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 B in Sem-I and Group A 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	6CH101	Engineering Chemistry	3	0	0	0	3	3	30	20	50	
2	BS	6MA102	Engineering Mathematics-II	3	1	0	0	4	4	30	20	50	
3	ES	6ME101	Engineering Graphics and CAD	2	0	0	0	2	2	30	20	50	
4	BS	6EL101	Basic Electrical Engineering	3	0	0	0	3	3	30	20	50	
5	ES	6EN101	Basic Electronics Engineering	2	0	0	0	2	2	30	20	50	
Professional Core (Lab)													
6	ES	6ME151	Engineering Graphics and CAD Lab	0	0	2	0	2	1	30	30	40	
7	ES	6EL151	Basic Electrical Engineering Lab	0	0	2	0	2	1	30	30	40	
8	BS	6CH151	Engineering Chemistry Lab	0	0	2	0	2	1	30	30	40	
9	ES	6EN151	Basic Electronics Engineering Lab	0	0	2	0	2	1	30	30	40	
			Total	**13**	**1**	**8**	**0**	**22**	**18**				

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)

AY 2022-23

Course Information					
Programme		B. Tech. All Branches			
Class, Semester		First Year B. Tech., Sem I/ II			
Course Code		6CH101			
Course Name		Engineering Chemistry			
Desired Requisites:		Chemistry course at Secondary and Higher secondary level			
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 make student familiar with engineering properties associated with different materials to use them successfully in practice.
2	To provide knowledge and significance of characterization and chemical analysis for using materials in different engineering 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	Explain chemical analysis, thermal analysis, water chemistry, phase rule. Types of polymers and its application and water's industrial applications. Draw schematic of water softeners, phase diagrams, Thermo grams and calorimeter.	II	Understanding
CO2	Classify types of chemical analysis, hard water, polymers, and thermal analysis.	II	Understanding
CO3	Calculate concentration of solutions, % or GF of analyte gravimetrically, hardness of water and Calorific values	III	Applying

Module	**Module Contents**	**Hours**
I	**General principles of chemical Analysis -** Chemical analysis, Its types, Titrimetric analysis – definition, classification, terms related to titrimetry, requirements of chemical reaction for titrimetry, Standards and its types, Solution and expressing its concentration (Numerical problems), Complexometry, Gravimetric analysis, its advantages, Conditions for precipitation, contamination of precipitate, calculations using gravimetric factor (numerical problems)	9
II	**Water Chemistry** - Natural sources of water, Impurities in natural water. Water quality parameters Hardness- Definition, Causes, Types, Expressing hardness, units to measure hardness, Numerical problems on hardness calculation, ill effects of hard water in steam generation, Ion exchange method of water softening,	6
III	**Phase Rule:** Gibbs phase rule, Explanation of the terms Phase, Component, Degree of freedom, Phase reactions, types of equilibrium, equilibrium conditions. One component system- Water system, Sulphur system, Two component system- Lead Silver system, Application of Eutectic system, Merits and Demerits of Phase rule.	6
IV	**Polymers-** Polymer, Polymerization reactions – Addition, Condensation and Co polymerization. Comparison of addition and condensation polymerization and polymers, Plastics and its types- Thermoplastic and thermosetting plastics, comparison Thermoplastic and thermosetting plastics, Properties and Uses of Epoxy resin, Fiber Reinforced Plastics (FRP), Rubber and properties of Rubber, vulcanization of natural rubber.	6

V	**Thermal Analysis** – Thermal analysis and its types, Thermal events, Thermal analysis methods Thermo gravimetric Analysis (TGA), Differential Thermal Analysis (DTA)and Differential Scanning Calorimetry (DSC) w.r.t. Principle, instrumentation, and applications, Interpretation of Thermogram	6
VI	**Energy Science:** Fuel and its classification, Characteristics of good fuel, Properties of solid, liquid and gaseous fuels. Calorific value, Gross and net calorific value, its units, Theoretical calculation using Dulong's formula and experimental determination by Bomb and Boy's gas calorimeter, Numerical problems on calorific value.	6
Textbooks		
1	S.K. Singh, "Engineering Chemistry", New Age Publication, 3rd Edition , 2005.	
2	Shasi Chawla, "Engineering Chemistry", Dhanpat Rai Publication, 3rd Edition , 2003.	
3	Jain P.C. and Jain Monika, "Engineering Chemistry", Dhanpat Rai Publication, 16th Edition, 2013	
References		
1	O G Palanna, "Engineering Chemistry" Tata McGraw Hill 2009.	
2	Mendham, R.C. Denney, J.D. Barnes, M.J.K Thomas, "Quantitative Chemical analysis", Vogel's Pearson Education, 6th Edition , 2008.	
3	S.S Dara, "Engineering Chemistry" S. Chand and Company 2008.	
4	Askeland and Phule , "The Science and Engineering of Materials" Thomson Publication 4th Edition ,2003	
Useful Links		
1	https://edu.rsc.org/resources A free resource for Chemistry teachers and students of all levels, including higher education, hosted by Royal Society of Chemistry.	
2	https://www.digimat.in/nptel/courses/video/122106028/L01.html	
3	https://onlinecourses.nptel.ac.in/noc21_cy49/preview	
4	https://www.coursera.org/browse/physical-science-and-engineering/chemistry	

