

D. Y. Patil College of Engineering and Technology

Kasaba Bawada, Kolhapur

(An Autonomous Institute)

Accredited by NAAC with 'A' Grade

Accredited by NBA



F.Y. B. Tech.

Structure and Curriculum

Department of First Year Engineering

w. e. f. A.Y.: 2023-24



D. Y. PATIL COLLEGE OF ENGINEERING & TECHNOLOGY
Kasaba Bawada, Kolhapur
(An Autonomous Institute)
Department of First Year Engineering
F. Y. B. Tech. Curriculum
w.e.f. A.Y. 2023-2024

F. Y. B. Tech. Scheme of Teaching and Examination w. e. f. A. Y. 2023-2024
(As Per National Education Policy 2020)

Semester-I (Physics Cycle)

Sr. No	Course Code	Course Type	Name of the Course	Teaching Scheme Per Week			Credits	Total Marks	Evaluation Scheme			
				L	T	P			Type	Max. Marks	Minimum Marks For Passing	
Students Induction Program As Per AICTE Guidelines												
1	231FYL101	BSC	Linear Algebra and Calculus	03	01	--	04	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
2	231FYL102	BSC	Applied Physics	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
3	231FYL103	ESC	Computer Programming & Problem Solving	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
4	231FYL104	ESC	Elements of Civil Engineering & Mechanics	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
5	231FYL105	VSEC	Design Thinking Through Innovation	01	--	--	01	25	ISE	25	10	10
6	231FYL106	IKS	Historical Places in and Around Kolhapur District	02	--	--	02	20	ISE	20	20	20
								30	MSE	30		
7	231FYP107	BSC	Applied Physics Laboratory	--	--	02	01	25	ISE	25	10	10
8	231FYP108	ESC	Computer Programming & Problem Solving Laboratory	--	--	02	01	25	ISE	25	10	10
9	231FYP109	ESC	Elements of Civil Engineering & Mechanics Laboratory	--	--	02	01	25	ISE	25	10	10
10	231FYP110	VSEC	Design Thinking Through Innovation Laboratory	--	--	02	01	25	ISE	25	10	10
Total				15	01	08	20	575	--	--	--	--
Mandatory Courses												
1	231FYM122	MC	Rural/Social Internship	--	--	--	--	50	ISE	Grade	--	--
2.	231FYM123	MC	Fundamentals of Aptitude and Technical-I	03	--	--	--	50	ISE	Grade	--	--



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F. Y. B. Tech. Scheme of Teaching and Examination w. e. f. A. Y. 2023-2024

(As Per National Education Policy 2020)

Semester -II (Physics Cycle)

Sr. No	Course Code	Course Type	Name of the Course	Teaching Scheme Per Week			Credits	Total Marks	Evaluation Scheme			
				L	T	P			Type	Max. Marks	Minimum Marks For Passing	
1	231FYL111	BSC	Differential Equations and Numerical Techniques	03	01	--	04	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
2	231FYL112	BSC	Applied Chemistry	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
3	231FYL113	ESC	Elements of Electrical and Electronics Engineering	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
4	231FYL114	ESC	Computer Aided Engineering Graphics	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
5	231FYL115	AEC	Professional Communication	01	--	--	01	25	ISE	25	10	10
6	231FYP116	BSC	Applied Chemistry Laboratory	--	--	02	01	25	ISE	25	10	10
7	231FYP117	ESC	Elements of Electrical and Electronics Engineering Laboratory	--	--	02	01	25	ISE	25	10	10
8	231FYP118	ESC	Computer Aided Engineering Graphics Laboratory	--	--	02	01	25	ISE	25	10	10
9	231FYP119	AEC	Professional Communication Laboratory	--	--	02	01	25	ISE	25	10	10
10	231FYP120	CCA	Liberal Learning Course	--	--	04	02	50	ISE	50	20	20
11	231FYL121	PCC	# Departmental Core Course	02	--	--	02	50	ISE	20	20	20
									MSE	30		
Total				15	01	12	22	625	--	--	--	--
Mandatory Courses												
1	231FYM124	MC	Capstone Project	--	--	--	--	50	ISE	Grade	--	--
2.	231FYM125	MC	Fundamentals of Aptitude and Technical-II	03	--	--	--	50	ISE	Grade	--	--

Departmental Core Courses List

1. Computer Science & Engineering (CSE, DS, AIML): Web Designing
2. Electronics & Telecommunication Engineering: Instrumentation & Control System
3. Mechanical Engineering: Foundation of Mechanical Engineering-I
4. Chemical Engineering: Chemical Process Instrumentation & Plant Utility
5. Civil Engineering: Engineering Mechanics



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Semester -I (Chemistry Cycle)

Sr. No	Course Code	Course Type	Name of the Course	Teaching Scheme Per Week			Credits	Total Marks	Evaluation Scheme			
				L	T	P			Type	Max. Marks	Minimum Marks For Passing	
Students Induction Program As Per AICTE Guidelines												
1	231FYL101	BSC	Linear Algebra and Calculus	03	01	--	04	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
2	231FYL112	BSC	Applied Chemistry	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
3	231FYL113	ESC	Elements of Electrical and Electronics Engineering	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
4	231FYL114	ESC	Computer Aided Engineering Graphics	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
5	231FYL115	AEC	Professional Communication	01	--	--	01	25	ISE	25	10	10
6	231FYP116	BSC	Applied Chemistry Laboratory	--	--	02	01	25	ISE	25	10	10
7	231FYP117	ESC	Elements of Electrical and Electronics Engineering Laboratory	--	--	02	01	25	ISE	25	10	10
8	231FYP118	ESC	Computer Aided Engineering Graphics Laboratory	--	--	02	01	25	ISE	25	10	10
9	231FYP119	AEC	Professional Communication Laboratory	--	--	02	01	25	ISE	25	10	10
10	231FYP120	CCA	Liberal Learning Course	--	--	04	02	50	ISE	50	20	20
Total				13	01	12	20	575	--	--	--	--
Mandatory Courses												
1	231FYM122	MC	Rural/Social Internship	--	--	--	--	50	ISE	Grade	--	--
2.	231FYM123	MC	Fundamentals of Aptitude and Technical-I	03	--	--	--	50	ISE	Grade	--	--



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(As Per National Education Policy 2020)

Semester -II (Chemistry Cycle)

Sr. No	Course Code	Course Type	Name of the Course	Teaching Scheme Per Week			Credits	Total Marks	Evaluation Scheme			
				L	T	P			Type	Max. Marks	Minimum Marks For Passing	
1	231FYL111	BSC	Differential Equations and Numerical Techniques	03	01	--	04	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
2	231FYL102	BSC	Applied Physics	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
3	231FYL103	ESC	Computer Programming & Problem Solving	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
4	231FYL104	ESC	Elements of Civil Engineering & Mechanics	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
5	231FYL105	VSEC	Design Thinking Through Innovation	01	--	--	01	25	ISE	25	10	10
6	231FYL106	IKS	Historical Places in and Around Kolhapur District	02	--	--	02	50	ISE	20	20	20
									MSE	30		
7	231FYP107	BSC	Applied Physics Laboratory	--	--	02	01	25	ISE	25	10	10
8	231FYP108	ESC	Computer Programming & Problem Solving Laboratory	--	--	02	01	25	ISE	25	10	10
9	231FYP109	ESC	Elements of Civil Engineering & Mechanics Laboratory	--	--	02	01	25	ISE	25	10	10
10	231FYP110	VSEC	Design Thinking Through Innovation Laboratory	--	--	02	01	25	ISE	25	10	10
11	231FYL121	PCC	# Departmental Core Course	02	--	--	02	50	ISE	20	20	20
									MSE	30		
Total				17	01	08	22	625	--	--	--	--
Mandatory Courses												
1	221FYM124	MC	Capstone Project	--	--	--	--	50	ISE	Grade	--	--
2.	221FYM125	MC	Fundamentals of Aptitude and Technical-II	03	--	--	--	50	ISE	Grade	--	--

Departmental Core Courses List

1. Computer Science & Engineering (CSE, DS, AIML): Web Designing
2. Electronics & Telecommunication Engineering: Instrumentation & Control System
3. Mechanical Engineering: Foundation of Mechanical Engineering-I
4. Chemical Engineering: Chemical Process Instrumentation & Plant Utility
5. Civil Engineering: Engineering Mechanics



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Course Title: Linear Algebra and Calculus	
Course Code : 231FYL101	Semester: I
Teaching Scheme L-T-P : 3-1-0	Credits: 04
Evaluation Scheme ISE-I,MSE,ISE-II: 10/30/10	ESE Marks: 50

Prior Knowledge of:	Matrices, Derivatives
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Course Objectives:

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

Curriculum Details

Course Contents	Duration
Unit-I Linear Algebra –I <ul style="list-style-type: none">• Introduction to matrices, types of matrices.• Rank of matrix by normal form and echelon form.• Solution of simultaneous linear Non-homogenous equations.• Solution of simultaneous linear homogenous equations.• System of linear equations with application in Electrical circuits.	07 Hrs
Unit-II Linear Algebra –II <ul style="list-style-type: none">• Definition of linear combination of vectors.• Dependence and independence of vectors.• Eigen values and its properties.• Eigen vectors and its properties.• Cayley-Hamilton theorem.	07 Hrs



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Course Contents	Duration
Unit-III Numerical Solutions of Linear Equations <ul style="list-style-type: none">• Introduction• Gauss–Elimination method.• Gauss –Jordan method.• Gauss –Seidel method.• Jacobi’s iterative method.	07 Hrs
Unit-IV Differential Calculus –I <ul style="list-style-type: none">• Introduction.• Taylor’s theorem, expansions and approximate value of functions.• Standard expansion by Maclaurin’s theorem.• Expansion of $\sin^{-1} x$, $\cos^{-1} x$, $\tan^{-1} x$ and related expansions.• Indeterminate forms and L’ Hospital’s rule.	07 Hrs
Unit-V Differential Calculus –II <ul style="list-style-type: none">• Introduction.• Partial derivatives.• Total derivatives.• Euler's theorem on homogeneous functions.• Jacobian and its properties.	07 Hrs
Unit-VI Integral Calculus <ul style="list-style-type: none">• Introduction of improper integral.• Gamma function and its properties.• Beta function and its properties.• Error Function and its properties.	07Hrs

Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
101.1	Reduce matrices to echelon form and apply the concept of rank of matrices to solve system of linear equations
101.2	Identify eigen values & make use of it for finding eigen vectors.
101.3	Solve linear equations by numerical methods.
101.4	Apply Taylor theorem to find the expansion of functions and identify the indeterminate forms
101.5	Apply the knowledge of partial differentiation.
101.6	Use special functions and their properties during their higher learning.



