F. Y. B. Tech 2022-2023 Credit system and course curriculum

Walchand College of Engineering

(Government Aided Autonomous Institute)

Credit System for F.Y. B.Tech. (All Programmes) for Group A in Sem-I and Group B in Sem-II AY 2022-23

Sr.No.	Category	Course Code	Course Name	L	T	P	I	Hrs	Cr	MSE/LA1	ISE/LA2	ESE	PoE
Professional Core (Theory)													
1	BS	6PH101	Engineering Physics	3	0	0	0	3	3	30	20	50	
2	BS	6MA101	Engineering Mathematics-I	3	1	0	0	4	4	30	20	50	
3	ES	6CV101	Engineering Mechanics	3	0	0	0	3	3	30	20	50	
4	HS	6HS101	Communication Skills	2	1	0	0	3	3	30	20	50	
5	BS	6BS104	Life Science	2	0	0	0	2	2	30	20	50	
Professional Core (Lab)													
6	ES	6CV151	Engineering Mechanics Lab	0	0	2	0	2	1	30	30	40	
7	ES	6ME152	Workshop Practice	0	0	2	0	2	1	30	30	40	
8	ES	6CS151	Programming for Problem Solving Lab	0	0	2	2	4	3	30	30	40	
9	BS	6PH151	Engineering Physics Lab	0	0	2	0	2	1	30	30	40	
			Total	**13**	**2**	**8**	**2**	**25**	**21**				

Notes:

For Theory courses: There shall be MSE, ISE and ESE. The ESE is a separate head of passing.

For Lab courses: There shall be continuous assessment (LA1, LA2, ESE). The ESE is a separate head of passing. The Y in the PoE indicates external component for ESE.

For Odd Sem, Engineering Mathematics-I for all programs and for Even Sem, Engineering Mathematics-II for all programs.

For further details, refer to Academic and Examination rules and regulations.

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

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Course Information

Programme	B.Tech.
Class, Semester	First Year B.Tech., Sem I & II
Course Code	6PH101
Course Name	**Engineering Physics**
Desired Requisites:	Students are expected to know the basic concept in Physics.

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	0 Hrs/week	30	20	50	100
		Credits: 3			

Course Objectives

1	To provide basic concepts to solve many engineering and technical issues.
2	To give deep insights into the understanding of engineering courses.
3	To encourage them to understand engineering and technical development.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Descriptor**
CO1	To comprehend basics of nanomaterials, Types of diffraction of light, Planks quantum hypothesis, de-Broglie's law, Compton effect, Heisenberg's uncertainty principle, Schrödinger's wave equations, Hall effect, Fermi-Dirac statistics. Seebeck effect.	I	Remembering
CO2	Explain half period zones, zone plate, Describe Plane diffraction grating, Explain Planck's quantum hypothesis, Schrödinger's wave equations and their applications; Explain the methods of production and detection methods of ultrasonic waves and its applications, Explain the methods of synthesis of nanomaterials, its properties. Explain carbon nanotubes.	II	Understanding
CO3	Classify transducers, and sensors and their applications. Classify solids onthe basis of band theory; Explain fermi level and its behavior in metal, semiconductor and insulator. Solve the problems on electrical Conductivityand Hall effect. Explain applications of nanomaterials.	III	Applying

Module	**Module Contents**	**Hours**
I	**Optics:** Introduction, types of optics, diffraction, types of diffraction, Fresnel's diffraction: Fresnel's half-period zones, zone plate and diffraction at a straight edge. Fraunhofer's diffraction: Diffraction due to single slit, Diffraction due to double slits, Plane diffraction grating.	8
II	**Quantum Physics:** Introduction, black body radiation, Planck's quantum theory, Wien's displacement law and Rayleigh – Jeans law, phase velocity, group velocity and particle velocity, de-Broglie's hypothesis, Compton effect: theory and experimental verification, Heisenberg's uncertainty principle and its applications, wave function and its physical significance, Schrödinger's wave equation: time independent and time dependent, applications of Schrödinger's wave equation.	7

