaration and initialization, Types of array: One and Two dimensional arrays, Strings declaration and initialization	6
Unit 5–Introduction to Object Oriented paradigm Introduction to OOP, Object, Class, Methods, Encapsulation, Abstraction, Inheritance, Polymorphism, Simple Program and its execution process.	7

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Unit 6–Introduction to Artificial Intelligence Understanding AI, its applications and use cases, how AI is transforming our lives, Introduction to Machine Learning, Deep Learning and Neural Networks, application to each and current trends.	3

Text Books :

1. Anita Goel, Computer Fundamentals, Pearson Publications.(Unit -1)
2. E Balagurusamy, Programming in ANSI C, McGraw Hill publications, 7th Edition (Unit 2 to 4)
3. Herbert Schildt C++, the complete reference Publisher: McGraw Hill India 4th edition (1 July 2017) (Unit 5)
4. John Paul Mueller, Luca Massaron , Artificial Intelligence for dummies, John Wiley and Sons Inc. (Unit 6)
5. John Paul Mueller, Luca Massaron , Machine Learning for dummies, John Wiley and Sons Inc. (Unit 6)

Reference Book:

1. V. Rajaraman, Fundamentals of Computers, PHI publications, 6th edition
2. Yashwant Kanitkar, Let us C, BPB publications, 16th Edition
   R. G. Dromey, How to solve it by computer, Prentice-Hall

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Course Title :**Fundaments of Computer and Programming Laboratory**	
Course Code : **201GEP105**	**Semester : I / II**
Teaching Scheme : L-T-P : **0-0-2**	Credits : **1**
Evaluation Scheme : ISE Marks : **25**	

Course Description: This course is designed to help students to acquire knowledge of basics of computer, C language and get acquainted with digital media useful in their professional life. The focus is on developing logical skills, drawing flow charts, writing algorithms to help the students to solve mathematical and engineering problems using C language. Awareness of object oriented paradigm, artificial intelligence and machine learning would help the students to apply the knowledge acquired while dealing with real world scenarios/problems in their career. Students will be exposed to proper usage of social media and digital transactions.

Course Objective:

1. To locate different computer components, peripherals, their configuration and usage.
2. To develop logic to solve a given problem using flow charts and algorithms.
3. To make use of different programming constructs while writing the programs to solve the mathematical and engineering problems.
4. To make the students aware of do's and don'ts of social media and digital transactions.

Course Outcomes (COs):

At the end of the course the student should be able to:

105.1	Recognise hardware components and develop simple software applications.
105.2	Draw flowcharts and write algorithms to solve problems logically.
105.3	Apply various concepts of procedural and object oriented paradigm to provide solutions to the engineering problems.
105.4	Inculcate the skills of proper usage of social media and digital transactions.

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Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	BTL
105.1	2	1	1	-	-	-	-	-	-	-	-		2
105.2	2	2	2	1	-	-	-	-	-	-	-	1	3
105.3	2	2	1	-	-	-	-	-	-	-	-	1	3
105.4	-	1	1	1	1	-	-	-	-	-	-	1	1

List of Experiments			
Expt. No.	**Name of Experiments**	**Type**	**Hours**
1	Inside the machine: identify different parts of the computer, add new hardware, configure screen, mouse, install new software, Use of editors, Office suite.	S	2
2	Introduction to C Editor and basic syntax, Flow Chart and Writing algorithm for minimum 5 basic problems.	S	2
3	Program/s to explore data types, constants and variables.	O	2
4	Program/s to provide insight to formatted and unformatted input and output in C.	O	2
5	Program/s to perform arithmetic, logical and relational operators.	O	2
6	Programs to solve problems involving different arithmetic operations.	O	2
7	Programs to perform number swapping and finding Prime Number	O	2
8	Program/s to generate the Fibonacci / other series.	O	2
9	Program/s to perform different matrix operations.	O	2
10	Introduction to C++ Editor and basic program	O	2
11	Program/s to show OOP functionality in C++	O	2
12	Case study of recent AI/ML system/s.	S	2
13	Awareness on proper usage of Social media.	S	2
14	Awareness on Digital transactions.	S	2

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- **S-STUDY, O-OPERATIONAL**
- **Note: The instructor may choose minimum ten experiments from experiment no. 1 to 12 & Experiment no. 13 and 14 are mandatory. Students of different batches should be assigned different problems/tasks and get done during practical sessions.**

Reference Books:

1. E Balagurusamy, "Programming in ANSI",McGraw Hill publications, 7th Edition
2. Yashwant Kanitkar, "Let us C", BPB publications, 16th Edition.
3. Byron Gottfried, Jitender Chhabra, Programming with C (Schaum's Outlines Series) McGraw Hill Education, 3rd edition
4. Herbert SchildtC++, the complete reference Publisher: McGraw Hill India 4th edition (1 July 2017)
5. R. G. Dromey, How to solve it by computer, Prentice-Hall
6. John Paul Mueller, Luca Massaron , Artificial Intelligence, Dummies
7. Appropriate weblinks.

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Course Title : **Professional Communication-I**	
Course Code : **201GEL110**	**Semester : I**
Teaching Scheme : L-T-P : **1-0-0**	Credits : **1**
Evaluation Scheme :	ESE Marks : **50**

Course Description

Communication skills are essential for engineers who aspire to carry out their professional practice in the global arena. Professional Communication skills comprise core elements such as the fluency in the English language with command over the four basic LSRW (Listening, Speaking, Reading, and Writing) skills.

Course Objectives

1. To make the students learn proper usage of language, style and vocabulary.
2. To make the students use key elements of structure and style in drafting short and long documents.

Course Outcomes

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

110.1	**Identify** various types of communication and barriers.
110.2	**Prepare** grammatically correct sentences.
110.3	**Demonstrate** basic communication skills -LSRW (Listening, Speaking, Reading, and Writing) skills.
110.4	**Demonstrate** various types of professional correspondence.