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

POs COs	BTL	1	2	3	4	5	6	7	8	9	10	11	12
101.1	2, 3	3	2	--	--	1	---	--	--	--	--	--	1
101.2	2, 3	3	2	--	--	1	--	--	--	--	--	--	1
101.3	3	3	2	--	--	1	--	--	--	--	--	--	1
101.4	2, 3	2	2	--	--	1	--	--	--	--	--	--	1
101.5	3	2	2	--	--	1	--	--	--	--	--	--	1
101.6	3	2	2	--	--	1	--	--	--	--	--	--	1

Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Advanced Engineering Mathematics	7 th	Peter V.O'Neil	Cengage Learning	2012
2	Advanced Engineering Mathematics	1 st	H. K. Dass	S. Chand Publications, New Delhi	2011
3	A Text Book of Applied Mathematics	7 th	P.N.Wartikar, J.N.Wartikar	Vidarthi Griha Prakashan, Pune.	2006
4	Higher Engineering Mathematics	36 th	B.S. Grewal	Khanna Publishers	2001

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Advanced Engineering Mathematics	5 th	Erwin Kreyszig	India Pvt, Ltd.	2014
2	Higher Engineering Mathematics	6 th	B.V.Ramana	Tata M/c Graw-Hill Publication	2010
3	Numerical Methods for Scientific and Engineering Computation	5 th	M.K.Jain	New Age International Pvt. Ltd New Delhi	2007
4	A Textbook of Engineering Mathematics	6 th	N.P.Bali, Iyengar	Laxmi Publication	2004



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Useful Link /Web Resources:

1. DELNET- <http://www.delnet.in>
2. NDL-<http://ndl.iitkgp.ac.in>
3. N-LIST- <http://www.nlist.inflib.ac.in>
4. https://www.youtube.com/results?search_query=Dr+Navneet+Sangle

List of Tutorials

Tut. No	Title of Tutorials	Duration
01	Linear Algebra –I: Rank of Matrix, Solutions of Non-homogenous simultaneous linear equations	01 Hr
02	Linear Algebra –I: Solutions of simultaneous linear homogeneous equations, Application in Electrical circuits	01 Hr
03	Linear Algebra –II: Dependence and Independence of vectors	01 Hr
04	Linear Algebra –II: Eigen values and Eigen vectors of Matrix, Cayley-Hamilton Theorem	01 Hr
05	Numerical Solutions of Linear Equations: Gauss–Elimination, method, Gauss–Jordan method.	01 Hr
06	Numerical Solutions of Linear Equations: Gauss–Seidel method, Jacobi’s iterative method.	01 Hr
07	Differential Calculus –I: Taylor’s theorem and Standard expansion by Maclaurin’s theorem	01 Hr
08	Differential Calculus –I: Indeterminate forms and L’Hospital’s rule	01 Hr
09	Differential Calculus –II: Euler's theorem on homogeneous functions.	01 Hr
10	Differential Calculus –II: Partial derivatives, Jacobian and its properties.	01 Hr
11	Integral Calculus: Gamma function and its properties.	01 Hr
12	Integral Calculus: Beta function and its properties, Error function and its properties.	01 Hr



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Course Title: Applied Physics	
Course Code: 231FYL102	Semester: I/II
Teaching Scheme: L-T-P :3-0-0	Credits: 03
Evaluation Scheme ISE-I/MSE/ISE-II: 10/30/10	ESE Marks: 50

Prior Knowledge of:	Fundamentals of optics, semiconductors, resonance, nature of radiation.
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Course Objectives:

1	To provide basic concept of modern optics
2	To expose electronic properties of materials for semiconductors from quantum mechanical point of view
3	To perceive the concepts of ultrasonic and nanomaterials for their applications in engineering fields
4	To make the students grasp the working principles of LASER and its applications

Curriculum Details

Course Contents	Duration
Unit 1. Modern Optics <ul style="list-style-type: none">• Introduction: interference, diffraction, review of geometric path, optical path• Theory of plane diffraction grating and grating equation• Resolving power of plane diffraction grating• Newtons ring: Experimental arrangement• Diameter of bright and dark ring• Determination of wavelength of monochromatic light using Newtons ring• Applications of interference in anti-reflecting coatings	07 Hrs
Unit 2. Ultrasonics and Oscillations <ul style="list-style-type: none">• Ultrasonic: properties of ultrasonic waves• Ultrasonic production method-magnetostriction and piezoelectric method• Determination of depth of the sea using SONAR method• Free oscillations, Forced oscillations, Resonance• Damped harmonic oscillator: differential wave equation and its solution	07 Hrs
Unit 3. Solid State Physics <ul style="list-style-type: none">• Energy band theory of solids• Fermi Dirac distribution, Fermi energy and Fermi level in intrinsic and extrinsic	07 Hrs



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semiconductors	
<ul style="list-style-type: none">• Dependence of Fermi energy on temperature• Hall effect: equation for Hall voltage and Hall coefficient and relation between them	
Unit 4. Quantum Physics <ul style="list-style-type: none">• Introduction to quantum Physics• De Broglie wavelength of matter waves and its different forms• Physical significance wave function• Wave function of particle in quantum physics• Schrodinger's time independent & dependent wave equation (1-D)• Energy of particle in 1-D potential well	07 Hrs
Unit 5. LASER and its applications <ul style="list-style-type: none">• Einstein's coefficients• Absorption, Spontaneous emission, Stimulated emission, Population inversion• Properties of LASER• Types of LASERS - Ruby LASER, He-Ne LASER• Applications of LASER: Industrial, Medical	07 Hrs
Unit 6. Nano Technology <ul style="list-style-type: none">• Introduction to nanotechnology, nanoscience, nanomaterials• Synthesis method-Top-down Process: Ball milling method• Synthesis method-Bottom-up Approach: Colloidal method• Properties of nanoparticles• Applications of nanomaterials	07 Hrs

Self-learning topics: NDT of materials, Acoustic design of good hall, Optical fibre as sensors, CO₂ LASER.

Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
102.1	Apply the principle of interference and relate concepts in various engineering applications
102.2	Determine the frequency of ultrasonics & explain the solution of damped wave equation in applied physics
102.3	Illustrate the electronic properties of semiconductors
102.4	Solve 1-D potential well problems using principles of quantum mechanical phenomenon



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CO	Statements
102.5	Describe the working mechanism and applications of LASER
102.6	Explain the need of nanomaterials in science and technology

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

POs Cos	BTL	1	2	3	4	5	6	7	8	9	10	11	12
102.1	3	3	2	-	-	-	-	-	-	-	-	-	1
102.2	3	3	2	-	-	-	-	-	-	-	-	-	1
102.3	3	3	2	-	-	-	-	-	-	-	-	-	1
102.4	3	3	2	-	-	-	-	-	-	-	-	-	1
102.5	2	3	-	-	-	-	-	-	-	1	-	-	1
102.6	2	3	-	-	-	-	-	-	-	1	-	-	1

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Engineering Physics	1 st	H. K. Malik	Tata McGraw Hill Education	2019
2	A Text Book of Engineering Physics	Revised	M. N. Avadhanulu, P. G. Kshirasagar	S. Chand Publications	2018
3	Engineering Physics	Revised	L.N. Singh	Synergy Knowledge Ware	2016
4	Engineering Physics	Revised	V. Rajendran	Tata McGraw Hill Education	2010
5	Engineering Physics	1 st	R.K. Gaur, S.L. Gupta	Dhanpat Rai Publications	1993



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Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Fundamentals of Physics	Revised	J. Walker, D. Halliday, R. Resnick	Wiley Publications	2018
2	Engineering Physics	1 st	B.K. Pandey and Chaturvedi	Cengage learning Publications	2017
3	Nanotechnology- Principles & Practices	3 rd	Sulabha K. Kulkarni	Capital Publication Co. New Delhi	2014
4	Introduction to Solid State Physics	8 th	Charles Kittel	John Willey and Sons Inc.	2009
5	Solid State Physics	6 th	S.O.Pillai	New edge Internationals	2009

Useful Link /Web Resources:

1. <http://hyperphysics.phy-astr.gsu.edu/hbase/index.html>
2. https://en.wikipedia.org/wiki/Wave_interference
3. https://en.wikipedia.org/wiki/Introduction_to_quantum_mechanics



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Course Title: Applied Physics Laboratory	
Course Code : 231FYP107	Semester: I / II
Teaching Scheme: L-T-P: 0-0-2	Credit : 01
Evaluation Scheme: ISE: 25	ESE Marks: -

Prior Knowledge of:	Optics, magnetic materials, semiconductor basics, graph plotting, slope calculation
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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.

List of Experiments-

Exp. No	Title of Experiments	Duration
01	To compute diameter of cylindrical obstacle using mono chromatic Source	02Hrs
02	To calculate radius of curvature of Plano convex lens using Newton's ring	
03	To determine the velocity of the ultrasonic wave in water using ultrasonic Interferometer	02Hrs
04	To determine wavelength of LASER using diffraction grating	02Hrs
05	To decide band gap energy of P-N junction diode	02Hrs
06	To determine divergence of LASER beam	02Hrs
07	To determine Resolving power of diffraction grating	02Hrs
08	To recognize carrier concentration of semiconductor using Hall effect	02Hrs
09	To Determine wavelength of light using Plane diffraction grating	02Hrs
10	To study physical Significance of wave function Quantum Mechanics	02Hrs
11	To calculate the Resolving power of telescope	02Hrs
12	To calculate energy loss of ferromagnetic materials using B-H curve	02Hrs

Minimum 10 Experiments should be conducted from above list.



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Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
107.1	Interpret knowledge related to optics to use for suitable purposes in applied physics
107.2	Identify theory of semiconductor in terms of band gap energy and carrier concentration
107.3	Explain ultrasonic interferometer to study velocity of ultrasound in given Liquid
107.4	Interpret knowledge related to LASER for suitable purposes in applied physics

Course Articulation Matrix: Mapping of Course Outcomes (Cos) with Program Outcomes (PO's)

PO's Cos	BTL	1	2	3	4	5	6	7	8	9	10	11	12
107.1	2	3	-	-	-	1	-	-	-	-	-	-	1
107.2	2	3	-	-	-	1	-	-	-	-	-	-	1
107.3	2	3	-	-	-	1	-	-	-	-	-	-	1
107.4	2	3	-	-	-	1	-	-	-	-	-	-	1

Suggested Learning Resources: --

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Engineering Physics	1 st	H.K. Malik	Tata McGraw Hill Education	2019
2	A Text Book of Engineering Physics	Revised	M. N. Avadhanulu, P. G. Kshirasagar	S. Chand Publications	2018
3	Engineering Physics	Revised	L. N. Singh	Synergy Knowledge Ware	2016
4	Engineering Physics	Revised	V. Rajendran	Tata McGraw Hill Education	2010
5	Engineering Physics	1 st	R.K. Gaur, S.L. Gupta	Dhanpat Rai Publications	1993



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Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Fundamentals of Physics	Revised	J.Walker, D.Halliday, R.Resnick	Wiley Publication	2018
2	Engineering Physics	1 st	B.K. Pandey and Chaturvedi	Cengage Learning Publications	2017
3	Nanotechnology- Principles & Practices	3 rd	Sulabha K. Kulkarni	Capital Publication Co. New Delhi	2014
4	Introduction to Solid State Physics	8 th	C.Kittel	John Willey and Sons Inc.	2009
5	Solid State Physics	6 th	S.O.Pillai	New edge Internationals,	2009

Useful Link /Web Resources:

1. <https://vlab.amrita.edu/?sub=1>
2. <http://vlabs.iitb.ac.in/vlab/labsps.html>



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Course Title : Computer Programming and Problem Solving	
Course Code : 231FYL103	Semester : I / II
Teaching Scheme L-T-P : 3-0-0	Credits : 3
Evaluation Scheme ISE-I,MSE,ISE-II: 10/30/10	ESE Marks : 50

Prior Knowledge of:	Basic knowledge of computers.
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Course Objectives:

1.	To provide basic knowledge of Computer and C Programming language.
2.	To learn the fundamental programming concepts and methodologies which are essential to building C programs.
3.	To introduce the concepts of new trends in IT.