III	**Ultrasonics:** Introduction, classification of sound, ultrasonic waves, generation of ultrasonic waves (Magnetostriction and Piezoelectric method), detection of ultrasonic waves by Kundt's tube, thermal detection and sensitive flame method, velocity of ultrasonic waves in liquid, applications of ultrasonic waves in scientific and engineering field.	7
IV	**Solid State Physics:** Introduction, formation of energy bands in solid, classification of solid on the basis of band theory, number levels in band, density of states, Fermi-Dirac statistics, Fermi level, variation of Fermi level with change in temperature for semiconductor, electrical conductivity of metal andsemiconductor, Hall effect, basic concept of p-n junction.	6
V	**Nanophysics:** Introduction to nanomaterials, Synthesis methods of nanomaterials, Properties of nanomaterials, Applications of nanomaterials, Introduction to Carbon Nanotubes and its applications.	7
VI	**Computer Instrumentation:** Introduction, instrumentations, measurement system, control system, Transducer and Sensor: transducers, sensors, classification of transducers, characteristics of transducers, selection criterion for transducers, temperature transducers, strain gauge, pressure transducers, force transducers, optical transducers, actuators.	6
Textbooks		
1	M. N. Avadhanulu and P. G. Kshirsagar, "*A Text book of Engineering Physics* ", S.Chand Pub.	
2	R. K. Gaur and S. L. Gupta *"Engineering Physics",* Dhanpat Rai Publications, 2011	
References		
1	Halliday, Resnic and Walker, *"Fundamentals of Physics"*, John Wiley, 9th edition 2011.	
2	A. Beiser, *"Concepts of Modern Physics",* McGraw Hill International, 5th edition, 2003.	
3	Ajoy Ghatak, *"Optics",* Tata McGraw Hill 5th edition, 2012.	
4	Charles P.Poole and Frank J. Owner, "*Introduction to Nanotechnology"*, Wiley India.	
5	G. Cao *"Nanostructures and Nanomaterials: Synthesis, Properties and Applications"* Imperial College Press, 2004.	
Useful Links		
1	For optics https://nptel.ac.in/courses/122/107/122107035/	
2	For Quantum Physics https://nptel.ac.in/courses/122/106/122106034/	
3	For Ultrasonic https://freevideolectures.com/course/3531/engineering-physics-i/8	
4	For Solid State Physics https://nptel.ac.in/courses/115/105/115105099/	
5	For Nanomaterials https://youtu.be/0EWCqCIsFOA	
6	Basics of Instrumentation https://www.youtube.com/watch?v=qbKnW42ZM5c	

CO-PO Mapping														
	Programme Outcomes (PO)												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2													
CO2	2													
CO3	2													
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.														

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Course Information

Programme	B. Tech. All Branches
Class, Semester	First Year B. Tech., Sem I
Course Code	6MA101
Course Name	Engineering Mathematics-I
Desired Requisites:	Mathematics course at Higher Secondary Junior College

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	1 Hrs/week	30	20	50	100
		Credits: 4			

Course Objectives

1	Introduce the basic concepts required to understand, construct, solve and interpret various types of differential equation.
2	Give an ability to apply knowledge of Mathematics on Engineering problems.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Descriptor**
CO1	Explain mathematical concepts in engineering field.	II	Understanding
CO2	Solve engineering and scientific problems.	III	Applying

Module	**Module Contents**	**Hours**
I	**Matrices** Rank of matrix, Homogeneous and non-homogeneous linear equations, Eigen values, Eigen vectors, Cayley Hamilton theorem, Diagonalizations of matrices.	**6**
II	**Calculus** Rolle's theorem, Mean value theorem, Taylor's and Maclaurin's theorem with remainders	**5**
III	**Complex Number** Polar form of complex number, Argand's diagram, De Moiver's theorem, roots of complex number, Hyperbolic function, relation between circular and hyperbolic function.	**7**
IV	**Partial Differentiation and its application** Partial derivative, chain rule for partial differentiation, Euler's theorem for homogeneous and non-homogeneous function, Jacobian, Error and approximation, maxima and minima of function of two variables	**8**
V	**First order ordinary differential equation and its application** Exact, Linear, Bernoulli's equations, Euler's equations, Orthogonal trajectory, applications to simple electric circuit.	**8**
VI	**Numerical Solution of Ordinary Differential Equations of first order and first degree:** Numerical Solution by (i) Taylor's series method (ii) Euler's method (iii) Modified Euler's method (iv) Runge- Kutta fourth order method	**6**

Textbooks

1	P. N. and J. N. Wartikar "A Text Book of Applied Mathematics, Vol I and II, Vidyarthi Griha Prakashan, Pune, 2006.
2	B .S. Grewal "Higher Engineering Mathematics", , Khanna Publication, 44th Edition, 2017.