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 II
Course Code	6MA102
Course Name	Engineering Mathematics-II
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	Familiarize the students with techniques in multivariate integration and Differential equation.

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	Apply computational tools to solve mathematical problems.	III	Applying
CO2	Solve the problems in multivariable calculus, complex variable.	III	Applying

Module	**Module Contents**	**Hours**
I	**Beta-Gamma Functions:** Definition of Beta, Gamma functions and properties of Beta Gamma functions	**6**
II	**Curve tracing** Tracing of curves for Cartesian and polar coordinate	**5**
III	**Multivariable Calculus:** Multiple Integrals: Double integrals, change of order of integration, change of variables (Cartesian to polar) Evaluation of triple integrals, Application of Multiple integrals such as Area enclosed by plane curves, Mass of lamina, Volume of solid.	**7**
IV	**Linear Differential equations of nth order with constant coefficient:** Linear Differential equation with constant coefficient, Complementary function, Particular Integral	**8**
V	**Application of Linear Differential equations of nth order with constant coefficient:** Applications of Linear Differential equation with constant coefficient to Mechanical, Civil and Electrical Engineering.	**8**
VI	**Complex Variables:** Concept of function of complex variable, Limits and Continuity, Analytical functions, Cauchy Riemann Equations, Harmonic functions	**5**

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, 2015, 10th Edition
2	Wylie C.R, "*Advanced Engineering Mathematics",* Tata McGraw Hill Publication, 8th Edition, 1999
3	H. K. Dass *, "Higher Engineering Mathematics",* S. Chand & Company Ltd., 1st Edition 2014.

4	S. S. Sastry, *"Engineering Mathematics (Volume-I)",* Prentice Hall Publication, 3rd Edition 2006
Useful Links	
1	https://www.youtube.com/watch?v=KgItZSst2sU
2	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. (Mechanical Engineering)			
Class, Semester		First Year B. Tech.			
Course Code		6 ME 101			
Course Name		Engineering Graphics and Auto CAD			
Desired Requisites:		Basic Knowledge of Different Types of Curves			
Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	2 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	0	30	20	50	100
		Credits: 2			

Course Objectives

1	Introduce students to the conventions, concepts and basic principles of Engineering Drawing.
2	Draw projections of geometrical objects and real life components.
3	Demonstrate graphics skill for communication of concepts, ideas and design of engineering products

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	Understanding Principles of Engineering and Computer Graphics	I	Understanding
CO2	Outline projection of engineering objects	II	Understanding
CO3	Demonstrating Principles of Engineering, Computer Graphics through drafting software	II	Demonstrating

Module	Module Contents	Hours
I	**Introduction to Engineering Drawing** Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales; Problems from the above units should also be practiced on computer aided drafting software	4
II	**Orthographic Projections** Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes; Problems from the above units should also be practiced on computer aided drafting software	5
III	**Projections of Regular Solids Sections and Sectional Views of Right Angular Solids** Inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale. Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc. Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only) Problems from the above units should also be practiced on computer aided drafting software	4

IV	**Isometric Projections** Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions; Problems from the above units should also be practiced on computer aided drafting software	4
V	**Introduction to Computer Aided Sketching** Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning and free hand practicing. Computer screen, layout of the software, standard tool bar/menus and description of most commonly used tool bars, navigational tools. Co-ordinate system and reference planes. of HP, VP, RPP & LPP. of 2D/3D environment. Selection of drawing size and scale. Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity. Dimensioning, line conventions, material conventions and lettering.	5
VI	**Annotations, layering & other functions** Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software modeling of parts and assemblies. Parametric and non-parametric solid, surface, and wireframe models. Part editing and two dimensional documentation of models. Planar projection theory, including sketching of perspective, isometric, multiview, auxiliary, and section views. Spatial visualization exercises. Dimensioning guidelines, tolerancing techniques; dimensioning and scale multi views of dwelling;	4