Curriculum Details

Course Contents	Duration
Unit-I Overview of C <ul style="list-style-type: none">• Number System: Decimal, Binary, Octal, Hexadecimal and Conversions.• Program Development Life Cycle Steps: Program Design: Algorithm, Flowchart, And Pseudo Code.• Structure of C program• Constants, Variables and Data types in C.• Operators in C, Precedence of operators and associativity• Managing Input and Output operations.• Decision making statements- Branching and Looping.	07 Hrs
Unit-II Arrays <ul style="list-style-type: none">• Introduction to Arrays, Types of Array.• Declaration and Initialization of an Array.• Character Arrays and Strings: Declaration and Initialization.• Reading string from terminal and writing strings to screen.• String handling Functions.	07 Hrs
Unit-III Functions <ul style="list-style-type: none">• Introduction to functions and Need.• Types of Function: User defined functions and Pre Defined Functions.• Elements of Function: Function Declaration, Function Call and Function Definition.• Categories of Function.	07 Hrs



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Course Contents	Duration
Unit-IV Structure and Unions <ul style="list-style-type: none">● Introduction to Structures.● Defining Structures.● Declaration and Initialization of Structures.● Array of Structures.● Array within structures.● Unions.	07 Hrs
Unit-V Pointers <ul style="list-style-type: none">● Defining and declaring pointers● accessing the address space of a variable● declaring and initialization pointer variables● accessing a variable through its pointer● Pointer as a function argument, pointer expressions, pointers to arrays.	07 Hrs
Unit-VI Recent Trends in IT Introduction to <ul style="list-style-type: none">● Cloud Computing.● Artificial Intelligence.● Machine Learning and Deep Learning.● Block chain Technology.	07 Hrs

Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
103.1	Describe the basic structure of C program and use of different data type
103.2	Explain the concept of arrays and strings to store homogeneous data
103.3	Use functions to break programs in to small module
103.4	Explain concept of structures and union
103.5	Use pointers to access memory location.
103.5	Understand the recent trends in Information technology.



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

POs Cos	BTL	1	2	3	4	5	6	7	8	9	10	11	12
103.1	2	2	2	-	-	-	-	-	-	-	-	-	1
103.2	2	2	2	-	-	-	-	-	-	-	-	-	1
103.3	2	2	2	-	-	-	-	-	-	-	-	-	1
103.4	2	2	2	-	-	-	-	-	-	-	-	-	1
103.5	2	2	2	-	-	-	-	-	-	-	-	-	1
103.6	2	2	2	-	-	-	-	-	-	-	-	-	1

Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Computer Fundamentals	1 st	Anita Goel	Pearson Publications.	2013
2	Programming in ANSI C	3 rd	E Balagurusamy	McGraw Hill publications	2018
3	Programming in C	1 st	Anita Seth	Cenage Learning	2011
4	Let Us C	16 th	YashwantKanetkar	BPB Publication	2017

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	How to solve it by computer	-	R. G. Dromey	Prentice-Hall	2007
2	Programming with ANSI and Turbo C	-	Ashok Kamthane	Pearson Education	2002
3	Programming in C	2 nd	J.B Dixit	Firewal Media	2011

Useful Link /Web Resources: 1.<https://nptel.ac.in/courses/106104128>

2.<https://www.simplilearn.com/top-technology-trends-and-jobs-article>

3.<https://www.forbes.com/sites/bernardmarr/2020/04/20/these-25-technology-trends-will-define-the-next-decade/?sh=2d1c8d9629e3>



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Course Title: Computer Programming and Problem Solving Laboratory	
Course Code: 231FYL108	Semester: I / II
Teaching Scheme L-T-P: 0-0-2	Credits: 1
Evaluation Scheme ISE Marks - 25	ESE: --

Prior Knowledge of:	Basic computer knowledge
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Course Objective:

1.	To Develops the ability to analyze a problem, develop an algorithm to solve it
2.	To Understand the concept of a program in a high-level language how it is being translated by a compiler into machine language and then executed
3.	To impart concept like looping, array, functions, structure and unions

List of Experiments

Exp. No	Title of Experiments	Duration
01	Write C Program/s to explore data types.	02Hrs
02	Write C Program/s to explore constants and variables.	02Hrs
03	Write C Program to perform arithmetic, logical and relational operators.	02Hrs
04	Write C Program using simple control statements: If-else, Do-while.	02Hrs
05	Write C Program using loops statement.	02Hrs
06	Write C Program using switch statement.	02Hrs
07	Write C Program using arrays: Declare and initialization of arrays.	02Hrs
08	Write C Program to demonstrate User defined Functions.	02Hrs
09	Write C Program to demonstrate structures.	02Hrs
10	Write C Program to demonstrate unions.	02Hrs
11	Write C Program to demonstrate use of Pointers.	02Hrs
12	Experiment to study different IDE's used for C programming.	02Hrs



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Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
107.1	Understand the logic for given problem and provide the solution.
107.2	Explain syntax and construction of C programming.
107.3	Describe the methods of iteration or looping and branching.
107.4	Make use of different data structures like Arrays, Structures, and Unions.

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

POs Cos	BTL	1	2	3	4	5	6	7	8	9	10	11	12
107.1	2	2	2	-	-	-	-	-	-	-	-	-	1
107.2	2	2	2	-	-	-	-	-	-	-	-	-	1
107.3	2	2	2	-	-	-	-	-	-	-	-	-	1
107.4	2	2	2	-	-	2	-	-	-	-	-	-	1

Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Programming in ANSI C	3 rd	E Balagurusamy	McGraw Hill publications	2018
2	Programming in C	1 st	Anita Seth	Cenage Learning	2011
3	Let Us C	16 th	YashwantKanetkar	BPB Publication	2017

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	How to solve it by computer	-	R. G. Dromey	Prentice-Hall	2007
2	Programming with ANSI and Turbo C	-	Ashok Kamthane	Pearson Education	2002
3	Programming in C	2 nd	J.B Dixit	Firewal Media	2011

Useful Link /Web Resources: 1.<https://www.cprogramming.com/>

2. <https://www.programiz.com/c-programming/examples>



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Course Title : Elements of Civil Engineering and Mechanics	
Course Code : 231FYL104	Semester : I / II
Teaching Scheme L-T-P : 3-0-0	Credit : 03
Evaluation Scheme ISE-I,MSE,ISE-II: 10/30/10	ESE Marks : 50

Prior Knowledge of:	Knowledge of forces, Newton's Laws of Motion, Moment
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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.

Curriculum Details

Course Contents	Duration
Unit-I Elements of Civil Engineering <ul style="list-style-type: none">● Scope of Civil engineering● Importance of Civil engineering in society● Basic Units used in Civil industry and its conversion (for example -acre- guntha , square meter – square foot etc.)● Branches of Civil Engineering● Types of Building – Load Bearing and Framed Structure● Detailed cross section of building – showing components of sub-structure and super-structure and their functions	07 Hrs
Unit-II Engineering Survey <ul style="list-style-type: none">● Introduction to Surveying-Types, Principles. Applications.● Introduction to levelling- HI, Rise and Fall method with change point.● Introduction to modern equipment's used in surveying- EDM, Total Station, GIS, GPS, Remote sensing.● Introduction to contour map	07Hrs
Unit-III Construction Material and Construction Equipment's <ul style="list-style-type: none">● Materials- Cement, Bricks, Sand-natural and artificial, Steel- Mild, Tor and High Tensile, flooring tiles, paints, Concrete- PCC, RCC, RM Pre-stressed and	07Hrs



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Course Contents	Duration
Precast. Introduction to RMC Plant <ul style="list-style-type: none">Construction Equipment-Introduction to Excavator, Paver Machine, Tower crane.	
Unit-IV Statics and Equilibrium <ul style="list-style-type: none">Basic Concepts and Fundamental LawsForce, Moment and Couple, System of Forces, Resultant,Varignon's Theorem, Law of Moments, Free Body Diagram, Lamis theoremBeams: Types of Loads, Types of supports, Equilibrium conditionsAnalysis of Simple beams based on UDL and Point load	07Hrs
Unit-V Collision and Impact <ul style="list-style-type: none">Impact: Types of Impact, Direct, Coefficient of restitutions.Law of conservation of momentum.Numerical based on direct impact.D' Alembert's principle	07 Hrs
Unit-VI Centroid and Moment of Inertia <ul style="list-style-type: none">Centroid and centre of gravityMoment of Inertia of Standard shapes from first principleParallel and perpendicular axis theoremRadius of gyration.Numerical on moment of inertia of plain and composite figures	07Hrs



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Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Elements of Civil Engineering and Mechanics	1 st	N. Balasubramanya	Cengage Learning India Private Limited	2018
2	Elements of civil engineering and engineering mechanics	3 rd	M. N. Sheshaprakash, Gganesh B. Mogaveer	PHI Learning Pvt. Ltd.	2014
3	Basic Civil Engineering	1 st	Dr. B. C. Punmia, Ashok Jain	Laxmi Publications	2013
4	Elements Of Civil Engineering	1 st	Dr. S SBhavikatti,	New Age International (P) Ltd., Publishers	2012
5	Basic Civil Engineering	19 th	G. K. Hiraskar	DhanpatRai Publication	2008
6	Engineering Mechanics and Dynamics	3 rd	S. Rajshekaran, G. Subramaniam	Vikas Publishing House Pvt. Ltd	2005
7	Applied Mechanics	16 th	S. S. Junnarkar. Dr. H. J. Shah	Chaotar Publishing House	2001

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Basic Civil Engineering	40 th	SatheeshGopi	Dorling Kindersley Pvt Ltd	2010
2	Basic Civil Engineering	2 nd	Rakesh Beohar	Uni. Science press	2010
3	Engineering Mechanics	10 th	Ferdinand Leon Singer	Harper & Row Publication, London.	2010
4	Engineering Mechanics	3 rd	S. S. Bhavikatti, K. G. Rajashekarappa	New Age International (P) Ltd.	2010

Useful Link /Web Resources:

1. <https://www.pdfdrive.com/basic-civil-engineering-e40136136.html>
2. <https://www.pdfdrive.com/applied-mechanics-books.html>



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Course Title : Elements of Civil Engineering and Mechanics Laboratory	
Course Code : 231FYL109	Semester : I / II
Teaching Scheme L-T-P : 0-0-2	Credit: 01
Evaluation Scheme : ISE Marks : 25	ESE: --

Prior Knowledge of:	Knowledge of forces, Newton's Laws of Motion, Moment
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Course Objective:

1.	Handle surveying instruments for field measurements.
2.	Apply knowledge of static and dynamic force system.

List of Experiments:

Exp. No	Title of Experiments	Duration
01	Study of building component on site.	02Hrs
02	Sketch cross section of Super structure and substructure (Drawings Sheet)	02Hrs
03	Calculate RL(Reduced levels) by HI Method and Rise Fall Method.	02Hrs
04	Measurement of area by using surveying equipment.	02Hrs
05	Market rate study of different building materials and comparisons	02Hrs
06	Market rate study of latest construction equipment's and their applications	02Hrs
07	Study of traffic sign, signal and road safety	02Hrs
08	Determine resultant of force system by graphical method. (Drawings Sheet)	02Hrs
09	Verify law of polygon of forces.	02Hrs
10	Calculate support reactions of beam by graphical method. (Drawings Sheet)	02Hrs
11	Identify support reactions of Beam by digital beam apparatus.	02Hrs
12	Micro-project –explain importance of traffic sign, signals and road safety to your family	02Hrs



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Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
109.1	Sketch the cross section of Super structure and substructure.
109.2	Explain the use of surveying instruments for Horizontal and Vertical Measurement.
109.3	Calculate forces experimentally and graphically.
109.4	Identify the Beam Reaction experimentally.