Prerequisite:	English Grammar and its application, LSRW

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Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	BTL
110.1	-	-	-	-	-	-	-	-	-	3	-	1	2
110.2	-	-	-	-	-	-	-	-	-	3	-	1	3
110.3	-	-	-	-	-	-	-	-	-	3	-	1	3
110.4	-	-	-	-	-	-	-	-	-	3	-	1	3

Content	Hours
Unit 1. Understanding Communication 1. Nature and Importance of Communication 2. Process of Communication 3. Types of Communication 4. Barriers to Communication **Self-learning topic: Importance and scope of communication for engineers**	3
Unit 2. Grammar And Vocabulary 1. Framing Sentences-Use of Articles, Prepositions, Tenses, Modals, SVO Structure , Punctuations 2. Transformation of Sentences: Voice, Direct-Indirect, Degree, Affirmative-Negative etc. 3. Vocabulary- TOEFL, IELTS, GATE, CAT. **Self-learning topic: Identify common errors and Improve vocabulary by reading**.	4
Unit 3. Developing Writing Skills 1 Essay Writing – Types, Techniques and Practice 2 Paragraph Writing - Techniques and Practice 3 Dialogue Writing	3
Unit 4. Professional Correspondence 1 Simple Application Letter, Inquiry and Quotation, Order, Sales etc. 2 E-mail writing	4

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Textbooks:

1. M.Ashraf Rizvi, Effective Technical Communication, McGraw Hill, 2005.
2. K. Mohan, M.Banerjee, Developing Communication Skills, MCMILLAN PUBLISHERS INDIA, 2009
3. S.Mishra, C.Murali krishna, Communication Skills for Engineers, Pearson, 2007
4. B. K.Mitra Effective Technical Communication, Oxford University Press, 2006

Reference Books:

1. Raymond Murphy, Intermediate English Grammar, Cambridge University Press, 1994
2. Dr. Anjali Ghanekar, Communication Skill, Everest Publishing House, 2004
3. M.Singh, O.P.Singh, Art of Effective Writing, S.Chand & Co. Ltd., 2002
4. R.B.Adler, G.Rooman, Understanding Human Communication, Oxford University Press, New York, 2006.
5. J.D.O Connor , Better English Pronunciation, Cambridge University Press, 2005

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Course Title : **Professional Communication-I Laboratory**	
Course Code : **201GEP110**	**Semester : I**
Teaching Scheme : L-T-P : **0-0-2**	Credits : **1**
Evaluation Scheme : ISE Marks : **25**	

Course Description

Communication skills are essential for engineers who aspire to carry out their professional practice in the global arena. Language Laboratory provides students a platform to master English language skills, communication skills and soft skills.

Course Objective

1. To practice and assess LSRW skills of the students i.e. Listening, Speaking, Reading and Writing.
2. To learn better pronunciation through accent, intonation, rhythm and stress.

Course Outcomes (COs)

At the end of the course the student will be able to:

110.1	**Illustrate** correct practices of English Grammar usage for effective speaking and writing.
110.2	**Demonstrate** effectively LSRW skills.
110.3	**Prepare** oral presentations effectively.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	BTL
110.1	-	-	-	-	-	-	-	-	-	2	-	1	3
110.2	-	-	-	-	-	-	-	-	-	2	-	1	3
110.3	-	-	-	-	-	-	-	-	-	2	-	1	3

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List of Laboratory Sessions			
Sr. No.	**Name of Laboratory Sessions**	**Type**	**Hours.**
1	Ice-breaking activities	O	2
2	Introduction : Self & Others	S & O	2
3	Grammar: Common Errors , Framing Sentences , Vocabulary Building	S	2
4	Listening Skills –Listening for understanding	O	2
5	Speaking Skills- Phonetics	O	2
6	Fluency tips - Situational Conversation	O	2
7	Reading Skills- Silent Reading , Reading aloud, Intensive and Extensive Reading	S	2
8	Writing Skills- Story Writing	S	2
9	Dialogue Writing (Skit)	O	2
10	Technical Writing- Technical paragraphs & it's presentation	S & O	2
11	Professional Correspondence- E-mail, letter writing etc.	O	2
12	Effective use of social media for learning and understanding	S	2

- Minimum 10 sessions should be conducted covering all units.
- S-STUDY, O-OPERATIONAL

Tools: Language Software e-TNL (e-Tail Networks Limited).

Reference Books:

1. J.D.O Connor , Better English Pronunciation, Cambridge University Press, 2005.

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Course Title : **Workshop Practice -I**	
Course Code : **201GEP112**	**Semester : I / II**
Teaching Scheme : L-T-P : **0-0-2**	Credits : **1**
Evaluation Scheme : ISE Marks : **50**	

Course Description: Workshop (Shop floor) is the place where engineering components are fabricated and manufactured. This course has great significance to acquire knowledge and hands on practice to use various hand tools and basic operations in engineering field. This course includes demonstration and experiments based on Safety Precautions, Carpentry, Smithy, plumbing, welding, and basic assembly operations.

Course Objectives:

1. To follow all safety Precautions in lab / shop / workshop/ industry.
2. To develop and utilize skills in carpentry, smithy, plumbing practices.
3. To utilize the skills of Welding, soldering operations.
4. To perform various operations of basic assemblies.

Course outcomes:

At the end of the course the student will be able to:

112.1	**Recognize** importance of safety precautions on work shop floor.
112.2	**Demonstrate** the skills of Carpentry Smithy and Plumbing Operations.
112.3	**Perform** Welding, soldering, operations.
112.4	**Carry out** activities related to basic assemblies.