References

1	Erwin Kreyszig , "Advanced Engineering Mathematics", , Wiley Eastern Limited Publication, 10th Edition, 2015.
2	Wylie C.R *"Advanced Engineering Mathematics",*., Tata McGraw Hill Publication, 8th Edition 1999.
3	H. K. Dass, "*Advanced Engineering Mathematics",* S. Chand & Company Ltd., 1st Edition, 2014.
4	B.V.Ramana, "Higher Engineering Mathematics ", The McGraw Hill companies, 2006.
Useful Links	
1	https://nptel.ac.in/courses/111105121

CO-PO Mapping														
	Programme Outcomes (PO)												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2			1										
CO2	2			1										
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.														

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Course Information					
Programme	B.Tech. (All Branches)				
Class, Semester	First Year B. Tech., Sem I/II				
Course Code	6CV101				
Course Name	Engineering Mechanics				
Desired Requisites:	Physics				
Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	0	30	20	50	100
		Credits: 3			

Course Objectives	
1	To impart knowledge on fundamentals of mechanics.
2	To provide knowledge of motions, forces and work energy principles.
3	To illustrate the applications of static and dynamic systems.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	Explain fundamental concepts in statics and dynamics.	II	Understanding
CO2	Apply fundamental concepts of mechanics to solve problems on static systems.	III	Applying
CO3	Use Newton's laws of motion, D'Alemberts and work energy principles to solve problems related to dynamic systems.	III	Applying

Module	**Module Contents**	**Hours**
I	**Forces** Fundamentals, Systems, Composition and Resolution, Resultant of planar force systems. Free Body Diagram, Equilibrium, Varignon's Theorem, Laws of Friction, Lami's Theorem, Problems on force system **Centroid and Moment of Inertia** Centre of gravity and Centroid, Moment of Inertia, Radius of gyration, Mass-Moment of Inertia.	9
II	**Force System in Beams** Introduction to force system in a building, concepts of determinacy and indeterminacy Beams: Supports, Types, Loads, Equilibrium, Reactions Principle of Virtual Work and its applications to statically determinate beams	6
III	**Plane Trusses** Pin-jointed statically determinate plane trusses: Assumptions, imperfect, perfect and redundant trusses, Analysis by Method of joints, method of sections	5
IV	**Kinematics** Motion Curves, Motion under uniform and variable acceleration, Equations of motion, Motion under gravity, Relative Motion, Relation between linear and angular motion, Motion of a Projectile, Curvilinear Motion	7
V	**Kinetics** Newton's laws of motion, D'Alemberts principle, Applications to rough inclined plane, lift, and connected bodies, Circular motion: Centripetal and Centrifugal Force, Super-elevation and applications	6

VI	**Work Energy and Impact** Method, Potential and Kinetic Energy, Law of Conservation of Energy. Impulse Momentum Method Collisions: Impact, Collision of bodies, Coefficient of Restitution, Loss of Kinetic Energy due to Impact.	7
Textbooks		
1	Ramamrutham., S. "Textbook of Applied Mechanics", Dhanpat Rai Publishing Company Limited, 2008.	
2	Bhavikatti., S. S. and Rajashekarappa., K. G. "Engineering Mechanics", New Age International Publishers, 2015, 5th Edition.	
3	Beer, F. P. and Johnston, E. R. "Vector Mechanics for Engineers Vol. I and II", McGraw Hill Company Publication, 2011, 9th Edition.	
References		
1	Singer, F. L. "Engineering Mechanics Statics & Dynamics", B. S. Publications, 2011.	
2	Timoshenko, S. and Young, D. H. "Engineering Mechanics", McGraw Hill Companies, 2008, 4th Edition.	
3	Meriam, L. and L.G. Kraige, "Engineering Mechanics – Dynamics", John Wiley & Sons, 2002, 6th Edition.	
Useful Links		
1	https://nptel.ac.in/courses/112106286	
2	https://www.youtube.com/watch?v=9Yt3I4bP-90	

CO-PO Mapping														
	Programme Outcomes (PO)												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2	3	1												
CO3	3	1												
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.														

