Walchand College of Engineering

(Government Aided Autonomous Institute)

Credit System for F.Y. B.Tech. (Computer Science and Engineering) Sem-II AY 2023-24

Sr.No.	Category	Course Code	Course Name	L	T	P	I	Hrs	Cr	MSE/LA1	ISE/LA2	ESE
Professional Core (Theory)												
01	BS	7MA104	Engineering Mathematics - II	3	1	0	0	4	4	30	20	50
02	BS	7CH103	Engineering Chemistry	3	0	0	0	3	3	30	20	50
03	ES	7EE106	Electrical & Electronics Engineering	3	0	0	0	3	3	30	20	50
04	PC	7CS102	Basics of Web Technology	3	0	0	0	3	3	30	20	50
Professional Core (Lab)												
05	BS	7CH155	Engineering Chemistry Lab	0	0	2	0	2	1	30	30	40
06	ES	7EE156	Electrical & Electronics Engineering Lab	0	0	2	0	2	1	30	30	40
07	ES	7CS108	Computer Programming	0	0	2	2	4	3	30	30	40
08	ES	7ME108	Engineering Graphics	0	0	2	1	3	2	30	30	40
09	PC	7CS152	Basics of Web Technology Lab	0	0	2	0	2	1	30	30	40
10	VS	7VS152	Engineering Skills - II	0	0	2	0	2	1	30	30	40
			Total	12	1	12	3	28	22			

Notes:

- For Theory courses: There shall be MSE, ISE and ESE. Theory-ESE is a separate head of passing.
- For Lab courses: There shall be continuous assessment (LA1, LA2, ESE). Lab-ESE is a separate head of passing.
- For Lab Courses, (LA1+LA2) should be >= 40% to appear for Lab ESE.
- **For further details, refer to Academic and Examination rules and regulations.**

Dr. N. L. Gavankar
DAC/Secretary, BoS

Dr. Mrs. M. A. Shah
Head, Computer Science and Engg. Dept./
Chairman, BoS

Dr. Mrs. S. P. Sonavane
Dean Academics

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Date:23/08/2023

Walchand College of Engineering, Sangli
(Government Aided Autonomous Institute)

AY 2023-24

Course Information	
Programme	B.Tech. (CSE/I.T.)
Class, Semester	First Year B. Tech., Sem II
Course Code	7MA104
Course Name	Engineering Mathematics- II(CS/IT)
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: 04			

Course Objectives	
1	Familiarize the students with techniques in multivariate integration and Differential equation.
2	Awareness about Mathematics fundamental necessary to solve and analyse the Engineering problem
3	
4	

Course Outcomes (CO) with Bloom's Taxonomy Level		
At the end of the course, the students will be able to,		
CO1	Understand the Mathematical tools that are needed to solve optimization problem.	Understanding
CO2	Apply computational tools to solve mathematical problems.	Applying
CO3	Solve the problems in multivariable calculus,	Applying
CO4		
CO5		

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.	8

IV	**Linear Differential equations of nth order with constant coefficient:** Linear Differential equation with constant coefficient, Complementary function, Particular Integral, Homogeneous Linear Differential equation	7
V	**Transportation Problem:** North West Corner method, The row minima method, Matrix minima method, Vogel's approximation method**.**	7
VI	**Assignment Problem:** Hungarian Method, Unbalanced assignment problem, maximisation problem	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.
3	S.C. Gupta, "Fundamentals of Mathematical Statistics and probability", Sultan chand &Sons,2014.
4	S.D. Sharma "Operation Research" KEDAR NATH RAM NATH Publication,18th 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
3	
4	

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										
CO3	2			1										
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.

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)

Walchand College of Engineering, Sangli
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AY 2023-24

Course Information

Programme	B. Tech. (Mechanical, Civil, CSE,IT)
Class, Semester	First Year B. Tech. Sem. I/II
Course Code	7EE106
Course Name	Electrical & Electronics Engineering
Desired Requisites:	12th Physics

Teaching Scheme		Examination Scheme (Marks)			
Lecture	3 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	-	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	To **explain** the difference between analog and digital electronic circuits.
4	To **explain** the working of diode circuits, transistorized and op-amp based amplifiers.

