Academic Documents for

FY B. Tech. (Mechanical Engineering)

Walchand College of Engineering, Sangli

(An Autonomous Institute)

Contents

Vision Mission and Objectives of Institute

Vision:

1. To produce capable graduate engineers with an aptitude for research and leadership

Mission:

1. To impart quality education through demanding academic programmes.
2. To enhance career opportunities for students through exposure to industry.
3. To promote excellence by encouraging creativity, critical thinking and discipline.
4. To inculcate sensitivity toward society and a respect for the environment.

Objectives:

1. Achieve excellence in learning and research through continual improvement in both content and delivery of the academic programmes.
2. Promote close interaction among industry, faculty and students to enrich the learning process and enhance career opportunities for students.
3. Develop state - of - the - art laboratories and other infrastructure commensurate with the need of delivering quality education and research services.
4. Strngthen the Institution through network of alumni and optimize use of resources by leveraging inter - departmental capabilities.
5. Provide opportunities and ensure regular skill. Up - gradation of faculty and staff through structured training programmes.

Vision, Mission, and Programme Educational Objectives of Department

VISION:

- To impart technical knowledge and innovative practices up to grass root level for socio-economical development of the region.
- To provide the facilities and conducive atmosphere in promoting quality education for achievement of global excellence.
- To enhance competencies for boosting the morale and inculcate ethical values of aspirants.

MISSION:

- To impart quality education through demanding academic programs.
- To enhance career opportunities for students through exposure to industry.
- To promote excellence by encouraging creativity, critical thinking and discipline.
- To inculcate sensitivity toward society and a respect for the environment

OBJECTIVES:

- To achieve excellence in learning and research through continual improvement in both content and delivery of the academic programs.
- To promote close interaction among industry, faculty and students to enrich the learning process and enhance career opportunities for students.
- To develop state - of - the - art laboratories and other infrastructure commensurate with the need of delivering quality education and research services.
- To strengthen the Institution through network of alumni and optimize use of resources by leveraging inter - departmental capabilities.
- To provide opportunities and ensure regular skill. Up - gradation of faculty and staff through structured training programs.
- To develop creativity, innovative ability and R & D culture to build new sustainable mechanisms, machines, systems and methodology for enhancing engineering and technological standards.

Department Programme Educational Objectives

Demonstrate technical competency by applying knowledge to solve problems related to engineering issues.

Exhibit skills and appropriate attitude to succeed in their professional career.

Display thirst for emerging technologies and quest for innovation with concern to society and environment.

PROGRAMME OUTCOMES.

At the end of the programme the Students in the UG Mechanical Engineering programme will be able to:

a. Identify Mechanical Engineering problems.

b. Analyze real life Mechanical engineering problems.

c. Apply Mechanical engineering knowledge for design, construction, operation and maintenance of constructed facilities within realistic constraints such as technical, economic, environmental, political, social, safety and sustainability.

d. Formulate, solve and simulate complex real life Mechanical engineering problem applying the imparted knowledge of mathematics, science, engineering, technology and optimization.

e. Function effectively as a member in multidisciplinary teams.

f. Demonstrate professional practice through participation in multidisciplinary activities.

g. Demonstrate high regards for engineering ethics and ethical responsibility.

h. Apply the techniques, skills and modern engineering tools necessary for engineering practice.

i. Recognize the importance of contemporary issues.

j. Interact and communicate effectively.

Walchand College of Engineering, Sangli

(An Autonomous Institute)

Structure approved by Board of Studies

for

B.Tech. in Mechanical Engineering

Academic Year

FY B. Tech. 2018-2019

SY B. Tech. 2019-2020

TY B. Tech. 2020-2021

Final Year B. Tech. 2021-22

Walchand College of Engineering, Sangli

(An Autonomous Institute)

Teaching and Evaluation Scheme effective from 2018-19

First year B. Tech. Programme in Mechanical Engineering

Course			Teaching Scheme				Evaluation Scheme			
Category	Code	Name	L	T	P	Credits	Component	Marks		
								Max	Min for Passing	
BS	4CH101	Chemistry for Civil and Mechanical Engineers	3	-	-	3	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
BS	4MA101	Engineering Mathematics I	3	1	-	4	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
ES	4CV101	Basic Civil Engineering	2	-	-	2	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
ES	4ME102	Engineering Graphics	1	-	4	3	ISE	100	40	
ES	4AM101	Engineering Mechanics	3	-	-	3	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
BS	4BS10*	Elective on Basic Sciences	2	-	-	2	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
BS	4CH151	Engineering Chemistry Laboratory	-	-	2	1	ISE	100	40	
ES	4ME152	Workshop practice	-	-	2	1	ISE	100	40	
ES	4CV151	Civil and Mechanics Laboratory	-	-	2	1	ISE	100	40	
Total			14	1	10	20	**Total Credits: 20** **Total Contact Hrs: 25**			

Semester I

Elective on Basic Sciences			
4BS101	Biology for Engineers	4BS102	Material Science
4BS103	Introduction to Geoscience	4BS104	Life Science

Walchand College of Engineering, Sangli

(An Autonomous Institute)

Teaching and Evaluation Scheme effective from 2018-19

First year B. Tech. Program in Mechanical Engineering

Semester II

Course			Teaching Scheme				Evaluation Scheme		
Category	Code	Name	L	T	P	Credits	Component	Marks	
								Max	Min for Passing
BS	4PH101	Physics for Civil and Mechanical Engineers	3	-	-	3	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
ES	4MA102	Engineering Mathematics II	3	1	-	4	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
ES	4EN101	Basic Electronics Engineering	2	-	-	2	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
ES	4EL101	Basic Electrical Engineering	2	-	-	2	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
HS	4HS101	English for Professional Communication	2	1	-	3	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
BS	4PH151	Engineering Physics Laboratory	-	-	2	1	ISE	100	40
ES	4CS151	Introduction to Computer Programming	1	-	2	2	ISE	100	40
ES	4EN151	Electronics Engineering Laboratory	-	-	2	1	ISE	100	40
ES	4EL151	Electrical Engineering Laboratory	-	-	2	1	ISE	100	40
Total			13	2	8	19	**Total Credits: 19** **Total Contact Hrs: 23**		

Walchand College of Engineering, Sangli
(An Autonomous Institute)
Teaching and Evaluation Scheme effective from 2019-2020
Second year B. Tech. Programme in Mechanical Engineering
Semester I

Course			Teaching Scheme				Evaluation Scheme		
Category	Code	Name	L	T	P	Credits	Component	Marks	
								Max	Min for Passing
BS	4ME201	Applied Mathematics for Mechanical Engineers	3	0	0	3	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
HS	4HS201/ 4HS202	Development of Societies/Philosophy	2	0	0	2	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
PC	4ME202	Thermodynamics	3	0	0	3	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
PC	4ME203	Strength of Materials	3	1	0	4	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
PC	4ME204	Materials Engineering	3	0	0	3	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
PC	4ME251	Mechanical Workshop I	1	0	2	2	ISE	50	20
							ESE	50	20
PC	4ME252	Thermodynamics Laboratory	0	0	2	1	ISE	50	20
							ESE	50	20
PC	4ME253	Materials Engineering Laboratory	0	0	2	1	ISE	50	20
							ESE	50	20
Total			15	1	6	19	**Total Credits: 19** **Total Contact Hrs: 22**		

Walchand College of Engineering, Sangli
(An Autonomous Institute)
Teaching and Evaluation Scheme effective from 2019-20
Second year B. Tech. Programme in Mechanical Engineering
Semester II

Course			Teaching Scheme				Evaluation Scheme		
Category	Code	Name	L	T	P	Credits	Component	Marks	
								Max	Min for Passing
HS	4HS203	Environmental Science	2	1	0	3	ISE 1	10	
							MSE	30	
							ISE 2	10	
							ESE	50	20
PC	4ME221	Fluid Mechanics & Fluid Machines	3	0	0	3	ISE 1	10	
							MSE	30	
							ISE 2	10	
							ESE	50	20
PC	4ME222	Manufacturing Processes	3	0	0	3	ISE 1	10	
							MSE	30	
							ISE 2	10	
							ESE	50	20
PC	4ME223	Kinematics & Theory of Machines	3	0	0	3	ISE 1	10	
							MSE	30	
							ISE 2	10	
							ESE	50	20
PC	4ME224	Instrumentation & Control	3	0	0	3	ISE 1	10	
							MSE	30	
							ISE 2	10	
							ESE	50	20
PE	4ME2**	Professional Elective 1	3	1	0	4	ISE 1	10	
							MSE	30	
							ISE 2	10	
							ESE	50	20
PC	4ME271	Fluid Mechanics & Fluid Machines Laboratory	0	0	2	1	ISE	50	20
							ESE	50	20
PC	4ME272	Manufacturing Processes	0	0	2	1	ISE	50	20
							ESE	50	20
PC	4ME273	Kinematics & Theory of Machines Laboratory	0	0	2	1	ISE	50	20
							ESE	50	20
Total			17	2	6	22	**Total Credits: 22** **Total Contact Hrs: 25**		

Professional Electives 1	
4ME231	Plastics Technology
4ME232	Metal Forming
4ME233	Composite Materials

Walchand College of Engineering, Sangli
(An Autonomous Institute)
Teaching and Evaluation Scheme effective from 2020-21
Third year B. Tech. Programme in Mechanical Engineering
Semester I

Course			Teaching Scheme				Evaluation Scheme			
Category	**Code**	**Name**	**L**	**T**	**P**	**Credits**	**Component**	**Marks**		
								Max	**Min for Passing**	
OE	4OE3**	Open Elective 1	3	0	0	3	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
HS	4HS3**	Elective Foundational Course in Humanities	3	0	0	3	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
PC	4ME301	Applied Thermodynamics	3	0	0	**3**	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
PC	4ME302	Heat Transfer	3	0	0	**3**	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
PC	4ME303	Manufacturing Technology	3	0	0	**3**	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
PC	4ME304	Metrology & Quality Control	2	0	0	**2**	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
PC	4ME351	Applied Thermodynamics Laboratory	0	0	2	**1**	ISE	50	20	
							ESE	50	20	
PC	4ME352	Heat Transfer Laboratory	0	0	2	**1**	ISE	50	20	
							ESE	50	20	
PC	4ME353	MQC / Mfg. Technology Laboratory	0	0	2	**1**	ISE	50	20	
							ESE	50	20	
Total			17	0	6	20	**Total Credits: 20** **Total Contact Hrs: 23**			

Professional electives on theory courses may also be opted by students of other programme.

Elective Foundation Course in Humanities			
4HS 301	Law and Engineering	4HS 304	Psychology
4HS 302	Ethics and Holistic Life	4HS 305	Sanskrit/Foreign language
4HS 303	Education, Technology and Society	4HS 306	Human Relations at Work

Open Elective 1		
Course Code	**Course Name**	**Offered by**
4OE 315	Remote Sensing & GIS, GPS	Civil Engg.,
4OE329	Manufacturing Engineering	Mechanical
4OE330	Energy Engineering	Mechanical
4OE331	Mechanisms & Machines	Mechanical
4OE 343	Electrical Machine Technology	Electrical
4OE 357	Electronic Systems	Electronics Engg.,
4OE 371	Software Engineering and Database Essentials	CSE
4OE 372	Algorithms and Applications	CSE
4OE 385	Internet of Things	IT
4OE 386	Python	IT
4OE 387	FOSS	IT

Walchand College of Engineering, Sangli
(An Autonomous Institute)
Teaching and Evaluation Scheme effective from 2020-21
Third year B. Tech. Programme in Mechanical Engineering
Semester II

Course			Teaching Scheme				Evaluation Scheme			
Category	Code	Name	L	T	P	Credits	Component	Marks		
								Max	Min for Passing	
OE	4OE3**	Open Elective 2	3	0	0	3	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
HS	4HS 307/401	Fundamentals of Management and Economics for Engineers	4	0	0	4	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
PC	4ME321	Design of Machine Elements	3	0	0	**3**	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
PC	4ME322	Automation in manufacturing	3	0	0	**3**	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
PE	4ME3**	Professional Electives 2	3	0	0	**3**	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
PE	4ME3**	Professional Electives 3	3	0	0	**3**	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
PE	4ME3**	Professional Elective II and III (Combined) Laboratory. *	0	0	2	**1**	ISE	50	20	
							ESE	50	20	
PC	4ME371	Design of Machine Elements-case studies	0	0	2	**1**	ISE	50	20	
							ESE	50	20	
PC	4ME372	Mechanical Workshop 2	0	0	2	**1**	ISE	50	20	
							ESE	50	20	
Total			19	0	6	22	**Total Credits: 22** **Total Contact Hrs: 25**			

Note: Name of the course in bold red is fixed. Please do not disturb that.
* Alternative week

Professional Electives 2		
4ME331	4ME381	Internal Combustion Engines
4ME332	4ME382	Energy Conservation & Mgt
4ME333	4ME383	Power Plant Engineering
Professional Electives 3		
4ME334	4ME384	Mechatronics Systems
4ME335	4ME385	Microprocessors in Automation
4ME336	4ME386	Industrial Hyd. & Pneumatics
4ME337	4ME387	Operation Research

Open Elective 2		
Course Code	**Course Name**	**Offered by**
4OE 309	Theory of Structures	Applied Mechanics
4OE 336	Power Plant Engineering	Mechanical
4OE 337	Fabrication Tech.	Mechanical
4OE 338	Mech. Power Transmission	Mechanical
4OE350	Renewable Energy	Electrical
4OE366	Biomedical Instrumentation	Electronics
4OE378	Data Analytics	CSE
4OE379	Network Essentials	CSE
4OE392	Web Design	IT
4OE393	Cloud and virtualization	IT
4OE394	Game Development	IT

Walchand College of Engineering, Sangli
(An Autonomous Institute)
Teaching and Evaluation Scheme from year 2021-22
Final year B. Tech. Programme in Mechanical Engineering
Semester I

Course			Teaching Scheme				Evaluation Scheme		
Category	Code	Name	L	T	P	Credits	Component	Marks	
								Max	Min for Passing
OE	4OE4**	Open Elective 3	3	0	0	3	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
PC	4ME401	Solid Mechanics	3	1	0	**4**	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
PE	4ME4**	Professional Electives 4	3	0	0	**3**	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
PE	4ME4**	Professional Electives 5	3	0	0	**3**	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
PE	4ME4**	Professional Electives 6	3	0	0	**3**	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
PE	4ME4**	Professional Electives 4 Laboratory	0	0	2	**1**	ISE	50	20
							ESE	50	20
PE	4ME4**	Professional Electives 5 Laboratory	0	0	2	**1**	ISE	50	20
							ESE	50	20
PE	4ME4**	Professional Electives 6 Laboratory	0	0	2	**1**	ISE	50	20
							ESE	50	20
PC	4ME441	Project 1 and Seminar	0	0	6*	3	ISE	50	20
							ESE	50	20
MC	4IC401	Indian Constitution	2	0	0	0	ISE 1	35	40
							MSE	30	
							ISE 2	35	
Total			17	1	12	22	**Total Credits: 22** **Total Contact Hrs: 30**		

*Project – I and Seminar – 6 hours per week (8-10 students) – 3 hours for 4-5 students.
All faculties are informed to maintain diary for this activity & record weekly progress. Every month the review will be taken by PAC / PEC – UG.

Professional Electives 4		
4ME411	4ME461	Finite Element Analysis
4ME412	4ME462	Comp. Fluid Dyn
4ME413	4ME463	Foundry Technology
Professional Electives 5		
4ME414	4ME464	DoM
4ME415	4ME465	Gas Dynamics & Jet propulsion
4ME416	4ME466	CIM
Professional Electives 6		
4ME417	4ME467	Computer Aided Design
4ME418	4ME468	Non- Conventional machining
4ME419	4ME469	Refrigeration & Air Cond

Open Elective 3		
Course Code	**Course Name**	**Offered by**
4OE 402	Finite Element Method	APM
4OE 416	Concrete Engineering and Technology	Civil
4OE 429	Auto. Engg	Mechanical
4OE 430	Aerospace Engg	Mechanical
4OE 431	Ind. Automation	Mechanical
4OE 443	Industrial Automation	Electrical
4OE 457	Cyber Physical Systems	Electronics
4OE458	Automobile Electronics	Electronics
4OE 471	Cyber Security	CSE
4OE 485	Data Visualization & Interpretation	IT
4OE 486	Social Network Analysis	IT
4OE 487	Basics of Soft Computing	IT

Walchand College of Engineering, Sangli
(An Autonomous Institute)
Teaching and Evaluation Scheme from year 2021-22
Final year B. Tech. Programme in Mechanical Engineering
Semester II

Course			Teaching Scheme				Evaluation Scheme		
Category	**Code**	**Name**	**L**	**T**	**P**	**Credits**	**Component**	**Marks**	
								Max	**Min for Passing**
PE	4ME4**	Professional Electives 7	3	0	0	**3**	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
PE	4ME4**	Professional Electives 8	3	0	0	**3**	ISE 1	10	40
							MSE	30	
							ISE 2	10	
							ESE	50	20
PC	4ME491	Project 2	0	0	8	**8**	ISE	50	20
							ESE	50	20
PC	4ME492	Skill Based Learning	0	0	2	**1**	ISE	100	40
PC	4ME493	Summer internship#	0	0	0	1	ISE	100	40
MC	4IC 402	Essence of Indian Traditional Knowledge	2	0	0	0	ISE 1	35	40
							MSE	30	
							ISE 2	35	
Total			8	0	10	16	**Total Credits: 16 Total Contact Hrs: 18**		

# Indicates internship to be completed during summer vacations after second year but before Final year semester I.

Professional Electives 7	
4ME431	Automobile Engg
4ME432	Product Life Cycle Mgt
4ME433	Robotics
4ME434	Total Quality Mgt.
Professional Electives 8	
4ME435	Experimental Stress Analysis
4ME436	Mechanical System Design
4ME437	Design of Transmission Systems

Semester	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**Total**
Credits	**20**	**19**	**19**	**22**	**20**	**22**	**22**	**16**	**160**

Walchand College of Engineering, Sangli
(An Autonomous Institute)
Curriculum Comparison for WCE and AICTE
B. Tech.

Sr. No.	Category	Mechanical Engineering			
		Credits		%	
		AICTE	DEPT	AICTE	DEPT
1	HS	12	15	7.5	9.4
2	BS	25	21	15.6	13.1
3	ES	24	18	15	11.3
4	PC	48	55	30	34.4
5	PE	18	29	11.3	18.1
6	OE	18	9	11.3	5.6
7	PC	15	13	9.4	8.1
8	MC	0	0	0	0
Total Credits		**160**	**160**	**160**	**100**

Category

Humanities and Social Sciences including Management courses (HS)

Basic Science courses (BS)

Engineering Science courses (ES)

Professional core courses (PC)

Professional Elective courses relevant to chosen specialization/branch[&] (PE)

Open subjects – Electives from other technical and /or emerging subjects (OE)

Project work, seminar and internship in industry or elsewhere (PC)

Mandatory Non- credit Courses (MC)

Walchand College of Engineering, Sangli

(An Autonomous Institute)

Curriculum (Structure and Syllabus)

for

First Year B. Tech.