Walchand College of Engineering, Sangli *(Government Aided Autonomous Institute)*					
AY 2022-23					
Course Information					
Programme	B.Tech. (All Branches)				
Class, Semester	First Year B. Tech., Sem I				
Course Code	6 HS 101				
Course Name	Communication Skills				
Desired Requisites:	Higher Secondary Level English				
Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	2 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	1 Hrs/week	30	20	50	100
		Credits: 3			

Course Objectives	
1	Inculcate the importance of Technical English Communication Skills
2	Enhance their communicative competence
3	Enable the students to communicate with clarity and precision
4	Prepare the students to acquire structure of Oral and written expression required for their profession and enable them to acquire proper behavioural skills

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	Course Outcome Statement/s	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Descriptor**
CO1	Communicate clearly, precisely and competently in different scenario	I	**Applying**
CO2	Demonstrate the information through oral , written and graphic messages	II	**Understanding**
CO3	Acquire basic proficiency in English including reading and listening comprehension ,writing and speaking skills	III	**Remembering**

Module	**Module Contents**	**Hours**
I	**Module 1: Sentence Structure and Vocabulary Building:** Subject Verb Agreement ,Modal verbs, Synonym & Antonyms, Standard abbreviations, Redundancies, Misplaced Modifiers, Passives, Question tags, Connectives, Phrasal verbs	**6**
II	**Module 2 : Fundamentals of Communication:** Features and Functions, Importance of Communication, The Communication Process, Barriers and Breakdown of Communication, Communication in an Organization, Upwardcommunication,Downwardcommunication,Horizontalcommunication, ,Diagonalcommunication,Informalcommunication/Grapevinecommunication	**4**
III	**Module 3 : Nature and Style of Writing:** Technical Communication Characteristic features of Technical communication, Style of technical communication, Audio-visual communication	**2**
IV	**Module 4 : A. Non Verbal Communication :** Kinesics or Body Language, Proxemics : Space Distance, Haptic, Chronemics, Nonverbal Barriers. **Vocalic: Paralinguistic features: 1.**Pitch 2.Volume 3.Pauses 4. Rate of words/minute **B. Listening Skills:-** 1.Process of Listening 2.Types of Listening 3. Barriers to effective Listening, Listening and note making	**5**

V	**Module 5 : A Speeches for different Occasions**: 1.Introduction, (Welcome Speech , Introductory Speech, Vote of Thanks Speech**)** 2. Group Presentations 3. Group Discussions 4. Individual Presentations 5. Job Interviews **B. Basics of Phonetics: -** 1. Improper Pronunciation 2. Classification of Sounds in English 3. Word Stress 4. Sentence Stress or Intonation 5. Pronunciation and Articulation	**5**
VI	**Module 6 : Written Communication A. Basic Writing Skills : 1.**Paragraph Writing 2. Comprehension 3.EssayWriting (Sentence Structures , Use of phrases & clauses in sentences**,** Importance of proper punctuations , Creating coherence Organising the principles of paragraphs in documents ,Techniques for writing precisely) **B. Business Correspondence** : 1. Job Applications 2. Complaint Letters and Adjustment Letters 3. Inquiry and Order **C. Official Correspondence : 1.** Memorandums 2. Circulars 3. Notices **D .Report Writing** : 1. Individual Report 2. Lab Report 3. Inspection Reports	**6**

	Textbooks
1	**Textbook: Sanjay Kumar, Pushplata , *Communication Skills*, Oxford University Press, First edition ,2012**
	References
1	K .R.Laxminarayanan, *English for Technical Communication*, Scitech, Sixth Edition, 2008
2	Ashraf Rizvi ,*Effective Technical Communication*, Tata McGraw Hills publishing Company 2006
3	William Sanborn Pfeiffer ,T.V.S. Padmaja ,*Technical Communication: A Practical Approach*, Pearson, Sixth Edition 2012
4	Exercises in Spoken English, Parts 1 and II CIEFL, Hyderabad , Oxford University Press
	Useful Links
1	**www.oupinheonline.com**
2	**www.scitechpublications.com**

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1										3				
CO2										2				
CO3										2				
CO4														

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO.