Course Outcomes (COs) / Program Outcomes (POs)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**BTL**
112.1	2	-	-	-	-	2	-	-	2	-	-	1	2
112.2	3	-	-	-	-	-	-	-	2	-	-	1	3
112.3	2	-	-	-	-	-	-	-	2	-	-	1	3
112.4	2	-	-	-	-	-	-	-	2	-	-	1	3

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Sr. No.	Name of Job/Activity	Type	Hours
1	Safety precautions while working on shop floor.	S	2
2	Introduction to Carpentry tools, various carpentry operations and Classification of wood.	S	2
3	To make job using carpentry operations as per given drawing	O	4
4	Describe smithy operations like ,bending, forming, upsetting, drawing and Demonstration of smithy operations & Tools	S/O	2
5	To make job using Smithy work.	O	2
6	Introduction and demonstration of plumbing connections and operations	S/O	2
7	Introduction to types of welding and soldering.	S	2
8	To make Lap joints/ Butt joints or T joints using metal arc welding.	O	2
9	Demonstration of soldering.	O	2
10	Application and use of common assembly tools. Assembly and disassembly of common electrical and automobile appliances.	S/O	4

- Minimum 8 Activities and 6 Assignments should be conducted covering all units.
- S-STUDY, O-OPERATIONAL

Text Books:

1) W. Felix, Basic workshop Technology: Manufacturing Processes, Kindle edition,2010
2) R. Singh, Introduction to basic manufacturing Process and technology, New Age International Publication , 2007

References:

1. Chapman, Workshop Technology, Vol – I , The English Language Book Society, 2001.
2. H.S.Bawa, Workshop Technology Vol.-I, TMH Publications, New Delhi, 1995.
3. B.S.Raghuvanshi, A Course in Workshop Technology, DhanapatRai and Sons, 2014.
4. Hajra, Choudhary S. K., Elements of Workshop Technology, Vol-1, New Media Publication, 2008.

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Course Title : **Engineering Mathematics-II**	
Course Code : **201GEL102**	**Semester : II**
Teaching Scheme : L-T-P : **3-1-0**	Credits : **4**
Evaluation Scheme : ISE + MSE Marks : **20 + 30**	ESE Marks : **50**

Course Description: Engineering Mathematics-II plays important role in all Engineering branches and generally taught in first year of courses. This course provides fundamentals of Mathematics required for all Engineering streams. This course focuses on Differential Equations, Numerical Differentiation, Special Functions, Integral Calculus.

Course Objectives:

1) To teach Mathematical methodology and models.
2) To develop mathematical skills and enhance logical thinking power of students.
3) To provide students with skills in Integral calculus, Differential Equations and Numerical Technique.
4) To imbibe graduates with mathematical knowledge, computational skills and the ability to apply these skills effectively in solution of engineering problems.

Course Outcomes (COs): At the end of the course the student will be able to:

102.1	**Apply** the knowledge of Ordinary differential equation.
102.2	**Solve** the differential equation by numerical methods & calculate the derivative using interpolation formulae.
102.3	**Use** special functions and their properties during their higher learnings.
102.4	**Apply** multiple integration in various applications.

Prerequisite:	Formulae of Integration.

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Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs)/ Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	BTL
102.1	3	2	-	-	1	-	-	-	2	-	-	1	3
102.2	3	2	-	-	1	-	-	-	2	-	-	1	3
102.3	3	2	-	-	1	-	-	-	2	-	-	1	3
102.4	3	2	-	-	1	-	-	-	2	-	-	1	3

Contents	Hours
Unit 1. Ordinary Differential Equations of First Order and First Degree 1. Exact differential equations. 2. Reducible to Exact differential equations. 3. Linear differential equations. 4. Reducible to Linear differential equations.	6
Unit 2. Applications of Ordinary Differential Equations of First Order and First Degree 1. Orthogonal Trajectories. (Cartesian curves) 2. Applications to Simple Electrical Circuits. 3. Newton's law of cooling. 4. Rate of Decay and growth.	6
Unit 3. Numerical Solution of Ordinary Differential Equations of First Order and First Degree 1. Euler's method. 2. Modified Euler's method. 3. Runge-Kutta's method.(Fourth order) 4. Taylor's series method.	6

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Unit 4. Beta, Gamma Function and its properties. 1. Gamma function. 2. Properties of Gamma function. 3. Beta function. 4. Properties of Beta function. 5. Differentiation under integral sign	6
Unit 5. Numerical Differentiation Computation of Derivatives by using 1. Newton's forward difference formula. 2. Newton's backward difference formula. 3. Stirling's Central difference formula. 4. Lagrange's interpolation formula	6
Unit 6. Multiple Integrals and its applications 1. Double Integral and its evaluation. 2. Change of order of integration. 3. Change into Polar Coordinates. 4. Area enclosed by plane curves. 5. Mass of a plane lamina 6. Introduction to triple integral	6

Note–Minimum 10 Tutorials should be conducted covering all units.

Text Books:

1) P.N.Wartikar, J.N.Wartikar, A Text Book of Applied Mathematics, Vol.I, Pune Vidyarthi Griha Prakashan, Pune.
2) Dr. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi.
3) H.K.Dass, Advanced Engineering Mathematics, S.Chand Publications, New Delhi.
4) Peter V.O'Neil, Advanced Engineering Mathematics, Cengage learning.

Reference Books:

1) Erwin Kreyszig, Advanced Engineering Mathematics, IndiaPvt, Ltd.
2) B.V.Ramana, Higher Engineering Mathematics,Tata M/c Graw-Hill Publication
3) M. K. Jain, Numerical methods for Scientific and Engineering Computation, New Age International Pvt. Ltd New Delhi.
4) N.P.Bali, Iyengar, A Textbook of Engineering Mathematics, Laxmi Publication.

F. Y. B. Tech. Curriculum
w.e.f. 2020-2021

Course Title : **Engineering Chemistry**	
Course Code : **201GEL106**	**Semester : I / II**
Teaching Scheme : L-T-P : **3-0-0**	Credits : **3**
Evaluation Scheme : ISE + MSE Marks : **20 + 30**	ESE Marks : **50**

Course Description:

Engineering Chemistry is a blend of basic topics in chemistry with applied chemistry. It is important for Engineers to have a good understanding of the subject as they look forward in designing and developing newer materials with requisite properties and structures that are eco-friendly, economical and long lasting.

Course Objectives:

1. To study the different water based concepts and its importance.
2. To impart the basic concepts of instrumental techniques.
3. To give the basic knowledge of fuel and some advanced materials.
4. To explain corrosion, engineering materials and green chemistry.

Course Outcomes (COs):

At the end of the course the student will be able to:

106.1	**Interpret** hardness, acidity, alkalinity and chloride content of water and methods for water softening.
106.2	**Explain** principles of chemical analysis by instrumental techniques
106.3	I**llustrate** types, properties, applications of fuel and some advanced materials.
106.4	**Describe** Nanomaterials, engineering materials, green chemistry with their applications.