Mechanical Engineering

Academic Year 2018-19

Title of the Course: Chemistry for Civil and Mechanical Engineers **4 CH 101**	L	T	P	Cr
	03	0	0	03

Pre-Requisite Courses: Chemistry course at secondary and higher secondary level

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. J Mendham, R.C. Denney, J.D. Barnes, M.J.K Thomas, "Quantitative Chemical analysis", Vogel's Pearson Education, 6thEdition , 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

Course Objectives :

1. To make student familiar with engineering properties associated with different materials to use them successfully in practice.
2. To provide knowledge on methods of characterization and chemical analysis.

Course Learning Outcomes:

CO	**After the completion of the course the student should be able to**	Bloom's Cognitive level	Descriptor
CO1	**Explain** chemical, thermal analysis, water chemistry, modern analytical techniques, phase rule. Types of polymers and its application and water's industrial applications **Draw** schematic of water softeners, phase diagrams, Thermograms, and spectroscopy set ups.	II	Understanding
CO2	**Classify** types of chemical analysis, hard water, polymers, modern techniques and thermal analysis	II	Understanding
CO3	**Calculate** concentration of solutions, hardness of water, wave number, frequency, wavelength, energy associated with radiations.	III	Applying

CO-PO Mapping:

Mechanical Engineering

PO	**a**	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**	**l**
CO1				**2**								
CO2				**2**								
CO3				**2**								

Assessments :

Teacher Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar etc.
MSE: Assessment is based on 50% of course content (Normally first three modules)
ESE: Assessment is based on 100% course content with 70-80% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Module 1. General principles of chemical Analysis - Chemical analysis, Its types, Advantages and Disadvantages of instrumental and non-instrumental methods, Different ways to express concentration of solution. Numerical problems. Standards and its types. Titrimetric analysis, Definition of terms associated with titrimetry.Classification of titrimetry, Gravimetry and its requirements, applications	**07 Hrs**
Module 2 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 Hrs**
Module 3- 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, Merit and Demerits of Phase rule.	**6 Hrs**
Module 4 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 Poly Vinyl Chloride (PVC), Bakelite, Epoxy resin, Fiber Reinforced Plastic (FRP), Rubber and properties of Rubber, vulcanization of natural rubber.	**7 Hrs**
Module 5 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 Hrs**
Module 6 Modern Analytical Techniques- EM radiation and Electromagnetic spectrum, Interaction of matter and EM radiation, UV-Visible spectrophotometry, Atomic absorption spectroscopy w.r.t. Principle, Instrumentation, Calibration, Application., Chromatography, details of Gas Liquid chromatography.	**7Hrs.**

Module wise Measurable Students Learning Outcomes :

After the completion of the course the student should be able to:

1: Explain and select chemical method of analysis. **2:** Decide suitability of available water towards various industrial applications. **3:** Describe one and two component systems and terms associated with respect to heterogeneous systems. **4:** Describe properties and uses of different organic materials plastics i.e. PVC, Bakelite, Epoxy, FRP **5:** Predict proper method to use material in desired application. **6**: Choose adequate method of analysis based on type of material under test.

Title of the Course: Engineering Mathematics –I (4MA101)	L	T	P	Cr
	3	**1**	**-**	**4**

Pre-Requisite Courses: Mathematics course at Higher Secondary Junior College

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.

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 Learning Outcomes:

CO	**After the completion of the course the student should be able to**	Bloom's Cognitive	
		level	Descriptor
CO1	Explain mathematical concepts relevant to address problems in engineering field.	II	Understanding
CO2	Solve engineering and scientific problems.	III	Applying

CO-PO Mapping :

(c) Mechanical Engineering

	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
CO1	**2**			**1**							
CO2	**2**			**1**							

Assessments :

Teacher Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar etc.
MSE: Assessment is based on 50% of course content (Normally first three modules)
ESE: Assessment is based on 100% course content with 60-70% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Module 1 : Matrices Rank of matrix, Homogeneous and non-homogeneous linear equations, symmetric and skew symmetric and orthogonal matrices, Eigen values, Eigen vectors, Cayley Hamilton theorem, Diagonalisation of matrices.	**6Hrs.**
Module 2: Calculus Rolle's theorem, Mean value theorem, Taylor's and Maclaurin's theorem with remainders, L'hospital rule and indeterminate forms	**6Hrs.**
Module 3: Complex Number Polar form of complex number, Argand's diagram, De Moiver's theorem, roots of complex number, Hyperbolic function, exponential form of complex number, relation between circular and hyperbolic function.	**7Hrs.**
Module 4: 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.	**8Hrs.**
Module 5: First order ordinary differential equation and its application Exact, Linear, Bernoulli's equations, Euler's equations, Orthogonal trajectory, applications to simple electric circuit.	**8Hrs.**
Module 6: Curve tracing Tracing of curves for Cartesian and polar coordinate.	**5Hrs.**

Module wise measurable students learning outcome:

After the completion of the course the student should be able to

Module 1 : Matrices

solve problems related with matrices.

Module 2: Calculus

solve problems in calculus.

Module 3: Complex Number

solve problems in complex number.

Module 4: Partial Differentiation and its application

solve problems of partial differentiation

Module 5: First order ordinary differential equation and its application

explain and solve problems in First order ordinary differential equation.

Module 6: Curve tracing

trace the different curves.

Tutorial:
During the tutorial we will ensure that the students have properly learnt the topics covered in the lectures. This shall include assignments, quiz, surprise test or declare test. The teacher may add another activity.

Title of the Course: Basic Civil Engineering 4CV101	L	T	P	Cr
	2	0	0	2

Pre-Requisite Courses: NIL

Textbooks:

1. Gole L.G., "Introduction to Civil Engineering", Mahu Publisher House, 4th Edition, 2005
2. Bhavikatti S.S.,"Basic Civil Engineering", New Age Publications, 2010
3. Hirasakar G. K.,"Basic Civil Engineering", Dhanpat Rai publications, 1st Edition,2007

References:

1. Duggal S.K., "Surveying (Vol I)", Tata McGraw Hill, 4th edition 2013
2. Bindra S.P., Arora S.P. , "Building Construction", Dhanpat Rai publication, 5th edition, 2012
3. Garg S. K., "Irrigation Engineering", Dhanpat Rai publication, 24th edition, 2012

Course Objectives :

1. To enable the students of non-Civil Engineering branch to acquire knowledge in Civil Engineering for application oriented concepts and ideas.
2. To share the knowledge related to environment, infrastructure and property transaction.

Course Learning Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive	
		Level	Descriptor
CO1	Explain concepts in Civil Engineering related to infrastructure, construction, environment and surveying.	II	Understanding
CO2	Summarize applications of Civil Engineering in various fields.	II	Understanding
CO3	Perceive the need of infrastructure development and property transaction	II	Understanding

CO-PO Mapping with regards to B.Tech Mechanical Programme:

PO	a	b	c	d	e	f	g	h	i	j	k
CO1					1			1		1	
CO2						2				1	
CO3					1	2	2			2	

Assessment:
Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment, oral, seminar, test (surprise/declared/quiz), and group discussion.[One assessment tool per ISE. The assessment tool used for ISE 1 shall not be used for ISE 2]
MSE: Assessment is based on 50% of course content (Normally first three modules)
ESE: Assessment is based on 100% course content with70-80% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Module 1 Introduction to Civil Engineering	**Hrs.**
Basics of engineering and civil engineering; broad disciplines of Civil engineering; Importance of Civil engineering, opportunities in civil engineering, infrastructure growth and real estate management in India Early constructions and developments over time; ancient monuments & modern marvels; works of eminent civil engineers Surveying-definition, classification and basic principles, types of scales, chain survey, linear and angular measurements, terms used in levelling, methods of reduction of levels, use of dumpy level and auto level, Introduction and use of digital planimeter,	**6**
Module 2 Fundamentals of Building Materials and Principles	
Properties and uses of basic materials: cement, bricks, stone, timber, natural and artificial sand, steel, concrete, PCC, RCC, brick masonry. Buildings-selection of site, types and basic functions. Basics of soil mechanics, various types of foundations. Principles of building planning, introduction to building bye laws and role of bye laws in regulating the environment. Concept of built up area, carpet Area and F.S.I., concept of green building. Introduction to smart cities	**6**
Module 3 Basics of Construction Management & Structural Engineering	
Temporary structures in construction; Construction methods for various types of Structures; Major construction equipment; automation & robotics in construction; Modern project management systems; importance of contracts management Structural Engineering: Types of buildings; tall structures; various types of bridges; other structural systems; Substructure and superstructure, components & their functions; concept of strength, stability, factor of safety	**5**
Module 4 Infrastructure	
Investments in transport infrastructure development in India for different modes of transport; Developments and challenges in integrated transport development in India: road, rail, port and harbour and airport sector; PPP in transport sector; Intelligent Transport Systems. Roads: classification, cross section and components of road, Types of pavements, road maintenance, concept of road safety audit, traffic signs, signals, road side and multistoried parking system, and causes of accidents Dams: purpose, selection of site, types of dams.	**6**
Module 5 Environmental Engineering & Sustainability	
Water and Wastewater treatment systems; municipal and hazardous solid waste management; sustainability in construction;	**3**

Module 6 Property Transaction	
Land documents, property purchase and sale procedure. property selection criteria and marketability of property transaction , property taxes; introduction to building finance	**2**
Module wise Measurable Students Learning Outcomes : **After the completion of the course the student should be able to:** 1. **Paraphrase** and **apply** fundamental knowledge of civil Engineering and use of modern surveying Instrument. 2. **Explain** basic principles of planning and bye Laws. Evaluate various properties of building materials. 3. **Explain c**construction Management and Structural Engineering 4. **Perceive and Summarize the need** of infrastructure development India. 5. **Explain** the importance of water treatment plant and solid waste management. 6. **Perceive and Summarize** the knowledge of Property transaction.	

Title of the Course: Engineering Graphics 4ME102	L	T	P	Cr
	1	0	4	3

Pre-Requisite Courses:

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.

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 Learning Outcomes:

CO	**After the completion of the course the student should be able to**	Bloom's Cognitive level	Descriptor
CO1	**Explain** principles of Engineering and Computer Graphics	II	Understanding
CO2	**Apply** principles of Engineering and Computer Graphics to draw projection of engineering objects	III	Applying
CO3	**Demonstrate** Principles of Engineering, Computer Graphics through drafting software	III	Applying

CO-PO Mapping:

Mechanical Engineering

	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**	**l**
CO1			2		1	1			**2**			
CO2			2		1	1			**2**			
CO3			2		1	1			**2**			

Assessments :

In Semester Evaluation (ISE)

Assessment	Marks
ISE based on drawing sheet submission (Minimum six practice and six submission sheet)	25
ISE based on declared test of drawing sheet (Minimum two)	25
ISE based on Autocad practical submission (Minimum Six submission sheets)	25
ISE based on declared test of Autocad practical submission/ oral	25
Assessment is based on 100% course content with 50 % weightage for manual drafting and 50 % weightage for CAD. **Student should get minimum 40% marks for passing**.	

Course Contents:

Module 1: ***Introduction to Engineering Drawing***	**Hrs. T-2, P-4**
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.	
Module 2: ***Orthographic Projections***	**Hrs. T-2, P-6**
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.	
Module 3: ***Projections of Regular Solids Sections and Sectional Views of Right Angular Solids***	**Hrs. T-2, P-12**
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.	
Module 4: ***Isometric Projections***	**Hrs. T-2, P-6**
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.	
Module 5: ***Introduction to Computer Aided Sketching***	**Hrs. T-2, P-12**
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.	
Module 6: Annotations, layering & other functions	**Hrs. T-3, P-12**
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;	

Module wise Measurable Students Learning Outcomes :
After the completion of the course the student should be able to:

- Explain engineering drawing and its place in society
  Demonstrate visual aspects of engineering design
- Explain, and apply engineering graphics projection of standard solid primitives
- Demonstrate visualization of 3-D solid modeling
- Demonstrate computer-aided geometric drafting
- Explain and apply working drawings

Title of the Course: Engineering Mechanics 4AM101	L	T	P	Cr
	3	0	0	3

Pre-Requisite Courses: Physics

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. Khurmi. R. S., *"Textbook of Applied Mechanics",* Tata McGraw Hill Publishing Company, 2013, 20th Revised Edition.

References:

1. Beer, F. P. and Johnston, E. R. *"Vector Mechanics for Engineers Vol. I and II",* McGraw Hill Company Publication, 2011, 9th Edition.
2. Singer, F. L. *"Engineering Mechanics Statics & Dynamics",* B. S. Publications, 2011.
3. Timoshenko, S. and Young, D. H. *"Engineering Mechanics"*, McGraw Hill Companies, 2008, 4th Edition.
4. Meriam, L. and L.G. Kraige, "*Engineering Mechanics – Dynamics",* John Wiley & Sons, 2002, 6th Edition.

Course Objectives :

1. To impart knowledge of concepts in mechanics applicable to civil and mechanical engineering.
2. To illustrate behavior of static bodies using mechanics concepts.
3. To provide knowledge of motions, forces and work energy principles and its engineering applications.

Course Learning Outcomes:

CO	**After the completion of the course the student should be able to**	Bloom's Cognitive	
		Level	Descriptor
CO1	**Apply** laws and basic concepts of mechanics of rigid bodies.	II	Understanding
CO2	**Analyze** system of forces in Statics and Dynamics.	IV	Analyzing
CO3	**Apply** concept of mechanics to solve engineering problems.	III	Applying

CO-PO Mapping:
Mechanical Engineering

PO	**a**	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**	**l**
CO1	**2**			**2**								
CO2	**2**			**2**								
CO3	**2**			**2**								

Teacher Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar etc.
MSE: Assessment is based on 50% of course content (Normally first three modules)
ESE: Assessment is based on 100% course content with 70-80% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Module 1: Equilibrium of Forces	**Hrs.**
Fundamental concepts and axioms, Types of Force Systems, Composition and resolution of forces, Moment of a force, Couple, Resultant of planar force systems. Equilibrium of forces- Free body diagrams, Equations of equilibrium, Equilibrium of planar systems, Equilibriums of beams- Types of loads and supports. Friction-Laws of friction, equilibrium of bodies on inclined plane, applications- problem involving wedges, ladders etc.	**8**
Module 2: Virtual work and Moment of inertia	**Hrs.**
Principle of Virtual work- applications to statically determinate simple and compound beams. Centre of gravity and Centroid, Moment of inertia, Radius of gyration, Mass-Moment of inertia.	**6**
Module 3: Analysis of plane frames	**Hrs.**
Pin-jointed statically determinate plane trusses- Assumptions, imperfect, perfect and redundant trusses, Analysis of statically determinate trusses, method of joints, method of sections and graphical method.	**6**
Module 4: Kinematics of particles	**Hrs.**
Rectilinear motion of a particle under uniform and variable acceleration, Equations of motion, Motion under gravity, Relative motion, Motion of a projectile, Curvilinear motion of a particle, Relation between linear and angular motion.	**7**
Module 5: Kinetics of particles	**Hrs.**
Newton's laws of motion, D'Alemberts principle. Rectilinear motion- Motion on a rough inclined plane, motion of a lift, motion of connected bodies, Circular motion- Centripetal and centrifugal force, motion of a bicycle, Car along a curved track, super elevation of roads and railway curves, Kinetics of rotation-Torque, mass moment of inertia, problems on centroidal and non centroidal rotation.	**7**
Module 6: Kinetics	**Hrs.**
Work energy method- potential energy, 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.	**6**

Module wise Measurable Students Learning Outcomes :

After the completion of the course the student should be able to:

1. Apply fundamental knowledge of engineering mechanics for rigid bodies under system of forces.
2. Use virtual work principle for analysis of beams. Evaluate various sectional properties such as centre of gravity, moment of inertia etc.
3. Analyse various types of statically determinate pin jointed trusses with analytical as well as

graphical methods.

4. Apply knowledge of kinematics of rigid body motion to solve engineering problems in dynamics.
5. Apply knowledge of kinetics of rigid body motion to solve engineering problems in dynamics and recognition of the importance of safety in phases of engineering design and practice.
6. Analyze the impact of work power and energy on engineering problems.

Title of the Course: Elective on Basic Sciences Biology For Engineers 4BS101	L	T	P	Cr
	2	0	0	2

Pre Requisite: Nil

Textbooks:

1. P. S. Verma and V. K. Agarwal, Concept of Cell Biology, S. Chand and Company Ltd, 2002.
2. R. D. Vidyarthi and P. N. Pandey, A Text book of Zoology, S. Chand and Company Ltd, 2004.
3. T. S. Ranganathan, Text book of Human Anatomy, S. Chand and Company Ltd, 2002.

References:

1. Peter H. Raven, George B. Johnson, Biology, McGraw hill, 11th edition, 2017.
2. Engelbert Buxbaum, Fundamentals of Protein Structure and Function, Springer, 2007.
3. Surinder Kumar, Essentials of Microbiology, Jaypee Brothers Medical Publishers (P) Ltd, 2016.
4. Laurence A. Cole, Biology of Life - Biochemistry, Physiology and Philosophy, Elsevier, 2016.
5. V. Sreekrishna, Comprehensive Biotechnology I - Cell Biology and Genetics, New Age, 2005.

Course Objectives:

1. Provide a foundation in basic biological principles.
2. Develop an understanding of the modern biological concepts and their applications to engineering and life.
3. Describe the stages of biological evolution on Earth and the interrelation ships among the living organims.