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

POs	BTL	1	2	3	4	5	6	7	8	9	10	11	12
109.1	3	3	2	-	-	-	-	-	-	-	1	-	-
109.2	3	3	2	-	-	2	-	-	-	-	-	-	1
109.3	3	3	2	-	-	-	-	-	-	-	1	-	1
109.4	3	3	2	-	-	-	-	-	-	-	-	-	1

Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Basic Civil Engineering	1 st	Dr. B. C. Punmia, Ashok Jain	Laxmi Publications	2013
2	Basic Civil Engineering	19 th	G. K. Hiraskar	DhanpatRai Publication	2008
3	Applied Mechanics	16 th	S. S. Junnarkar. Dr. H. J. Shah	Chaotar publishing house	2001
4	Engineering Mechanics and Dynamics	3 rd	S. Rajshekaran, G.Subramaniam	Vikas Publishing House Pvt. Ltd	2005



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Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Basic Civil Engineering	40 th	SatheeshGopi	Dorling Kindersley Pvt Ltd	2010
2	Basic Civil Engineering	2 nd	Rakesh Beohar	Uni. Science press	2010
3	Engineering Mechanics	10 th	Singer	Harper & Row Publication, London.	2010
4	Engineering Mechanics	3 rd	S. S. Bhavikatti, K. G. Rajashekarappa	New Age International (P) Ltd.	2010

Useful Link /Web Resources:

1. Virtual Lab by IITR- <http://sl-iitr.vlabs.ac.in/List%20of%20experiments.html>



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Course Title : Design Thinking Through Innovation	
Course Code : 231FYL105	Semester : I / II
Teaching Scheme L-T-P : 1-0-0	Credits : 01
Evaluation Scheme: ISE: 25	ESE Marks :--

Course Objectives:

1.	To Familiarize with Engineering Design Process and The basics of Design Thinking
2.	To Bring Awareness on Idea Generation to Solve the Problems
3.	To Discuss the Fundamentals of Project Management and Engineering Ethics
4.	To Discuss the Fundamentals of Entrepreneurial Mindset

Curriculum Details:

Course Contents	Duration
Unit I: Engineering Design & Design Thinking <ul style="list-style-type: none">• Introduction, Key Concepts of Design• A Simplified Process of Engineering Design• What is Design Thinking? - Its Importance, Socio-Economical Relevance• Principles, Origin, Process of Design Thinking• Relevance of Design and Design Thinking in Engineering	04
Unit II: Idea Generation <ul style="list-style-type: none">• Introduction to Idea Generation• Idea Generation Techniques, Processes• Define the Problem, Needs v/s Wants, Identify Philosophy• Problem Solving Tools• Case Studies	04
Unit III: Project Management <ul style="list-style-type: none">• Introduction to Project Management	03



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Course Contents	Duration
<ul style="list-style-type: none"> • Project Management Methodologies, Teamwork • Engineering Ethics, Moral Values • Significance of Professional Ethics, Code of Conduct for Engineers 	
<p>Unit VI: Entrepreneurial Mindset</p> <ul style="list-style-type: none"> • What does it mean to be Entrepreneur? • Mental Attitude or Inclination Toward Entrepreneurship • Entrepreneurship in Organizations. • Creation of Value, Embracing Uncertainty, Putting it all Together. 	03

Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
105.1	Learn structured approach of Engineering Design and the relevance of Design and Design Thinking in Engineering
105.2	Apply Idea Generation techniques to solve the problems
105.3	Learn Project Management Methodologies
105.4	Develop mindset of a successful Entrepreneur

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

POs \ COs	BTL	1	2	3	4	5	6	7	8	9	10	11	12
105.1	1	2	-	-	-	-	-	-	-	-	-	-	1
105.2	2	2	1	-	-	-	-	-	-	-	-	-	1
105.3	2	2	-	-	-	-	-	-	1	-	-	2	1
105.4	2	2	-	-	-	-	-	-	1	-	-	-	1



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Suggested Learning Resources:

Text Books:

Sr. No	Title	Author(s)	Publisher	Year
1.	"The Design of Business: Why Design Thinking is the Next Competitive Advantage"	Roger Martin	Harvard Business Press	2009
2.	"Design Thinking: Understand – Improve– Apply"	Hasso Plattner, Christoph Meine and Larry Leifer (eds)	Springer	2011
3.	"Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School"	Idris Mootee	John Wiley & Sons	2013
4.	The Design Thinking Playbook	Michael Lewrick	Wiley	2019

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1.	"Engineering Design Process"	2 nd	Yousef Haik and Tamer M. Shahn	CengageLearning	2011
2.	Solving Problems with Design Thinking - Ten Stories of What Works	1st	Jeanne Liedtka, Andrew King, Kevin Bennett	Columbia Business School Publishing	2013



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Course Title: Design Thinking Through Innovation Laboratory	
Course Code : 231FYP110	Semester: I / II
Teaching Scheme: L-T-P: 0-0-1	Credit : 01
Evaluation Scheme: ISE: 25	ESE Marks: --

Course Objectives:

1.	To discuss various techniques of Idea generation.
2.	To explain the various Tools used for Innovation.
3.	To discuss the methods of implementing design thinking in the real world.
4.	To discuss the implementation of Creativity and Innovation.
5.	To discuss the fundamentals of Entrepreneurial Mindset.

List of Experiments-

Sr. No.	Title of Experiments	Duration
01	Overview of Design Thinking: Ethical design and Critiques.	02Hrs
02	Generation of “IDEA” – Idea, Development, Evaluation & Application.	02Hrs
03	Problem Identification and Exercises.	02Hrs
04	Brainstorming sessions to find out solution for identified problems.	02Hrs
05	Prototyping and Modelling challenge.	02Hrs
06	Various Tools and Methodology used for the Prototyping.	04Hrs
07	Creation of Prototype and Innovative solution.	02Hrs
08	Test and Evaluation of Prototype.	02Hrs
09	Report Drafting - Instructions & Practices.	02Hrs
10	Presentation & Exhibition.	02Hrs
11	Presentation & Exhibition.	02Hrs
12	Industrial Visit or Interaction with Successful Entrepreneurs.	02Hrs



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Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
1	Learn structured approach to creativity, problem identification and problem solving
2	Apply design thinking approach to identify innovation opportunities and develop solutions
3	Develop mindset of a successful Entrepreneur

Course Articulation Matrix: Mapping of Course Outcomes (Cos) with Program Outcomes (PO's)

POs	BTL	1	2	3	4	5	6	7	8	9	10	11	12
COs													
110.1	1	2	-	-	-	-	-	-	-	-	-	-	1
110.2	2	2	1	-	-	-	-	-	-	-	-	-	1
110.3	2	2	-	-	-	-	-	-	1	-	-	2	1

Suggested Learning Resources: --

Reference Books:

Sr. no.	Name of Book	Author	Year
1.	Design Thinking: Understand-Improve-Apply	S. G. Blank	2007
2.	Design Thinking for innovation research and Practice	Walter Brenner, Falk Uebernickel, Springer	2016
3.	Business Design Thinking and Doing: Frameworks, Strategies and Techniques for Sustainable Innovation	Angele M. Beausoleil	2022



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Course Title: Historical Places in and Around Kolhapur District	
Course Code : 231FYL106	Semester: I/II
Teaching Scheme L-T-P : 2-0-0	Credits: 02
Evaluation Scheme ISE-I, MSE, ISE-II: 20/30/00	ESE Marks: --

Curriculum Contents	Duration
Unit 01: Chhatrapati Shahu Maharaj: A King for Society <ul style="list-style-type: none">• Introduction• Life History• Contribution of Rajarshi Shahu Maharaj in various fields as a modern Social Reformer as Women Empowerment in 19th Century• Development in Education• Social Reservation and equality• Agriculture• Industry• Initiation for Radhanagai Village and Dam	07 Hrs
Unit 02: A Study of Khidrapur- Kopeshwar <ul style="list-style-type: none">• Life History of Khidrapur Kopeshwar Temple• The Wonder of Khidrapur Kopeshwar Temple• Swarga Mandap in Kopeshwar Temple• Sabha Mandap, Antaral Kaksha of Kopeshwar Temple• Beauty of Exterior Architecture of Kopeshwar Temple• Mystery of Black stone• Measures Suggested to Development of Khidrapur	07 Hrs
Unit 03 : A Study of Panhala Fort and Pawankhind <ul style="list-style-type: none">• History of Panhala Fort• Major Features: Andhar Bawadi• Major Features: Kalavanticha Mahal, Ambarkhana• Major Features: Dharma Koti, Sajja Koti	07 Hrs



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Curriculum Contents	Duration
<ul style="list-style-type: none">• Teen Darwaja, Raj Darwaja• Rajdindi Bastion• Journey from Panhalgad to Pawankhind by Chhatrapati Shivaji Raje	
Unit 04: A Study of Mahalaxmi Temple <ul style="list-style-type: none">• History and construction of Temple• The Main Shrines Doorway• Darshan and Kurma Mandap• Ganapati Chowk, Garud Mandap• Boundary wall, Entrances and complex• Mahalaxmi Temple Timings• Kiranostav Celebrations	07 Hrs

References:

1. Social Movements in India: A Review of Literature – Ghanshyam Shah ISBN 0761995145 New Delhi ; Thousand Oaks : Sage Publications, 2004
2. Rajarshi Shahu Maharaj – Jeevan Vakarya, editor – Ramesh Patnaje.
3. Shahu Chhatrapati - Royal Revolutionary – Dhananjay Keer
4. Samajik Sanshodhan Padnativa Tantro – Dr. Pradeep Aaglave.
5. Kalasekar. T. L : Khidrapur: Khojura of Maharashtra.
6. Chothe R.G : Temples of Khidrapur, A heritage of India.
7. Kulkarni A. B : Kopeswar temple of Khidrapur.
8. Gazetteer of Kolhapur District.
9. Eaton, Richard Maxwell (2005). The New Cambridge History of India
10. "Translations of Panhala inscriptions". Government of Maharashtra. Retrieved 19 March 2009.
11. "Mahalakshmi Temple - Jewel Among Kolhapur Temples
12. "Inside Temples". mahalaxmikolhapur.com.



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Department of First Year Engineering

F. Y. B. Tech. Curriculum

w.e.f. A.Y. 2023-2024

Course Title : Differential Equations and Numerical Techniques	
Course Code: 231FYL111	Semester: II
Teaching Scheme L-T-P : 3-1-0	Credits : 04
Evaluation Scheme ISE-I, MSE, ISE-II: 10/30/10	ESE Marks : 50

Prior Knowledge of:	Formulae of Derivatives and Integration, Differential Equation
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Course Objectives:

1.	To teach mathematical methodology
2.	To develop mathematical skills and enhance logical thinking power of students.
3.	To provide students with skills in differential equations 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.