Textbooks	
1	Bhatt N.D., Panchal V.M. and Ingle P.R., Engineering Drawing, Charotar Publishing House, 2014.
2	Shah, M.B. and Rana B.C., Engineering Drawing and Computer Graphics, Pearson Education, 2008.
3	Agrawal B. and Agrawal C. M., Engineering Graphics, TMH Publication, 2012.
References	
1	Narayana, K.L. and P Kannaiah, Text book on Engineering Drawing, Scitech Publishers, 2008.
2	Warren J. Luzzader, Fundamentals of Engineering Drawing, Prentice Hall of India, New Delhi, 2010
3	Fredderock E. Giesecke, Alva Mitchell others, Principles of Engineering Graphics, Maxwell McMillan Publishing, 2010
Useful Links	
1	https://nptel.ac.in/courses/112/103/112103019/
2	https://nptel.ac.in/courses/105/104/105104148/
3	https://www.youtube.com/watch?v=xXdpkQXDuMw&list=PL9RcWoqXmzaJT-fliqTSwUjWU4zCX_H2A

CO-PO Mapping For Mechanical Engineering Department

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

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Course Information

Programme		First Year B. Tech. (All Branches)			
Class, Semester		First Year B. Tech, Sem I/ II			
Course Code		6EL101			
Course Name		Basic Electrical Engineering			
Desired Requisites:					
Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	0	30	20	50	100
		Credits: 3			

Course Objectives

1	This course intends to summarize and solve electrical and magnetic circuits.
2	It imparts skill to identifying principles, construction and working of electrical machines.
3	It develops skill to describe the wiring system, lamps and low voltage installation components.

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** principles, construction and working of electrical machines.	II	Understanding
CO2	**Solve** electrical and magnetic circuits.	III	Applying

Module	Module Contents	Hours
I	**Module 1: DC Circuits** Review of R-L-C- Electrical circuit elements, KCL and KVL. Star- delta conversion, voltage and current sources. Thevenin, Norton and Superposition, Maximum powers transfer Theorems.	9
II	**Module 2: AC Circuits** Representation of sinusoidal waveforms, peak, RMS values, phasor representation real, reactive and apparent power. Analysis of single-phase, ac circuits consisting of R, L, C, RL, RC, RLC (series and parallel) circuits and three-phase balanced circuits. Voltage and current relations in star and delta.	6
III	**Module 3: DC Machines** Construction, working principle and types of DC generator and Motor. Voltage and speed control methods, Speed-Torque characteristics. Principle, construction, working and application of stepper, servo and universal motors.	6
IV	**Module 4: Transformers** Magnetic circuits, Construction, working principle and types of single-phase transformer, open circuit and short circuit tests: Losses, efficiency, all-day efficiency and regulation. Autotransformer.	5
V	**Module 5: AC Machines** Construction and working principle of single and three- phase induction motor. Types, torque- speed characteristics and applications of induction motor, Types of starters, AC generator.	6
VI	**Module 6: Wiring, Electrical Installations and Components of LT Switchgear** Switch fuse unit, MCB, ELCB, MCCB. Types of wire and cables. Staircase, Go-down and Domestic wiring, CFL, LED, Fluorescent tube. Lighting schemes, Earthing, types of batteries, characteristics of batteries.	4

Textbooks

1	D.C. Kulshreshtha, "Basic Electrical Engineering", 1st revised edition McGraw Hill, 2012.
2	D.P Kothari and I.J Nagrath, "*Basic Electrical Engineering"*, Tata McGraw Hill, 2010.
3	B.L Theraja "A Textbook of Electrical Technology", S Chand Publication, 2013.