Course Learning Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive level	Bloom's Cognitive Descriptor
CO 1	Identify the characteristics and basic needs of living organisms and explain the mechanisms of evolution in living organisms.	II	Understanding
CO 2	Outline the structure of the biomolecules and describe the structure and function of cells including the metabolic reactions that occur in cells.	II	Understanding
CO 3	Describe the chromosome theory, molecular genetics as well as identify microorganisms and their role in various environments.	II	Understanding

CO-PO Mapping:
Mechanical Engineering

	a	b	c	d	e	f	g	h	i	j	k	l
CO1			**1**									
CO2												
CO3												

Assessments:
Teacher Assessment:
Two components of In-Semester Evaluation (ISE), One Mid-Semester Examination (MSE) and one End-Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and **ISE 2** are based on assignment/declared test/quiz/seminar etc.
MSE: Assessment is based on 50% of course content (Normally first three modules)
ESE: Assessment is based on 100% course content with60-70% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Module 1 : Introduction and Classification	**Hrs.**
Introduction: History and Significance of Biology. **Evolution**: Origin of life; Biological evolution. **Five kingdom classification**; Need for classification, Salient features and classification of Monera, Protista, Fungi, Plantae and Animalia, Lichens, Viruses and Viroids.	**03**
Module 2 : Molecular Biology	**Hrs.**
Cell theory and cell as the basic unit of life: Structure of Prokaryotic (Typical Bacterial Cell) and Eukaryotic cell (Plant cell and animal cell) **Cell organelles**: Structure and function of endoplasmic reticulum, Golgi bodies, lysosomes, vacuoles; mitochondria, ribosomes, plastids, micro bodies; Cytoskeleton, cilia, flagella, centrioles (ultra structure and function). Nucleus: nuclear membrane, chromatin, nucleolus. **Cell division**: Cell cycle, mitosis, meiosis and their significance.	**05**
Module 3 : Genetics	**Hrs.**
Introduction: Chromosomes, DNA, RNA, Genes, Genetics, Transcription and Translation in prokaryotic and eukaryotic cell **Inheritance**: Mechanisms of inheritance, Unifactorial Inheritance, Multifactorial inheritance, Sex-linked Inheritance.	**04**
Module 4 : Macromolecular Analysis and Protein Structure	**Hrs.**
Biomolecules: Structure and function of proteins (primary secondary, tertiary and quaternary structure), carbohydrates, lipid, nucleic acids; **Enzymes**: Types, properties, enzyme action: - Lock and Key hypothesis, Induced fit hypothesis.	**04**
Module 5 :Bioenergetics and Metabolism	**Hrs.**
Bioenergetics: Thermodynamics –First law of thermodynamics, second law of thermodynamics, Gibbs free energy, endergonic & exergonic reactions, **ATP:** Structure, properties and energy currency of the cell. **Introduction to Metabolism** - Catabolism, anabolism, catabolic, anabolic and amphibolic pathways **Carbohydrate Metabolism:** Introduction, Aerobic and anaerobic pathways: Glycolysis and its regulation, Gluconeogenesis and its regulation. TCA cycle, amphibolic & anaplerotic reactions, production of ATP, Photosynthesis – 'light' and 'dark' reactions: C4-pathway. **Lipid Metabolism:** Beta – oxidations of saturated & unsaturated fatty acids. Ketone bodies, Biosynthesis of fatty acids – Acetyl-CoA carboxylase reaction, Fatty acid synthase complex, Regulation of fatty acid biosynthesis. Biosynthesis of cholesterol. **Amino Acid Metabolism:** Biodegradation of amino acids – deamination, transamination, decarboxylation, urea cycle including its regulation. Biosynthesis of amino acids, Disorders of amino acid metabolism.	**07**
Module 6 : Microbiology	**Hrs.**
Introduction , Concept of single celled organisms, Concept of species and strains, Identification and Classification of microorganisms, Microscopy, Ecological aspects of single celled organisms, Sterilization and media compositions.	**05**

Module Wise Measurable Students Learning Outcomes:

Module 1 : Introduction and Classification
Identify and describe levels of organization and related functions in plants and animals, their characteristics and basic needs. Explain the classification and the stages of biological evolution on Earth and the interrelation ships among the living organims and development process in individuals and populations.

Module 2 : Molecular Biology
Describe the structure and function of eukaryotic and prokaryotic cells and explain the structure and function of endoplasmic reticulum, Golgi bodies, lysosomes, vacuoles; mitochondria, ribosomes, plastids, micro bodies; Cytoskeleton, cilia, flagella, centrioles (ultrastructure and function). Nucleus: nuclear membrane, chromatin, nucleolus. including the metabolic reactions that occur in cells. And discuss the process of cell division in both somatic and germ cells.
Module 3 : Genetics
Outline and explain the chromosome theory, molecular genetics and quantitative and evolutionary genetics. Discuss the function, replication and evolution of genomes. Describe Transcription and Translation in prokaryotic and eukaryotic cell Explain the process of inheritance.
Module 4 : Macromolecular Analysis and Protein Structure
Identify the structure of the biomolecules found in all living organisms. Describe how RNA, DNA and proteins are synthesized and describe the types and properties of enzymes and enzyme action.
Module 5 :Bioenergetics and Metabolism
Explain the fundamental energetics of biochemical processes and the chemical logic of metabolic pathways Recognize the basic mechanisms of pathway regulation. Discuss the processes of metabolic transformation a the molecular level.
Module 6 : Microbiology
Describe cellular, biochemical, and physiological aspects of microorganisms Explain cellular and biochemical processes involved in pathogenesis (human-pathogen interactions).Identify microorganisms and their role in various environments. Describe the cultural use of microorganisms in food production, medicine, fuel production, and waste treatment.

Title of the Course: Elective on Basic Sciences **Material Science 4BS102**	L	T	P	Cr
	2	0	0	2

Pre-Requisite Courses: 12th Std Basic science courses

Textbooks:

1. William D. Callister, "*Fundamentals of Materials Science and Engineering",* Wiley India Pvt. Ltd, 7th Edition, 2009.
2. V.Raghavan, "*Materials Science and Engineering*", PHI Publication, 6th Edition, 2015.
3. U.C.Jindal, "*Material Science and Metallurgy*", Pearson India, 1st Edition, 2012.

References:

1. Van Vlack, lawrence H.,"*Elements of Material Science and Engineering*", Pearson India, 6th Edition, 2002.
2. Dr. Donald R. Askeland, "*Essentials of Materials Science & Engineering*", Cengage Learning Publisher, SI Edition, 3rd Edition 2013.

Course Objectives :

1. To explain the Mechanical, Magnetic and Thermal properties of Materials.
2. To introduce applications of Metals, Polymers, Ceramics, Composites and Advanced materials.
3. To impart the awareness about role of Materials in Human Evaluation and Industrial Evaluation.

Course Learning Outcomes:

CO	**After the completion of the course the student should be able to**	Bloom's Cognitive	
		level	Descriptor
CO1	Summarize various mechanical properties of materials used in engineering practices.	II	**Understanding**
CO2	Compare applications of advanced in materials by considering their properties.	II	**Understanding**
CO3	Discuss social issues, environmental issues and recycling practices related to materials.	II	**Understanding**

CO-PO Mapping :
Mechanical Engineering

	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**	**l**
CO1			**2**	**1**								
CO2			**2**								**1**	
CO3			**2**					**3**				

Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment	Marks
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MSE	30
ISE 2	10
ESE	50

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MSE: Assessment is based on 50% of course content (Normally first three modules)

ESE: Assessment is based on 100% course content with 70-80% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Module 1: Introduction Historical perspective of Materials Science. Why study properties of materials? Classification of materials. Miller indices. Crystallography and Structure of Metals , Unit cell, Crystal systems, Bravais lattice, Miller indices for directions and planes, Close-packed planes and directions, Packing efficiency, Interstitial voids, Hume-Rothery rules, Role of X-ray diffraction in determining crystal structures**.**	**6 Hrs.**
Module 2: Mechanical Properties of Metals Elastic deformation. Plastic deformation. Interpretation of tensile stress-strain curves Yielding under multiaxial stress. Fracture. Ductile and brittle fracture, Yield criteria and macroscopic aspects of plastic deformation.	**6 Hrs.**
Module 3: Applications of Polymers and Composites Types of polymers, Plastics, Special purpose plastics. Particle reinforced composites. Fiber reinforced composites. Structural composites	**4 Hrs.**
Module 4: Thermal and Magnetic Properties of Materials Heat capacity. Thermal expansion. Thermal conductivity. Thermal stresses. Diamagnetism and paramagnetism. Ferromagnetism.Antiferromagnetism and ferrimagnetism. Influence of temperature on magnetic behavior. Domains and Hysteresis, Superconducting materials.	**4 Hrs.**
Module 5: Advanced Materials 1.Smart Materials-Introduction, Classification, Types, Applications. 2. Bio Materials- Introduction, Classification, Types, Applications. 3. Materials for sports- Introduction, Classification, Types, Applications. 4. Meta materials- Introduction, Classification, Types, Applications.	**4 Hrs.**
Module 6: Economic, Environmental and Social Issues in Material Science and Engineering Economic considerations. Environmental and societal considerations. Recycling issues. Life cycle analysis and its use in design.	**3 Hrs.**

Module wise Measurable Students Learning Outcomes :

After the completion of the course the student should be able to

1. Describe different classes of materials and its classification methods.
2. Follow the influence of different mechanical properties in materials selection process for design considerations.
3. Summarize applications of Composites, Ceramics and Polymers.
4. Summarize thermal and magnetic properties of materials.
5. Describe role of advanced materials in future technology development.
6. Follow newer environmental friendly technology for recycling of materials.

Title of the Course: Elective on Basic Sciences **Introduction To Geoscience 4BS103**	L	T	P	Cr
	2	-----	-----	2

Pre-Requisite Courses: -----

Textbooks:

1. Subinoy Gangopadhyay, 'Engineering Geology', Oxford University Press; Pap/Psc edition (March 18, 2013)
2. K. M. Bangar.,"Principles of Engineering Geology", Standard Publishers Distributors 1705-B Nai Sarak, Delhi, edition 2016
3. N. Chenna Kesavulu ,"Textbook of Engineering Geology",Macmillian India Ltd. 2/10 Ansari Road Daryanganj, New Delhi. Edition 2013
4. Parbin Singh,"Engineering and General Geology", , S. K. Katariya and Sons, Delhi.,2013

References:

1. A. Holmes, "Principles of Physical Gelogoy", ELBS Chapman and Hall, London.Edition Dec.2016.
2. Dr. D. V. Reddy, "Engineering Geology", Vikas Publishing; Second edition ,2017.
3. M. S. Krishnan, Geology of India and Burma, CBS Publishers & Distributers ,6th Edition December 2009
4. D. N. Wadia, "Geology of India', Forgotten Books Publisher, April 2018
5. Mead L. Jensen and Alan M. Bateman, "Economic Mineral Deposits", John Wiley & Sons; Revised 3rd Edition edition ,11 March 1981.
6. P.C. Jain & M.S. Anantharaman, "Palaeontology", Vishal Publishing co., 2016
7. Umeshwar Prasad, "Economic Geology" CBS Publishers , 2nd edition, 2010.
8. A. I. Levorsen,"Geology of Petroleum" , CBS Publisher, 2nd Edition, 2006
9. U. Ashwathnarayana,"Principles of Nuclear Geology", Routledge; 1 edition , 1985
10. Read, H. H.," Rutley's Elements of Mineralogy" Springer Netherlands, 2012
11. Tyrell, G. W., "Principles of Petrology" Aitbs Publishers And Distributors (2012)
12. M. Ramakrishnan and R. Vaidyanathan, "Geology of India Vol.-I&II" Geological society of India, Bangalore, 2010.

Course Objectives :

1. Introduce students the necessary knowledge and concepts in the field of geology and to recognize the synchronism between Geology and other branches of science.
2. Introduce the technique of recognizing and describing various geological features.
3. Enable students to illustrate and interpret geological phenomenon before its consideration in the field of engineering.

Course Learning Outcomes:

CO	**After the completion of the course the student should be able to**	Bloom's Cognitive level	Descriptor
CO1	Recognize and describe the gross knowledge about the Earth and explain the geotectonic phenomenon.	II	Understanding
CO2	Summarize different geological phenomenon and also know minerals/rocks and the usages of different ores.	II	Understanding
CO3	Discuss the stratigraphy of geological formation and understand the lithological conditions and its importance.	II	Understanding

CO-PO Mapping

Mechanical Engineering

	a	b	c	d	e	f	g	h	i	j	k	l
CO1			2	1								
CO2			2								**1**	
CO3			2					3				

Assessments :

Teacher Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar etc.
MSE: Assessment is based on 50% of course content (Normally first three modules)
ESE: Assessment is based on 100% course content with 70-80% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Module 1: <u>Geology and Geotectonics</u>: Geology, branches of geology and its relation with other sciences. Origin of the Earth, Earth as a member of solar system. Gross features of the Earth. Brief idea about interior of the earth, core, mantle, crust. Concept and theory of Isostacy, continental drift and plate tectonics.orogeny and epirogeny, types of mountains.	**5 Hrs.**
Module 2: <u>Mineralogy and Petrology</u>: Introduction to Mineralogy, definition of mineral, common rock forming minerals viz. quartz, feldspars, olivine, augite, hornblende, mica, calcite. Introduction to petrology. Study of igneous, sedimentary and metamorphic rocks. Common rocks viz. granite, gabbro, rhyolite, basalt, shales and sandstone, limestone and laterite, schist, gneiss, marble and quartzite.	**5 Hrs.**
Module 3: <u>Structural Geology and Palaeontology</u>: Earthquakes and volcanoes. Introduction to geological structures viz. faults, folds, joints. Introduction to palaeontology, Definition and scope of Palaeontology. Processes of fossilization.,Application of paleontological data in economic geology, palaeoecology, evolution, stratigraphy.	**5 Hrs.**
Module 4: <u>Economic Geology(Metals)</u>: Introduction to economic geology, Definition of ore, ore minerals and gangue minerals, grades of ores and non-metallic minerals, assay value and tenor of ore. Broad outline of ideas regarding classification of mineral deposits. Uses, geological occurrences, origin and geographical distribution of the ore mineral deposits viz. Iron, Lead, Zinc, Gold, Aluminum, Radioactive minerals,	**5 Hrs.**
Module 5: <u>Economic Geology(Non-metals)</u>: Uses, geological occurrences, origin and geographical distribution of Non-metals (related to refractory, fertilizers, cement, chemical, gemstone and electronic industry) like- Asbestos, Barytes, Gypsum, Mica, Graphite, Talc, Magnesite, Kyanite, Sillimanite, Monazite, Pyrite and Diamond and Rare earth (RE) elements. Fossil fuel (oil and natural gas).	**3 Hrs.**

Module 6 : <u>Introduction to Indian Stratigraphy</u>: Physiographic divisions of India and their characteristics, Rivers and mountains of India, Principles of stratigrphy, Geological time scale. Introduction to Vindhyan Supergroup, Gondwana Supergroup and Deccan Trap systems with respect to classification, geologic and geographic distribution, lithological characteristics, fossil content and economic importance.	**5 Hrs.**

Module wise Measurable Students Learning Outcomes :

After the completion of the course the student should be able to:

After the completion of the course the student should be able to:

1. perceive and describe the gross knowledge of the Earth and Geotectonics.
2. describe the minerals and rocks with sense of mineralogy and petrology.
3. summarize the phenomenon in physical geology and explain the concepts of palaeontology.
4. describe and sense the knowledge of geology for economic purpose.
5. describe and sense the knowledge of of non-metallic minerals for economic purpose.
6. discuss the concepts of Indian Stratigraphy.

Title of the Course: Elective on Basic Sciences Life Science 4BS104	L	T	P	Cr
	2	0	0	2

Pre requisite: NA

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.

Reference Books:

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.
4. V. Sreekrishna, Comprehensive Biotechnology I - Cell Biology and Genetics, New Age, 2005.

Course Objectives:

1. Introduce students to modern aspect of life science.
2. Develop an understanding if 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. Provide a foundation of basic biological principles aned education in life science technologies.

Course Learning Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive level	Bloom's Cognitive Descriptor
CO 1	Outline and describe cytological, biochemical, physiological and genetic aspects of the cell,	II	Understanding
CO 2	Explain the structure and function of organ systems in the human body and describe the concept, practice and significance of immunity.	II	Understanding
CO 3	Relate knowledge of Bio chemistry, Biotechnology and Bioinformatics with application areas in Engineering.	II	Understanding

CO-PO Mapping:

Mechanical Engineering

	a	b	c	d	e	f	g	h	i	j	k	l
CO1												
CO2												
CO3											2	

Assessments:

Teacher Assessment:

Two components of In-Semester Evaluation (ISE), One Mid-Semester Examination (MSE) and one End-Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and **ISE 2** are based on assignment/declared test/quiz/seminar etc.
MSE: Assessment is based on 50% of course content (Normally first three modules)
ESE: Assessment is based on 100% course content with60-70% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Module 1 : Cell Biology	**Hrs.**
Structure and function of prokaryotic (Typical Bacterial Cell) and eukaryotic cell (Plant cell and animal cell) and intracellular organelles, Mechanism of cell division including (mitosis and meiosis) and cell differentiation; Cell-cell interaction.	**03**
Module 2 : Bio Chemistry	**Hrs.**
Structure of atoms, molecules and chemical bonds, Principles of physical chemistry, Thermodynamics, kinetics, dissociation and association constants, Nucleic acid structure, genetic code, replication, transcription and translation in prokaryotic and eukaryotic cell, Structure, function and metabolism of carbohydrates, lipids and proteins, Enzymes and coenzyme.	**04**
Module 3 : Human Physiology	**Hrs.**
a. Digestive system - Digestion, absorption, energy balance b. Respiratory system: Comparison of respiration in different species, anatomical considerations, transport of gases, exchange of gases, waste elimination, neural and chemical regulation of respiration. c. Neural system: Neurons, action potential, gross neuroanatomy of the brain and spinal cord, central and peripheral nervous system, neural control of muscle tone and posture. d. Excretory system: Comparative physiology of excretion, kidney, urine formation, urine concentration, waste elimination, micturition, regulation of water balance, blood volume, blood pressure, electrolyte balance, acid-base balance. e. Cardiovascular System: Comparative anatomy of heart structure, myogenic heart, specialized tissue, ECG – its principle and significance, cardiac cycle, heart as a pump, blood pressure, f. Endocrinology and reproduction - Endocrine glands, basic mechanism of hormone action, hormones and diseases; reproductive processes, gametogenesis, ovulation, neuroendocrine regulation	**09**
Module 4 : Immunity	**Hrs.**
Antigen and Antibody: Introduction, definition and types of Antigens, Structure and functions of different classes of immunoglobulins, Primary and secondary immune response, Lymphocytes and accessory cells, Humoral and cell mediated immunity, Mechanism of immune response and generation of immunological diversity; Application of immunological techniques.	**04**
Module 5 : Biotechnology And Its Applications	**Hrs.**
Principles and process of Biotechnology: Genetic engineering (Recombinant DNA technology). Application of Biotechnology in health and agriculture: Production of secondary metabolites/product Insulin, growth hormones: Indol acetic acid, interferons. Methods of gene transfer in plants, improvement. Introduction to trangenics**:** gene therapy, Genetically modified organisms Biosafety issues– Bio piracy.	**04**
Module 6 : Bioinformatics and its Applications	**Hrs.**
Introduction and Definition of Bioinformatics, Molecular Bio informatics: Genomics, Proteomics and Drug Design. Organic and Community Bioinformatics: Bioinformatics of species diversity. Applications of Bioinformatics: Human health, Microbial genome application, Biotechnology, Agriculture, Comparative studies**.**	**04**

Module wise measurable students learning outcomes

Module 1 : Cell Biology
Describe the intricate relationship between various cellular structures and their corresponding functions. Explain the cytological, biochemical, physiological and genetic aspects of the cell, including cellular processes common to all cells, to all eukaryotic, prokaryotic cells as well as processes in certain specialized cells. Relate normal cellular structures to their functions.
Module 2 : Bio Chemistry
Outline structure of atoms, molecules and chemical bonds. Describe principles of physical chemistry, thermodynamics and kinetics. Explain the structure, function and metabolism of carbohydrates, lipids and proteins, Enzymes and coenzyme.
Module 3 : Human Physiology
Outline and describe structure and function of major organ systems in the human body, the neural system and explain the transmission of signals in excitable cells.
Module 4 : Immunity
Identify major components of the immune system at organ, cellular and molecular levels and discuss normal functions of these components during immune responses. Elucidate the relationship between major cellular and molecular components of the immune system. Explain adverse functions of these cellular and molecular components during abnormal circumstances. Describe mechanisms of diseases associated with adverse functions of the immune system.
Module 5 : Biotechnology And Its Applications
Explain the theory and practice of recombinant DNA technology. Describe biocatalysis, pathway engineering, bioprocess control and downstream processing and Identify the applications of Biotechnology.
Module 6 : Bioinformatics and its Applications
Outline the flow and regulation of biological information. Explain the techniques used to collect sequence and expression data. Identify appropriate biological data bases for specific analyses and describe the applications of Bioinformatics

Title of the Course: Engineering Chemistry Laboratory: 4CH151	L	T	P	Cr
	0	0	2	1

Pre-Requisite Courses: : Chemistry course at secondary and higher secondary level

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.