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Course Information

Programme	B.Tech. All Branches
Class, Semester	First Year B. Tech., Sem I/ II
Course Code	6BS104
Course Name	Life Science
Desired Requisites:	Higher Secondary Level

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	2 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	0 Hrs/week	30	20	50	100
		Credits: 2			

Course Objectives

1	Introduce students to modern aspects of life science.
2	Develop an understanding of scientific methods with a broad background in the life sciences at all levels of biological organization (from molecular, cellular, and organismal biology, to populations, communities and ecosystems)
3	Prepare the students to acquire structure of Oral and written expression required for their profession and enable them to acquire proper behavioural skills

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Descriptor
CO1	Outline and describe different infectious diseases and would identify diversity and variation among Genes, alleles, the basic needs and the chemistry of living things.	I	Understand
CO2	Explain the human physiology aspects in addition to the concepts of food nutrition and food hygiene	II	Understand
CO3	Identify the crucial role of life science in planning and relating the knowledge of Genetics, Biotechnology and Immunology with in the application areas in Engineering and technology	III	Understand

Module	Module Contents	Hours
I	**FOOD, NUTRITION AND HEALTH -** Definition and concept of health. Basic concept of food and nutrition, Functions of food. Nutritional Biochemistry. Food hygiene.	4
II	**IMMUNOLOGY-** Introduction to Immunity, definition and types of Immunities and Antigens. Immunoglobulins: Structure and functions, different classes of immunoglobulins. Primary and secondary immune response. Lymphocytes and accessory cells. Humoral Immune Response and Cell mediated immunity.	7
III	**INFECTIOUS DISEASES AND HUMAN BODY-** Viral Infections Bacterial Infections Fungal Infections. Parasitic Infections Emerging and Re-emerging Infections.	4
IV	**TOXICOLOGY -** Principles of toxicology Environmental toxicology Toxicology of heavy metals Toxicology of insecticides and pesticides Neuro Toxicology	4
V	**HUMAN PHYSIOLOGY -** Endocrine System: Introduction and types of Glands, General mechanism of hormone action, Hormones and diseases. Respiratory System: Respiratory organs, Mechanism of Breathing, Disorders of Respiratory system. Cardiovascular System: Heart, Circulatory routes, Cardiovascular Disorders. Neural System: Structural organization of CNS and PNS, Major parts of the brain, Neuron structure.	5

VI	**APPLIED BIOLOGY AND BIOTECHNOLOGY** Principles and process of Biotechnology: Genetic engineering (Recombinant DNA technology). Application of Biotechnology in Health and Agriculture Introduction to transgenics: Gene therapy, Biosafety issues– Bio piracy	4
Textbooks		
1	T. S. Ranganathan, Text book of Human Anatomy, S. Chand and Company Ltd, 2002.	
2	P. S. Verma and V. K. Agarwal, Concept of Cell Biology, S. Chand and Company Ltd, 2002.	
3	R. D. Vidyarthi and P. N. Pandey, A Text book of Zoology, S. Chand and Company Ltd, 2004.	
References		
1	Bruce Alberts and Alexander Johnson, Molecular Biology of the Cell Garland Science, Taylor & Francis Group, 6th Edition, 2015.	
2	Peter H. Raven, George B. Johnson, Biology, McGraw hill, 11th edition, 2017.	
3	Laurence A. Cole, Biology of Life - Biochemistry, Physiology and Philosophy, Elsevier, 2016.	
Useful Links		
1	https://www.youtube.com/watch?v=yaQhH9iKY0M	
2	https://www.youtube.com/watch?v=V6s0xOTNmT4	
3	https://www.youtube.com/watch?v=5Q9LgvQs5Nw	
4	https://www.youtube.com/watch?v=nzJXq4YMPYE	

CO-PO Mapping

	Programme Outcomes (PO)												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1						**1**	**1**							
CO2							**1**	**1**						
CO3							**1**							

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on MSE, ISE and ESE. MSE shall be typically on modules 1 to 3.
ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.
ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6. For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

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Course Information

Programme		B.Tech. (All Branches)			
Class, Semester		First Year B. Tech., Sem I/II			
Course Code		6CV151			
Course Name		Engineering Mechanics Lab			
Desired Requisites:		Engineering Mechanics			
Teaching Scheme		**Examination Scheme (Marks)**			
Practical	2 Hrs/ Week	**LA1**	**LA2**	**Lab ESE**	**Total**
Interaction	0	30	30	40	100
		Credits: 1			