References	
1	V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989.
2	E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
3	V. N. Mittle and Arvind Mittal, “Basic Electrical Engineering”, 2nd edition, Tata McGraw Hill.
Useful Links	
1	Basic Electrical Technology, IISc Bangalore, by Prof. L. Umanand, “https://nptel.ac.in/courses/108108076”
2	Basic Electrical Technology, IIT Kharagpur, by Prof. N.K. De, Prof. G.D. Roy, Prof. T.K. Bhattacharya, “https://nptel.ac.in/courses/108105053”
3	Fundamentals of Electrical Engineering, IIT Kharagpur,by Prof. Debapriya Das , “https://nptel.ac.in/courses/108105112”

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												
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. (Electronics Engineering)
Class, Semester	First Year B. Tech., Sem.- I/ II
Course Code	6 EN101
Course Name	Basic Electronics Engineering
Desired Requisites:	Physics course at Secondary and Higher secondary level

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

Course Objectives

1	To **explain** the difference between analog and digital electronic circuits.
2	To **explain** the realization of a logic using combinational and sequential circuits.
3	To **explain** the working of diode circuits, transistorized and op-amp based amplifiers.
4	To **build and test** simple electronic circuits.

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** the fundamentals of digital electronics.	I	Understand
CO2	**Explain** the working of amplifiers and oscillators.	I	Understand
CO3	**Solve** the examples on digital circuits, diodes and transistors based circuits.	III	Apply
CO4	**Implement** small application circuit using op-amp and IC 555.	III	Apply

Module	Module Contents	Hours
I	**Fundamentals of Digital Electronics** Boolean algebra, SOP and POS terms, K-map reduction technique, converting AOI to NAND/NOR logic. Combinational Circuits: half adder and subtractor, 1-bit full adder and subtractor, 1-bit and 2-bit comparator, Sequential Circuits: flip-flop, counters.	7
II	**Diodes and its Applications** P-N junction diode, diode characteristics, half-wave and full-wave rectifier, clippers and clampers; Zener diode, LED, Photodiode and Solar Cell.	4
III	**Basics of Transistor** Transistor structure, types (BJT, FET and MOSFET), transistor configurations, biasing methods, transistor as a switch, Introduction to CMOS circuit.	4
IV	**Amplifiers and Oscillators** Amplifier fundamentals, small signal amplifiers: common emitter amplifier, common collector amplifier; JFET/MOSFET common source/ common drain amplifier, Oscillators: classification, RC phase shift oscillator.	5
V	**Operational Amplifier** Basic op-amp configuration, op-amp powering, feedback in op-amp circuits, ideal op-amp circuits analysis, inverting, non-inverting amplifier, summing amplifier, difference amplifier, unity gain buffer; IC555 timer.	5
VI	**Regulated DC Power Supply** Block diagram of regulated dc power supply, Zener diode voltage regulator, series and shunt regulator, op-amp based voltage regulator.	3

Textbooks

1	R. P. Jain, "Modern Digital Electronics", 4th edition, Tata McGraw Hill, 2009.
2	A. Anand Kumar, "Fundamentals of Digital Design", 4th edition, PHI, 2016.
3	Robert Boylestad, Louis Nashelsky, 11th edition, "Electronic Devices and Circuits, Pearson, 2015.

4	Ramakant Gaikwad, “Op-amp and Linear Integrated Circuits”, 4th edition, Pearson, 2015.
References	
1	Morris Mano, “Digital Design”, Pearson, 4th edition, 2011
2	Donald A. Neamen, “Electronic Circuit Analysis and Design”, 3rd edition, Tata McGraw Hill, 2011
3	Robert F. Coughlin and Frederick F. Driscoll, “Operational Amplifiers and Linear Integrated Circuits”, 6th edition, PHI, 2009
Useful Links	
1	https://nptel.ac.in/courses/108101091
2	https://nptel.ac.in/courses/108105113

CO-PO Mapping

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

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	6 ME 151
Course Name	Engineering Graphics and Auto CAD Lab
Desired Requisites:	Basic Knowledge of Computer

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 impart the techniques of engineering graphics using the CAD software
2	To prepare the students for applying knowledge of engineering graphics in real life drawings using CAD software
3	To develop the skills of students for evaluating CAD software for its 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	Understand the basic principle of Engineering graphics and working of CAD software.	I	Understanding
CO2	Draw different views of components using the CAD software.	III	Applying
CO3	Apply the knowledge of engineering graphics in real life applications.	III	Applying

List of Experiments / Lab Activities/Topics

List of Topics(Applicable for Interaction mode):

List of Experiments:

1: Plane Curves and Conic Sections (Min. 5 Problems)
2: Projections of Points and Lines (Min. 5 Problems)
3: Projections of Planes and Solids (Min. 6 Problems)
4: Development of Lateral Surfaces (Min. 3 Problems)
5: Orthographic Projections (Min. 2 Problems)
6: Isometric Projections (Min. 2 Problems)

Submission of A3 size print of CAD drawing on above topics

Textbooks

1	Bhatt N.D., Panchal V.M. and Ingle P.R., Engineering Drawing, Charotar Publishing House, 2014
2	Shah, M.B. and Rana B.C., Engineering Drawing and Computer Graphics, Pearson Education, 2008.
3	Agrawal B. and Agrawal C. M., Engineering Graphics, TMH Publication, 2012.