Course Objectives :

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

Course Learning Outcomes:

CO	**After the completion of the course the student should be able to**	Bloom's Cognitive level	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

CO-PO Mapping :

Mechanical Engineering

	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
CO1				**1**							

Assessments : In Semester Evaluation (ISE)

Assessment	Marks
ISE	100

On the basis of each experiment performed during regular laboratory session, quiz and performance of experiment.

Course Contents:

List of experiments (Minimum 09) — **2 Hrs each**

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 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 $BaSO_4$ as BaO.

Title of the Course: Workshop Practice 4ME152	L	T	P	Cr
	0	**0**	**02**	**01**

Pre-Requisite Courses:

Textbooks:

1. Raghuwanshi B. S.,"*A Course in Workshop Technology I",*Dhanapat Rai Publications,10th Ed.2009
2. S. K. Hajra Choudhury and A. K. Hajra Choudhary,*"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.

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 Learning Outcomes:

CO	**After the completion of the course the student should be able t**	Bloom's Cognitive	
		level	Descriptor
CO1	Describe the methods, operations and processes of manufacturing	II	Understanding
CO2	Summarize the simple mechanical systems, machines, equipment's, the basic working of cutting tools for manufacturing.	II	Understanding
CO3	Use of chemical etching technique for making the PCB for electronic applications.	III	Applying

CO-PO Mapping :

Mechanical

	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**	**l**
CO1	**2**		**2**			**1**						
CO2	**2**		**2**			**1**						
CO3	**2**		**2**			**1**						

Assessments :Teacher Assessment:

100% ISE, Continuous assessment based on the experiments, demonstration performed in the lab and followed by oral examination at the end of semester.

Assessment	Marks
ISE	100

Course Contents:

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. (8 Hrs.)

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.

Title of the Course: Civil and Mechanics Laboratory 4CV151	L	T	P	Cr
	--	--	2	1

Pre-Requisite Courses: Basic Civil Engineering and Engineering Mechanics

References:

1. Duggal S.K., "Surveying (Vol I)", Tata McGraw Hill, 4th edition 2013
2. Bhavikatti., S. S. and Rajashekarappa., K. G. "Engineering Mechanics", New Age International Publishers,5th Edition,2015.
3. Khurmi. R. S., "Textbook of Applied Mechanics", Tata McGraw Hill Publishing Company, 20th Revised Edition, 2013.

Course Objectives :

1. To impart necessary skills to conduct the experiments in surveying using conventional and modern instruments and engineering mechanics.
2. To provide knowledge for conducting experiments to verify the principles of engineering mechanics.

Course Learning Outcomes:

CO	**After the completion of the course the student should be able to**	Bloom's Cognitive	
		level	Descriptor
CO1	**Demonstrate** the use of instruments for the measurement of distance, angle and levels.	III	Applying
CO2	**Demonstrate** the verification of laws of mechanics experimentally, analytically and graphically.	III	Applying

CO-PO Mapping :

Mechanical Engineering:

PO	**a**	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
CO1					1			1		1	
CO2						1		1		1	

Assessments :

Teacher Assessment:

In Semester Evaluation (ISE), and End Semester Examination (ESE) having 50% weights each.

Assessment	Marks
ISE	100
ISE is based on experimental work/performance in laboratory/assignment/declared test/etc.	

Course Contents:

List of Exercises in Civil Engineering

1. Direct and Indirect Ranging (Line Ranger), Measurement of Horizontal Distances by using chain and Tape,
2. Chain Survey, Setting of offsets by using open cross staff, French cross staff, and Indian optical Square.
3. Chain and Compass Traversing.
4. Study of Digital Planimeter.
5. Study of Dumpy Level and determinationreduced levels.
6. Introduction to Modern Instruments.

List of Exercise in Engineering Mechanics:

1. Verification of Law of triangle of forces.
2. Verification of law of polygon of forces.
3. **Determination of support reactions of simply supported beam.**
4. **Verification of the law of moments using Bell crank lever/Efficiency of Bell crank lever**.
5. Graphical solution for concurrent and non-concurrent coplanar force system.

List of Drawings and Reports:

1. Preparation of Half Imperial Drawing Sheet showing types of lines, symbols of Doors-windows, building materials, North line etc. according to IS 962.
2. Preparation of Half Imperial Drawing Sheet showing line plan of a single storey Building.

Module wise Measurable Students Learning Outcomes :

Title of the Course: Physics for Civil & Mechanical Engineers (4PH101)	L	T	P	Cr
	3	-	-	3

Pre-Requisite Courses: Students are expected to know the basic concept in Physics.

Textbooks:

1. M. N. Avadhanulu and P. G. Kshirsagar, "A Text book of Engineering Physics " S.Chand and Company, New Delhi. Revised edition 2014
2. R. K. Gaur and S. L. Gupta "Engineering Physics", Dhanpat Rai Publications, New Delhi. 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.
4. P. M. Mathews, K. Venkatesan,"Text Book of Quantum Mechanics",Tata McGraw Hill 2nd Edition, 2010
5. M.K Harbola, "Engineering Mechanics", Cengage 2nd edition, 2013.
6. D. Kleppner & R. Kolenkow, "An Introduction to Mechanics", McGraw Hill Education, 1st edition 2017

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 Learning Outcomes:

CO	**After the completion of the course the student should be able to**	**Bloom's Cognitive**	
		level	**Descriptor**
CO1	**Describe** optical phenomenon such as interference, diffraction polarization and in terms of wave model. **Explain** the methods of production and detection methods of ultrasonic waves and its applications.	**II**	**Understanding**
CO2	**Explain** Planck's quantum hypothesis, Compton effect, Heisenberg's uncertainty principle, Schrödinger's wave equations and their applications; **Show** the relationship between torque and angular momentum. **Discuss** two body problem, energy equation and diagram,	**II**	**Understanding**
CO3	**Utilize** the concept of rotational dynamics and **implement** them in solving the problems. **Apply** Kepler's law, **Calculate** torques from given forces around given axes of rotation. **Calculate** the moment of inertia of bodies of different shapes.	**III**	**Applying**

CO-PO Mapping:
Mechanical Engineering

PO	a	b	c	d	e	f	g	h	i	j	k	l
CO1				2								
CO2				2								
CO3				2								

Assessments :

Teacher Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar etc.
MSE: Assessment is based on 50% of course content (Normally first three modules)
ESE: Assessment is based on 100% course content with60-70% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Module 1: Optics	**7Hrs.**
Introduction, types of optics, diffraction, types of diffraction, Fresnel's diffraction: Fresnel's half period zones, zone plate, diffraction at straight edge. Fraunhofer's diffraction: diffraction due to single slit, double slits, plane diffraction grating. Polarization: optical activity, specific rotation of optical active substances, Laurent's half shade polarimeter.	
Module 2: Quantum Physics	**7Hrs.**
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.	
Module 3: Ultrasonics	**7Hrs.**
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.	
Module 4: Rotational Dynamics-I	**6Hrs.**
Angular momentum of a particle and system of particles, Torque, Principle of conservation of angular momentum, Rotation about a fixed axis.	
Module 5: Rotational Dynamics-II	**5Hrs.**
Moment of Inertia. Calculation of moment of inertia for rectangular, cylindrical and spherical bodies. Kinetic energy of rotation. Motion involving both translation and rotation.	

Module 6: Gravitation and Central Force Motion	**8Hrs.**
Law of gravitation, Gravitational potential energy, Inertial and gravitational mass, Potential and field due to spherical shell and solid sphere, Motion of a particle under a central force field, Two-body problem and its reduction to one-body problem and its solution, The energy equation and energy diagram, Kepler's Laws, Satellite in circular orbit and applications, Geosynchronous orbits.	

Module wise Measurable Students Learning Outcomes :

After the completion of the course the student should be able to:

1. Module-1: describe Fresnel's and Fraunhofer type diffraction, polarization and applications in technological field.
2. Module-2: use the concepts of quantum mechanics and apply for solving the problems.
3. Module-3: acquire the knowledge of ultrasonic waves and implement in various fields.
4. Module-4: show the relationship between torque and angular momentum.
5. Module-5: calculate the moment of inertia of bodies of different shapes.
6. Module-6: discuss two body problem, energy equation and diagram, Kepler's law.

Title of the Course: Engineering Mathematics II 4MA102	L	T	P	Cr
	3	**1**	**-**	**4**

Pre-Requisite Courses: Mathematics course at Higher Secondary Junior College

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.

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.

Course Objectives :

Familiarize the students with techniques in multivariate integration and statistics. .

Course Learning Outcomes:

CO	**After the completion of the course the student should be able to**	Bloom's Cognitive	
		level	Descriptor
CO1	Apply computational tools to solve mathematical and statistical problems.	III	Applying
CO2	Solve problems in probability, statistics and multivariable calculus.	III	Applying

CO-PO Mapping :

Mechanical Engineering

	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
CO1	**2**			**1**							
CO2	**2**			**1**							

Assessments :

Teacher Assessment:

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Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar etc.

MSE: Assessment is based on 50% of course content (Normally first three modules)

ESE: Assessment is based on 100% course content with60-70% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Module 1: Beta-Gamma Functions: Definition of Beta, Gamma functions and properties of Beta Gamma functions.	**5Hrs.**
Module 2: 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.	**10Hrs.**
Module 3: Numerical Solution of Ordinary Differential Equations of first order and first degree: Numerical Solution by (i) Picard's Method (ii) Taylor's series method (iii) Euler's method (iv) Modified Euler's method (v) Runge- Kutta fourth order method.	**6Hrs.**
Module 4: Probability theory: Introduction, Sample Space, Events, Axioms of probability, Conditional probability Baye's Theorem.	**6 Hrs.**
Module 5: Statistics: Correlation, Linear Regression, Curve-fitting: (a) straight Line (b) parabolic curve (c) exponential curve (d) logarithmic curve.	**6 Hrs.**
Module 6: Probability Distribution: Random Variable, Binomial distribution, Poisson distribution, Normal distribution.	**7Hrs.**

Module wise measurable students learning outcome:
After the completion of the course the student should be able to

Module 1: Beta-Gamma Functions:
Solve complicated integrals with the help of Beta-Gamma functions.
Module 2: Multivariable Calculus:
Explain and solve the integral of physical phenomena when it depends on several variables
Module 3: Numerical Solution of Ordinary Differential Equations of first order and first degree:
Solve different numerical methods of ordinary differential equation of first order and first degree.
Module 4: Probability theory:
Solve various problems in probability theory.
Module 5: Statistics:
Fit the curve using given data.
Module 6: Probability Distribution:
Solve various problems in probability distribution.

Tutorial:
During the tutorial we will ensure that the students have properly learnt the topics covered in the lectures. This shall include assignment , quiz, surprise test or declare test. The teacher may add another activity**.**

Title of the Course: Basic Electrical Engineering (4EL101)	L	T	P	Cr
	2	--	--	2

Pre-Requisite Courses:

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.

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 TMH, 2006.

Course Objectives :

This course intends to

1. Summarize and solve electrical and magnetic circuits.
2. Impart skill to identifying principles, construction and working of electrical machines.
3. Develop skill to describe the wiring system, lamps and low voltage installation components.

Course Learning Outcomes:

CO	**After the completion of the course the student will be able to**	Bloom's Cognitive	
		level	Descriptor
CO1	**Explain** principles, construction and working of electrical machines.	II	Understanding
CO2	**Solve** electrical and magnetic circuits.	III	Applying

CO-PO Mapping :

Mechanical Engineering

PO	**a**	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
CO1				2							
CO2				2							

Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment, oral, seminar, test (surprise/declared/quiz), and group discussion.[One assessment tool per ISE. The assessment tool used for ISE 1 shall not be used for ISE 2]
MSE: Assessment is based on 50% of course content (Normally first three modules)
ESE: Assessment is based on 100% course content with 70-80% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Module 1: DC Circuits	**Hrs.**
Review of R-L-C- Electrical circuit elements, KCL and KVL. Star- delta conversion, voltage and current sources. Magnetic circuits, equivalence of heat and power. Thevenin, Norton and Superposition Theorems.	**4**
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.	**4**
Module 3: DC Machines	**Hrs.**
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.	**4**
Module 4: Transformers	**Hrs.**
Construction, working principle and types of single-phase transformer, open circuit and short circuit tests: Losses, efficiency, all-day efficiency and regulation. Autotransformer Three-phase transformer construction and connections.	**6**
Module 5: AC Machines	**Hrs.**
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.	**4**
Module 6: Wiring, Electrical Installations and Components of LT Switchgear	**Hrs.**
Switch fuse unit, MCB, ELCB, MCCB. Types of wire and cables. Staircase, Godown and Domestic wiring, CFL, LED, Fluorescent tube. Lighting schemes, Earthing, types of batteries, characteristics of batteries.	**4**

Module wise Measurable Students Learning Outcomes:

After completion of the course students will be able to:

1. Explain the KVL and KCL to solve electric and magnetic circuit.
2. Explain fundamentals of AC circuit.
3. Describe construction and working of DC machine.
4. Summarize construction and working of single- phase transformer and three- phase transformer.
5. Describe three- phase and single- phase Induction Motor with application.

Recognize wiring, illumination, supply system and installation components.

Course Name: Basic Electronics Engineering (4EN101)	**L**	**T**	**P**	**Cr**
Course Code: 4EN101	2	0	0	2

Pre-Requisite Courses: 12th Physics

Textbooks:

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

References:

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

Course Objectives:

The aim of this course is to provide knowledge of basic electronics to first year engineering students, so that they can understand, design and implement small digital / analog electronic circuits.

Course Learning Outcomes:

COs	After the completion of the course the student should be able to	Bloom's Cognitive	
		Level	Descriptor
CO1	**explain** fundamentals of digital electronics.	II	Understanding
CO2	**use** logic gates, diodes and transistors based circuit.	III	Applying
CO3	**construct** small application circuits using opamp and IC 555.	III	Applying

CO-PO Mapping :

Mechanical Engineering

PO	**a**	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
CO1				2							
CO2				2							
CO3				2							

Assessments:

Teacher Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks	Evaluation
ISE 1	10	Based on assignments/declared tests/quizzes/seminar etc.
MSE	30	Assessment is based on 50% of course contents.
ISE 2	10	Based on assignments/declared tests/quizzes/seminar/ mini-project etc.
ESE	50	Assessment is based on 100% course contents with 70-80% weightage for course contents covered after MSE.

Course Contents:	**Hours**
Module 1: Fundamentals of Digital Electronics	
Number systems and arithmetic operations, logic gates, Boolean algebra, SOP and POS terms, K-map reduction technique, converting AOI to NAND/NOR logic	5
Module 2: Combinational and Sequential Circuits	
Combinational Circuits: half adder and subtractor, 1-bit full adder and subtractor, 1-bit and 2-bit comparator, BCD and gray code, binary to gray code converter, gray to binary code converter, Sequential Circuits: flip-flops, counters.	5
Module 3: Semiconductor Diode and its Applications	
PN junction diode, diode characteristics, types of diode, diode as Switch, diode circuits: half-wave and full-wave rectifier, zener diode as voltage regulator, clippers and clampers.	5
Module 4: Basics of Transistor	
Transistor structure, types (BJT and FET), transistor configurations, biasing methods, transistor as a switch, BJT amplifier, JFET amplifier, Introduction to MOS transistor.	5
Module 5: Operational Amplifier	
Amplifier fundamentals, 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	5
Module 6: IC555	
IC555 timer: Block diagram, construction and working of astable and monostable multivibrator using IC555	3
Module wise Measurable Students Learning Outcomes: After the completion of the course the student should be able to Module 1: **explain** fundamentals digital electronics. Module 2: **use** logic gates based circuits. Module 3: **illustrate** applications of semiconductor diode. Module 4: **illustrate** use of transistor as a switch and amplifiers. Module 5: **construct** op-amp based electronic circuits. Module 6: **construct** IC 555 based electronic circuits.	

Title of the Course: English for Professional Communication **Course Code : 4HS101**	***L*** **2**	***T*** **1**	***P*** **0**	***Cr*** **3**

Pre-Requisite Courses: Higher Secondary Level

Textbook:

References:

1. K.R.Laxminarayanan, *English for Technical Communication,* Scitech, Sixth Edition, 2008
2. William Sanborn Pfeiffer ,T.V.S. Padmaja ,*Technical Communication: A Practical Approach,* Pearson, Sixth Edition 2012
3. A.K.Jain, Praveen Bhatia, A.M.Shaikh, *Professional Communication Skills,* S. Chand and Co: Fifth edition ,2009
4. Ashraf Rizvi ,*Effective Technical Communication,* Tata McGraw Hills publishing Company 2006
5. F.T.Wood,Remedial English Grammar, Macmillan, 2007
6. Andrea J.Rutherford,Phd. *Basic Communication Skills for Technology,* Pearson Education Asia,2001
7. Exercises in Spoken English, Parts 1 and II CIEFL, Hyderabad , Oxford University Press
8. Sanjay Kumar, Pushplata , *Communication Skills*, Oxford University Press, First edition ,2012

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 and written expression required for their profession and enable them to acquire proper behavioral skills

Course Learning Outcomes:

After completing this course students will be able to:

1. Communicate clearly, precisely and competently in different scenario.
2. Demonstrate the information through oral, written and graphic messages.
3. Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

CO	**After the completion of the course the student should be able to**	**Bloom's Cognitive**	
		Level	**Descriptor**
CO1	Communicate clearly, precisely and competently in different scenario	III	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	Applying

CO-PO Mapping :

Mechanical Engineering

PO	a	b	c	d	e	f	g	h	i	j	k
CO1										3	
CO2										3	
CO3										3	

Assessments :

Teacher Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar etc.
MSE: Assessment is based on 50% of course content (Normally first three modules)
ESE: Assessment is based on 100% course content with 70-80% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Module 1: Sentence Structure and Vocabulary Building 1. Subject Verb Agreement 2. Modal verbs 3. Question tags 4. Connectives 5. Synonyms, Antonyms, and Standard abbreviations 6. Redundancies 7. Misplaced Modifiers 8. Passives	**5Hrs.**
Module 2 : Fundamentals of Communication 1. Features and Functions 2. Importance of Communication 3. The Communication Process	**3Hrs.**

4. Barriers and Breakdown of Communication 5. Communication in an Organization i. Upward communication ii. Downward communication iii. Horizontal communication iv. Diagonal communication v. Informal communication / Grapevine communication	
Module 3 : Nature and Style of Writing 1. Describing 2. Defining 3. Classifying 4. Providing examples or evidence 5. Writing Introduction and Conclusion	**3Hrs.**
Module 4 : **A. Non Verbal Communication** 1. Kinesics or Body Language 2. Proxemics : Space Distance 3. Haptic 4. Vocalic : Paralinguistic features i. Pitch ii. Volume iii. Pauses iv. Rate of words/minute 5.Chronemics 6.Nonverbal Barriers **B. Listening Skills** 1. Process of Listening 2. Types of Listening 3. Barriers to effective Listening	**2Hrs.** **2Hrs**

Module 5 : **A. Oral Communication** 1. Speeches for different Occasions (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	**4Hrs.** **1Hr**
Module 6 : Writing Communication **A. Basic Writing Skills :** 1. Paragraph Writing 2. Comprehension 3. Essay Writing 4. Sentence Structures 5. Use of phrases & clauses in sentences 6. Importance of proper punctuations 7. Creating coherence 8. Organising the principles of paragraphs in documents 9. 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	**2Hrs** **2Hrs** **2Hrs** **2Hrs**

Module wise Measurable Students Learning Outcomes :

Module 1: Construct different types of sentences

Module 2: Communicate effectively and avoid barriers

Module 3: Understand the different styles of writing.