Course Objectives

1	To provide hands on practice for the conduct of experiments to verify the principles of mechanics.
2	To demonstrate the graphical methods to verify the analytical solutions.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	Demonstrate verification of laws and basic principles of mechanics through experiments.	III	Applying
CO2	Apply graphical method to solve problems on force system, beams, and frames.	III	Applying

List of Experiments / Lab Activities/Topics

List of Experiments :

1. Verification of law of triangle of forces.
2. Verification of law of polygon of forces.
3. Determination of support reactions for Simply Supported Beam.
4. Verification of the principle of moments using Bell crank lever apparatus.
5. Determination of the coefficient of friction for motion on horizontal plane.
6. Determination of the coefficient of friction for motion on inclined plane.
7. Analysis of concurrent and non-concurrent coplanar force system by graphical method.
8. Analysis of statically determinate beams by graphical method
9. Analysis of pin jointed perfect plane frames by graphical method

Textbooks

1	Lab Manual Link - https://atifmohd077.files.wordpress.com/2019/03/em-lab-manual-1.pdf
2	Lab Manual Links - https://jecassam.ac.in/wp-content/uploads/2018/10/1_Engineering-Mechanics-Laboratory-2nd-SEM-DU-Old-Course.pdf
3	Bhavikatti., S. S. and Rajashekarappa., K. G. "Engineering Mechanics", New Age International Publishers, 2015, 5th Edition.

References

1	Ramamrutham., S. "Textbook of Applied Mechanics", Dhanpat Rai Publishing Company Limited, 2008.
2	Beer, F. P. and Johnston, E. R. "Vector Mechanics for Engineers Vol. I and II", McGraw Hill Company Publication, 2011, 9th Edition.
3	R. K. Bansal "Engineering Mechanics" Laxmi Publications,ltd.

Useful Links

1	https://nptel.ac.in/courses/112106286
2	https://www.youtube.com/watch?v=9Yt3I4bP-90
3	https://www.vlab.co.in/broad-area-civil-engineering
4	Virtual Lab link by IIT Mumbai - http://vlabs.iitb.ac.in/vlab/labsme.html

CO-PO Mapping														
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1				1										
CO2		1												
The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO, and preferably to only one PO.														

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AY 2022-23

Course Information

Programme		B.Tech. All Branches			
Class, Semester		First Year B. Tech. SEM-I & II			
Course Code		6 ME 152			
Course Name		Workshop Practices			
Desired Requisites:		NA			
Teaching Scheme		**Examination Scheme (Marks)**			
Practical	2 Hrs/ Week	**LA1**	**LA2**	**Lab ESE**	**Total**
Interaction	0	30	30	40	100
		Credits: 1			

Course Objectives

1	To train the students to use different tools and equipments involved in the manufacturing processes
2	To develop the skills to handle the basic machine tools and equipments required for various manufacturing processes
3	To prepare the students to carry out the various operations to make a finished product
4	Train the students for making PCB for electronic applications

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Descriptor
CO1	Describe the methods, operations and processes of manufacturing		Apply
CO2	Summarize the simple mechanical systems, machines, equipment's, the basic working of cutting tools for manufacturing.		Analyze
CO3	Use of chemical etching technique for making the PCB for electronic applications.		Evaluate

List of Experiments / Lab Activities/Topics

List of Experiments:

1. Composite job based on carpentry, fitting, tin-smithy, welding etc. (16 Hrs.)
2. Composite job of PCB making based on negative film making, UV exposure, development and etching etc. (6 Hrs.)
   In case of mini-projects, drawing, presentations etc, write the relevant details of the same.

Module wise Measurable Students Learning Outcomes :Laboratory Outcomes

- Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- By assembling different components, they will be able to produce small devices of their interest.

By studying PCB making, students will able to make their own electronic circuits.