Prerequisite:	Fundamental Chemistry, Analytical techniques, Advanced Materials, Fuel, Corrosion, Engineering materials

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Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	BTL
106.1	3	1	_	_	_	_	_	_	_	_	_	1	3
106.2	3	-	_	_	_	_	_	_	_	_	_	1	2
106.3	3	1	_	_	_	_	_	_	_	_	_	1	3
106.4	3	-	_	_	_	_	1	_	_	-	_	1	2

Contents	Hours
Unit 1. Water Introduction, impurities in natural water, water quality parameters total solids, acidity, alkalinity, chlorides, and dissolved oxygen (definition, causes, significance), hardness of water types of hardness, units of hardness, ill effects of hard water in steam generation in boilers (scale & sludge formation), numericals on hardness, treatment of hard water (ion exchange and reverse osmosis).	6
Unit 2. Instrumental methods of chemical analysis Introduction, advantages and disadvantages of instrumental methods A) Spectrometry: Introduction, Laws of spectrometry (Lamberts and Beer-Lambert's law),Single beam spectrophotometer (schematic, working and applications). B) Chromatography: Introduction, types, gas-liquid chromatography (GLC), Basic principle, instrumentation and applications..	6
Unit 3. Advanced materials A) Polymers: Introduction, plastics, thermo softening and thermosetting plastics, industrially important plastics like phenol formaldehyde, urea formaldehyde and epoxy resins, Conducting polymers and Biopolymer (Introduction, examples and applications.) B)Composite materials: Introduction, Composition, properties and uses of fiber reinforced plastics (FRP) and glass reinforced plastic (GRP)	6

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Unit 4. Fuels A) Introduction, classification, calorific value, definition, units (calorie, kcal, joules, kilojoules), characteristics of good fuels, Boy's Calorimeter and its numerical. B) Fuel cells : Introduction, theoretical principle, advantages, disadvantages, types.	6
Unit.5. Nanomaterials Introduction to nanomaterials, Types of nanomaterials, Characteristics and Applications of 1)Fullerenes 2) Carbon Nanotubes 3)Nanowires 4)Graphite	6
Unit 6. Engineering materials & Green Chemistry A) Battery & battery technology : Introduction , primary call (carbon zinc cell, lithium cell), secondary cell (rechargeable alkaline storage battery, rechargeable lithium ion batteries) B) Green Chemistry: Definition, Twelve principles of Green Chemistry.	6

Text Books :

1. S.S.Dara, S.S.Umare, A Textbook of Engineering Chemistry, S. Chand & Company Ltd., New Delhi. 2013.
2. C.P.Murthy, C.V.Agarwal, A.Naidu, A Textbook of Engineering Chemistry, BS Publications, Hyderabad, 2012
3. S.Chawla, A text Book of Engineering Chemistry, DhanpatRai & Co. (Pvt.) Ltd, Delhi.2017
4. P.C. Jain, Engineering Chemistry, Dhanpat Rai Publication Co., 2015

Reference Books:

1. R.P.Mani, K.N.Mishra, Chemistry of Engineering Materials, Cengage Learning, 2015
2. B.Chinnappan, S.Baskar , R.Dhillon, Engineering Chemistry by Wiley India, 2012
3. B.SivaShankar, Engineering Chemistry, Tata Mc Graw Hill Publishing Limited, 2015
4. C.V.Agarwal, C. P. Murthy, A. Naidu, Chemistry of Engineering Materials, Wiley India, 2013

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F. Y. B. Tech. Curriculum
w.e.f. 2020-2021

Course Title : **Engineering Chemistry Laboratory**	
Course Code : **201GEP106**	**Semester : I / II**
Teaching Scheme : L-T-P : **0-0-2**	Credits : **1**
Evaluation Scheme : ISE Marks : **25**	

Course Description: The course includes experiments based on water quality parameters, quantitative and colourimetric analysis of metals from alloys. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list.

Course Objectives:

1. To calculate the different water quality parameters and its importance.
2. To impart the basic concepts of instrumental techniques.
3. To give the basic knowledge of fuel and some advanced materials.

Laboratory Outcomes (LOs):

At the end of the course the student will be able to:

106.1	**Analyze** hardness, acidity, alkalinity and chloride content of water and percentage of elements in some alloys.
106.2	**Produce** various advanced materials and analyze aqueous solutions using instruments.
106.3	**Perform** various experiments by following written instructions.

Course Articulation Matrix: Mapping of Laboratory Outcomes (LOs) with Program Outcomes (POs)

Lab. Outcomes (LOs) / Program Outcomes (POs)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**BTL**
106.1	3	-	-	-	-	-	-	-	1	1	-	1	3
106.2	3	-	-	-	-	-	-	-	1	1	-	1	3
106.3	3	-	-	-	-	-	-	-	1	1	-	1	3

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	List of Experiments		
Expt. No.	**Name of Experiment**	**Type**	**Hours**
1	Determination of total hardness and alkalinity of water samples.	O	2
2	Determination of chloride content and acidity of water samples.	O	2
3	Determination of rate of corrosion of aluminium in acidic and basic medium.	O	2
4	Determination of percentage of copper in brass	O	2
5	Estimation of zinc in brass solution	O	2
6	Preparation of urea-formaldehyde resin	O	2
7	Preparation of phenol-formaldehyde resin	O	2
8	Estimation of Nickel by colorimeter	O	2
9	Determination of Acid value of an oil	O	2
10	Determination of saponification value of an oil	O	2
11	Estimation of Calcium in limestone	O	2
12	Demonstration of pH meter	S	2
13	Demonstration of photo-colorimeter / spectrophotometer	S	2

- Minimum 10 experiments should be conducted covering all units.
- S-STUDY, O-OPERATIONAL

References:

1. P.C.Jain, Engineering Chemistry, DhanpatRai Publishing Company Ltd., New Delhi, 2014
2. S.K.Bashin, Dr. Sudha Rani, laboratory manual on engineering chemistry, Dhanpatrai Publishing company, New Delhi, 2012

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F. Y. B. Tech. Curriculum
w.e.f. 2020-2021

Course Title : **Fundamentals of Civil Engineering**	
Course Code : **201GEL107**	**Semester : I / II**
Teaching Scheme : L-T-P : **3-0-0**	Credits : **3**
Evaluation Scheme : ISE + MSE Marks : **20 + 30**	ESE Marks : **50**

Course Description: The course includes introduction to various branches of Civil Engineering and its application, use of modern instruments in surveying and various construction materials. It also includes concepts of Static and Equilibrium, Dynamics, Centroid and Moment of Inertia.