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
CO3	**Explain** the fundamentals of digital electronics.	I	Understanding
CO4	**Solve** the examples on digital circuits, diodes and transistors and Op-amp based 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	6
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: Electrical Machines** Construction, working principle and types of DC generator and Motor. Speed-Torque characteristics. Construction and working principle of single and three- phase induction motor. Types, torque- speed characteristics Magnetic circuits, Construction, working principle of single-phase transformer, and types.	6

IV	**Module 4: 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.	6
V	**Module 5: Diodes and Transistors** P-N junction diode, diode characteristics, half-wave and full-wave rectifier, clippers and clampers; Zener diode, LED, Photodiode and Solar Cell. Introduction to sensors: Light and Temperature Sensors. Transistor structure, types (BJT, FET and MOSFET), biasing methods, transistor as a switch.	
VI	**Module 6: 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.	6

	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.
4	R. P. Jain, "Modern Digital Electronics", 4th edition, Tata McGraw Hill, 2009.
5	Robert Boylestad, Louis Nashelsky, 11th edition, "Electronic Devices and Circuits, Pearson, 2015.
6	Ramakant Gaikwad, "Op-amp and Linear Integrated Circuits", 4th edition, Pearson, 2015.

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

	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"
4	https://nptel.ac.in/courses/108101091
5	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	3														
CO2		3													
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 Three modules. (One and half modules from Electrical syllabus and one and half modules from Electronics syllabus)
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 up to MSE and 60% weightage on modules after MSE.
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)

Walchand College of Engineering, Sangli
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Course Information

Programme	B.Tech. (Computer Science & Engineering)
Class, Semester	First Year B. Tech., Sem II
Course Code	7CS102
Course Name	Basics of Web Technology
Desired Requisites:	

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

Course Objectives

1	To make students understand technologies involved in a web application.
2	To enable students to develop simple web form using basic web technologies and host it.
3	To enable students to develop a responsive web application.
4	To make students understand security issues involved in web applications and how to handle them.

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 Description
CO1	Distinguish between static and responsive layout, HTML, HTML5 and explain web security issues.	Understand
CO2	Implement web forms, web pages using front end and back end technologies with suitable UI for a target device.	Apply
CO3	Observe effect of changing CSS styles and dynamic styling using JavaScript	Analyse

Module	Module Contents	Hours
I	**Module 1: Introduction to World Wide Web** Overview of the Internet and the World Wide Web, Evolution of web technology and its impact on society, Understanding web browsers and web servers, Introduction to Web Developer Tools	6
II	**Module 2: HTML Basics and HTML5** Introduction to HyperText Markup Language (HTML), Creating a simple HTML page with headings, paragraphs, and lists, Working with hyperlinks and anchor tags, Advances in HTML5	6
III	**Module 3: CSS Basics** Introduction to Cascading Style Sheets (CSS), Styling HTML elements: text, colors, backgrounds, and borders, Creating layouts using CSS positioning and floats	7
IV	**Module 4: Introduction to JavaScript and Document Object Model (DOM)** Basics of JavaScript programming language, Variables, data types, and operators, JavaScript functions and control structures, Understanding the DOM and its significance, Manipulating HTML elements using JavaScript, Handling events and user interactions	8
V	**Module 5: Responsive Web Design and Introduction to Backend Technologies**	6

	Design principles for mobile-friendly websites, Using media queries for responsive layouts, Working with Flexbox and Grid for flexible designs **Backend Technologies:** Overview of server-side scripting languages (e.g., PHP or Node.js), Introduction to databases and data storage, Building a simple server-side application	
VI	**Module 6: Web Forms and Data Validation, Web Hosting and Web Security** **Forms and Validation:** Creating HTML forms for user input, Form handling using JavaScript and server-side scripting **Web Hosting:** Understanding web hosting and domain registration, Configuring and deploying a basic website on a hosting server, Introduction to Content Management Systems (CMS) **Web Security:** Common web security threats and vulnerabilities, Best practices for securing web applications, Implementing user authentication and authorization	6

Text Books	
1	Web Technology: Theory and Practice by M. Srinivasan, Released June 2012, Publisher(s): Pearson India, ISBN: 9788131774199

References	
1	Web Application Security by Andrew Hoffman, Released March 2020, Publisher(s): O'Reilly Media, Inc. ISBN: 9781492053118
2	Web Technologies by Achyut Godbole and Atul Kahate, Publication: Tata McGraw-Hill Education Pvt. Ltd., ISBN13: 9781259062681