Textbooks

1	Raghuwanshi B. S.,"A Course in Workshop Technology I",Dhanpat Rai Publications,10th Ed.2009
2	S. K. Hajra Choudhury and A. K. HajraChoudhary,"Workshop Technology" – Vol I [Manufacturing Processes]", , Media Promoters and Publishers Pvt. Ltd., 10th edition, reprint 2001

References

1	W.A.J. Chapman, "Workshop Technology Volume I", CBS Publishing & Distributors, Delhi. [ISBN-13:9788123904016] 2001

2	Rao P.N., “Manufacturing Technology”, Vol. I and Vol. II, Tata McGrawHill House,2017
3	Gowri P. Hariharan and A. Suresh Babu,”Manufacturing Technology – I” Pearson Education, 2008
Useful Links	
1	https://www.vlab.co.in/broad-area-mechanical-engineering
2	http://vlabs.iitb.ac.in/vlab/labsme.html
3	https://drive.google.com/file/d/1tp5yV2ghp_Slub58S7iKnvvJyoEwQVYq/view

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High

Each CO of the course must map to at least one PO, and preferably to only one PO.

CO-PO Mapping															
	Programme Outcomes (PO)												**PSO**		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1				1											
CO2				1											
CO3					1										
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High															

Walchand College of Engineering, Sangli.

(Government Aided Autonomous Institute)

AY 2022-23

Course Information

Programme		B.Tech.			
Class, Semester		First Year B. Tech All Branches			
Course Code		6CS151			
Course Name		Programming for Problem Solving Lab			
Desired Requisites:		Basic course of software and hardware programming.			
Teaching Scheme		**Examination Scheme (Marks)**			
Practical	2 Hrs/ Week	**LA1**	**LA2**	**Lab ESE**	**Total**
Interaction	2 Hrs/ Week	30	30	40	100
		Credits: 3			

Course Objectives

1	To impart problem-solving and programming skills to translate text described problems into programs, written using the Programming language with the help of language constructs.
2	To demonstrate use of computer language constructs and principles such as: conditional branching loops, block structures, functions, and input/output for implementing programs to solve problems.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Descriptor
CO1	Paraphrase the basics of programming.	II	Understanding
CO2	Convert the algorithms to programs.	II	Understanding
CO3	Examine a given program to identify its output.	III	Applying
CO4	Implement programs using programming language in a programming environment/using programming tool to solve problems.	III	Applying

List of Experiments / Lab Activities/Topics

List of Topics (Applicable for Interaction Session):

Module 1: Introduction to Programming: Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples. From algorithms to programming Language: source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

Module 2: Arithmetic expressions, Precedence constraints, Conditional Branching & Loops
Arithmetic expressions & Precedence : Arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation Conditional Branching & Loops: Statements and blocks, if and switch statements, Loopswhile, do-while and for statements, break, continue, goto and labels

Module 3: Arrays : Arrays- concepts, declaration, definition, accessing elements, storing elements, arrays and functions, two-dimensional arrays, Character arrays, Strings, and applications of arrays.

Module 4: Functions and Recursion :
Designing structured programs, Functions basics, parameter passing, call by value, idea of call by reference, storage classes like extern, auto, register, static, scope rules, block structure, user defined functions, Recursion with examples.

Module 5: Pointers, Structures and Union
Pointers- concepts, initialization of pointer variables, pointers and function arguments, address arithmetic, Character pointers and functions, pointer to pointer. Derived types: structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, and unions.

Module 6: Introduction to File handling Input and output - concept of a file, text files and binary files, streams, standard I/O, Formatted I/O, file I/O operations, error handling.

List of Lab Activities:

Assignments based on the following topics in line with topics covered in Interaction:

1. Familiarization with programming environment IDE (Integrated development environment).
2. Writing algorithms to solve problems.
3. Variable types and type conversions
4. Programs to demonstrate different operators and their order precedence.
5. Programs to solve simple computational problems using arithmetic expressions e.g. simple and compound interest.
6. Programs to demonstrate problems on conditional branching e.g. roots of quadratic equation, finding a maximum/minimum value.
7. Programs to show statement block, conditional statement.
8. Programs to show different types of iteration / loop.
9. Implementation of iterative problems e.g., sum of series.
10. Programs to demonstrate matrix problems, string operations, sorting problems.
11. Programs to implement numerical methods problems (Root finding, numerical differentiation, and numerical integration): using array, function and recursion.
12. Programs to illustrate use of pointer with simple data type (create pointer variable, assign value, access value and show address using (* and &).
13. Programs to solve the problems using pointers and structures e.g. swap two numbers.
14. File handling: Study and implementation file operations.
15. Programs to demonstrate simple read and write operation on the external text file.
16. Case study to demonstrate basic programming constructs.