Course Objectives:

1. Use basic Civil Engineering knowledge of surveying and construction material in real life.
2. Apply concepts of static and dynamics in engineering problems.

Course Outcomes (COs):

At the end of the course the student will be able to:

107.1	**Explain** the importance of various branches of Civil Engineering and concept of surveying.
107.2	**Explain** the use of various construction materials and Building Components.
107.3	**Solve** numericals on force system and equilibrium conditions.
107.4	**Apply** knowledge of engineering dynamics to solve numerical.
107.5	**Identify** centroid and moment of inertia of composite figures.

Prerequisite:	Knowledge of forces, Newton's Laws of Motion, Moment

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Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	BTL
CO106.1	3	1											2
CO106.2	2	-											2
CO106.3	3	3											3
CO106.4	3	3											3
CO106.5	3	3											3

Contents	Hours
Unit 1. Relevance of Civil Engineering Introduction to branches of Civil Engineering-Environmental Engineering, Structural Engineering, Geotechnical Engineering, Water Recourse Engineering, Construction Management, Transportation Engineering-Road ways, Rail ways, Air ways.	6
Unit 2. Engineering Survey Introduction to conventional methods and equipment used for surveying and leveling, Introduction to Topo sheets and use of maps. Introduction to modern equipment's used in surveying- EDM, Total Station, GIS, GPS, Remote sensing, Area measurement by digital planimeter.	6
Unit 3. Construction Materials and Building Components **Materials**- Cement, Bricks, Stone, Sand-natural and artificial, Steel- Mild, Tor and High Tensile, Concrete- PCC, RCC, Pre-stressed and Precast, Smart materials. **Components**-Substructure and Superstructure – Functions of each component,	6
Unit 4. Statics and Equilibrium Basic Concepts and Fundamental Laws, Force, Moment and Couple, System of Forces, Resultant, Varignon's Theorem, Law of Moments, Free Body Diagram, Equilibrium conditions, Beams: Types of Loads, Types of supports, Analysis of Simple beams based on UDL and Point load.	6

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Unit 5. Dynamics of Particles Introduction to Kinetics and Kinematics of Linear motion, Newton's Laws, D'Alembert's Principle, Impact: Types of Impact, Numerical on Direct Impact.	6
Unit 6. Centroid and Moment of Inertia Centroid and Centre of Gravity, Moment of Inertia of Standard shapes from first principle, Parallel and perpendicular axis theorem, Moment of Inertia of plain and composite figures, Radius of Gyration.	6

Text Books:

1) G. K.Hiraskar, Basic Civil Engineering, DhanpatRai Publication.
2) Dr. B.C.Punmia, Ashok Jain, Basic Civil Engineering, Laxmi Publications, 2013
3) R.Subramanian, P.D.Kulkarni, Civil Engineering Material, Tata Mcgrahill Publishing.
4) R.K.Bansal, Engineering Mechanics, Laxmi Publications.
5) S.S.Junnarkar. Dr.H.J.Shah, Applied Mechanics, Chaotar publishing house, 2001
6) S.Rajshekaran, G.Subramaniam, Engineering Mechanics and Dynamics, Vikas Publishing House Pvt. Ltd, 2005

Reference Books:

1) N. Basak, Surveying, Tata Mc-Graw Hill Publication.
2) S.Gopi, Basic Civil Engineering, Dorling Kindersley Pvt Ltd., First Impresion, 2010.
3) Rakesh Beohar, Basic Civil Engineering, Uni. Science press, 2010
4) S.S.Bhavikatti, K.G.Rajashekarappa, Engineering Mechanics, New Age International (P) Ltd.
5) F.L.Singer, Engineering Mechanics, Harper & Row Publication, London.
6) F.P.Beer, E.R.Johnston, Mechanics for Engineers: Statics , McGraw- Hill Book Company, New York.

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F. Y. B. Tech. Curriculum
w.e.f. 2020-2021

Course Title : **Fundamentals of Civil Engineering Laboratory**	
Course Code : **201GEP107**	**Semester : I / II**
Teaching Scheme : L-T-P : **0-0-2**	Credits : **1**
Evaluation Scheme : ISE Marks : **25**	

Course Description: The course includes experiments based on use of modern instruments in surveying. It also includes experiments related to concepts of finding resultant and beam reaction with the help of graphical methods. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list.

Course Objectives: In this course Students will
1. Handle surveying instruments for field measurements.
2. Apply knowledge of static and dynamic force system.

Course Outcomes (COs):
At the end of the course the student will be able to:

107.1	**Explain** the use of surveying instruments for Horizontal and Vertical Measurement and Concept of surveying & levelling.
107.2	**Sketch** the cross section of Super structure and substructure
107.3	**Demonstrate** the use of digital instruments.
107.4	**Identify** the forces and Reaction by experimentally and graphically.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	BTL
107.1	1	2	-	-	2	-	-	-	-	-	-	1	3
107.2	1	2	-	-	-	-	-	-	-	-	-	1	3
107.3	2	2	-	-	3	-	-	-	-	-	-	1	3
107.4	2	2	-	-	-	-	-	-	-	-	-	1	3

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Expt. No.	Name of Experiment	Type	Hours
1	Introduction to instruments used for the measurement of Distances.	S	2
2	To find Reduction of levels by HI Method.	O	2
3	To find Reduction of levels by Rise Fall Method.	O	2
4	Measurement of horizontal and vertical distances using Total Station.	O	2
5	Measurement of plot area by Digital Planimeter.	O	2
6	Sketch cross section of Super structure and substructure (Drawings Sheet)	S	2
7	To find resultant of force system by graphical method (Drawings Sheet)	S	2
8	To find support reactions of beam by graphical method (Drawings Sheet)	S	2
9	To verify law of polygon of forces	O	2
10	To verify the principle of using Bell Crank Lever	O	2
11	To identify Support Reactions of Beam by digital beam apparatus.	O	2
12	To find Gravitational acceleration using Flexure's Trolley	O	2
13	Study of traffic signs, signals and road safety.	S	2
14	Visit to building site.	O	2
15	Micro Project-1. Explain Traffic sign, signals and safety to family.	O	2