Useful Links	
1	https://www.w3schools.com/

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

Assessment (for Theory Course)
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.
Class, Semester	First Year B. Tech. Sem I/II
Course Code	7CH155
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	0Hrs/ 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 Instrumental and 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 Description
CO1	Apply principles of Volumetry/gravimetry to quantitative analysis for water quality parameter, metal and alloys.	III	Applying
CO2	Demonstrate use of instrument for quantitative analysis.	III	Applying
CO3	Experiment physical/Chemical characteristics of material. Execute preparation of product.	III	Applying

List of Experiments (Minimum 8 experiments from the following list)

Sr. No	List of Experiments	Hours
1	Estimation of hardness of water by EDTA method (Complexometric Titration).	
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 by conductometrically.	2 Hrs. each Expt.
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 $BaSO_4$ as BaO.	
14	Preparation of Resin	

List of Topics(Applicable mode):

	Verification of Calcium content from Cement/ Limestone/Eggs shells/Calcium tablet.	

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	3													
CO2	3													
CO3	3													

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 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty	During Week 18 to Week 19 Marks Submission at the end of Week 19	40

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Walchand College of Engineering, Sangli
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AY 2023-24

Course Information	
Programme	First Year B. Tech. (Mech, Civil, CSE, IT)
Class, Semester	First Year B. Tech., Sem I/II
Course Code	7EE156
Course Name	Electrical and Electronics Engineering Lab
Desired Requisites:	12th Physics

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.
3	This course intends to demonstrate basic knowledge of Electronics engineering.
4	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 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
CO3	**Identify and explain** use of electronics components and instruments.	II	Understanding
CO4	**Construct** digital IC, diode, transistor and op-amp based circuits.	III	Applying

List of Experiments / Lab Activities/Topics

List of Topics(Applicable for Interaction mode): Electrical
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.
5. Measure voltage, current and power in single phase R-C series circuit.
6. Measure Voltage, current and power factor of 1-phase A.C R-L series circuit.

List of Lab Activities: Electrical
1. Electrical Safety Measures.
2. To study series-parallel RL, RC and RLC circuits
3. To verify KVL and KCL theorems.
4. To study speed control techniques of ac and dc machines.
5. To perform load test on transformer.
6. Find out equivalent resistance in series and parallel connection.

List of Lab Activities: Electronics
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 half-wave and full-wave rectifier.
5. Study of diode-based clipper and clamper circuits
6. Study of transistor as a switch.
7. Study of inverting and non-inverting amplifier using op-amp.

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.
3.	R. P. Jain, "Modern Digital Electronics", 4th edition, Tata McGraw Hill, 2009.
4.	Robert Boylestad, Louis Nashelsky, 11th edition, "Electronic Devices and Circuits, Pearson, 2015.
5.	Ramakant Gaikwad, "Op-amp and Linear Integrated Circuits", 4th edition, Pearson, 2015.

References	
1	V. N. Mittle and Arvind Mittal, "Basic Electrical Engineering", 2 nd edition, Tata McGraw Hill.
2	Morris Mano, "Digital Design", Pearson, 4th edition, 2011
3	Donald A. Neamen, "Electronic Circuit Analysis and Design", 3rd edition, Tata McGraw Hill, 2011
4	Robert F. Coughlin and Frederick F. Driscoll, "Operational Amplifiers and Linear Integrated Circuits", 6th edition, PHI, 2009

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/#
2	Virtual Labs, An Initiative of Ministry of Education Under the National Mission on Education through ICT:Basic Electronics
3	https://nptel.ac.in/courses/122106025

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								2					
CO3	3													
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.

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 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	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.

Walchand College of Engineering, Sangli
(Government Aided Autonomous Institute)
AY 2023-24

Course Information

Programme	B.Tech.
Class | Semester	First Year B. Tech (Computer Science & Engineering) | Semester II
Course Code	7CS108
Course Name	Computer Programming (C Programming)
Desired Requisites:	

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 understand problem solving and problem solving aspects.
2	To learn basics, features and future of C programming.
3	To acquaint with data types, input output statements, decision making, looping, functions, array, string, pointer, structure and union in C.