Curriculum Details

Course Contents	Duration
Unit-I Ordinary Differential Equations of First Order and First Degree <ul style="list-style-type: none">• Definition of differential equation, order and degree of differential equation.• Exact differential equations.• Non - exact differential equations.• Linear differential equations.• Bernoulli's differential equations.	07 Hrs
Unit-II Applications of Ordinary Differential Equations of First Order and First Degree <ul style="list-style-type: none">• Introduction of variable separable form.• Orthogonal trajectories. (Cartesian form)• Applications to simple electrical circuits.• Newton's law of cooling.• Rate of decay and growth	07 Hrs
Unit-III Numerical methods to solve Ordinary Differential Equations of First Order and First Degree <ul style="list-style-type: none">• Introduction• Picard's method.	07 Hrs



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Course Contents	Duration
<ul style="list-style-type: none">• Taylor's series method.• Euler's method.• Runge - Kutta's method.(Fourth order)	
Unit-IV Numerical Solutions of Algebraic & Transcendental equations <ul style="list-style-type: none">• Introduction of Algebraic and Transcendental equations• Bisection method.• Newton-Raphson method.• Regula-Falsi method.• Secant method.	07 Hrs
Unit-V Numerical Differentiation <ul style="list-style-type: none">• Introduction• Newton's forward difference formula.• Newton's backward difference formula.• Stirling's central difference formula.• Lagrange's interpolation formula.	07 Hrs
Unit-VI Partial Differential Equations <ul style="list-style-type: none">• Definition of partial differential equation.• Formation of partial differential equation.• Lagrange's method to solve first order linear partial differential equations• Standard method to solve first order non-linear partial differential equations of the Form I $f(p, q)=0$• Standard method to solve first order non-linear partial differential equations of the Form II $f(z,p,q)=0$• Standard method to solve first order non-linear partial differential equations of the Form III $f(x, p)=g(y, q)$	07 Hrs



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Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
111.1	Solve ordinary differential equations of first order and first degree.
111.2	Apply the knowledge of ordinary differential equation of first order and first degree.
111.3	Solve partial differential equations with different methods.
111.4	Use the numerical methods to solve ordinary differential equations.
111.5	Calculate the derivative using interpolation formulae.
111.6	Apply the numerical techniques to solve algebraic & transcendental equations.

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

POs COs	BTL	1	2	3	4	5	6	7	8	9	10	11	12
111.1	2, 3	3	2	-	-	1	-	-	-	-	-	-	1
111.2	3	3	2	-	-	1	-	-	-	-	-	-	1
111.3	2, 3	3	2	-	-	1	-	-	-	-	-	-	1
111.4	3	2	2	-	-	1	-	-	-	-	-	-	1
111.5	3	2	2	-	-	1	-	-	-	-	-	-	1
111.6	2, 3	2	2	-	-	1	-	-	-	-	-	-	1



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Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Advanced Engineering Mathematics	7 th	Peter V.O'Neil	Cengage Learning	2012
2	Advanced Engineering Mathematics	1 st	H.K.Dass	S. Chand Publications, New Delhi	2011
3	A Text Book of Applied Mathematics	7 th	P.N.Wartikar, J.N.Wartikar	Vidyarthi Griha Prakashan, Pune.	2006
4	Higher Engineering Mathematics	36 th	B.S. Grewal	Khanna Publishers	2001

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Advanced Engineering Mathematics	5 th	Erwin Kreyszig	India Pvt, Ltd.	2014
2	Higher Engineering Mathematics	6 th	B.V.Ramana	Tata M/c Graw-Hill Publication	2010
3	Numerical Methods for Scientific and Engineering Computation	5 th	M.K.Jain	New Age International Pvt. Ltd New Delhi	2007
4	A Textbook of Engineering Mathematics	6 th	N.P.Bali, Iyengar	Laxmi Publication	2004

Useful Link /Web Resources:

1. DELNET- <http://www.delnet.in>
2. NDL-<http://ndl.iitkgp.ac.in>
3. N-LIST- <http://www.nlist.inflib.ac.in>
4. https://www.youtube.com/results?search_query=Dr+Navneet+Sangle



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List of Tutorials

Tut. No	Title of Tutorial	Duration
01	Ordinary Differential Equations: Exact and non-exact differential equations.	01 Hr
02	Ordinary Differential Equations: Linear and non-linear differential equations.	01 Hr
03	Applications of Ordinary Differential Equations: Orthogonal Trajectories. (Cartesian curves), Applications to Simple Electrical Circuits.	01 Hr
04	Applications of Ordinary Differential Equations: Newton's law of cooling, Rate of Decay, and growth	01Hr
05	Numerical Solution of Ordinary Differential Equations of First Order and First Degree: Picard's method, Taylor's series method.	01 Hr
06	Numerical Solution of Ordinary Differential Equations of First Order and First Degree: Euler's method, Runge-Kutta's method.	01 Hr
07	Numerical Solutions of Algebraic & Transcendental Equations: Bisection method, Newton-Raphson method.	01 Hr
08	Numerical Solutions of Algebraic & Transcendental Equations: Regula-Falsi method, Secant method.	01 Hr
09	Numerical Differentiation: Newton's forward difference formula, Newton's backward difference formula.	01Hr
10	Numerical Differentiation: Stirling's Central difference formula, Lagrange's interpolation formula.	01 Hr
11	Partial Differential Equations: Form I $f(p, q)=0$, Form II $f(z,p,q)=0$	01 Hr
12	Partial Differential Equations: Form III $f(x, p)=g(y, q)$, Lagrange's method to solve first order linear partial differential equations.	01 Hr



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F. Y. B. Tech. Curriculum

w.e.f. A.Y. 2023-2024

Course Title : Applied Chemistry	
Course Code : 231FYL112	Semester : I / II
Teaching Scheme L-T-P : 3-0-0	Credits : 3
Evaluation Scheme ISE-I/MSE/ISE-II: 10/30/10	ESE Marks : 50

Prior Knowledge of:	Periodic properties of elements, Basics of organic, inorganic, physical and analytical chemistry
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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 battery technology, engineering materials and green chemistry.

Curriculum Details

Course Contents	Duration
Unit-I Water Chemistry <ul style="list-style-type: none">• Introduction,• Impurities in natural water,• Water quality parameters total solids, acidity, alkalinity and chlorides, (definition, causes, significance)• Hardness of water, types of hardness, units of hardness, numerical on hardness,• ill effects of hard water in steam generation in boilers (scale & sludge formation).• Treatment of hard water (Ion exchange and reverse osmosis process).	07 Hrs
Unit-II Instrumental methods of chemical analysis <ul style="list-style-type: none">• Introduction• Advantages and disadvantages of instrumental methods• p^HMetry: Introduction, p^H measurement using glass electrode and its applications• Spectrometry: Introduction	07 Hrs



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F. Y. B. Tech. Curriculum

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Course Contents	Duration
<ul style="list-style-type: none">Laws of spectrometry (Lamberts and Beer-Lambert's law)UV-visible spectrophotometry(schematic, working and applications).Chromatography: Introduction, types, gas-liquid chromatography (GLC),Basic principle, instrumentation and applications..	
Unit-III Advanced materials <ul style="list-style-type: none">Polymers: IntroductionPlastics, thermos-softening and thermosetting plasticsIndustrially important plastics like phenol formaldehyde, ureaformaldehydeandepoxyresinsConducting polymers and Biopolymers (Introduction, examples and applications.)Composite materials: Introduction, Composition, properties and uses of fibere in forced plastics (FRP) and glass rein forced plastic(GRP)	07 Hrs
Unit-IV Fuels & Fuel Cells <ul style="list-style-type: none">IntroductionClassification, calorific value, definition, units (calorie, kcal, joules, kilojoules)Characteristics of good fuelsBoy's Calorimeter and their numerical.Introduction to Fuel cells, theoretical principle, advantages, disadvantagesTypes of Fuel CellsH2-O2 fuel cells (Construction, Working and Applications)	07 Hrs
Unit-V Nano-Chemistry <ul style="list-style-type: none">Introduction to nanomaterialsTypes & synthesis approaches of nanomaterialsCharacteristics and Applications of Fullerenes	07 Hrs



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Course Contents	Duration
<ul style="list-style-type: none">• Characteristics and Applications of Carbon Nanotubes• Characteristics and Applications of Nanowires• Characteristics and Applications of Graphite	
Unit-VI Battery Technology & Green Chemistry <ul style="list-style-type: none">• Introduction to basic principles of electrochemistry• Introduction to Battery & battery technology• primary cell (carbon zinc cell, lithium cell)• secondary cell (rechargeable alkaline storage battery- Ni-Cd Battery, rechargeable lithium ion batteries)• Green Chemistry: Definition• Twelve principles of Green Chemistry.	07 Hrs

Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
112.1	Interpret hardness, acidity, alkalinity and chloride content of water and methods For waters of tening.
112.2	Enumerate importance, principles of chemical analysis by instrumental techniques.
112.3	Illustrate general synthesis and mechanisms of some advanced polymeric materials
112.4	Discuss fuels and concept of green chemistry with its applications.
112.5	Summarize synthesis, properties and applications of nanomaterials
112.6	Correlate basics of battery technology and fuel cells with their types, properties and applications.



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

POs \ COs	BTL	1	2	3	4	5	6	7	8	9	10	11	12
112.1	3	3	2	–	–	–	–	–	–	–	–	–	1
112.2	2	3	–	–	–	–	–	–	–	–	–	–	1
112.3	2	3	–	–	–	–	–	–	–	–	–	–	1
112.4	3	3	2	–	–	–	–	–	–	–	–	–	1
112.5	2	3	–	–	–	–	–	–	–	–	–	–	1
112.6	2	3	–	–	–	–	–	–	–	–	–	–	1

Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	A Textbook of Engineering Chemistry	12 th	S. S. Dara, S. S. Umare	S. Chand & Company Ltd., New Delhi.	2011
2	A Textbook of Engineering Chemistry	1 st	C. P. Murthy, C. V. Agarwal, A. Naidu	BS Publications, Hyderabad,	2012
3	A text Book of Engineering Chemistry	1 st	S. Chawla	Dhanpat Rai & Co. (Pvt.) Ltd, Delhi	2011
4	Engineering Chemistry	15 th	P.C.Jain	Dhanpat Rai & Co. (Pvt.) Ltd,Delhi	2015

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Chemistry of Engineering Materials	3 rd	R. P. Mani, K. N. Mishra	Cengage Learning	2015
2	Engineering Chemistry	3 rd	B.Chinnappan, S. Baskar, R.Dhillon	Wiley India	2015
3	Engineering Chemistry	1 st	PALANNA O.G.	TataMc-Graw Hill Publishing Limited	2012
4	Instrumental Methods Of Chemical Analysis : Analytical Chemistry	6 th	Chatwal, Anand	Himalaya Pub. House, Mumbai	2010

Useful Link /Web Resources:

1. <https://archive.nptel.ac.in/courses/122/106/122106028/#>
2. <https://nptel.ac.in/courses/118104008>



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F. Y. B. Tech. Curriculum

w.e.f. A.Y. 2023-2024

Course Title : Applied Chemistry Laboratory	
Course Code : 231FYP116	Semester : I / II
Teaching Scheme L-T-P : 0-0-2	Credits : 1
Evaluation Scheme ISE : 25	ESE:--

Prior Knowledge of:	Experiments based on titration, Handling of Glassware's & Chemicals
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Course Objective:

1.	To test water quality parameters using various titration analysis methods
2.	To synthesize simple advanced materials and estimate concentration of elements in material's.
3.	To know handling of glassware's and simple equipment's for chemical analysis.