- Minimum ten experiments should be conducted covering all units including experiment No.13, 14 and micro-project are mandatory.
- S-STUDY, O-OPERATIONAL

Text Books:

1) G.K.Hiraskar, Basic Civil Engineering, DhanpatRai Publication.
2) Dr.B.C.Punmia, Ashok Jain, Basic Civil Engineering, Laxmi Publications, 2013
3) R Subramanian, P.D.Kulkarni, Civil Engineering Material, Tata Mcgrahill Publishing.
4) R.K.Bansal, Engineering Mechanics, Laxmi Publications.
5) S.S.Junnarkar. Dr.H.J.Shah, Applied Mechanics, Chaotar publishing house, 2001
6) S.Rajshekaran, G.Subramaniam, Engineering Mechanics and Dynamics, Vikas Publishing House Pvt. Ltd, 2005

F. Y. B. Tech. Curriculum
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Reference Books:

1) N.Basak, Surveying, Tata Mc-Graw Hill Publication.
2) S.Gopi, Basic Civil Engineering, Dorling Kindersley Pvt Ltd., First Impresion, 2010.
3) R.Beohar, Basic Civil Engineering, Uni. Science press, 2nd edition,2010
4) S.S.Bhavikatti, K.G.Rajashekarappa, Engineering Mechanics, New Age International (P) Ltd.
5) F.L.Singer, Engineering Mechanics , Harper & Row Publication, London
6) F.P.Beer, E.R.Johnston, Mechanics for Engineers: Statics, McGraw- Hill Book Company, New York.

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F. Y. B. Tech. Curriculum
w.e.f. 2020-2021

Course Title : **Fundamentals of Electrical & Electronics Engineering**	
Course Code : **201GEL108**	**Semester : I / II**
Teaching Scheme : L-T-P : **3-0-0**	Credits : **3**
Evaluation Scheme : ISE + MSE Marks : **20 + 30**	ESE Marks : **50**

Course Description:

This course aims to provide knowledge about fundamentals of electrical and magnetic circuits as well as single phase and three phase AC circuits in first half and in the second half the focus is on semiconductors devices, transducers and measuring devices.

Course Objectives:

1. To make the students learn basic knowledge of electrical and magnetic circuits.
2. To impart the skill to identify working of single phase and three phase AC circuits
3. To make the students understand basic knowledge of semi-conductor devices.
4. To expose then students to the working principles of different types of transducers and measuring devices

Course Outcomes (COs):

At the end of the course the student will be able to:

108.1	**Explain** the basic concept of electric and magnetic circuits.
108.2	**Interpret** the Single Phase and Three Phase AC Circuits and their uses.
108.3	**Describe** and classify basic knowledge on the working of semi-conductor devices.
108.4	**Use** different types of transducers and measuring devices

Prerequisite:	Basics of Electricity, Semiconductors and Calculus

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Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	BTL
108.1	3	1	-	-	-	-	-	-	-	-	-	-	2
108.2	3	2	-	-	-	-	-	-	-	-	-	-	3
108.3	3	1	-	-	-	-	-	-	-	-	-	-	2
108.4	3	1	-	-	-	-	-	-	-	-	-	-	2

Content	Hours
Unit 1. Electricity and Magnetism Current, Power, Resistance, Inductance, Capacitance, EMF, Ohm's Law, Kirchoff's voltage and current law, Concept of mmf, reluctance, magnetic flux, Magnetic Flux density, Magnetic field strength, magnetic leakage, fringing, Faraday's law of Electromagnetic induction.	6
Unit 2. Single phase and Three phase AC circuits Generation of single phase sinusoidal voltage, advantages of three phase systems, Generation of three phase signal, generation of three phase power. Average value, root mean square value, form factor and peak factor of sinusoidal varying quantities. Series R-L-C circuit, Power factor and its improvement	6
Unit 3. Single phase AC Machines A) Single phase Transformer: Construction, operating principle, Types, emf equation, turns ratio, power losses and efficiency. B) AC Motors: Construction and working of single phase and three phase induction motor.	6
Unit 4. Semiconductor Devices and Applications Diode & its Types, VI characteristics, Rectifiers, Filter(C & CLC), Zener diode as Voltage Regulator, IC regulators 78XX, 79XX, LM317	6

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Unit 5. Transistor and Application Bipolar Junction Transistor, Modes of Operations, CE configuration, Biasing *: Need, Stabilization, Requirement of biasing , Stability Factor*, Transistor as an amplifier, Transistor as switch	6
Unit 6. Transducers & Measuring Devices Classification of transducers, Temperature transducers, Speed transducers, Displacement transducers, Pressure transducers, Photo transducers, Dual Trace Cathode Ray Oscilloscope (CRO), Multimeter, Function Generator	6

Text Book:

1) S.K.Sahdev, Basic Electrical Engineering, Pearson Education Publication
2) B.L.Theraja, Electrical Technology vol.1, vol.2 – S. Chand Publication
2) V.K.Mehata, Principle of Electronics - S. Chand Publication
4) H.S.Kalasi, Electronic Instrumentation, Tata McGraw Hills Publication

Reference Books:

1) I.J.Nagrath. D.P.Kothari, Basic Electrical Engineering, Tata McGraw Hill,2001
2) B. Dwivedi, A.Tripathi, Fundamentals of Electrical Engineering, Willey Precise
3) R.L.Boylestad, L.Nashelsky , Electronics Devices and Circuit Theory, Pearson Education Publication
4) R.Prasad, Fundamental of Electronics Engineering, CENGAGE- Learning

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Course Title : **Fundamentals of Electrical & Electronics Engineering Laboratory**	
Course Code : **201GEP108**	**Semester : I / II**
Teaching Scheme : L-T-P : **0-0-2**	Credits : **1**
Evaluation Scheme : ISE Marks : **25**	

Course Description: The Lab course includes experiments based on Electrical circuits and semiconductors devices. This course will help students to get practical exposure on actual working of Electrical and Electronics circuits.