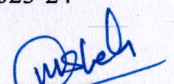### Course Outcomes (CO) with Bloom's Taxonomy Level

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	To understand the basics of problem solving and C programming.	II	Understand
CO2	To translate the algorithms to programs (in C language).	III	Applying
CO3	To test and execute the C programs and correct syntax and logical errors.	IV	Analyse

List of Experiments / Lab Activities/Topics

List of Topics (Applicable for Interaction Mode):	Hrs/Week
Module I: Basics of Problem Solving & C Programming: General Problem Solving Concepts, Types of Problems, Problem Solving Strategies. **Program Design Tools:** Algorithms, Flowcharts and Pseudo-Codes. **C Programming:** Types of programming languages, Features of C, Basic Concepts, Structure of a C Program, Declarations, Constants, Variables, Data Types, Operators and Expressions, Input and Output Functions.	4
Module II: Decision Control Statements: Conditional Statements: If, If-else, Nested If, If-elseif Statements. **Iterative Statements:** While Loop, For Loop, Do While Loop, Break, Continue, Pass, else Statement used with Loops.	5
Module III: Functions: Need for functions, Definition, Function Call, Block Structure, Variable Scope, Return Type, Passing Arguments to a Function: Call by Reference, Call by Value, Recursive Functions.	4
Module IV: Array: Declaration, Initialization, Two-Dimensional Arrays, Multi-Dimensional Array. **String:** Declaration and Initialization of Strings, Array of Strings, String functions.	4
Module V: Pointers: Introduction, Definition and Declaration of Pointers, Address Operator, Pointer Variables. **Structures and Unions:** Declaration, Initialization, Accessing members of a Structure, Initializing a Union, Accessing the Members of a Union.	5
Module VI: File handling: Concept of a File, Types of File, File Operation, File functions, File opening modes in C, Reading, Write and Closing a File.	4

Course Contents for B. Tech Programme First Year, AY 2023-24

List of Experiments:

1. Program to simulate simple calculator that performs basic tasks such as addition, subtraction, multiplication and division.
2. Program to demonstrate different operators and their order precedence.
3. Program to accept the number and Compute a) square root of number, b) Square of number, c) Cube of number d) check for prime, d) factorial of number e) prime factors.
4. Program to accept a number from user and print digits of number in a reverse order.
5. Program to accept two numbers from user and compute smallest divisor and Greatest Common Divisor of these two numbers.
6. Program to find whether the number is positive / negative / zero using conditional statement.
7. Programs to show different types of iteration / loop.
8. Program to accept N numbers from user and compute and display maximum in list, minimum in list, sum and average of numbers.
9. Program to print the Fibonacci Series (with & without recursion).
10. Program to swap two number using function (Call by value & reference).
11. Program to demonstrate structure to array.
12. Program to demonstrate structure and union.
13. Program to demonstrate file handling.

	Textbooks
1	E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill.
2	Yashavant Kanetkar, "Lets Us C", BPB Publication, 5th Edition, 20216.

	References
1	Maureen Spankle, "Problem Solving and Programming Concepts", Pearson; 9th edition, ISBN-10: 9780132492645, ISBN-13: 978-0132492645.
2	Herbert Schidt, C: The complete reference, 4th edition, McGraw Hill publication.
3	Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

	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	3	2												
CO2	1		2		2									
CO3		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, Submission	Lab Course Faculty	During Week 1 to Week 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, Submission	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30

Course Contents for B. Tech Programme First Year, AY 2023-24

Lab ESE	Lab activities/ submission/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	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.				

Walchand College of Engineering, Sangli
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AY 2023-24

Course Information

Programme	B.Tech. (Electrical, Electronics, CSE, IT)
Class, Semester	First Year B. Tech., Sem I &II
Course Code	7ME108
Course Name	Engineering Graphics Lab
Desired Requisites:	Basic Knowledge of Computer

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

Course Objectives

1	To impart the techniques of engineering graphics.
2	To prepare the students for applying knowledge of engineering graphics in real life drawings.
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 Description
CO1	Understand the basic principle of Engineering graphics.	II	Understanding
CO2	Draw different views of components using the first angle projections method.	III	Applying
CO3	Apply the knowledge of engineering graphics in real life applications.	III	Applying

List of Experiments / Lab Activities

List of Experiments:
Submission of drawing on following topics (Any two sheets on CAD)
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)

Text Books

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 Electrical Engineering Department

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

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

CO-PO Mapping Electronics Engineering Department

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

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

CO-PO Mapping Computer Science and Engineering Department

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

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

CO-PO Mapping For Information Technology Department

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

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

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 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	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.