List of Experiments

Exp. No	Title of Experiments	Duration
01	Determination of total hardness and of water sample by EDTA method (Complexometric Titration).	02Hrs
02	Determination of alkalinity of given water sample using acid-base titration.	02Hrs
03	Determination of alkalinity of given water samples.	02Hrs
04	Determination of chloride content of water samples.	02Hrs
05	Determination of p^H of given sample using p^H Meter.	02Hrs
06	Estimation of iron by colorimetric method	02Hrs
07	Preparation of urea-formaldehyde resin	02Hrs
08	Preparation of phenol-formaldehyde resin	02Hrs
09	To determine the proximate analysis of coal	02Hrs
10	To determine the ultimate analysis of the coal sample.	02Hrs
11	Synthesis and characterization of nano sized ZnO by precipitation method	02Hrs
12	Construction of galvanic cell	02Hrs



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Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
116.1	Analyze hardness, acidity, alkalinity and chloride content of water and percentage of elements in some alloys.
116.2	Produce various advanced materials and analyze aqueous solutions using instruments.
116.3	Perform various experiments by following written instructions.
116.4	Express involvement by understanding concepts in applied chemistry.

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

POs COs	BTL	1	2	3	4	5	6	7	8	9	10	11	12
116.1	3	3	-	-	-	-	-	-	-	1	-	-	1
116.2	3	3	-	-	-	1	-	-	-	1	-	-	1
116.3	3	3	-	-	-	-	-	-	-	1	-	-	1
116.4	3	3	-	-	-	-	-	-	-	1	-	-	1

Suggested Learning Resources:

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Laboratory manual on engineering chemistry	1 st	S. K. Bashin, Dr.Sudha Rani	Dhanpat Rai Publishingcompany Ltd.,New Delhi	2012
2	Engineering Chemistry	15 th	P. C. Jain,	Dhanpat Rai Publishing Company Ltd., New Delhi	2014

Useful Link /Web Resources:

1. <https://www.vlab.co.in/broad-area-chemical-sciences>



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F. Y. B. Tech. Curriculum

w.e.f. A.Y. 2023-2024

Course Title : Elements of Electrical and Electronics Engineering	
Course Code : 231FYL113	Semester : I / II
Teaching Scheme L-T-P : 3-0-0	Credits : 03
Evaluation Scheme ISE-I,MSE,ISE II: 10/30/10	ESE Marks : 50

Prior Knowledge of:	Ohms law, Magnetism, Semiconductor theory
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Course Objectives:

1.	To learn basic knowledge of electrical and magnetic circuits.
2.	To understand concept of single phase and Three phase AC circuits.
3.	To impart basic knowledge for understanding of AC machines.
4.	To introduce fundamental concepts of Analog electronics.
5.	To introduce fundamental concepts of Digital electronics.
6.	To expose the students about different types of transducers

Curriculum Details

Course Contents	Duration
Unit-I: Electric and Magnetic Circuits <ul style="list-style-type: none">• Electric Circuit: Basic concepts- Voltage, Current, Power, Resistance, Inductance, Capacitance, E.M.F.• Simplification of networks using series and parallel combinations(R,L,C)• Kirchhoff's laws .• Magnetic Circuit: Flux, flux density, reluctance, MMF, permeability and field strength, their units.• Magnetic leakage, fringing, Faraday's law of Electromagnetic induction.	07 Hrs
Unit-II: Single Phase AC Circuits and Three Phase AC Circuits <ul style="list-style-type: none">• Generation of single phase sinusoidal voltage• Generation of 3 phase supply and its necessity.• Average value, root mean square value, form factor and peak factor of sinusoidal varying quantities.• Single phase ac circuit analysis (R-L-C series)	07 Hrs
Unit-III: Single phase AC Machines <ul style="list-style-type: none">• Single Phase Transformer: Construction, operating principle• Types of Transformer• E.M.F equation• Turns ratio, voltage ratio	07 Hrs



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Course Contents	Duration
<ul style="list-style-type: none">Power lossesAC Motors: Construction and working of single phase induction motor.	
Unit-IV: Analog Electronics <ul style="list-style-type: none">Introduction to semiconductor.Construction, symbol, working, characteristics, applications of<ol style="list-style-type: none">P-N JunctionZener DiodeRectifiers:(HWR, FWR, Bridge)Filter(C)Features of IC regulators 78XX, 79XX, LM317Transistor: construction, types, operation; transistor configuration.	07 Hrs
Unit-V: Digital Electronics <ul style="list-style-type: none">Introduction to Logic GatesUniversal gatesCombinational Logic Circuit: Reduction of digital expressions by Boolean algebra and De Morgan's Theorem.	07 Hrs
Unit-VI: Transducers <ul style="list-style-type: none">Classification of transducersTemperature transducersSpeed transducersDisplacement transducersPhoto transducers	07 Hrs

Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
113.1	Explain the basic concept of electric and magnetic circuits.
113.2	Understand concept of single phase and Three phase AC circuits.
113.3	Interpret the knowledge of single Phase AC machine.
113.4	Identify type of diodes, transistor configurations.
113.5	Apply De Morgan's theorem and Boolean algebra to reduce digital expressions.
113.6	Classify different types of transducers.



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

POs \ COs	BTL	1	2	3	4	5	6	7	8	9	10	11	12
113.1	L1,2,3	3	2	-	-	-	-	-	-	-	-	-	1
113.2	L1,2,3	3	2	-	-	-	-	-	-	-	-	-	1
113.3	L1,2,3	3	-	-	-	-	-	-	-	-	-	-	1
113.4	L1,2	3	2	-	-	-	-	-	-	-	-	-	1
113.5	L1,2	3	2	-	-	-	-	-	-	-	-	-	1
113.6	L1,2	3	-	-	-	-	-	-	-	-	-	-	1

Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Theory and problems of Basic Electrical Engineering	Eastern Economy Edition.	I. J. Nagrath and Kothari	PHI learning 2. Pvt .Ltd	2009
2	Fundamentals of Electrical Engineering	4th Edition.	Ashfaq Husain	Dhanpat Rai &Co.	2013
3	Basic Electrical Engineering	2nd Edition.	V. N. Mittal and Arvind Mittal	Tata Mc Graw Hill	2007
4	Basic Electrical Engineering	1st Revised Edition	V.K. Mehta,	S. Chand & Co. Pvt . Ltd. New Delhi)	2008
5	Electronics Devices	9th Edition	Thomas. L. Floyd	Pearson	2008
6	Modern Digital Electronics	4th Edition	R.P. Jain	Tata Mc Graw Hill	2010



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Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Basic Electrical Engineering	1st Edition	D. C. Kulshreshta	Tata McGraw hill	2008
2	A textbook of Electrical Technology Vol I	1st Edition.	B. L. Theraja and A. K. Theraja	Chand & Co. Pvt. Ltd. New Delhi	2008
3	A textbook of Electrical Technology Vol II	1st Edition.	B. L. Theraja and A. K. Theraja	Chand & Co. Pvt. Ltd. New Delhi	2008
4	Electrical Technology	10th Edition	Edward Hughes,	Pearson	2008
5	Digital Fundamentals	10th Edition	Thomas L Floyd	Pearson	1982
6	Digital design	3rd Edition	M. Morris Mano	Pearson	1996
7	Fundamentals of digital circuits	2nd Edition	Anand Kumar	Prentice Hall of India	2008

Useful Link /Web Resources:

NPTL: <https://www.youtube.com/watch?v=0SnfR13p6Mc&t=12s>



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F. Y. B. Tech. Curriculum

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Course Title : Elements of Electrical and Electronics Engineering Laboratory	
Course Code : 231FYP117	Semester : I / II
Teaching Scheme L-T-P : 0-0-2	Credits : 1
Evaluation Scheme: ISE Marks 25	ESE: --

Prior Knowledge of:	Identify electrical and electronic component
----------------------------	--

Course Objective:

117.1	To make the students learn working principal of different Electrical & Electronic Circuits
117.2	To impart the skills to identify types of transformers and the their losses
117.3	To make the students use of transducers.
117.4	To expose the students to working of analog and digital circuits

List of Experiments

Exp. No	Title of Experiments	Duration
01	Introduction to Electrical Engineering laboratory.	02Hrs
02	Testing of Electronic components using multi-meter & CRO	02Hrs
03	Verification of Kirchhoff's Current Law/ Kirchhoff's Voltage Law	02Hrs
04	Determination of reactance for Series R-L- C Circuit.	02Hrs
05	Polarity and Ratio Test for single Phase Transformer	02Hrs
06	Experiment on Transistor Characteristics.	02Hrs
07	Experiment on Half wave rectifiers.	02Hrs
08	Experiment on Full wave rectifiers.	02Hrs
09	Measurement of Displacement using LVDT/strain Gauge.	02Hrs
10	Experiment and use of IC (78XX, LM317) as Voltage regulators.	02Hrs
11	Verification of truth table of basic logic gates and derived logic gates.	02 Hrs
12	Implementation of logic gate by using universal gate.	02Hrs



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Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
117.1	Understand the working principal of different Electrical & Electronic Circuits
117.2	Illustrate differences between the types of transformers and the their losses
117.3	Use analog and digital circuits.
117.4	Use measuring devices and transducers

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

POs \ COs	BTL	1	2	3	4	5	6	7	8	9	10	11	12
117.1	3	3	3	-	-	-	-	-	-	-	-	-	1
117.2	3	3	-	-	-	-	-	-	-	-	-	-	1
117.3	3	3	3	-	-	-	-	-	-	-	-	-	1
117.4	3	3	-	-	-	-	-	-	-	-	-	-	1

Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Theory and problems of Basic Electrical Engineering	Eastern Economy Edition.	I. J. Nagrath and Kothari	PHI learning 2. Pvt .Ltd	2009
2	Fundamentals of Electrical Engineering	4th Edition.	Ashfaq Husain	Dhanpat Rai &Co.	2013
3	Basic Electrical Engineering	2nd Edition.	V. N. Mittal and Arvind Mittal	Tata Mc Graw Hill	2007
4	Electronics Devices	9th Edition	Thomas. L. Floyd	Pearson	2008
5	Modern Digital Electronics	4th Edition	R.P. Jain	Tata Mc Graw Hill	2010



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Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Basic Electrical Engineering	1st Edition	D. C. Kulshreshta	Tata McGraw hill	2008
2	A textbook of Electrical Technology Vol I	1st Edition.	B. L. Theraja and A. K. Theraja	Chand & Co. Pvt. Ltd. New Delhi	2008
3	A textbook of Electrical Technology Vol II	1st Edition.	B. L. Theraja and A. K. Theraja	Chand & Co. Pvt. Ltd. New Delhi	2008
4	Digital Fundamentals	10th Edition	Thomas L Floyd	Pearson	1982
5	Digital design	3rd Edition	M. Morris Mano	Pearson	1996
6	Fundamentals of digital circuits	2nd Edition	Anand Kumar	Prentice Hall of India	2008



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Course Title: Computer Aided Engineering Graphics	
Course Code: 231FYL114	Semester: I / II
Teaching Scheme L-T-P: 3 – 0 – 0	Credits: 3
Evaluation Scheme: ISE-I, MSE, ISE-II: 10 /30/10	ESE Marks : 50

Prior Knowledge of:	Fundamentals of drawings
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Course Objectives:

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

Curriculum Details

Content	Duration
Unit-I: Introduction to Computer Aided Sketching <ul style="list-style-type: none">▪ Introduction to CAD software▪ Graphical User interface of CAD software▪ Selection of Drawing size and scale▪ Standard Toolbars, Menus, Tabs, navigational tools▪ Basic Commands to draw 2D objects▪ Co-ordinate system and planes▪ Viewing Commands	08 Hrs
Unit-II: Customization and Annotations <ul style="list-style-type: none">▪ Edit & Modify Commands▪ Dimensions▪ Lettering▪ Annotations as per BIS conventions▪ Changing length through modifying existing line▪ Plotting	08 Hrs



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Content	Duration
Unit-III: Projections of Solids <ul style="list-style-type: none">▪ 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	08 Hrs
Unit-IV: Orthographic Views <ul style="list-style-type: none">▪ 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, dimensioning and sections	09 Hrs
Unit-V: Isometric Projections <ul style="list-style-type: none">▪ Introduction to Isometric▪ Isometric scale▪ Isometric projections and Isometric views / drawings▪ Circles in isometric view▪ Isometric views of simple solids and objects	09 Hrs

Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
114.1	Understand modern engineering tools used for engineering drawing.
114.2	Prepare 2-D drawings with appropriate dimensional and geometrical constraints.
114.3	Prepare drawing for projection of solid.
114.4	Prepare drawing for orthographic & sectional views.
114.5	Prepare drawing for isometric projection.