Course Objective:

1. To make the students learn working principal of different Electrical & Electronic Circuits
2. To impart the skills to identify types of transformers and the their losses
3. To expose the students to working of various measuring devices used in electronic applications.
4. To make the students use the semiconductor devices and transducers

Course Outcomes (COs):

At the end of the course the student will be able to:

108.1	**Understand** the working principal of different Electrical & Electronic Circuits
108.2	**Illustrate** differences between the types of transformers and the their losses
108.3	**Describe** the working of various measuring devices used in electronic applications
108.4	**Use** semiconductor devices and transducers

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**BTL**
108.1	3	-	-	-	-	-	-	-	-	-	-	-	2
108.2	3	-	-	-	-	-	-	-	-	-	-	-	3
108.3	3	-	-	-	1	-	-	-	-	-	-	-	2
108.4	3	-	-	-	-	-	-	-	-	-	-	-	3

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List of Experiments			
Expt. No.	**Name of Experiment**	**Type**	**Hours.**
1	Laboratory Sessions covering, General Introduction to Electrical Engineering laboratory, Experimental Set ups, Instruments etc.. Electrical Symbols.	S	2
2	Verification of Kirchhoff's Voltage Law and Kirchhoff's Current Law.	S	2
3	Determination of Reactance's for Series R-L- C Circuit.	O	2
4	Polarity and Ratio Test for single Phase Transformer.		2
5	Efficiency and regulation by Open Circuit and Short circuit tests on single phase transformer	O	2
6	Study of different luminaries including Incandescent lamp, Mercury vapour lamps, fluorescent tube, CFL, and LED lamps.	S	2
7	Testing of Electronic components- resistors, capacitors, inductor, diode, transistor, LED and Switches using multi-meter &C.R.O.	S	2
8	Experiment on Half and Full wave rectifiers and their comparison.	O	2
9	Experiment on transistor as switch.	O	2
10	Experiment and use of IC (78XX, LM317) as Voltage regulators.	O	2
11	Measurement of Displacement using LVDT/strain Gauge.	O	2
12	Measurement of Temperature using any transducer.	O	2
13	Micro-project based on electrical	O	2
14	Micro-project based on electronics	O	2

- Minimum ten experiments should be conducted covering all units including Micro projects on electrical and electronics as mandatory.
- S-STUDY, O-OPERATIONAL

References:

1) S.K.Sahdev, Basic Electrical Engineering, Pearson Education Publication
2) B.Dwivedi, A.Tripath, Fundamentals of Electrical Engineering, Willey Precise
3) R.L.Boylestad, L.Nashelsky, Electronics Devices and Circuit Theory, Pearson Education Publication

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Course Title : **Fundamentals of Mechanical Engineering**	
Course Code : **201GEL109**	Semester **: I / II**
Teaching Scheme : L-T-P : **1-0-0**	Credits : **1**
Evaluation Scheme : ISE + MSE Marks : **20+30**	ESE Marks :**--**

Course Description:
This course aims to impart preliminary knowledge of various mechanical systems such as thermal systems, energy conversion systems and refrigeration systems.

Course Objectives:
1. Impart knowledge in concepts of thermodynamics.
2. Acquire fundamental knowledge of energy conversion devices and refrigeration systems.

Course Outcomes (COs):
At the end of the course the student will be able to:

109.1	**Discuss** concepts and laws of thermodynamics.
109.2	**Describe** principle of energy conversion devices.
109.3	**Explain** the working of Refrigeration systems.

Prerequisite	Basics of Thermodynamics, Mathematics

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**BTL**
109.1	3	-	-	-	-	-	1	-	-	-	-	1	2
109.2	3	-	-	-	-	-	1	-	-	-	-	1	2
109.3	3	-	-	-	-	1	2	-	-	-	-	1	2

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Contents	Hours
Unit 1.Thermodynamics Thermodynamic system, State, Process, Cycle, Path and Point functions, Heat and Work, Internal energy, Thermodynamic Equilibrium, Zeroth law, First law of thermodynamics, PMM-I, Limitations of first law, Statements of Second Law of Thermodynamics, PMM-II. (No numerical treatment)	7
Unit 2. Energy Conversion devices Classification of Pumps and Compressors, Construction, working (P-V, T-S diagrams) and applications of Centrifugal Pump, Reciprocating compressor.	3
Unit 3. Introduction to Refrigeration Refrigeration, Refrigerant- Types and Properties, Refrigeration Systems- Vapour Compression (VCRS) and Vapour Absorption (VARS).	3

Text Books:

1. B.Agrawal, C.M.Agrwal, Basic Mechanical Engineering, Wiley India Pvt. Ltd., 2011
2. T. J.Prabhu, V.Jaiganesh, S.Jebaraj, Basic Mechanical Engineering, Scitech Publications, Channai, 2007.
3. S.N.Sapali, Basic Mechanical Engineering, Nirali Prakashan, Pune, 2016

Reference Books:

1. R.K.Rajput, Thermal Engineering, Laxmi Publication (P) Ltd., Delhi, 2013
2. G.S.Sawhney, Thermal and Hydraulic Machines PHI Learning Pvt. Ltd.,2014
3. S.M.Yahya, Turbines, Compressors and Fan, Tata McGraw Hill, NewDelhi, India, 2005
4. A. Domkundwar, A course in Refrigeration & air-conditioning by DhanpatRai & Co. (P) Ltd., 2015.

D Y PATIL
COLLEGE of
ENGINEERING & TECHNOLOGY
KASABA BAWADA, KOLHAPUR.
(AN AUTONOMOUS INSTITUTE)

Approved By AICTE, New Delhi, Recognised by Govt. of Maharashtra & Affiliated to Shivaji University, Kolhapur.

F. Y. B. Tech. Curriculum
w.e.f. 2020-2021

Course Title : **Professional Communication-II**	
Course Code : **201GEL111**	**Semester : II**
Teaching Scheme : L-T-P : **1-0-0**	Credits : **1**
Evaluation Scheme :-	ESE Marks : **50**

Course Description

The globalization has brought the concept of professional communication to the forefront of academia and industry. Effective communication has become an integral part of each and every organization. It is essential to develop professional communication that enables students to cope with new challenges in the field of profession and society. This course will develop the competency of the students to communicate effectively.