Module 4: Demonstrate the advantages and limitations of non verbal Communication
Module 5: Acquire proficiency in technical English and communicate confidently in different Formal situations.
Module 6: Write effective paragraphs, reports, letters and practice written communication effectively.

After the completion of the course the student should be able to:

1. Enrich their Vocabulary.
2. Improve their sentence structure.
3. Communicate confidently in different formal situations.

Tutorial: Computer Usage / Lab Tool :

Language lab activities are conducted on computers

Laboratory Experiences:

1. Listening and reading skills improved
2. Thinking and concentration are developed

Independent Learning Experiences:

Students prepare for Seminars, presentations, Group Discussions and also Written Tests confidently.

Title of the Course: Engineering Physics Laboratory 4PH151	L	T	P	Cr
	-	-	2	1

Pre-Requisite Courses: Students are expected to know the basic practical knowledge at HSC Level.

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.

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 Learning Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive level	Bloom's Cognitive 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

CO-PO Mapping :
Mechanical Engineering

	a	b	c	d	e	f	g	h	i	j	k
CO1				1							

Assessments: : In Semester Evaluation (ISE)

Assessment	Marks
ISE	100
On the basis of each experiment performed during regular laboratory session, performance of experiment, quiz or oral, and final internal practical examination.	

Course Contents:

List of Experiments (Minimum 8 experiments from the following list) 1. Find the diameter of the thin wire by diffraction of the light 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.	**2 Hrs. each Expt.**

Title of the Course: Introduction to Computer Programming 4CS151	L	T	P	Cr
	1	0	2	2

Pre-Requisite Courses: Basic course of software and hardware programming.

Textbooks:

1. Yashavant Kanetkar, "Let Us C", BPB Publication, Fifteenth edition, 2016.
2. E. Balagurusamy, "Programming in ANSI C", Tata McGraw-Hill Education, Seventh edition, 2016.
3. Byron Gottfried, Schaum's, "Outline of Programming with C", McGraw-Hill, Third edition, 2017.

References:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India, Second edition, 2015.

Course Objectives :

1. To develop problem-solving skills to translate text described problems into programs written using the programming language with the help of language constructs.
2. To impart knowledge on general principles of computer languages such as: conditional branching, loops, block structures, functions, and input/output.

Course Learning Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive level	Bloom's Cognitive Descriptor
CO1	grasp the basics of computer programming.	II	Understanding
CO2	construct algorithms and programs.	III	Applying

CO-PO Mapping :

Mechanical Engineering

PO	a	b	c	d	e	f	g	h	i	j	k
CO1				1				1			
CO2				1				1			

Assessments :

Teacher Assessment:

In-Semester Evaluation – 100 marks

Assessment type-

Assessment Type	Percentage
Continuous Performance Evaluation	50
Continuous Assignment Evaluation	20
Test Evaluation (written, implementation and oral)	30

(ISE is based on the performance of student in laboratory, experimental write-up, presentation, oral, and test (surprise/ declared/ quiz). The course teacher shall use atleast two assessment tools as mentioned above for ISE.)

Course Contents:

Module 1: Basics of Computer Programming	**Hrs.**
Introduction to basics of computer system, algorithm / pseudo code, flowchart, program development steps, structure of a program. **Assignments:**	**2**
Assignments to be carried out in any IDE (Integrated development environment) like Code Blocks, Sublime Text Editor, Turbo C editor and NetBeans for C/C++ Development. Draw flowchart and write a program using arithmetic and logical operators.	**4**
Module 2: Programming Concepts	**Hrs.**
Identifiers, basic data types & sizes, constants, variables, operators, conditional expressions. **Assignments:**	**3**
Programs to display different data type value and size. Programs to demonstrate different operators and their order precedence.	**4**
Module 3 : Conditional Loops in Programming	**Hrs.**
Statements & blocks, if, if-else, nested if-else, if-else ladder, for, while, do-while loops. **Assignments:**	**2**
Programs to demonstrate statement block and conditional statement. Programs to use nested if-else and if-else ladder.	**4**
Module 4 : Control Statements in Programming	**Hrs.**
Switch, break, continue, and goto statements. **Assignments:**	**2**
Programs to demonstrate different types of iteration / loops. Programs to differentiate break and continue statements.	**2**
Module 5 : Function	**Hrs.**
Structure of function, user defined functions, parameter passing methods. **Assignments:**	**2**
Programs to create simple and user defined functions. Programs to demonstrate parameter passing methods.	**6**
Module 6 : Storage classes and recursive functions	**Hrs.**
Storage classes, scope rules, and recursive functions. **Assignments:**	**2**
Programs to demonstrate types of storage classes. Programs to demonstrate use of recursion.	**6**

Module wise Measurable Students Learning Outcomes :

After the completion of the course the student should be able to:

1. explain basics of computer and algorithms for simple problems.
2. use algorithms to implement error free programs.
3. implement conditional branching.
4. implement control statements in programming.
5. decompose a problem into functions and synthesize a complete program using modular approach.
6. implement programs using different types of storage classes and recursive function.

Course Name: Electronics Engineering Laboratory 4EN151	L	T	P	Cr
	0	0	2	1

Pre-Requisite Courses: 12th Physics

Textbooks:

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

References:

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

Course Objectives:

The aim of this course is to provide knowledge of basic electronics to first year engineering students, so that they can understand, design and implement small digital / analog electronic circuits.

Course Learning Outcomes:

COs	After the completion of the course the student should be able to	Bloom's Cognitive Level	Bloom's Cognitive Descriptor
CO1	**identify** electronics components and instruments.	II	Applying
CO2	**construct** digital IC, diode and op-amp based circuits.	III	Analyzing

CO-PO Mapping :

Mechanical Engineering

PO	a	b	c	d	e	f	g	h	i	j	k
CO1				2							
CO2				2							

Assessments :

Teacher Assessment:

100% ISE, Continuous assessment based on lab performance, quiz related with experiments, circuit simulation task given in groups and oral at the end of semester

Assessment	Marks	Evaluation
ISE	20	Continuous Assignment Evaluation
	50	Continuous Performance Evaluation based on declared tests /quizzes /mini project /seminar etc.
	30	Final performance lab test conducted at the end of semester (Implementation and Oral)

Course Contents:

Experiment List: (Minimum 13 Lab sessions)

1) Identification of components and instruments required in lab to perform experiments based on Electronics.
2) Verification of truth table of all logic gates.
3) Realization of logic gates using basic building block (NAND/NOR).
4) Implementation of combinational logic circuit.
5) Study of P-N Junction diode characteristics
6) Working of Half-wave rectifiers
7) Working of Full-wave rectifiers
8) Working of clipper
9) Working of clampers
10) Study of transistor as a switch and amplifier (BJT and JFET)
11) Study of inverting and non-inverting amplifier (IC 741)
12) Implementation of opamp based application (Adder / Subtractor)
13) Working of multivibrator using IC 555 (Astable and Monostable)

Measurable Students Learning Outcomes based on above experiments:

After the completion of the course the student should be able to

1) identify and handle electronic components, ICs and instruments
2) implement and test diode, transistor and opamp based circuits
3) identify use of diode, transistor and opamp in various applications
4) apply knowledge to deal with electronic circuitry

Computer Usage / Lab Tool: Proteus Simulator, Analog / Digital Trainer kit, Digital Oscilloscope, Signal Generator, Multimeter and DC power supply.

Title of the Course: Electrical Engineering Laboratory 4EL151	L	T	P	Cr
	--	--	2	1

Pre-Requisite Courses:

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.

References:

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

Course Objectives :

1. To demonstrate basic knowledge of Electrical engineering.
2. To develop skills to recognize working principle, construction and types of electrical machines.

Course Learning Outcomes:

CO	After the completion of the course the student will be able to	Bloom's Cognitive level	Bloom's Cognitive Descriptor
CO1	**Demonstrate** the use of transformers and AC/DC machines.	3	Applying
CO2	**Describe** basic concepts of electrical circuits and various theorem.	2	Understanding

CO-PO Mapping :

Mechanical Engineering

PO	a	b	c	d	e	f	g	h	i	j	k
CO1				2							
CO2				2							

Assessment:

In Semester Evaluation (ISE).

Assessment	Marks
ISE	100

ISE is based on performance of student in laboratory, experimental write-up, presentation, oral, and test (surprise/declared/quiz). The course teacher shall use at least two assessment tools as mentioned above for ISE.

Course Contents:

1. To study AC and DC machines parts and their functions.
2. To study series-parallel RL, RC and RLC circuits
3. To verify KVL and KCL theorems.
4. Study of AC/DC motor starters.

5. To study speed control techniques of ac and dc machines.
6. To perform load test on transformer.
7. To study servo motor/ steeper motor with application.
8. Study of installation techniques using fuse, MCB and MCCB.

Academic Rules and Regulations (V1.6)
[UG]
(After 5th Academic Council Meeting)

Preface

Walchand College of Engineering, (WCE), Sangli is one of the oldest and renowned Engineering colleges in India. The college was established with an objective to provide quality technical education, research and training. WCE is recognized by its contribution to technical education, and involvement of its alumni in designing, planning and execution of engineering projects of national importance. It has established a firm foundation for technical education and research with a high-quality faculty and ethically sound disciplined alumni. The teaching-learning process is student centric and governed by the concept of outcome based education.

This booklet gives comprehensive information on the existing rules and regulations for B. Tech. programmes of all branches. All undergraduate programmes will be governed by these rules and regulations. The various departments are given a direction to excel in academics through these rules and regulations approved by the academic council from time to time, keeping in view the ever growing challenges and new developments. The stakeholders particularly the students, and parents/guardians, are advised to be fully familiar with the academic system of the college. Students should know the rules and regulations governing academic requirements, evaluation system, and grading system. These rules and regulations related to academics evolved over the period of time, after the college was awarded autonomy in 2007 by UGC. These rules are also changed from time to time as per the directives of UGC, AICTE and also by studying the rules of other reputed autonomous institutes. It is expected that this booklet will bring the transparency in the functioning of the college related with academics amongst students, faculty members, administrator, parents and other stakeholders. WCE, Sangli has student oriented academic system, every possible opportunity is provided to progress academically, and overall development of the students is ensured.

Date: 11th July 2016 Dean Academics Director
Release of V 1.6

INDEX

1. DEFINITIONS

1. “College” means Walchand College of Engg., Sangli (WCE).
2. “BoG" means Board of Governors (Administrative Council).
3. “University” means Shivaji University, Kolhapur.
4. “Academic Council (AC)" means apex academic body governing the academic programmes and policies in WCE.
5. “Grievance Redressal and Discipline Committee (GRDC)" means committee appointed by Director to deal with cases of indiscipline.
6. “Complaint Redressal Committee (CRC)” means committee appointed by Director to deal with cases of unfair means/malpractice/s in examination.
7. “Board of Studies (BoS)" means departmental academic body common for UG and PG programmes.
8. “Semester" means period in which academic activities are carried out.
9. “Summer Term" means a period during summer vacation for approximately 3-4 weeks duration, during which remedial classes, industrial training, and soft skill training are conducted.
10. “Course" means theory/laboratory/seminar/project/mini project.
11. “Course credit" means weightage assigned to a course.
12. “Grade" means double letter assigned to indicate the performance of student in a course.
13. “Course teacher" means faculty member assigned to teach a course.
14. “Semester Performance Index (SPI)" means the weighted average of grade point of a student in a semester.
15. “Cumulative Performance Index (CPI)" means the weighted average of grade points for all the semesters completed by a student.
16. “Allowed to Keep Term (ATKT)" means allowed for admission after satisfying minimum credits criterion.
17. “Board of Examination (BoE)" means apex examination body implementing rules and regulations framed by AC.
18. “Grade Moderation Committee “(GMC)" means committee appointed by Controller of Examinations to moderate and finalize the grades assigned by course teachers.
19. “Academic Standing Committee (ASC)” means apex body next to AC to take decisions under emergent situations subjected to ratification by AC.
20. “Academic RRs” means rules and regulations governing academic system of the college.
21. “Departmental Advisory Board”(DAB) means departmental advisory body common for UG and PG programmes.
22. “Departmental Academic and Programme Evaluation Committee (DAPEC)” means departmental academic and advisory body next to BoS and DAB.

2. INTRODUCTION

2.1. All six undergraduate Engineering programmes (Civil, Mechanical, Electrical, Electronics, Computer science and Engg., and Information Technology) shall be governed by the rules and regulations provided in this version of academic RRs. The curriculum of each programme provides i) broad based knowledge; ii) quality content of courses; iii) academic flexibility; iv) scope for multi-disciplinary learning activities; v) opportunity for industry oriented projects. The curriculum designed shall be in line with the out-come based education. Apart from programme requirements, students shall compulsorily undergo foundation courses on sciences, humanities, and engineering; courses on management and economics. The stringent evaluation norms shall be followed to maintain quality of engineering education. The examination system shall be transparent and governed by rules, regulations and time-bound activities.

2.2. The medium of instruction throughout the programme shall be in English.

2.3. The semester system shall be adopted for academic activities in the college. Normally, all odd semesters shall start in third week of July except for first semester of B.Tech. and shall end in first week of November. All even semesters shall start in January and shall end in last week of April. The start of first semester for B. Tech. and M. Tech. shall be governed by admission schedule declared by Government of Maharashtra. Academic calendar shall be prepared and displayed before the start of every academic year.

2.4. The rules and regulations mentioned in this document shall be common to all undergraduate programmes (B.Tech.) offered by the college.

2.5. The provisions made in this document shall govern the policies and procedures, curriculum, course delivery, evaluation system and conduct of the examinations.

2.6. The rules and regulations here under shall be subjected to amendment made by the Academic Council (AC) from time to time, based on the recommendations of the BoS. All such amendments shall be applicable to all further batches including those already undergoing the programme.

2.7. The rules and regulations formulated in this document shall be subjected to revisions/refinement/updates/modifications through approval by the AC, from time to time, and shall be binding on all concerned stake holders, including the students, faculty, staff, departments, and institute authorities.

3. ORGANIZATION STRUCTURE AND ACADEMIC DEPARTMENTS

3.1. The academic administration of the college consists of committees and functionaries. The committees shall be AC, ASC, BoE, BoS, DAB and DAPEC, and functionaries shall be Director, Deputy Director, Dean Academics, Controller of examinations, Heads of Department, Programme academic coordinator, Programme evaluation coordinator, and First year programme coordinator.

3.2. The academic programmes of the college shall be governed by Rules and Regulations approved by the AC from time to time. The AC is a statutory and supreme body that governs all academic matters of the college, and the decisions of Chairman (AC) (Director of the college) shall be final in regard to all academic issues. All academic activities shall be scheduled through an approved academic calendar notified in the beginning of each academic year. ASC shall continuously assess the academic activities and makes appropriate revisions/modifications/improvements as and when required under emergent situations.

3.3. Academic departments and programmes offered

The college offers undergraduate programmes in engineering. The academic departments and the respective programme offered are given in Table 3.1.

Table 3.1: Academic Departments and Offered Programmes

S. No.	Academic Department	Programme Offered	Programme Code	Department/Branch Code
1	Civil Engineering	Bachelor of Technology in Civil Engineering [B.Tech. (Civil)]	BTE	CV
2	Mechanical Engineering	Bachelor of Technology in Mechanical Engineering [B.Tech. (Mechanical)]	BTE	ME
3	Electrical Engineering	Bachelor of Technology in Electrical Engineering [B.Tech. (Electrical)]	BTE	EL
4	Electronics Engineering	Bachelor of Technology in Electronics Engineering [B.Tech. (Electronics)]	BTE	EN
5	Computer Science and Engineering	Bachelor of Technology in Computer Science and Engineering (B.Tech. (Computer Science and Engineering)	BTE	CS
6	Information Technology	Bachelor of Technology in Information	BTE	IT

		Technology [B.Tech. (Information Technology)]		
7	Humanities	-	-	HS
8	Mathematics	-	-	MA
9	Chemistry	-	-	CH
10	Physics	-	-	PH
11	Applied Mechanics	-	-	AM

The normal duration of these academic programmes is eight semesters. An extension to this period may be given subjected to approval by AC.

4. ADMISSION

4.1. Regular and Lateral Entry

Regular entry refers to admission of students for first, second (excluding lateral entry), third, and final year of the programme in odd semesters.

Lateral entry refers to admission of students for second year directly through Diploma qualification.

4.2. The admission process and eligibility to various undergraduate programmes for regular entry (first year) and lateral entry (second year) are governed by the norms and procedures of Government of Maharashtra.

The candidate shall be provisionally admitted subject to fulfilment of eligibility criteria prescribed by government/University from time to time.

4.3. Each student shall be allotted Programme Registration Number (PRN) at the time of first admission/registration and that will be a permanent identification number. The number shall be

YYYY	PPP	BB	SS	NNN
Year	Programme	Department/Branch	Specialization/ Streams	Roll Number

SS is applicable to M. Tech. programme only, for B. Tech. programmes SS shall be 00.

This number shall never change and the allotted number shall not be offered to any other student even after cancellation of admission. The number shall be valid till the student completes the programme or cancels the admission or is removed from the roll.

4.4. The students seeking admission (regular entry) to second, third and final year should have earned all the credits of the pre-previous year and at least 75% credits of the previous year. For example, for admission to 5th semester (i.e. 3rd year of programme), a student should have earned all credits of the first year and 75% credits of the second year. Similarly for admission to the 7th semester (i.e. 4th year of programme), a student should have earned all the credits of the second year and 75% credits of the third year. However, if calculation of 75% credits results in to a mixed number (integer + proper fraction) then the integer part of that number shall be considered for taking decision related with this clause.