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

(POs) (COs)	1	2	3	4	5	6	7	8	9	10	11	12
114.1	3	2	-	-	3	-	-	-	-	-	-	-
114.2	3	2	-	-	3	-	-	-	-	-	-	-
114.3	3	2	-	-	3	-	-	-	-	-	-	-
114.4	3	2	-	-	3	-	-	-	-	-	-	-
114.5	3	2	-	-	3	-	-	-	-	-	-	-

Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Engineering Graphics with Auto CAD	13 th	D. M. Kulkarni A. P. Rastogi	(PHI) Publisher	2010
2	Computer Aided Engineering Drawing	3 rd	S. Trymbaka Murthy	I.K. International Publishing House	2013
3	Engineering Drawing	53 rd	N. D. Bhatt	Charotor Publication House, Bombay	2014
4	Machine Drawing	46 rd	N. D. Bhatt	Charotor Publication House, Bombay	2016

Reference Books:

Sr. No	Title	Author(s)	Publisher
1	Graphic Science	French and Vierck	Mc-Graw Hill International
2	Working with AutoCAD 2000	Ajeet Sing	Tata McGraw Hill
3	Machine Drawing	K. L. Narayana	New Age Publication
4	Engineering Drawing and Graphics	K. Venugopal	New Age Publication
5	A text book of Engineering Drawing	R. K. Dhawan	S. Chand and Co.
6	Fundamentals of Engineering Drawing	W. J. Luzadder	Prentice Hall of India
7	Engineering Drawing	N. B. Shaha and B. C. Rana	Pearson Education



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Course Title: Computer Aided Engineering Graphics Laboratory	
Course Code: 231FYP118	Semester: I & II
Teaching Scheme L-T-P: 0 – 0 – 2	Credits: 1
Evaluation Scheme: ISE - 50	ESE :--

Prior Knowledge of:	Fundamentals of drawings
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Course Objectives:

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

Curriculum Details

Content		
Exp. No	Details	Hrs.
1	Introduction of basic CAD software commands	2.00
2	Use and practice of Customization & Annotations	2.00
3	Draw Basic Drawings (Minimum two problems)	4.00
4	Draw problems on Projections of Solid (Minimum two problems)	4.00
5	Draw problems on Orthographic views (Minimum two problems)	4.00
6	Draw problems on Sectional Orthographic views (Minimum two problems)	4.00
7	Draw problems based on Isometric projections (Minimum two problems)	4.00



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Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
118.1	Understand modern engineering tools used for engineering drawing.
118.2	Prepare 2-D drawings with appropriate dimensional and geometrical constraints.
118.3	Prepare drawing for projection of solid.
118.4	Prepare drawing for orthographic & sectional views.
118.5	Prepare drawing for isometric projection.

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

(POs) / (COs)	1	2	3	4	5	6	7	8	9	10	11	12
118.1	3	2	-	-	3	-	-	-	-	-	-	-
118.2	3	2	-	-	3	-	-	-	-	-	-	-
118.3	3	2	-	-	3	-	-	-	-	-	-	-
118.4	3	2	-	-	3	-	-	-	-	-	-	-
118.5	3	2	-	-	3	-	-	-	-	-	-	-
118.1	3	2	-	-	3	-	-	-	-	-	-	-

Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Engineering Drawing	53 rd	N. D. Bhatt	Charotar Publication House, Bombay	2014
2	Machine Drawing	46 rd	N. D. Bhatt	Charotar Publication House, Bombay	2016
3	Engineering Graphics with Auto CAD	13 th	D. M. Kulkarni A. P. Rastogi	(PHI) Publisher	2010
4	Computer Aided Engineering Drawing	3 rd	S. Trymbaka Murthy	I.K. International Publishing House	2014



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Reference Books:

Sr. No	Title	Author(s)	Publisher
1	Graphic Science	French and Vierck	Mc-Graw Hill International
2	Working with AutoCAD 2000	Ajeet Sing	Tata McGraw Hill
3	Machine Drawing	K. L. Narayana	New Age Publication
4	Engineering Drawing and Graphics	K. Venugopal	New Age Publication
5	A text book of Engineering Drawing	R. K. Dhawan	S. Chand and Co.
6	Fundamentals of Engineering Drawing	W. J. Luzadder	Prentice Hall of India
7	Engineering Drawing	N. B. Shaha and B. C. Rana	Pearson Education



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Course Title: Professional Communication	
Course Code: 231FYL115	Semester: I/II
Teaching Scheme L-T-P: 1-0-0	Credits: 01
Evaluation Scheme: - ISE: 25	ESE: -

Prior knowledge of:	Basic English grammar, Basics of communication
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Course Objectives:

1.	To make students learn important communicative situations, the basics of communication, and its significance in the corporate sector
2.	To enhance their basic knowledge of grammar to communicate correctly
3.	To sharpen their listening, speaking, and reading skills
4.	To facilitate them to draft office documents effectively

Curriculum Details

Course Contents	Duration
Unit 1 Language and Communication <ul style="list-style-type: none">• Need for effective communication• The process and levels of communication• Professional communication• Communication networks/ flows• Forms and methods (verbal and non-verbal) of communication• Barriers to communication and solutions	04 Hrs
Unit 2 Remedial English <ul style="list-style-type: none">• Parts of speech, Sentence pattern• Modal auxiliaries• Tenses• Change the voice• Direct indirect speech/Reported speech• Common Errors: Subject-verb agreement, Noun-pronoun agreement, Misplaced	03Hrs



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modifiers, Articles, Prepositions	
<ul style="list-style-type: none">• Vocabulary building: TOEFL, GRE, IELTS	
Unit 3 Introduction to LSRW <ul style="list-style-type: none">• Listening Skills: Hearing and listening, Listening as an active skill; Types of Listening; Barriers to effective listening skills.• Speaking Skills: Importance, Various oral business contexts/situations, Group communication, Preparing effective public speeches (Impromptu and prepared)• Reading Skills: Benefits of effective reading, Types of reading (Skimming; Scanning, Intensive reading, Extensive reading) Overcoming common obstacles, Reading comprehension.• Writing Skills: Importance, Paragraph writing techniques	03 Hrs
Unit 4 Professional Correspondence and Ethics <ul style="list-style-type: none">• Official correspondence Principles, structure (elements) Layout (complete block, modified block, semi-block), Types (enquiry and reply, claim and adjustment)• Office drafting Writing notice, agenda and minutes of the meeting• Email writing Advantages and limitations Style, structure and content Email etiquette• Corporate etiquette and ethics	04 Hrs

Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
115.1	Implement verbal and non-verbal codes for effective communication
115.2	Prepare grammatically correct and meaningful sentences
115.3	Demonstrate language learning skills-LSRW (Listening, Speaking, Reading, and Writing)
115.4	Draft business documents and exhibit corporate etiquettes efficiently



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

POs \ COs	BTL	1	2	3	4	5	6	7	8	9	10	11	12
115.1	3	-	-	-	-	-	-	-	3	2	3	-	1
115.2	3	-	-	-	-	-	-	-	-	-	3	-	1
115.3	3	-	-	-	-	-	-	-	-	3	3	-	1
115.4	3	-	-	-	-	-	-	-	3	-	3	-	1

Levels: Slight (Low):1, Moderate (Medium):2, Substantial (High): 3, If there is no correlation, put “-”

Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Technical Communication: Principles and Practice	4 th	Meenakshi Raman & Sangita Sharma	Oxford University Press	2022
2	Personality Development and Soft- Skills	2 nd	Barun K. Mitra	Oxford University Press	2016
3	Communication Skills	2 nd	Sanjay Kumar & Pushp Lata	Oxford University Press	2015
4	Communication Skills	3 rd	Meenakshi Raman & Sangeeta Sharma	Oxford University Press	2013

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Business Communication	2 nd	Urmila Rai and S.M. Rai	Himalaya Publishing House Pvt. Ltd.	2014
2	A University Grammar of English	1 st	Randolph Quirk and S Greenbaum	Pearson	2007
3	Effective Technical Communication	2 nd	B. K.Mitra	Oxford University Press	2006
4	Effective Technical Communication	2 nd	M.Ashraf Rizvi	McGraw Hill Education	2005



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Useful Links/Web Resources:

1. <https://www.skillsyouneed.com>
2. <https://www.psychologytoday.com>
3. <https://www.britishcouncil.in>
4. <https://www.udemy.com>
5. <https://www.englishclub.com>



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Course Title: Professional Communication Laboratory	
Course Code: 231FYP119	Semester: I/II
Teaching Scheme L-T-P: 0-0-2	Credit: 01
Evaluation Scheme: ISE Marks: 25	ESE Marks: --

Prior knowledge of:	Basic language learning and behavioral skills
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Course Objectives:

1.	To familiarize students with English phonology and improve their pronunciation
2.	To improve language learning skills (LSRW) by providing ample practice
3.	To develop students' verbal and non-verbal communication
4.	To cultivate behavioral skills among them

List of Lab Sessions

Exp.No	Title of Activities	Duration
01	Icebreaking: Introducing self and others Different ways of introducing self and others: demonstration	02Hrs
02	Phonetics Introduction to phonetics - consonants, vowels and diphthongs, stress, intonation in English with video samples	02Hrs
03	Remedial English Vocabulary-building games and identifying errors	02Hrs
04	Listening Practice Listening comprehension, strategies for effective listening with audio/video samples	02Hrs
05	Reading Practice Improving Comprehension Skills, Techniques for good comprehension	02Hrs
06	Technical Writing Practice Paragraph writing, writing notices, agenda minutes of the meeting, report writing	02Hrs
07	Public Speaking Practicing extempore and prepared speeches	02Hrs
08	Group discussion Group discussions on current topics	02Hrs
09	Mock Meetings Purposes, preparation, and procedure for conducting effective meetings	02Hrs



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Exp.No	Title of Activities	Duration
10	Situational Conversations Writing and practicing situational conversations	02Hrs
11	Creative Writing Blog Writing	02Hrs
12	Film/Book Appreciation Showing short films and appreciation of them. Reading novels or short stories and critical analysis of them.	02Hrs