Course Objective

1. To make the students to identify the conditions to be effective communicators as engineers.
2. To analyze & articulate student's interests, skills, and relate them to education & career plans.

Course Outcomes

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

111.1	**Implement** various types of technical writing skills.
111.2	Make **use** of soft skills such as understanding self, leadership skills, teamwork,, etc.
111.3	**Utilize** the oral communication skills for better performance.
111.4	**Demonstrate** effectively as a member or leader of team.

Prerequisite:	Formal communication and correspondence.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	BTL
111.1	-	-	-	-	-	-	-	-	-	2	-	-	3
111.2	-	-	-	-	-	-	-	-	-	1	-	1	2
111.3	-	-	-	-	-	-	-	-	-	2	-	-	2
111.4	-	-	-	-	-	-	-	-	2	2	-	-	3

F. Y. B. Tech. Curriculum
w.e.f. 2020-2021

Content	Hours
Unit 1. Technical Writing Skills 1. Office Drafting: Notice, Meetings and MoM 2. Report Writing **Self-learning topic: Students need to understand formal notices and reports.**	4.
Unit 2. Introduction to Soft Skills 1. What are soft skills? 2. Self-Understanding (SWOT Analysis) 3. Leadership 4. Team Work. 5. Decision Making	4
Unit 3. Non-Verbal Communication 1. Body Language Communication 2. Graphic Language Communication	3
Unit 4. Career Skills 1. Job application and Resume 2.Group Discussion 3.Debate 4. Interview **Self-learning topic: To understand the importance of Career skills.**	3

Textbooks:

1. M.Ashraf Rizvi, Effective Technical Communication McGraw Hill, 2005.
2. S.Mishra, C.Muralikrishna, Communication Skills for Engineers, Pearson, 2007
3. R.C.Sharma, Krisha Mohan, Business Correspondence and Report Writing, TATA Mc.Graw Hill Publishing Co. Ltd.,2008
4. M.Raman, S.Sharma, Technical Communication, Oxford University, Press, 2007

Reference Books:

1. W.S. Pfeiffer, T.V.S. Padmaja, Technical Communication: A Practical Approach , Pearson Education, 2007.
2. R.B.Adler, G.Rooman, Understanding Human Communication, Oxford University Press, New York, 2006.
3. R.C.Sharma, K.Mohan, Business Correspondence and Report Writing, TATA Mc.Graw Hill Publishing Co. Ltd. 2008
4. Dr.A.Singh, Behavioural Science, Wiley India Pvt.Ltd., 2012
5. P. Patnaik, Group Discussion and Interview Skills, Cambridge, 2015.
6. Dr.K.Alex, Soft Skills: Know Yourself and Know The World, S.Chand Publishing, 2009.

F. Y. B. Tech. Curriculum
w.e.f. 2020-2021

Course Title : **Professional Communication-II Laboratory**	
Course Code : **201GEP111**	**Semester : II**
Teaching Scheme : L-T-P : **0-0-2**	Credits : **1**
Evaluation Scheme : ISE Marks : **25**	

Course Description

Professional communication enables students to cope with new challenges in the field of industry. The graduate engineers need to be equipped with pertinent skills to face the challenges of the industry. This course will develop the competency among the students to fulfill professional requirements. Language Laboratory provides students a platform to master English language skills, communication skills and soft skills.

Course Objective

1. To inculcate employability skills among the students.
2. To train the students professionally by conducting practice sessions.

Course Outcomes (COs):

At the end of the course the student will be able to:

111.1	**Utilize** professional behaviour and etiquettes at the workplace.
111.2	**Use** effectively verbal and nonverbal communication skills.
111.3	**Demonstrate** effectively as a member and a leader of team.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	BTL
111.1	-	-	-	-	-	-	-	-	-	2	-	1	3
111.2	-	-	-	-	-	-	-	-	-	2	-	1	3
111.3	-	-	-	-	-	-	-	-	2	2	-	1	3

F. Y. B. Tech. Curriculum
w.e.f. 2020-2021

List of Laboratory Sessions			
Sr. No.	**Name of Laboratory Sessions**	**Type**	**Hours.**
1	Ice breaking activities	O	**2**
2	Report writing practice	O	2
3	Office Drafting: Notice, Meetings and MoM	O	2
4	Job Application with Resume	O	2
5	Team Building Activities	O	2
6	Elocution : Impromptu	S & O	2
7	SWOC Analysis	O	2
8	Non -Verbal Codes	O	2
9	Presentation on current topics (PPT)	S & O	2
10	Debate on current topics	S & O	2
11	Group Discussion	S & O	2
12	Interview	O	2

- Minimum 10 experiments should be conducted covering all units.
- S-STUDY, O-OPERATIONAL

Tools: Language Software e-TNL (e-Tail Networks Limited)

Reference Books:

1. W.S. Pfeiffer, T.V.S. Padmaja, Technical Communication: A Practical Approach, Pearson Education, 2007

F. Y. B. Tech. Curriculum
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List of Laboratory Sessions			
Sr. No.	**Name of Laboratory Sessions**	**Type**	**Hours.**
1	Ice breaking activities	O	2
2	Report writing practice	O	2
3	Office Drafting: Notice, Meetings and MoM	O	2
4	Job Application with Resume	O	2
5	Team Building Activities	O	2
6	Elocution : Impromptu	S & O	2
7	SWOC Analysis	O	2
8	Non -Verbal Codes	O	2
9	Presentation on current topics (PPT)	S & O	2
10	Debate on current topics	S & O	2
11	Group Discussion	S & O	2
12	Interview	O	2

- ❖ Minimum 10 experiments should be conducted covering all units.
- ❖ S-STUDY, O-OPERATIONAL

Tools: Language Software e-TNL (e-Tail Networks Limited)

Reference Books:

1. W.S. Pfeiffer, T.V.S. Padmaja, Technical Communication: A Practical Approach, Pearson Education, 2007

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Dept. of
D. Y. Patil College of Engg. & Tech.,
Kasaba Bawada, Kolhapur.