4.5. Entry from University Pattern to Autonomous Pattern

Students admitted to WCE in pre-autonomous status and desirous of seeking re-admission shall be eligible for admission in autonomous status only in odd (3rd, 5th, and 7th) semesters. Such students should have passed all the courses of previous semesters or fulfil the prevailing ATKT norms of Shivaji University, Kolhapur. The students admitted through ATKT norms shall clear backlog courses by appearing for the respective examinations of Shivaji University, Kolhapur. Further they shall undergo additional academic requirements (bridge courses) if any as specified by the BoS of the respective department to be at par with WCE autonomous curriculum. Students who have obtained condone in any of the subjects/courses of university curriculum by Shivaji University, Kolhapur shall be considered to have cleared that subject/course.

4.6. Change of programme/branch

Students shall be eligible to apply for change of branch after completing the first two semesters. The following rules/guidelines shall be used for considering their application for change:

i. The process of change of branch shall be carried out purely on merit basis subject to the rules of admissions prevailing at the time of such change.

ii. Students with fail grade (FF) in any course and/or having backlogs shall not be eligible to apply.

iii. The request for change of branch by a student from branch A to branch B shall be considered if number of students of branch B does not exceed the sanctioned capacity of branch B.

iv. All such transfers shall be effected only once at the beginning of third semester. No application for change of branch during subsequent semesters shall be entertained.

v. Students allotted with a branch of their choice should accept it and no further request for change shall be entertained.

vi. There shall be no change in PRN number for students availing facility of branch change.

4.7. Temporary Withdrawal

A student shall be permitted to withdraw temporarily from the college for the reasons beyond his/her control. The applicable rules are:

i. The withdrawal shall be considered for a complete semester or in multiples of semester.

ii. The student shall apply to Dean Academics for such a withdrawal stating the reasons for such a withdrawal, along with supporting documents, consent of his/her parent/guardian and clearance/no due certificate from all the concerned departments.

iii. Dean Academics shall peruse the case and recommend for the approval from AC/ASC.

iv. A student availing of temporary withdrawal from the College under the above provision shall be required to pay such fees and/or charges as may be fixed by the college until such time as his/her name appears on the student's roll list. However, it may be noted that the fees/charges once paid shall not be refunded.

v. Normally, a student will be entitled to avail the temporary withdrawal facility only once during the programme. However, request for any further withdrawal for the concerned student shall have to be approved by the AC of the college.

4.8. Termination from the Programme

A student shall be terminated from the programme in the following cases:

i. Involved in ragging and not obeying discipline stipulated by college;

ii. Successive failures in first Year: Normally a student who fails to obtain eligibility for admission to third semester within three successive academic years shall be declared as Not Fit for Technical Education [NFTE]. Such students shall be permitted for only one year to continue the education in the college provided the permission is accorded by AC. Director shall be authorized to terminate such student.

iii. Not completing programme in prescribed period: Students shall have to complete B. Tech. programme in maximum period of 6 years (12 semesters) for regular entry and 5 years (10 semesters) for lateral entry from the date of first admission. However, genuine cases with proper justification may be referred to AC for extending programme completion period. Such student will be declared as Failed to Complete Technical Education [FCTE].

5. ACADEMIC CALENDAR

5.1. The academic activities of the college shall be governed by academic calendar prepared by Dean Academics and approved by the AC/ASC. It shall be notified at the beginning of each academic year. Academic calendar shall incorporate schedule of admission, course registration, course delivery, examination/evaluation, course feedback, course/graduate exit survey, co-curricular activities, extra-curricular activities, holidays, compensation for academic loss, meetings (AC, ASC, IQAC, BoE, Alumni), academic audit, and vacation.

5.2. The curriculum shall be typically delivered in two semesters in an academic year. Each semester shall be of 20 weeks (100 days) duration, including evaluation, grade moderation and result declaration. Generally, 13-14 weeks (72-77 days) for course content delivery and 4-6 weeks (20–30 days) for examination/evaluation shall be assigned in each semester. The academic session in each semester shall provide at least 75 teaching days, with 40 hours of teaching per week. The first and second semesters of an academic year normally shall begin from mid-July and first week of January respectively.

5.3. The academic calendar should be strictly adhered to, and all other activities including co-curricular and extra-curricular activities should be scheduled so as not to interfere with the curricular activities as stipulated in the academic calendar.

5.4. The non-conduct of academics on any particular teaching day for what so ever reason shall be made up by having the class/lab/teaching sessions conducted on a suitable Saturday by following the particular class time table of that teaching day which was so lost.

6. ATTENDANCE

6.1 All students should attend the classes and expected to be regular (100% attendance) for all the courses. The attendance records of students should be maintained in WCE moodle by the course teacher. The students should check their attendance in WCE moodle regularly and should contact respective course teacher for any discrepancy/grievance.

6.2 A maximum of 25% exemption in the attendance may be permitted for the approved leave of absence from class teacher/HoD for participating in co-curricular/extra-curricular activities/medical emergencies/reasons beyond the control of student. Students with more than 75% attendance shall not be imposed with any grade penalty.

6.3 The students with less than 75% attendance in theory course/s shall be liable for grade penalty as below:

i. Students having attendance greater than or equal to 65% but less than 75% shall be allowed to appear for ESE in that course with maximum grade of BC.

ii. Students having attendance greater than or equal to 50% but less than 65% shall be allowed to appear for ESE in that course with maximum grade of CC.

iii. Students having attendance less than 50% shall be awarded with XX1 grade in that course.

6.4 Students reported having "non-satisfactory performance" in a laboratory/seminar/mini project/project by the course teacher shall obtain XX1 grade. Non-satisfactory performance shall be reported in case of poor attendance or not satisfying/fulfilling the requirements for these courses.

6.5 Students obtaining XX1 grade in a course/s shall not be eligible to appear for ESE in that semester and also makeup examination in that academic year for these course/s. The performance of such students in ISE and MSE for this course/s shall be cancelled.

6.6 Students obtaining XX1 grade shall re-register for the course/s in subsequent year.

6.7 Students obtaining "XX1" grade in more than three courses in a regular semester shall be detained for that semester and shall not be allowed to appear for ESE in that semester and also make up examination in that academic year for any of the courses. The performance of the student in ISE and MSE for all courses shall be cancelled. Such students shall have to re-register for all courses of that semester in next academic year and undergo all evaluations along with regular students.

7. CURRICULUM

7.1. There shall be a prescribed course structure for each of the academic programmes and in general terms it shall be known as the curriculum of courses of study. The curriculum prescribes all the courses of study semester-wise with credits, assigned teaching/contact hours, evaluation scheme and minimum requirements for the award of degree. The curriculum revisions/reforms/revamping shall be a continuous process governed by outcome based education, choice based credit system and AICTE guidelines.

7.2. The components of curriculum with the weightages assigned are given in Table 7.1. The weightage given for these components are in line with those suggested by AICTE.

Table 7.1: Components of Curriculum

S. No.	Component of curriculum	Weightage assigned (% in terms credit)
1	Humanities, Social science and Management	6
2	Basic sciences including mathematics	15
3	Engineering science	15
4	Professional core	34
5	Professional elective	15
6	Open elective	5
7	Project work, Seminar, Internship in industry etc.	10

7.3. The curriculum shall have credit and audit courses. The structure of curriculum for a programme and course syllabi shall be approved by AC on recommendation of respective BoS.

7.4. Normally number of courses in a semester shall not be more than six for theory and four for laboratory courses.

7.5. Open electives offered by any parent department shall be the courses listed in the curriculum structure under the open elective category. These shall be offered to students of any other department (excluding parent department) in 5^{th} and 6^{th} semester and any other department (including the parent department) in 7^{th} semester. Normally, professional and open electives shall be conducted if minimum of fifteen students opt for that elective course.

7.6. Major project work shall be in 8^{th} semester. Project work in the final year facilitates students in exhibiting their technical knowledge and professional skills to address a solution to societal/industrial problems. It also encourages students to work in teams and adopt project management skills. The preparatory work for the project shall be carried out in 7^{th} semester under pre-project work. The students shall have an option to carry out the project either within campus or in industry/autonomous institutes/reputed organizations. Normally, major project work shall be carried out by not more than five students in a group. The formation of project groups shall be based on policy of respective departments. The students shall be encouraged to opt for Sponsored Project At Industry/Institute (SPAI). The projects under SPAI/any project outside the campus require approval from concerned department.

7.7. Process and guidelines for SPAI shall be:

i. Students may opt for SPAI to be carried out in 8^{th} semester.

ii. Students opting for SPAI should decide, identify and interact with relevant industry/institute in 7^{th} semester itself. However, as per the specific needs of a particular department, the departmental academic and programme evaluation committee shall decide appropriately. Students shall take necessary help from their parent department/Training and Placement Officer (TPO) to establish contact with industries/institutes.

iii. Students shall submit the application attached with relevant details viz. correspondence with industry, area and nature of project to the department before the end of 7^{th} semester.

iv. Director/Dean Academics shall issue permission letter to the students on the recommendation of HoD. Students shall be allowed to work in the industry/institute for maximum of 13 weeks during the project work in 8^{th} semester.

v. An internal guide from the parent department and mentor from industry/organization/institute where project is to be undertaken shall be allocated to student. Both guides should discuss and finalize the scope of project work and monitor the progress together.

vi. Internal guide should visit the industry at least twice in a semester to see the progress of his/her student. Faculty will be supported with travelling and dearness allowance to visit industry/institute.

vii. Students should maintain a diary, regularly write progress and get the approval from both internal and external guides at least twice in a month either by physically reporting or through email communication.

viii. Progress report and certification of the project work undertaken shall be submitted by the student to the respective guide. The mode of evaluation shall be same as adopted for students carrying out projects in-house.

7.8. A course code shall be NBBLMJ [e.g. 3CV313; 2OE301; 3IC401]

where, N: revision number, BB: Code of branch for core courses and departmental professional electives/Code OE for open elective/Code IC for institute mandatory course, L: Year/Level of course, and MJ: Course number [01 to 10 (semester I) and 21 to 30 (semester II) for theory core courses; 11 to 20 (semester I) and 31 to 40 (semester II) for theory professional electives; 41 to 50 (semester I and II) for seminar and mini-projects; 51 to 70 (semester I) and 71 to 90 (semester II) for laboratory courses; 91 to 99 (semester I and II) for project; 01-07 (semester I), 08-14 (semester II) for open electives offered by AM; 15-21 (semester I), 22-28 (semester II) for open electives offered by CV; 29-35 (semester I), 36-42 (semester II) for open electives offered by ME; 43-49 (semester I), 50-56 (semester II) for open electives offered by EL; 57-63 (semester I), 64-70 (semester II) for open electives offered by EN; 71-77 (semester I), 78-84 (semester II) for open electives offered by CS; 85-91 (semester I), 92-98 (semester II) for open electives offered by IT]

7.9. A typical description of course syllabus shall consist of course title, course code, teaching hours per week for lecture/tutorial/practical, credit, pre-requisites, text books, reference books, objectives, outcomes with relevant Bloom's taxonomy levels, mapping of course outcome with programme outcome, assessment scheme, content, and module-wise outcomes (for theory course).

7.10. The details of curriculum structure and course details shall be published in college intranet (ftp//:10.10.16.16) and website (www.walchandsangli.ac.in).

7.11. Summer term shall also be conducted for academically weak students during the academic year for theory courses. Remedial classes and student-teacher interactive sessions shall be conducted during summer term. The duration of summer term shall be typically 3-4 weeks. The registration for the courses in summer term shall be mainly to students who have obtained FF grade in a course in the current academic year. Students with XX1 grade shall also be allowed for registration to summer term. However, students with XX1 grade shall not be allowed to appear for makeup examination in that semester as mentioned in section 6.5. Attendance penalty given in section 6.3 shall be applicable for makeup examination also.

Students with FF/XX1 grade may register for course/s in a summer term by paying prescribed fee for each course. A particular course/s shall be conducted if the number of registered students for a course/s is more than 10. The registered students should attend the classes regularly. Attendance rules shall be applicable to summer term also.

7.12. Credit System:

The primary purpose of the credit system is continuous evaluation of a student's performance which is measured by the number of credits the student has earned. Typically, credit measures the quantum of work involved in a course. The cumulative

performance index (CPI) is calculated based on the course credits and grades obtained by the student. A minimum number of earned credits and a minimum CPI should be acquired in order to qualify for the degree.

7.13. A typical credit structure for various courses with various combinations of theory/ tutorial and laboratory/project/ seminar/ mini-project hours is given in Table 7.2.

Table 7.2: Assigned credits for various types of courses

Hours per week per student for			**Credits assigned**
Theory	**Tutorial/ Seminar**	**Laboratory/ Project**	
0	0	2	1
0	1	0	1
1	0	0	1
0	0	4	2
1	1	0	2
1	0	2	2
3	0	0	3
2	0	2	3
2	1	0	3
3	1	0	4
3	0	2	4
4	0	0	4
2	0	4	4
Credit = Theory hours + Tutorial hours + 0.5 (Laboratory hours)			

A student can earn credits for a particular course by fulfilling the minimum academic requirements of attendance and evaluation. No credits shall be awarded if a student satisfies the minimum attendance requirements but fails to meet minimum evaluation requirements.

7.14 The total number of credits required for completing a programme typically is in the range of 175-180 for regular entry and 148-155 for lateral entry. The exact number of credits required is mentioned in the curriculum structure for the respective programme. The total number of credits in a semester in which a student shall register is generally 23-25. Normally, the maximum number of credits per semester shall not exceed 30.

8. REGISTRATION

8.1. The students admitted through regular and lateral entry shall be automatically registered for the courses of that year. Such students shall not have to register separately for the courses.

8.2. A regular admitted student and willing to apply for CPI improvement/having FF/XX1/XX2 grade in a course/s shall re-register for the courses in which the student is seeking grade improvement/passing grade. Such students have to complete the course re-registration procedure alongwith regular students.

8.3. A student, not admitted as regular student, shall have to re-register for the courses in which he/she has obtained FF/XX1/XX2 grade. Such students have to complete the course re-registration procedure as per the schedule in academic calendar. A student obtaining "XX1" grade in less than four courses in a regular semester shall be allowed to re-register for such course/s in next academic year.

8.4. Course re-registration procedure shall include filling up course registration form prescribed by Dean Academics office, verification by examination cell, recommendation by programme academic coordinator and HoD of respective department, payment of prescribed fee and final approval by Dean academics. Student/s re-registered for course/s shall interact with concerned course teacher for any academic help. Student/s shall complete all the academic and evaluation requirements in consultation with course teacher.

8.5. Re-registration, according to rules, shall be carried out as per the schedule given in academic calendar. Late registration may be permitted only for valid reasons and on payment of late registration fees. In any case, registration should be completed before the prescribed last date for registration.

8.6. In-absentia registration may be allowed only in rare cases at the discretion of the Dean Academics and with prior permission.

8.7. Course re-registration shall be done for the course/s of both semesters at the start of academic year as per the schedule in academic calendar.

9. COURSE EVALUATION

9.1 The evaluation of theory courses shall be on the basis of two In-Semester Evaluations (ISE 1 and ISE 2), one Mid-Semester Exam (MSE), and one End Semester Examination (ESE). The weightage for each of these evaluations is given in Table 9.1.

Table 9.1: Weightage of Evaluation

Evaluation	**Weightage**	
	Credit course	**Audit course**
ISE-I	10%	35%
ISE-II	10%	35%
MSE	30%	30%
ESE	50%	Nil

9.2 In-Semester Evaluation (ISE) for a theory course shall be carried out using assessment tools such as assignment, oral, seminar, test (surprise/declared/quiz), and group discussion. The course teacher shall use at least one assessment tool per ISE. The assessment tool used for ISE 1 shall not be used for ISE 2. The assessment tool/s for ISE shall be decided and announced by the course teacher at the beginning of the course. The record of evaluation shall be maintained by course teacher and shall submit it during academic audit.

9.3 The ISE 2 component for theory course shall not be shown to students and all other components shall be shown to students.

9.4 MSE for every theory course (credit and audit) shall be conducted centrally as per the schedule indicated in the academic calendar. MSE shall be of 30 marks and 1.5 hour duration. MSE shall usually be based on modules 1, 2 and 3. There shall be no re-examination for MSE.

9.5 ESE (written/online) for every theory credit course shall be conducted centrally. It shall be of 50 marks and of duration 2 hours, or as mentioned in the examination scheme approved by BoS of the respective programme. The examination shall be based on entire syllabus of the respective course. The weightage shall be 20-30% for the syllabus covered for MSE and 70-80% for the remaining syllabus after MSE. The question paper of ESE may have options up to 20% for all theory credit courses. A student absent for ESE of a course shall obtain "FF" grade. Such a student shall be allowed to appear for make-up examination. There shall be no re-examination for ESE.

9.6 Evaluated answer books of MSE and ESE theory courses shall be shown to students. It shall not be mandatory to show evaluated answer books to the students not present at the given time slot by the course teacher.

9.7 If any examinee is not in a position to write on account of temporary physical disability or injury due to accident and applies for a request for a writer with medical certificate from the Civil Surgeon to that effect, then a writer shall be allowed/ assigned by CoE to such examinee. Normally, such a writer shall neither be a student or a degree holder of any technical programme having similar competency. The examinee shall, however, apply in a prescribed proforma to CoE asking for permission to allow for such a writer. CoE shall then verify the medical certificate and give a permission letter to the examinee for using the writer. CoE shall then take the undertaking from the writer in a prescribed proforma. Such examinee shall produce the permission letter from CoE for using writer to the invigilator. Writer shall be allowed extra time as per section 9.8.

9.8 In case of student admitted with differently abled category/similar case/writer, who can write but at much slower speed as compared to a normal student, he/she may be allowed an extra time of 15 minutes for 30/50 marks paper and 30 minutes for 100 marks paper to write the examination for all the courses, provided he/she seeks permission from CoE for extra writing time on account of his/her disability by producing medical certificate from Civil Surgeon to this effect.

9.9 The paper setting, assessment and conduct of ISE 1, ISE 2 and MSE for audit course shall be as per rules of credit course. Answers books of MSE for audit course shall be shown to students.

9.9 The evaluation for laboratory courses shall be on the basis of either ISE or ISE and ESE each having 50% weightage. ISE shall be continuous evaluation carried out throughout

the semester and based on performance of student in laboratory, experimental write-up, presentation, oral, and test (surprise/declared/quiz). The course teacher shall use at least two assessment tools as mentioned above for ISE. ESE shall be based on either oral or performance and oral as per the examination scheme. ISE marks for laboratory course shall be shown to students and ESE marks shall not be shown to students. External and internal examiners shall conduct ESE.

9.10 The evaluation of courses, such as seminar, mini-projects where ISE is the only component, shall be continuous in the form of presentation, test (surprise/declared/quiz), assignment, oral and quality of report write-up. ISE marks shall be displayed.

9.11 The evaluation for project shall be on the basis of ISE and ESE each having 50% weightage. ISE shall be continuous evaluation carried out throughout the semester. A project evaluation committee composed of two faculty members related to subject area of project work and guide shall be constituted. The distribution of weightage for ISE shall be 25% each by two faculty members and 50% by guide. Each student shall give at least two progress seminars before the committee as per the schedule in academic calendar. A report on project work shall be submitted by students at the time of second progress seminar. ESE in the form of presentation followed by oral shall be conducted by an external examiner and internal examiner/guide. The above mode of evaluations and attendance for ISE and ESE as and when declared shall be mandatory for all students inclusive of students carrying out their project work in industry (outside the campus)/SPAI.