References

1	Narayana, K.L. and P Kannaiah, Text book on Engineering Drawing, Scitech Publishers, 2008.
2	Warren J. Luzzader, Fundamentals of Engineering Drawing, Prentice Hall of India, New Delhi, 2010
3	Fredderock E. Giesecke, Alva Mitchell others, Principles of Engineering Graphics, Maxwell McMillan Publishing, 2010

Useful Links

1	https://nptel.ac.in/courses/112/103/112103019/
2	https://nptel.ac.in/courses/105/104/105104148/
3	https://www.youtube.com/watch?v=xXdpkQXDuMw&list=PL9RcWoqXmzaJT-fliqTSwUjWU4zCX_H2A

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

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Course Information

Programme	First Year B. Tech. (All Branches)
Class, Semester	First Year B. Tech., Sem I/II
Course Code	6EL151
Course Name	Basic Electrical Engineering Lab
Desired Requisites:	

Teaching Scheme		**Examination Scheme (Marks)**			
Practical	2 Hrs/ Week	**LA1**	**LA2**	**Lab ESE**	**Total**
Interaction		30	30	40	100
		Credits: 1			

Course Objectives

1	This course intends to demonstrate basic knowledge of Electrical engineering.
2	It intends to develop skills to recognize working principle, construction and types of electrical Machines.

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	**Describe** basic concepts of electrical circuits and various theorems.	II	Understanding
CO2	**Demonstrate** the use of transformers and AC/DC machines.	III	Applying

List of Experiments / Lab Activities/Topics

List of Topics(Applicable for Interaction mode):

1. To study AC and DC machines parts and their functions.
2. Study of AC/DC motor starters.
3. To study servo motor/ steeper motor with application.
4. Study of installation techniques using fuse, MCB and MCCB.

List of Lab Activities:

1. To study series-parallel RL, RC and RLC circuits
2. To verify KVL and KCL theorems.
3. To study speed control techniques of ac and dc machines.
4. To perform load test on transformer.

Textbooks

1	D.C. Kulshreshtha, "Basic Electrical Engineering", 1 st revised editionMcGraw Hill, 2012.
2	D.P Kothari and I.J Nagrath, "Basic Electrical Engineering",Tata McGraw Hill, 2010.

References

1	V. N. Mittle and Arvind Mittal, "Basic Electrical Engineering", 2 nd edition, Tata McGraw Hill.

Useful Links

1	Virtual Labs ,An Initiative of Ministry of Education Under the National Mission on Education through ICT, 1. https://www.vlab.co.in/broad-area-electrical-engineering 2. http://vlabs.iitkgp.ac.in/asnm/#

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2022-23

Course Information					
Programme	B.Tech. (Electronics Engineering)				
Class, Semester	First Year B. Tech., Sem I/II				
Course Code	6CH151				
Course Name	Engineering Chemistry Lab				
Desired Requisites:	Chemistry course at secondary and higher secondary level				
Teaching Scheme		**Examination Scheme (Marks)**			
Practical	2Hrs/ Week	**LA1**	**LA2**	**Lab ESE**	**Total**
Interaction	0 Hrs/ Week	30	30	40	100
		Credits: 1			

Course Objectives	
1	To make the student familiar with analytical techniques.
2	To provide hands on practice of titrimetric analysis.