Course Outcomes (COs): After successful completion of the course, students will be able to:

CO	Statements
119.1	Demonstrate effective LSRW skills
119.2	Comprehend grammar rules and sound patterns for better professional communication
119.3	Deliver speeches and participate in business meetings effectively
119.4	Draft business documents by following writing ethics

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

POs \ COs	BTL	1	2	3	4	5	6	7	8	9	10	11	12
119.1	3	-	-	-	-	-	-	-	-	3	3	-	1
119.2	3	-	-	-	-	-	-	-	-	-	3	-	1
119.3	3	-	-	-	-	-	-	-	3	3	3	-	1
119.4	3	-	-	-	-	-	-	-	3	3	3	-	1



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Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	A Practical Course in Spoken English	1 st	J.K. Gangaj	PHI Learning Pvt. Ltd	2014
2	English Language Laboratories	2 nd	Nira Konar	PHI Learning Pvt. Ltd	2014
3	Better English Pronunciation	2 nd	J.D.O Connor	Cambridge University Press,	1980

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Communication Skills	2 nd	Sanjay Kumar & Pushp Lata	Oxford University Press	2015
2	Technical Communication: Principles and Practice	2 nd	Meenakshi Raman & Sangita Sharma	Oxford University Press	2011

Useful Links /Web Resources:

1. <https://www.indiabix.com>
2. <https://www.skillsyouneed.com>
3. <https://interviewbuddy.in>
4. <https://learnenglish.britishcouncil.org>
5. <https://www.fluentu.com>



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Course Title : Liberal Learning Course	
Course Code: 231FYP120	Semester: I / II
Teaching Scheme L-T-P : 00-0004	Credits : 02
Evaluation Scheme ISE: 50	ESE Marks :--

- Liberal Learning Through Students Clubs and particular areas is a Two-credit course run for First Year B.Tech .
- Students are required to go through the list of liberal learning courses and rank their preferences through google form provided by department at the beginning of semester.
- They will be allocated one area from the list. Experts from particular areas (club) conduct sessions once a week for each area on campus through activities, discussions, presentations, and lecture methods and evaluation out of 50 per area is done for each area throughout the semester.
- Evaluation pattern may differ according to the nature of each area (Club).
- Although there is no pre-defined syllabus, there is an outline which experts normally develop and follow for the sessions.
- However, students may approach the faculty to cover certain topics of their interest in that area during sessions based on students' interest and experts'.
- List of liberal learning courses will get display at the beginning of odd semester.



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Course Title: Rural/Social Internship	
Course Code: 231FYM122	Semester: I
Teaching Scheme: L-T-P :0-0-0	Credits: Grade (Mandatory Course)
Evaluation Scheme ISE: 50	ESE Marks: --

Course Objectives:

1	To provide possible opportunities to learn, understand and sharpen the real time technical / managerial skills required at the job.
2	To exposure to the current technological developments relevant to the subject area of training.
3	To expose students to the engineer's responsibilities and ethics.
4	To understand the social, economic and administrative considerations that influence the working environment of industrial organizations
5	To gain experience in writing technical reports/projects.
6	To understand the social, economic and administrative considerations that influence the working environment of industrial organizations

Curriculum Details

As per the approved structure of curriculum, students will be allowed to do internship during first semester of B. Tech. program. During internship students are required to be visit village/ward/small industry/organization etc

For following activities

1. Prepare and implement plan to create local job opportunities.
2. Prepare and implement plan to improve education quality in village.
3. Preparing an actionable DPR for Doubling the village Income.
4. Developing Sustainable Water Management system.
5. Prepare and Improve a plan to improve health parameters of villagers.
6. Developing and implementing of Low Cost Sanitation facilities
7. Prepare and implement plan to promote Local Tourism through Innovative Approaches
8. Implement/Develop Technology solutions which will improve quality of life.
9. Prepare and implement solution for energy conservation.



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10. Prepare and implement plan to Skill village youth and provide employment.
11. Develop localized techniques for Reduction in construction Cost.
12. Prepare and implement plan of sustainable growth of village.
13. Setting of Information imparting club for women leading to contribution in social and economic issues.
14. Developing and managing Efficient garbage disposable system.
15. Contribution to any national level initiative of Government of India. For eg. Digital India/ Skill India/ Swachh Bharat Internship etc

Every student is required to prepare a file containing documentary proofs of the activities done by him. The evaluation will be done by expert committee constituted by HoD/Departmental Internship In-charge/ faculty mentor.



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Course Title: Fundamental of Aptitude and Technical-I	
Course Code: 231FYM123	Semester: I
Teaching Scheme: L-T-P :3-0-0	Credits: 00
Evaluation Scheme ISE: 50	ESE Marks: --

Curriculum Details

Course Contents	Duration
UNIT-I: Learning Basic Aptitude Module-1: Percentage Module-2: Average & Its Applications	04 Hrs
UNIT-II: Series Completion Module-1: Number Series Module-2: Letter Series Module-3: Alphanumeric Series	04 Hrs
UNIT-III: LSRW-I Module-1. Listening Introduction & Activities Module- 2. Speaking Introduction & Activities Module-3. Reading Introduction & Activities Module-4. Writing Introduction	05 Hrs
UNIT-IV: Career Management-1 Module-1: SWOT Analysis Module-2: Goal Setting(Why & How of SMART goals) Module-3: Personality Traits & Self-Assessment Module-4: Competency Mapping	05 Hrs
UNIT-V: Interpersonal Skills Module-1: Team Management Module-2: Attitude Building Module-3: Time Management	05 Hrs
UNIT VI: Technical Training Module-1: Introduction to C Language	18 Hrs



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Course Contents	Duration
Module-2: Identifiers & Data types, Operations	
Module-3: Control Instructions, Function, Recursion	
Module-4: Array, Strings, Pointers	
Module-5: Structure & Union	
Module-6: Memory Allocation	
Module-7: Enumeration, Pre-processor	
Module-8: Command Line Arguments	



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Course Title: Fundamental of Aptitude and Technical-II	
Course Code: 231FYM125	Semester: I/II
Teaching Scheme: L-T-P :3-0-0	Credits: 00
Evaluation Scheme ISE: 50	ESE Marks: --

Curriculum Details

Course Contents	Duration
UNIT-I: Learning Basic Aptitude Module-1: Ratio & Proportion Module-2: Mixture & Alligation Module-3: HCF & LCM	06 Hrs
UNIT-II: Logical Reasoning Module-1: Blood Relations Module-2: Seating Arrangement Module-3: Pattern Completion	06Hrs
UNIT-III: Functional English Module-1: Spotting Errors, Sentence Correction/ Sentence Improvement Module-2: Sentence completion Module-3: Sentence Formation/ Ordering of words Module-4: One word Substitution Module-5: Para jumbles	10 Hrs
UNIT-IV: Attitude Building-I Module-1. Focus & Discipline Module-2. ASK Model- Corporate Expectations Module-3. Change Management (Changing & Developing habits)	06 Hrs
UNIT-V: Technical Training Module-1: C++ Introduction-History of C++,C++ specifications and keywords, Data type and its type, type modifiers and qualifiers,Structure in C/C++, access specifier, Memory Allocation Functions-simple programs.	14 Hrs



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Module-2: Creating Classes and Objects-Access Specifiers,Constructor,Types of Functions Member Functions-Internally Defined, Externally Defined,Inline Function,Friend Function Virtual Function Introduction,Nesting of Member Functions

Module-3 - Functions-Function Arguments- Call by Value, Call by Reference,Object as Function Argument, Array of Objects

Module-4-Constructor and Destructor Constructor Types-Default, Parameterized, Copy Constructor,Destructor,Concept of Pointers Shallow Copy,Deep Copy

Module-5- Exception Handling-Static members,Static functions,Exception Handling



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Course Title: Capstone Project	
Course Code: 231FYM124	Semester: II
Teaching Scheme: L-T-P :0-0-0	Credits: Grade (Mandatory Course)
Evaluation Scheme ISE: 50	ESE Marks: --

Course Objectives:

1	To inculcate independent learning by problem solving with social context.
2	To engages students in rich and authentic learning experiences.
3	To emphasizes learning activities that are long-term, interdisciplinary and student-centric.
4	To provide every student the opportunity to get involved either individually or as a group so as to develop team skills and learn professionalism.

Curriculum Details

As per the approved structure of curriculum, students will be allowed to do capstone project during second semester of B. Tech. program.

Topics:

Capstone Project may be a theoretical analysis, modeling & simulation, experimentation & analysis, prototype design, fabrication of new equipment, correlation and analysis of data, software development, etc. or a combination of these.

Group Structure:

Working in supervisor/mentor monitored groups; the students plan, manage, and complete a task/project/activity which addresses the stated problem.

1. There should be team/group of 4 -5 students
2. A supervisor/mentor teacher assigned to individual groups

Selection of Project:

The project demo model for learning is recommended. The model begins with the identifying of a problem, often growing out of a question or “wondering”. This formulated problem then stands as the starting point for learning. Students design and analyze the problem within an articulated interdisciplinary or subject frame or based on Rural/Social internship.



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A problem can be theoretical, practical, social, technical, symbolic, cultural, and/or scientific and grows out of students' wondering within different disciplines and professional environments. A chosen problem has to be exemplary. The problem may involve an interdisciplinary approach in both the analysis and solving phases.

By exemplarity, a problem needs to refer back to a particular practical, scientific, social and/or technical domain. The problem should stand as one specific example or manifestation of more general learning outcomes related to knowledge and/or modes of inquiry.

There are no commonly shared criteria for what constitutes an acceptable project. Projects vary greatly in the depth of the questions explored, the clarity of the learning goals, the content, and structure of the activity.

1. A few hands-on activities that may or may not be multidisciplinary.
2. Use of technology in meaningful ways to help them investigate, collaborate, analyze, synthesize, and present their learning.
3. Activities may include- Solving real life problem, investigation, /study and Writing reports of in-depth study, fieldwork.

Recommended Guidelines and phases:

Capstone project is learning through activity. One of the teachers can be appointed as guide for capstone project group. Following are the recommended guidelines that will work as an initiator and facilitator in process of completion of Capstone project.

1. In first week of commencement of 2nd semester, let the guide create awareness about capstone project (what, why, and how) among the students. Convey students expected outcomes, assessment process and evaluation criteria.
2. Get groups of students registered preferably 4-5 students per group.
3. Assign guide to each group.
4. Provide guidelines for title identification (Problem can be some real-life situation that needs technology solutions. This situation can be identified by rural/social internship, by meeting people around, visiting various industries, society, and institutes. The solution can be prototype, model, convertible solutions, survey and analysis, simulation, and similar).
5. Let students submit the problem identified in prescribed format (Problem Statement, Initial Survey for topic finalization, Abstract, Software, Hardware required, Title)



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6. Guide can approve the problem statements based on feasibility and learning outcomes expected for first year engineering students
7. Guide is to monitor progress of the task during phases of project work. Broadly phases may include- requirements gathering, preparing a solution, technology design for the solution.
8. Weekly monitoring and continuous assessment record are to be maintained by guide.
9. Get the report submitted at the end of semester.

Student is required to prepare a capstone project and file containing documentary proofs of the activities done by him. The evaluation will be done by expert committee constituted by HoD/Departmental capstone project In-charge/ faculty mentor.