Walchand College of Engineering, Sangli
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AY 2023-24

Course Information	
Programme	B.Tech. (Computer Science & Engineering)
Class, Semester	First Year B. Tech., Sem II
Course Code	7CS152
Course Name	Basics of Web Technology Lab
Desired Requisites:	

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

Course Objectives	
1	To enable students to develop simple web form using basic web technologies and host it.
2	To enable students to develop a responsive web application.
3	To make students understand security issues involved in web applications and how to handle them.
4	To enable students to use databases and content management system (CMS)

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 Description
CO1	Explain responsive and static layouts, databases, web security, CMS, authorization and authentication	Understand
CO2	Implement web forms, web pages using front-end and back-end technologies with suitable UI for a target device.	Apply
CO3	Observe dynamic web layouts and styling	Analyze

List of experiments:

1. **Objective**: Get acquainted with web browsers and web development tools.
   Tasks:
   a. Uninstall and install Google Chrome and Firefox
   b. Start localhost server
   c. Install Visual Studio Code

2. **Objective**: Create a basic HTML page with headings, div, paragraphs, and lists.
   Tasks:
   a. Create website for registering students to 'ExeclTech College of Engineering' having 3 pages home.html, signup.html, login.html.
   b. Use appropriates tasks for following content on home.html
      Name of the college, address of the college, information and image of the college
   c. Create separate sections for: list of UG academic programs, list of PG academic programs, list of faculty members and contact information. Give appropriate title for each section.

3. **Objective**: Understand the concept of hyperlinks and anchor tags.
   Tasks:
   a. Provide hyperlinks for Sign up and Login on home.html. On click of Sign up, user should get navigated to signup.html page. On click on Login page, user should get navigated to login.html. These 2 pages can be blank.
   b. Provide Search link on the top that navigates to www.google.com
   c. Provide navigation links on the top of the page on home.html for the following: UG program, PG program, Faculty. On clicking on these links user should get navigated to respective section on the same page.

4. **Objective**: Apply styles to HTML elements using CSS
   Tasks:
   a. Add CSS rules to change the text colour, font, and size of all headers on home.html.
   b. Set background colour for the page and for paragraph tag.
   c. Apply borders and margins to elements to create visual effects for paragraph and header tags.

5. **Objective**: Understand how to create layouts using CSS positioning and floats.
   Tasks:
   a. Create a simple two-column layout using CSS positioning for home.html.
   b. Add various sections on home.html to div tags. Create float-right, float-left CSS class and apply to div tags.
   c. Convert links for UG programs, PG programs and Faculty into visually appealing boxes using div tag and appropriate styling.

6. **Objective**: Familiarize with the basics of JavaScript programming.
   Tasks:
   a. Perform arithmetic operations (add, subtract, divide and multiply) by creating functions and using JavaScript operators.
   b. Write a function that accepts 2 strings and returns concatenates string.
   c. Write a function to check if a number is odd or even.
   d. Write a function that accepts a number n and outputs all numbers from 0 to n in increasing order.

7. **Objective**: Understand the Document Object Model (DOM) and its significance.
   Tasks:
   a. Create login.html which accepts Username and Password. Provide Submit button.
   b. On click of button, check if username is 'admin' and password in 'PwD123'. If entered details are correct, navigate to home.html and provide text message 'Login successful!' on the home.html in green. If details are incorrect, navigate to home.html and provide text message 'Unsuccessful login..' on the home.html in red.

8. **Objective:** Create HTML forms for user input and handle form submission using JavaScript.
   Tasks:

a. Design signup.html to accept following information from user: First name, Last name, Age, Contact number, Address (multi-line input should be accepted), Email ID, Username, Password and Confirm Password. Provide Submit button.

b. Modify home.html, signup.html and login.html to give common header of name of college and suitable colour scheme. Align all elements, if required, suitably.

c. Perform following validation of fields on signup.html. Give pop up error message.

i. Names should be alphabets only

ii. Age should be numeric

iii. Contact number should be only numeric and 10 digits long.

iv. Email ID should contain @

v. Password and Confirm Password should be same.