9.12 A common rubric shall be developed to assess seminar, mini-project and major project courses for each programme by departmental academic and programme evaluation committee. The rubric for the laboratory course shall be developed by the concerned course coordinator. A course coordinator is the teacher who conducts the relevant theory course or as decided by the departmental academic and programme evaluation committee.

10. THE GRADING SYSTEM

10.1 Students shall be assigned a grade based on performance in all components of evaluation/examination scheme of a course as per the structure. The grade indicates an assessment of the student's performance and shall be associated with equivalent number called a '*grade point*'. The performance of the student as per the grade point on a 0-10 scale shall further fall into a letter grading system as shown in Table 10.1.

Table 10.1: Grade points

Letter Grade	Grade point	Description
AA	10	Outstanding
AB	9	Excellent
BB	8	Very good
BC	7	Good
CC	6	Average
CD	5	Below average
DD	4	Marginal
FF	0	Fail due to poor performance
XX1	0	Fail due to attendance shortage
XX2	0	Fail due to disciplinary action
PP (only for non-credit audit courses)	0	Passed
NP (only for non-credit courses)	0	Not passed

An 'AA' grade stands for outstanding achievement relative to the class. The 'CC' grade stands for average performance and it refers to 'average' as per course teacher's expectations in a holistic sense and is not based on the class average. The 'DD' grade stands for marginal performance and is the minimum passing grade. The 'FF' grade denotes poor performance. A student who obtains FF grade in any course shall either appear for make-up examination or re-register for the course/s, till a passing grade is obtained.

The 'XX1'grade denotes failure of student due to shortage of minimum attendance (less than 50% of the total hours engaged for that course) and not satisfactory performance in laboratory course.

The 'XX2'grade denotes failure of student due to disciplinary action.

A student who obtains 'XX1/XX2' grade in any course has to necessarily re-register for the course in the subsequent semesters until a passing grade is obtained. Such students shall not be allowed to appear for makeup examination.

10.2 Relative grading shall be applicable to courses where the number of students registered is greater than or equal to 15.

10.3 The concerned faculty shall use ISE 1, ISE 2, MSE and ESE marks to decide the total marks. The marks of each mode of evaluation shall be up-to one decimal place and shall not be rounded. The total of ISE 1, ISE 2, MSE and ESE will be computed and rounded to the nearest higher integer.

10.4 A student will be given maximum of two grace marks per course to obtain passing grade in maximum of two courses provided he/she has passed in all other courses for that semester. If a student has failed in more than two courses, no grace marks will be applicable in any course.

10.5 The grace marks shall be applicable only to regular students and shall not be applicable to any re-registered student in a course.

10.6 FF grade shall be assigned to a student in a theory course in the following cases;

i. Sum of marks obtained by the student in ISE 1, ISE 2, MSE, ESE, and grace (if any) is less than 40.

ii. Marks obtained in ESE are less than 20.

10.7 FF grade shall be assigned in a laboratory course to a student who shall get less than 40% marks in ESE. XX1 grade shall be assigned in a laboratory course to a student obtaining less than 40% marks in ISE.

10.8 In the further grading process, the failed students shall be excluded.

10.9 Then, the mean (μ) and standard deviation (σ) of total marks of passed students shall be computed. From these, the relative grading thresholds shall be decided with the use of Tables 10.2 and 10.3 for theory and lab./ proj./ mini-proj /seminar respectively.

Table 10.2: Relative grading thresholds for theory credit courses

Theory Credit Course		
Grade	≥Min Threshold	< Max Threshold
FF	0	40
DD	40	Max (43, Min [L(μ- 1.745*σ), 46])
CD	Max (43, Min [L (μ- 1.745* σ), 46])	Max (47, Min [L (μ- 1.175 *σ), 52])
CC	Max (47, Min [L (μ- 1.175 *σ), 52])	Max (56, Min [L (μ- 0.613 *σ), 63])
BC	Max (56, Min [L (μ- 0.613 *σ), 63])	Max (64, Min [L (μ- 0.05 *σ), 73])
BB	Max (64, Min [L (μ- 0.05 *σ), 73])	Max (70, Min [L (μ+ 0.5836* σ), 82])
AB	Max (70, Min [L (μ+ 0.5836* σ), 82])	Max (75, Min [L (μ+ 1.225* σ), 90])
AA	Max (75, Min [L (μ+ 1.225* σ), 90])	100

Table 10.3: Thresholds for Lab./ Proj./ Mini-Proj /Seminar

Lab Course		
Grade	≥Min Threshold	< Max Threshold
FF	0	40
DD	40	Max (43, Min [L (μ- 2.336* σ), 46])
CD	Max (43, Min [L (μ- 2.336* σ), 46])	Max (47, Min [L (μ- 1.88* σ), 52])
CC	Max (47, Min [L (μ- 1.88* σ), 52])	Max (56, Min [L (μ- 1.475* σ), 63])
BC	Max (56, Min [L (μ- 1.475* σ), 63])	Max (64, Min [L (μ- 0.84* σ), 73])
BB	Max (64, Min [L (μ- 0.84* σ), 73])	Max (70, Min [L (μ- 0.1* σ), 82])
AB	Max (70, Min [L (μ- 0.1* σ), 82])	Max (75, Min [L (μ+ 0.807* σ), 90])
AA	Max (75, Min [L (μ+ 0.807* σ), 90])	100

10.10 After the relative grade thresholds are calculated, the faculty shall check the histogram of the grades and adjust the thresholds to get nearly bell shaped histogram.

10.11 After this the faculty shall get the grade thresholds, approved from GMC. After approval, the faculty shall lock the grade thresholds.

10.12 The faculty then shall review the boundary cases for each grade and may assign max +1 grace (ISE) mark to those boundary cases. This shall not change the grade boundaries.

10.13 The grades shall be calculated as per the Tables 10.2 and 10.3 and assigned to each student.

10.14 The faculty shall prepare the grade sheet, verify it, sign on it, get the signature of the GMC and handover the grade sheet to the HoD.

10.15 HoD shall receive grade sheets of all courses of the department from respective faculty, verify them, and approve it and display the class wise provisional result on the departmental notice board.

10.16 Absolute grading is applicable to courses where the number of students registered for a course is less than 15. Allocation of grace marks shall be same as mentioned in 10.4.

The thresholds for absolute grading are given in Tables 10.4 and 10.5.

Table 10.4: Absolute grading thresholds for credit course

Grade	Min Threshold	Max Threshold
FF	≥ 0	< 40
DD	≥ 40	< 45
CD	≥ 45	< 50
CC	≥ 50	< 60
BC	≥ 60	< 70
BB	≥ 70	< 80
AB	≥ 80	< 90
AA	≥ 90	≤100

Table 10.5: Absolute grading Thresholds for audit courses

Grade	Min Threshold	Max Threshold
NP	≥ 0	< 40
PP	≥ 40	≤100

CPI shall be calculated as per absolute grading system for the students switched over from university pattern to autonomous pattern.

10.17 Makeup Examination

i. There shall be a makeup examination for all courses (theory and laboratory) once in a year. The makeup examination for an academic year shall be conducted before the commencement of an odd semester of the next academic year.

ii. The students failed in an odd semester and/or even semester in theory/laboratory credit course in an academic year shall be allowed to appear for a makeup examination for the same academic year. A student failed in an audit course shall have to re-register for the course/equivalent course, whenever it is offered in subsequent semester/s.

iii. Also the students, who have secured DD or CD grade in a course in an odd semester or even semester in an academic year and applied for CPI improvement, can appear for such makeup examination for the same academic year. Students with XX1/XX2 grade in a course shall not be allowed to appear for makeup examination of that course in that year.

iv. If a student applies for appearing for such makeup examination for a theory course, the MSE, ISE 1 and ISE 2 marks of the course shall be null and void. Also grade obtained in the course during regular odd or even semester examination shall be null and void.

v. The makeup examination for a theory course shall be of 100 marks and shall be based on all modules in the syllabus with equal weightage to each module. The question paper shall not have any options (no internal options also).

vi. ISE component of student performance in regular semester for a laboratory course shall be retained and makeup examination shall be conducted for ESE component either with oral/performance and oral as per examination scheme of that course.

vii. For makeup examination absolute grading shall be used and Table 10.4 shall be applied for assigning the grades.

viii. The evaluated answer books of makeup examination shall be shown to students.

ix. Grace marks shall not be awarded in makeup examination.

x. If the student fails to clear the course, even in make-up examination, he/she shall have to re-register for the course whenever it is offered and undergo all the modes of evaluations afresh.

xi. There shall not be any other re-examination for makeup examination for what so ever reason.

10.18 Revaluation

A provision of addressing grievance by a student in evaluation of his/her answer book for a course/s in ESE and makeup examination is made in terms of revaluation. If student is not satisfied with the evaluation of his/her answer books in ESE and makeup examination, he/she may apply for revaluation by paying prescribed fee after the declaration of result. If the marks awarded in the paper before and after revaluation vary by 10% or more of the maximum marks assigned to that paper, then marks after revaluation shall be accepted for the revision of result. However, irrespective of what is stated above, the marks obtained after revaluation shall be accepted if the candidate gets the benefit of passing the examination. In any case revaluation fee shall not be refunded.

10.19 The grade "PP" (Passed)/ "NP" (Not Passed) shall be awarded for audit courses depending upon the performance of a student evaluated by the faculty in-charge. No grade points shall be associated with these grades and performance in these courses shall be not taken into account in the calculation of the performance indices (SPI, CPI). However, the award of the degree shall be subject to obtaining a "PP" grade in all such courses.

10.20 Transfer of credits

In order to provide opportunity to students for studying in different learning environment, normally third year students can be sent to other reputed autonomous institutes for one semester under credit transfer. Students can avail credit transfer from other autonomous colleges for one semester provided the curriculum of both the colleges have same minimum three core courses in that semester. The remaining courses in that semester of that institute can be taken as professional electives. Grades obtained by such credit students from that institute will be suitably transferred to the grade card of WCE after approval from CoE, Dean Academics and Director. Such credit transfer is mutually possible from both institutes.

10.21 CPI improvement

i. A student in third and final year, and student who has passed final year B. Tech. shall be permitted to apply for CPI improvement provided his/her CPI is less than 6.50 (for students admitted before 2014-15)/6.75 (for students admitted after 2014-15) by the end of second/third/final year. Such students may apply for CPI improvement by registering for the course/s, of current academic year or immediately preceding academic year, in which the student has obtained DD/CD grade.
[e.g. 1. A student in final year may apply for the course/s of final and third year. The student shall be permitted to appear for makeup examination in final year /re-register for the course/s of third year for CPI improvement.
2. A student in third year may apply for the course/s of third and second year. The student shall be permitted to appear for makeup examination in third year /re-register for the course/s of second year for CPI improvement.]

ii. Re-registration should be done as per schedule in academic calendar.

iii. A student who has passed final B. Tech. shall apply for CPI improvement within 15 days after declaration of makeup examination result. He/she shall re-register for the course/s of final and third year in which the student wants to apply for grade improvement. Such students shall return all the concerned original grade cards to CoE.

iv. If the grade obtained by the student at the improvement examination is improved, it shall be considered as the final grade. For such students new grade card shall be issued with a remark "grade after improvement" for that course/s in which grade is improved.

v. No student shall be permitted to improve grades in courses like laboratory/seminar/mini-project/project.

vi. A student shall be permitted to apply for CPI improvement by re-registering for maximum of five courses in an academic year.

11. CALCULATION OF PERFORMANCE INDICES

11.1 The overall performance of a student shall be indicated by indices: FYPI First Year Performance Index (FYPI), Semester Performance Index (SPI) and Cumulative Performance Index (CPI).

11.2 The performance of a student in a semester shall be indicated by a number called SPI.

11.3 SPI shall be the weighted average of the grade points obtained in all the courses registered by the student during a semester.

11.4 Calculation of SPI.

$$SPI = \frac{\sum_{i}^{n} C_i G_i}{\sum_{i}^{n} C_i}$$

where, C_i = number of credits earned in i^{th} course of semester,
$i = 1 \ldots n$ represent number of courses in which the student has registered in that semester,
G_i = grade point earned in i^{th} course.

11.5 SPI and CPI are calculated only after make-up examination.

11.6 First Year Performance Index (FYPI):

$$FYPI = \frac{\sum_{i}^{n_f} C_i G_i}{\sum_{i}^{n_f} C_i}$$

where, C_i = number of credits earned in i^{th} course of first year,
$i = 1 \ldots n_f$ represent number of courses in which the student has registered in first year,

G_i = grade point earned in i^{th} course.

11.7 FYPI shall reflect all the courses undergone by a student in the first year including the courses in which he/she has failed. FYPI may get modified in the subsequent semesters whenever a student clears his/her first year backlog courses.

11.8 FYPI shall be calculated after the make-up examination on the basis of the grade obtained by that student in a make-up examination. FYPI shall be calculated for the students admitted prior to 2014-15. FYPI shall not be calculated for the students admitted for academic year 2014-15 and onwards.

11.9 Cumulative Performance Index (CPI):

CPI is the weighted average of the grade points obtained in all the courses registered by a student from the beginning of the third semester (for the students admitted prior to 2014-15) and first semester (for the students admitted for academic year 2014-15 and onwards) of the programme.

$$CPI = \frac{\sum_{j}^{m} C_j G_j}{\sum_{j}^{m} C_j}$$

where, j = 1,…m represent the number of courses registered by the student upto the semester upto which CPI is to be calculated.

11.10 FYPI, SPI and CPI will be rounded up to second decimal.

11.11 Conversion of CPI into equivalent percentage

The final CPI is converted into equivalent percentage for students admitted prior to 2014-15 and from 2014-15 is given in Table 11.1.

Table 11.1: CPI conversion to Percentage

CPI of students admitted		**Equivalent Percentage**
Prior to 2014-15	**2014-15 onwards**	
6.00	6.25	55
6.50	6.75	60
7.00	7.25	65
7.50	7.75	70
8.00	8.25	75
8.50	8.75	80
9.00	9.25	85
9.50	9.75	90

11.12 Students admitted prior to 2014-15 and passed with CPI above 6.50 will be awarded first class else pass class. Student admitted after 2014-15 and passed with CPI above 6.75 will be awarded first class else pass class.

12. GRADE REPORT

12.1 A grade report in the form of grade card shall be issued to students at the end of academic year after the declaration of makeup examination results.

12.2 The grade card shall include the following;

i. The list of courses registered for an academic year along with credits.
ii. The letter grade obtained in each course.
iii. The total number of credits earned by a student.
iv. SPI, FYPI (if applicable) and CPI.
v. Examination details.

12.3 Grading System, calculation of performance indices and conversion of CPI to equivalent percentage shall be provided on the back page of grade card.

12.4 Result and class obtained shall be indicated only in the grade card of final year.

13. AWARD OF DEGREE

13.1 A student shall be eligible for the award of B. Tech. Degree from the College and the University provided the student has:

i. Registered and passed all the prescribed courses and earned minimum credit requirement for the degree.

ii. Obtained CPI $\geq$ 5.0.

iii. Paid all the institute dues and satisfied all the requirements prescribed.

iv. No case of indiscipline pending against him/her.

v. Obtained eligibility certificate from University.

13.2 AC shall recommend the list of students to Shivaji University for award of B. Tech. degree.

14. AWARD OF MEDALS

14.1 Awards shall be given to the students for excellent performance in academics, sports/extra-curricular/co-curricular activities, and overall performance.

14.2 Gold, silver and bronze medals shall be awarded to students with excellent academic performance based on CPI in each programme.

14.3 Student shall be awarded with academically best performing student amongst all the progrommes based on CPI.

14.4 An overall best student award shall be given for a student considering all-round performance in academics, extra- and co-curricular activities.

14.5 The award of scholarships/free-ships and other benefits shall be in accordance with rules of Government of Maharashtra and Government of India.

15 COMMITTEES AND FUNCTIONARIES

15.1 The tenure of all committees shall be two years. The frequency of meeting shall depend on nature of the committee. One-third members of the committee shall constitute the quorum. The tenure of functionaries (coordinators) mentioned in this document shall be three years.

15.2 Academic council:

The Academic Council will be solely responsible for all academic matters, such as, framing of academic policy, approval of courses, regulations and syllabi, etc. The Council will involve faculty at all levels and also experts from outside, including representatives of the university and the government. The decisions taken by the Academic Council will not be subject to any further ratification by the Academic Council or other statutory bodies of the university. The composition and functions of the academic council are given below:

Composition:

i. Director of the college (Chairman).
ii. All Heads of department in the college.
iii. Four teachers of the college representing different categories of teaching staff by rotation on the basis of seniority of service in the college.
iv. Not less than four experts from outside the college representing such areas as industry, education, engineering etc., to be nominated by the Board of Governors (BoG)/Administrative council.
v. Three nominees of the university.
vi. Dean academics (member secretary).

Functions and Powers:

a. Scrutinise and approve the proposals with or without modification of the Boards of Studies with regard to courses of study, academic regulations, curricula, syllabi and modifications thereof, instructional and evaluation arrangements, methods, procedures relevant thereto etc., provided that where the Academic Council differs on any proposal, it will have the right to return the matter for reconsideration to the Board of Studies concerned or reject it, after giving reasons to do so.

b. Make regulations regarding the admission of students to different programmes of study in the college subjected to Government rules and regulations.

c. Advice measures for improving the quality of teaching, study and research, innovative evaluation and teaching-learning methods.

d. Make regulations for sports, extra-curricular activities, and proper maintenance and functioning of the playgrounds and hostels.

e. Recommend to BoG proposals for institution of new programmes of study.

f. Recommend to BoG for institution of scholarships, studentships, fellowships, prizes and medals, and to frame regulations for the award of the same.

g. Advice the BoG on suggestions(s) pertaining to academic affairs made by it.

h. Perform such other functions and such other duties as may be necessary and as may be assigned by BoG pertaining to academics.

15.3 Academic Standing Committee (ASC)

Composition:
The composition is same as that of AC except external members.
ASC shall perform the functions under emergent situations subjected to ratification by the AC.