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	**Apply** principles of Volumetry to quantitative analysis of water quality parameter, metal and alloys. **Demonstrate** use of instrument for quantitative analysis. **Experiment** physical/Chemical characteristics of material	III	Applying

Sr.No	**List of Experiments** (Minimum 8 experiments from the following list)	**Hours**
1	Estimation of hardness of water by EDTA method (Complexometric Titration).	2 Hrs. each Expt.
2	Estimation of alkalinity of water (Neutralization Titration).	
3	Estimation of Dissolved Oxygen in water (Iodometric Titration).	
4	Estimation of Chloride content in water (Argentometry).	
5	Demonstration of pH meter & pH metric titration.	
6	Determination of strength of acid/base conductometrically.	
7	Colorimetric estimation of Copper.	
8	Estimation of copper from Bronze. (Iodometric Titration).	
9	Estimation of Zn from Brass (Displacement Titration).	
10	Determination of purity of Iron (Redox Titration).	
11	Determination of viscosity of given liquid. By Ostwald viscometer.	
12	Determination of corrosion rate by weight loss method	
13	Gravimetric estimation of Ba from BaSO4 as BaO.	

Textbooks	
1	College Practical Chemistry, V K Ahaluwaliya.Sunita Dhingra,Adarsha Gulati, Universities Press.
2	Laboratory Manual on Engineering Chemistry by Sudha Rani And S.K. Bashin, Dhanpat Rai & Co.

References	
1	Engineering Chemistry Laboratory Manual, Department of Chemistry WCE, Sangli.
2	J Mendham, R.C. Denney, J.D. Barnes, M.J.K Thomas, "Quantitative Chemical analysis", Vogels, Pearson Education, 2008, 6th Edition.

Useful Links	
1	https://www.lccc.edu/academics/science-and-engineering/science-in-motion/labs-equipment/chemistry-lab-experiments
2	https://edu.rsc.org/resources/collections/classic-chemistry-experiments

CO-PO Mapping														
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	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.														

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2022-23

Course Information

Programme	B. Tech. (Electronics Engineering)
Class, Semester	First Year B. Tech., Sem –I/II
Course Code	6 EN151
Course Name	Basic Electronics Engineering Laboratory
Desired Requisites:	Physics course at Secondary and Higher secondary level

Teaching Scheme		**Examination Scheme (Marks)**			
Practical	2 Hrs/ Week	**LA1**	**LA2**	**Lab ESE**	**Total**
Interaction	--	30	30	40	100
		Credits: 1			

Course Objectives

1	To **provide** knowledge of electronic components and circuits to first year engineering students, so that they can understand, design and implement simple analog / digital electronic circuits.

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	**Identify and explain** use of electronics components and instruments.		Understand
CO2	**Explain** the working of diode circuits, transistorized and op-amp based amplifiers.		Understand
CO3	**Construct** digital IC, diode, transistor and op-amp based circuits.		Apply
CO4	**Build and Test** simple electronic circuits using op-amp and IC555.		Apply

List of Experiments / Lab Activities/Topics

List of Topics(Applicable for Interaction mode): List of Lab Activities: (minimum 08 experiments)

1. Identification of components and instruments required in lab to perform experiments in basic electronics engineering.
2. Realization of logic gates using basic building block (NAND/NOR).
3. Implementation of combinational and sequential logic circuit.
4. Study of p-n junction diode characteristics.
5. Study of half-wave and full-wave rectifier.
6. Study of diode based clipper and clamper circuits
7. Study of transistor as a switch and amplifier (BJT and JFET).
8. Study of common emitter/common source amplifier.
9. Study of inverting and non-inverting amplifier using op-amp.
10. Implementation of op-amp based applications (adder / subtractor).
11. Build and test multivibrator/ timer circuits using IC 555.

Study of regulated dc power supply (Zener diode voltage regulator/ op-amp based linear voltage regulator).

Textbooks

1	R. P. Jain, "Modern Digital Electronics", 4th edition, Tata McGraw Hill, 2009.
2	A. Anand Kumar, "Fundamentals of Digital Design", 4th edition, PHI, 2016.
3	Robert Boylestad, Louis Nashelsky, 11th edition, "Electronic Devices and Circuits, Pearson, 2015.
4	Ramakant Gaikwad, "Op-amp and Linear Integrated Circuits", 4th edition, Pearson, 2015.

References

1	Morris Mano, "Digital Design", Pearson, 4th edition, 2011
2	Donald A. Neamen, "Electronic Circuit Analysis and Design", 3rd edition, Tata McGraw Hill, 2011
3	Robert F. Coughlin and Frederick F. Driscoll, "Operational Amplifiers and Linear Integrated Circuits", 6th edition, PHI, 2009

Useful Links

1	https://nptel.ac.in/courses/122106025
2	https://nptel.ac.in/courses/108101091
3	https://nptel.ac.in/courses/108105113

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					1					1
CO4				2					1					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.														

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 Week6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7to 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.				