9. **Objective**: Apply design principles for mobile-friendly websites using media queries.
   Tasks:
   a. Apply media queries to home.html, signup.html and login.html.
   b. Test responsive UI on browsers by web developer tools in the browser.
   c. Observe how div tags are floating and change CSS if required.
   d. Use off the shelf responsive UI frameworks like Bootstrap and create home-responsive.html using grid layout.

10. **Objective**: Understand server-side scripting languages, databases, and data storage.
    Tasks:
    a. Install and set up a server-side scripting environment (PHP or Node.js).
    b. Connect to a database (e.g., MySQL) and perform basic CRUD operations.
    c. Display data from the database on a web page.
    (Instructor to provide necessary table creation script and data. Students are only expected to get the data from DB and display on web page.)

11. **Objective**: Understand web hosting and domain registration concepts.
    Tasks:
    a. Explore various web servers.
    b. Explore how to enable localhost on Windows system.
    c. Host home.html on local system
    d. Explore various domain providers and their costings

12. **Objective**: Implementing User Authentication and Authorization
    Tasks:
    a. Provide user authorization and authentication such that
    b. All users should be able to access home.html, signup.html and login.html.
    c. Only following users should get navigated to home.html with proper success message.

Username	Password
User1	PwD125
User2	PwD124
admin	PwD123

    d. Validate all pages properly and check for security issues, if any.

13. **Objective**: Get familiar with Content Management Systems.
    Tasks:
    a. Explore popular CMS platforms (e.g., WordPress, Joomla).
    b. Install and set up a CMS on a local development environment.
    c. Create and manage content using the CMS's interface.

Text Books	
1	Web Technology: Theory and Practice by M. Srinivasan, Released June 2012, Publisher(s): Pearson India, ISBN: 9788131774199

References	
1	Web Application Security by Andrew Hoffman, Released March 2020, Publisher(s): O'Reilly Media, Inc. ISBN: 9781492053118

2	Web Technologies by Achyut Godbole and Atul Kahate, Publication: Tata McGraw-Hill Education Pvt. Ltd., ISBN13: 9781259062681

Useful Links	
1	https://www.w3schools.com/

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

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 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty	During Week 18 to Week 19 Marks Submission at the end of Week 19	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.				

Course Information	
Programme	B. Tech. (Electronics Engineering)
Class, Semester	First Year B. Tech., Sem.-I
Course Code	7VS152
Course Name	Engineering Skills-II
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	To provide basic knowledge of handling electrical equipment and safety.
2	To impart skills to plan and implement simple electrical wiring.
3	To **provide** exposure to the students with hands on experience on various basic engineering practices in Electrical and Electronics Engineering.
4	To explain the working of small electronic gadget like electronic bell, emergency lamp etc.

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	**Identify** the instruments for measurement of electrical parameters.	I	Remembering
CO2	**Illustrate** working of switchgear for electrical safety and protections.	III	Applying
CO3	**Identify and explain** the use of electronic instruments.	II	Understanding
CO4	**Build and Test** simple electronic gadget.	III	Applying

List of Experiments / Lab Activities/Topics

List of Lab Activities: (minimum 08 experiments)
Engineering Skills (Electrical)
Module 1:
   i.   Measurement of Electrical Parameters in DC Circuits.
   ii.   Measurement of Electrical Parameters in Single Phase AC Circuits.
Module 2:
   i.   Study of various types of wires and cables.
   ii.   Basic wiring schemes for residential and industrial applications.
   iii.   Demonstrate the operation of fuse, MCCB, ELCB
Module 3:
   i.   Preparation of Earthing Pit for Electrical Installation Safety.
   ii.   Dismantling, Assembly and Fault Finding of Ceiling Fans / Table Fans, Automatic Electric Iron, Plate Tube Water Heater, Use of Megger.

Engineering Skills (Electronics)
Module 1: Introduction to Lab Instruments like CRO, Power supply, Oscillator, Multi meter. Frequency measurement, AC-DC voltage measurement using CRO and multi meter

Module 2: Study of components (Resistance, capacitor, Diode, Transistor, Transformer, switches, relays, PCB etc.) testing and lead identification

Module 3: Electronics Gadget building & testing (Gadget must work)

Textbooks

1	Make: Electronics, by Charles Platt, Published by Maker Media, 2015
2	Electronics Projects For Dummies, by by Earl Boysen and Nancy Muir, Published by Wiley Publishing, Inc., 2006
3	D.C. Kulshreshtha, "Basic Electrical Engineering", 1 st revised editionMcGraw Hill, 2012.
4	D.P Kothari and I.J Nagrath, "Basic Electrical Engineering",Tata McGraw Hill, 2010.