Textbooks	
1	Byron Gottfried, Schaum's, “Outline of Programming with C”, McGraw-Hill, Third edition, 2017.
2	Yashavant Kanetkar, “Let Us C”, BPB Publication, Fifteenth edition, 2016.
3	E. Balagurusamy, “Programming in ANSI C”, Tata McGraw-Hill Education, Seventh edition, 2016.
References	
1	Brian W. Kernighan and Dennis M. Ritchie, “The C Programming Language”, Prentice Hall of India, Second Edition, 2015.
Useful Links	
1	https://www.programiz.com/c-programming
2	https://www.w3schools.com/c/c_intro.php
3	https://www.javatpoint.com/c-programming-language-tutorial

CO-PO Mapping

	Programme Outcomes (PO)												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2	1		1	1									
CO2	2	1		1	1									
CO3	3	2		3	2									
CO4				3	2									

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO, and preferably to only one PO.

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Course Information

Programme	F. Y. B. Tech.
Class, Semester	First Year B.Tech., Sem I &II
Course Code	6PH151
Course Name	Engineering Physics Lab. 6PH151
Desired Requisites:	Students are expected to know the basic practical knowledge in HSC Level.

Teaching Scheme		**Examination Scheme (Marks)**			
Practical	02 Hrs/ Week	**LA1**	**LA2**	**Lab ESE**	**Total**
Interaction	0	30	30	40	100
		Credits: 1			

Course Objectives

1	To gain practical knowledge by applying the experimental methods to correlate with the physics theory.
2	To learn the usage of electrical and optical systems for various measurements.
3	To Apply the analytical techniques and graphical analysis to the experimental data.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Descriptor**
CO1	Calculate the diameter of the thin wire, wavelength of light, Planck's constant, values of e/m of an electron, Specific rotation of optical active substances. Demonstrate Hartley and Colpitt's oscillator with their simulations, Newton's ring, and I-V characteristics of semiconductor diode. Kundt's tube.	III	Applying

List of Experiments / Lab Activities/Topics

Expt. No	**List of Experiments** (Minimum 8 experiments from the following list)	**Hours**
1	Find the diameter of the thin wire by diffraction of the light	2 Hrs. each Expt.
2	Determination of wavelength of light by plane diffraction grating.	
3	Determine the Specific rotation of sugar solution	
4	Find the wavelength of He-Ne Laser using Plane diffraction grating.	
5	Find the e/m for the cathode rays	
6	Verify the expression for the resolving power of a telescope.	
7	Measure the wavelength of ultrasonic waves by Kundt's tube method.	
8	Design and simulate Colpitt's & Hartley Oscillator.	
9	Determine the Planck's constant.	
10	Find the wavelength and velocity of ultrasonic waves in liquid.	
11	Study the I-V characteristic of semiconductor diode.	
12	Newton's ring: Determination of wavelength of light and refractive index of liquid.	

Textbooks

1	C. L. Arora *"Practical Physics"* S. Chand & Co Edition 2009.
2	P.R. Sasi Kumar *"Practical Physics"*, PHI Learning Pvt.Ltd 1st edition 2011.

References

1	Halliday, Resnic and Walker, *"Fundamentals of Physics"*, John Wiley, 9th edition 2011.
2	A. Beiser, *"Concepts of Modern Physics",* McGraw Hill International, 5th edition, 2003.
3	Ajoy Ghatak, *"Optics",* Tata McGraw Hill 5th edition, 2012.

Useful Links	
1	https://nptel.ac.in/courses/115/105/115105121/
2	https://www.iitg.ac.in/cet/nptel.html
3	http://nptel.ac.in/video.php?subjectId=117106091
4	http://nptel.ac.in/courses/115106057/

CO-PO Mapping														
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1													
CO2														
CO3														
CO4														
The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO, and preferably to only one PO.														

Assessment				
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%				
Assessment	**Based on**	**Conducted by**	**Typical Schedule**	**Marks**
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 13 Marks Submission at the end of Week 13	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty and External Examiner as applicable	During Week 14 to Week 16 Marks Submission at the end of Week 16	40
Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.				