References

1	Paul Horowitz, Winfield Hill, "The Art of Electronics", Cambridge University Press, 1989
2	E-learning material through Intranet/Internet
3	V. N. Mittle and Arvind Mittal, "Basic Electrical Engineering", 2 nd edition, Tata McGraw Hill.
4	

Useful Links

1	
2	
3	
4	

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1			1		2				1				1	
CO2			1		2				1				1	
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 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	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.

Walchand College of Engineering, Sangli
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AY 2023-24

Course Information

Programme	B.Tech. (I.T. & Computer Engineering)
Class, Semester	First Year B. Tech., Sem I/ II
Course Code	7CH103
Course Name	Engineering Chemistry (I.T./ Computer)
Desired Requisites:	Chemistry course at Secondary and 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: 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 Description
CO1	Explain terms chemical analysis, Calorific value, water parameters, Types of corrosion, Mechanism of Corrosion, water's industrial applications	II	Understanding
CO2	Draw schematic of water softeners, Glass electrode, GLC setup, Calorimeters	II	Understanding
CO3	Classify types of chemical analysis, hard water, Engineering materials, types of polymers. Chromatography.	II	Understanding
CO4	Calculate concentration of solutions, % of analyte gravimetrically, hardness of water, Calorific values	III	Applying

Module	Module Contents	Hours
I	**Module 1. General principles of chemical Analysis Part A: Volumetry** Chemical analysis, Its types/ classification, Different ways to express concentration of solution & Numerical problems. Standards and its types, Definition of terms associated with titrimetry. Classification of titrimetry with application of type analysis & Numerical problems.	7
II	**Module 2. General principles of chemical Analysis Part B: Gravimetry & Instrument** Gravimetry and its requirements, applications and Numerical problems. pH metry, potentiometry, Single beam spectrophotometry w.r.t. Principle, Instrumentation, Calibration, Application Chromatography and its types & Introduction to GLC, Introduction for SEM, TEM, AFM and its applications. Advantages and Disadvantages of instrumental and non-instrumental methods.	6

(Dr. Dodla S. Rao)   (A. A Powar)   (K. V. Madhale)   (Mrs. V. B. Giryaonkar)

III	**Modules 3. 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, Alkalinity, Chloride , Dissolved oxygen(DO), Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) its significance. Ion exchange method of water softening.	7
IV	**Module 4 : Corrosion Science** Definition of corrosion, Types of corrosion, Dry & wet corrosion, Electrochemical & Galvanic series & its importance, Mechanism of Hydrogen evolution and Oxygen absorption corrosion, Factors influencing rate of corrosion, Various methods for protection from corrosion viz. Surface coatings(Electroplating, Galvanizing, Tinning) Cathodic and Anodic protection.	7
V	**Module 5: 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, and determination by Bomb and Boys calorimeter, Numerical problems on calorific value.	6
VI	**Module 6: Non-metallic Materials:** Engineering materials and its types, polymer: Polymerization reactions. Addition and condensation and co polymerization Plastic & types of plastics, Properties & uses of PVC, PS, Bakelite, Epoxy resin. Elastomers and its properties, Natural rubber and its drawbacks, process of vulcanization Properties and uses of Butyl rubber, Neoprene and Thiokol, Insulating Materials: Introduction, characteristics, Classification, Properties and uses of Glass wool, Thermocole and Asbestos.	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
5	V.R. Gowarikar, *Polymer Science"*, Wiley Eastern Publication, 1986, 1st Edition
6	Douglas A. Skoog, E James Holler, Stanely R Crouch, " Principles of Instrumental Analysis", Thomson publication, 2007, 6th Edition

	Useful Links
1	https://edu.rsc.org/resources
2	A free resource for Chemistry teachers and students of all levels, including higher education, hosted by Royal Society of Chemistry.
3	https://www.digimat.in/nptel/courses/video/122106028/L01.html
4	https://onlinecourses.nptel.ac.in/noc21_cy49/preview

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													
CO3	3													
CO4	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.

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, surprise or declared test etc.
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)

(Dr.Dodla S. Rao)

A-A-Powar

(K.V.Madhale)

(Mrs. V.B. Giryaonkar)