15.4 Board of Studies

The Board of Studies (BoS) is the basic constituent of the academic system of an autonomous college. Its functions will include framing the syllabi for various courses, reviewing and updating syllabi from time to time, introducing new courses of study, determining details of continuous assessment, recommending panels of examiners under the semester system, etc. The composition and functions of the Board of Studies are given below:
Composition:

i. Chairman: Head of the concerned department
ii. Internal members: The entire faculty of each specialisation.
iii. Academic council nominee: Two experts in the subject from outside the college nominated by the Academic Council.
iv. University nominee: One expert nominated by the vice-chancellor from a panel of six recommended by Director.
v. Industry representative: One representative from industry/corporate sector/allied area relating to placement.
vi. One postgraduate meritorious alumnus to be nominated by Director.
vii. Co-opt members: Chairman, Board of Studies, may with the approval of the Director shall co-opt: Experts from outside the college whenever special courses of studies are to be formulated
viii. Member secretary: Programme Academic Coordinator

In addition to BoS for departments of various disciplines, there shall be a BoS for Basic sciences, Mathematics and humanities.
Composition of general BoS:

i. Chairman: First year programme coordinator
ii. Internal members: The entire faculty of each specialisation.
iii. Academic council nominee: Two experts in the subject from outside the college nominated by the Academic Council.
iv. University nominee: One expert nominated by the vice-chancellor from a panel of six recommended by Director.
v. Industry representative: One representative from industry/corporate sector/allied area relating to placement.
vi. Co-opt members: Chairman, BoS, may with the approval of the Director shall co-opt: Experts from outside the college whenever special courses of studies are to be formulated.
vii. Member secretary: Nominated by first year Programme coordinator.

The term of the nominated members shall be two years. Director shall draw the schedule for meeting of the Board of Studies for different departments. The meeting may be scheduled as and when necessary, but at least once a year.

The Board of Studies of a department in the college shall:

a. Review and revision of curriculum keeping in view the VMOs of the college and department, interest of the stakeholders, and national requirement for consideration.
b. Ensure academic standard and excellence of the courses offered by the department.
c. Recommend the curriculum for approval of the Academic Council.
d. Coordinate research, teaching, extension and other academic activities in the department/college.

15.5 Departmental Advisory Board (DAB)

DAB is another basic constituent of the academic system of an autonomous college. The composition and functions of the DAB are given below:

Composition:

i. Chairman: Head of the concerned department
ii. Internal members: Two senior faculty members of department.
iii. Industry representative: One representative from industry/corporate sector/allied area relating to placement.
iv. One academician outside college.
v. One meritorious alumnus.
vi. One parent.
vii. One student.
viii. Member secretary: Programme Evaluation Coordinator

The term of the nominated members shall be two years. Director shall draw the schedule for meeting of the DAB for different departments. The meeting may be scheduled as and when necessary, but at least once a year.

The DAB of a department in the college shall:

a. Formulate a process to review post-implementation effects of curriculum.
b. Suggest measures to ensure academic standard and excellence of the courses offered by the department.
c. Suggest methodologies for innovative teaching and evaluation techniques; enhancement of industry-institute interaction.
d. Identify and recommend the need of new programme.
e. Review target set for attainment of course outcomes and programme outcomes.
f. Guide and provide support to department for enhancing interaction with outside world.
g. Plan strategically to enhance the academic quality of department.
h. Address concerns of stakeholders expressed through feed back.
i. Defining and redefining the Programme Educational Objectives (PEOs) and Programme Outcomes (POs) based on the recommendations by departmental academic committee.
j. Study the achievement of PEOs and POs reported by department academic committee and suggest measures for improvement.

15.6 Board of Examinations (BoE)

Composition:

i. Director (Chairman)
ii. Dean Academics
iii. Controller of Examination (COE): Member Secretary
iv. University Nominee (COE of Shivaji University (SU) or his nominee not below the rank of Deputy Registrar)
v. One expert possessing ten years of industrial/field experience nominated by the Chairman.
vi. DPC Chairpersons (Representing DPC)
vii. Coordinators (Examination, Assessment, Results and Tabulation)

Functions and Powers:

a. The BoE shall
    i. Ensure proper performance of the various duties in conducting examinations viz. paper setting, time table preparation, assessment and declaration of results.
    ii. Recommend examination reforms and shall implement them after approval of academic council.
    iii. Prepare the detailed time table of examinations as per the schedule approved by academic council.
    iv. Arrange for strict vigilance during the conduct of examination so as to avoid use of unfair means by the students, faculty, and invigilators.
b. Chairman, BoE shall constitute Complaint Redressal Committee (CRC) consisting of three members as and when required to deal with the complaints related to the conduct of examinations.
c. The recommendations of the CRC shall be approved by Chairman, BOE to take appropriate disciplinary actions in the concerned matter. The disciplinary actions shall be endorsed by the BOE.
d. The BOE shall perform such duties and responsibilities that are assigned by Academic Council of the institute from time to time.

15.7 Departmental Academic and Programme Evaluation Committee

Composition:

i. Head of Dept. (Chairman)
ii. Five faculty members (at least one from each specialisation) nominated by HoD.
iii. Member Secretary: Programme Academic Coordinator (UG)/Programme Evaluation Coordinator (UG).

Functions and Powers:

a. Review, revise and prepare curriculum structure following institutional policy, suggest improvements in syllabus of a course/s prepared by course teacher/s, and forward the curriculum to BoS for further recommendation.
b. Check appropriateness of course objectives, course outcomes, and mapping of COs with POs and suggest necessary improvements/modifications.
c. Monitor the academic progress throughout the semester, conduct of classes, and take appropriate corrective measures to improve quality of curriculum delivery.
d. Review academic performance of students.
e. Counsel the concerned course teachers for improvement based on student feedback, academic and question paper audit reports.

f. Set target/s for attainment of course outcomes and programme outcomes.
g. Formulate strategy to collect feedback from stake holders, analyze the collected feedback and forward the analysis to DAB.
h. Contribute to maintain academic standard, improve quality of the courses offered by the department and enhancement of industry-institute interaction.
i. Suggest open and professional electives considering societal needs.
j. Recommend methodologies for innovative teaching and evaluation techniques to BoS.
k. Coordinate research, teaching, extension and other academic activities in the department/college.
l. Carry out preparatory work for defining/redefining the Programme Educational Objectives (PEOs) and Programme Outcomes (POs) periodically.
m. Monitor evaluation of course attainments leading to achievement of programme outcomes and report the results of assessment to BoS.

15.8 Programme Academic Coordinator

There shall be Programme Academic Coordinator for UG programme. The functions and duties are:

a. Coordination of all academic activities of the programme viz. curriculum revision, framing of syllabus, time table, BoS meeting as member secretary, re-registration of course/s, display and submission of attendance status.
b. Coordination for programme related examination activities (submission of ISE marks and question papers), Preparation of schedule of ESE for laboratory in coordination with examination cell.
c. Monitoring academic activities and conduct of classes.
d. Extend necessary help to departmental academic and programme evaluation committee.
e. Recording and forwarding all academic and examination related documents to Dean academics/CoE.
f. Work in association with Dean Academics and Controller of Examinations.

15.9 Programme Evaluation Coordinator

There shall be Programme Evaluation Coordinator for UG programme. The functions and duties PEC are:

a. Coordination to conduct internal academic audit, question paper audit, and departmental advisory board meetings as a member secretary.
b. Conduct course and graduate exit survey, make arrangements for feedback from stakeholders (industry/employer/alumni) and feedback analysis.
c. Monitoring assessment of course outcomes.
d. Computation/assessment/evaluation/achievement of PEOs and POs as per NBA requirements.
e. Compilation of information required for Annual Quality Assurance Report (AQAR) of the Internal Quality Assurance Cell (IQAC) and forwarding it to Dean QA.
f. Extend necessary help to departmental academic and programme evaluation committee.
g. Work in association with Dean QA.

PACUG and PECUG will coordinate NBA documentation activity.

15.10 First Year Programme Coordinator (FYPC)

There shall be FYPC and functions and duties are:

a) Coordination of all academic and examination (submission of ISE marks and question papers)activities of first year programme (excluding basic engineering courses) viz. curriculum revision, framing of syllabus, time table, BoS meeting as Chairman, re-registration of course/s, display and submission of attendance status.
b) Coordination to conduct internal academic and question paper audit.
c) Provide assessment of course outcomes to concerned departments and relevant information required for NBA documentation.
d) Monitoring academic activities and conduct of first year classes.
e) Work in association with Dean Academics.

15.11 Faculty advisor /Mentor

The faculty Advisor/Mentor will be appointed by the HoD of the parent department, who will be assigned a group (20 -25) of students of the concerned parent department, and will be valid throughout their duration of study. A group shall consist of 5-7 students from each class.

The functions and duties of FA are:

a. Help the students in planning their courses and related activities during their study period.
b. Monitor, guide, advice and counsel the students on *all* academic matters.
c. Interact with the students at least twice in a semester and maintain the records/minutes of meeting.

15.12 Course teacher

The functions and duties of course teacher are:

a. Conduct classes as per the time table issued by the HoD and maintain all academic records (Attendance on moodle, Evaluation, Attainment) for that course.
b. Prepare course delivery and evaluation plan for student performance and distribute to all the students within the first week of each semester.
c. Display students' performance in attendance and evaluation as stipulated in the academic RRs.
d. Report to the HOD on a periodic (*monthly*) basis, the potential cases of very poor academic performance as well as those of low attendance.
e. Submit ISE marks to PACUG as per the schedule in academic calendar.
f. Document all academic records in the course book in a format specified by Dean QA and submit it for academic audit.

16. DISCIPLINE AND CONDUCT

16.1 Any act of misconduct committed by a student inside or outside the campus shall be an act of violation of discipline of the college. Violations of the discipline shall include:

a. Disruption of teaching, examination, administrative work, curricular or extra-curricular activity, and any act likely to cause such disruption.
b. Damaging or defacing the property inside or outside the college campus.
c. Engaging in any attempt at wrongful confinement of teachers, offices, employees and students of the college.
d. Use of abusive and derogatory slogans or intimidatory language or incitement of hatred and violence.

e. Ragging in any form ("Ragging" means causing, inducing, compelling or forcing a student, whether by way of a practical joke or otherwise, to do any act which detracts from human dignity or violates his person or exposes him to ridicule or to forbear from doing any lawful act, by intimidating, wrongfully restraining, wrongfully confining or injuring him or by using criminal force to him or by holding out to him any threat of such intimidation, wrongful restraint, wrongful confinement, injury or the use of criminal offence. Supreme Court of India has defined ragging as a criminal offence.)
f. Eve teasing or disrespectful behaviour to women or girls students.
g. An assault upon, or intimidation of, or insulting behaviour towards a teacher, officer, employee or student or any other person.
h. Getting enrolled in more than one programme course of study simultaneously.
i. Committing forgery, tampering with documents or records, identity cards, furnishing false certificate or false information.
j. Organising instant agitation/meetings without prior permission in the campus.
k. Viewing/downloading obscene information/data, images and executable files, sending obscene mails/messages via facebook / tweeter/other social sites using college servers.
l. Sharing the login and passwords & other details of IT facilities provided to other students/outsiders.
m. Refusing to provide an identity card when demanded by any college authority.
n. Consuming or possessing alcoholic drinks, dangerous drugs or other intoxicants in the college campus.
o. Possessing or using any weapons and fire arms in the college campus.
p. Unauthorized occupation of hostel, Accommodating guests or other persons in hostels without permission.
q. Malpractice in examination.
r. indulging in anti-national activities contrary to the provisions of acts and laws enforced by Government.
s. Any other act which may be considered by the Director or the Discipline Committee to be an act of violation of discipline.

16.2 Any act of indiscipline of a student reported to Director/Concerned authority shall be referred to Grievance Redressal and Disciplinary Committee of the college. The Committee shall enquire into the charges and recommend suitable punishment if the charges are substantiated. The penalties/punishment/actions may include:

a. Written warning and information to the parents/guardian.
b. Imposition of fine ranging from Rs. 500/- upto Rs. 5000/-.
c. Suspension from the College/Hostel/Mess/Library/ or availing of any other facility.
d. Suspension or cancellation of scholarships/fellowship or any financial assistance from any source.
e. Recover of loss caused to college property.
f. Debarring from participation in sports/NSS/student club.
g. Disqualifying from holding any representative position in the Class/College/Hostel/Mess/Sports/Clubs and in similar other bodies.
h. Disqualifying from appearing in placement and receiving any awards.
i. Expulsion from the Hostel/Mess/Library/Club/College for a specified period by forfeiting fees.
j. Debarring from an examination.
k. Action as per Maharashtra anti-ragging act 1999.

16.3 If a student is found guilty of malpractice in examinations then he/she shall be punished as per the recommendations of the Complaint Redressal Committee (CRC) constituted by BoE. The CRC shall inquire and decide the punishment by following the Guidelines for imposing punishment on examinee/s/others involved in unfair means. However depending on the situation, committee may quantify the severity of the punishment which may include:

a. Cancellation of the performance of the student in the course/s in which he/she was involved in malpractice.

b. Cancellation of the performance in that examination for all the courses.

c. Expulsion/termination from the college if repeatedly involved.

d. Stoppage of scholarships/stipend.

e. Issuing warning.

f. Debarring from the examinations for a specified period.

16.4 Student/s involved in act of indiscipline/malpractice in examination shall be issued notice asking him/her asked to be present before the respective committee (GRDC/CRC) on the day at specified time and venue with his/her parents/guardian. He/she shall give written reply/oral explanation to the charges levelled against him/her for consideration. If the implicated student/s fails to appear before the committee, then decision shall be taken in absentia, on the basis of available evidence/documents, which shall be binding on the concerned student.

16.5 Every admitted student shall be issued photo identification (ID) card which must be retained by the student while he/she is registered at WCE. The student must have valid ID card with him/her while in the institute.

17. CONCLUSIONS

The academic policies/regulations regarding conduct of undergraduate programme in WCE are published in this document. The academic council reserves the right to modify these policies/regulations as and when required from the point of view of achieving academic excellence.

The decision of Director (Chairman, Academic council) shall be final and binding on all concerned i) for the cases not covered through this document; ii) in case of any dispute, difference of opinion in interpretation of this regulation; and iii) emergent cases.

Director

Changes/Amendments in Academic Rules and Regulations [UG]

(After 6th and 7th Academic Council Meeting)

Annexure-A

Walchand College of Engineering, Sangli
(An Autonomous Institute)

Amendmentsin UG and PG RRs		
RR	**Present**	**Amended**
UG/PG 6.1	**Attendance:**All students should attend the classes and expected to be regular (100% attendance) for all the courses. The attendance records of students should be maintained in WCE moodle by the course teacher. The students should check their attendance in WCE moodle regularly and should contact respective course teacher for any discrepancy/grievance.	**Attendance:**All students (except **B. Tech. students in 8th semesterandM.Tech Students of Second Year carrying out SPAI)** should attend the classes and expected to be regular (100% attendance) for all the courses. The attendance records of students should be maintained in WCE moodle by the course teacher. The students should check their attendance in WCE moodle regularly and should contact respective course teacher for any discrepancy/grievance.
UG/PG 8.4	**Course re-registration procedure** shall include filling up course registration form prescribed by Dean Academics office, verification by examination cell, recommendation by programme academic coordinator and HoD of respective department, payment of prescribed fee and final approval by Dean academics. Student/s re-registered for course/s shall interact with concerned course teacher for any academic help. Student/s shall complete all the academic and evaluation requirements in consultation with course teacher.	**Course re-registration procedure** shall include filling up course registration form prescribed by Dean Academics office, verification by examination cell, recommendation by programme academic coordinator and HoD of respective department, payment of prescribed fee and final approval by Dean academics. Student/s re-registered for course/s shall interact with concerned course teacher for any academic help. Student/s shall complete all the academic and evaluation requirements in consultation with course teacher. **However, the students re-registering for all the courses should attend the classes and attendance rules shall be applicable to them.**

WALCHAND COLLEGE OF ENGG. SANGLI

Amendmentsin UG and PG RRs		
RR	**Present**	**Amended**
UG/PG 9.2	**In-Semester Evaluation (ISE)** for a theory course shall be carried out using assessment tools such as assignment, oral, seminar, test (surprise/declared/quiz), and group discussion. The course teacher shall use at least one assessment tool per ISE. The assessment tool used for ISE 1 shall not be used for ISE 2. The assessment tool/s for ISE shall be decided and announced by the course teacher at the beginning of the course. The record of evaluation shall be maintained by course teacher and shall submit it during academic audit.	**In-Semester Evaluation (ISE)** for a theory course shall be carried out using assessment tools such as assignments, oral, seminar, test [surprise (except **B. Tech. students in 8th semester**and**M.Tech Students of Second Year carrying out SPAI**)/declared/quiz], and group discussion. The course teacher shall use at least one assessment tool per ISE. The assessment tool used for ISE-1 shall not be used for ISE-2. The assessment tool/s for ISE shall be decided and announced by the course teacher at the beginning of the course. The record of evaluation shall be maintained by course teacher and shall submit it during academic audit.
UG: 10.18; PG: 10.20	**Revaluation:**A provision of addressing grievance by a student in evaluation of his/her answer book for a course/s in ESE and makeup examination is made in terms of revaluation. If student is not satisfied with the evaluation of his/her answer books in ESE and makeup examination, he/she may apply for revaluation by paying prescribed fee after the declaration of result. If the marks awarded in the paper before and after revaluation vary by 10% or more of the maximum marks assigned to that paper, then marks after revaluation shall be accepted for the revision of result. However, irrespective of what is stated above, the marks obtained after revaluation shall be accepted if the candidate gets the benefit of passing the examination. In any case revaluation fee shall not be refunded.	**Revaluation:**A provision of addressing grievance by a student in evaluation of his/her answer book for a course/s in ESE and makeup examination is made in terms of revaluation. If student is not satisfied with the evaluation of his/her answer books in ESE and makeup examination, he/she may apply for revaluation by paying prescribed fee after the declaration of result. If the marks awarded in the paper before and after revaluation vary by 10% or more of the maximum marks assigned to that paper, then marks after revaluation shall be accepted for the revision of result. However, irrespective of what is stated above, the marks obtained after revaluation shall be accepted if the candidate gets the benefit of passing the examination. In any case revaluation fee shall not be refunded. **In case of third evaluation the result shall be based on average of two closest marks as per rule which is in force at Shivaji University, Kolhapur.**

Amendmentsin UG and PG RRs

<table>
<tr><th>RR</th><th>Present</th><th>Amended</th></tr>
<tr><td>UG: 11.11</td><td>Conversion of CPI into equivalent percentage
The final CPI is converted into equivalent percentage for students admitted prior to 2014-15 and from 2014-15 is given in Table 11.1.
Table 11.1: CPI conversion to Percentage
<table><tr><td colspan="2">CPI of students admitted</td><td rowspan="2">Equivalent Percentage</td></tr><tr><td>Prior to 2014-15</td><td>2014-15 onwards</td></tr><tr><td>6.00</td><td>6.25</td><td>55</td></tr><tr><td>6.50</td><td>6.75</td><td>60</td></tr><tr><td>7.00</td><td>7.25</td><td>65</td></tr><tr><td>7.50</td><td>7.75</td><td>70</td></tr><tr><td>8.00</td><td>8.25</td><td>75</td></tr><tr><td>8.50</td><td>8.75</td><td>80</td></tr><tr><td>9.00</td><td>9.25</td><td>85</td></tr><tr><td>9.50</td><td>9.75</td><td>90</td></tr></table></td><td>Conversion of CPI into equivalent percentage
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Table 11.1: CPI conversion to Percentage
<table><tr><td colspan="2">CPI of students admitted</td><td rowspan="2">Equivalent Percentage</td></tr><tr><td>Prior to 2014-15 (except students admitted to first year B. Tech. in 2013-14)</td><td>To first year in 2013-14 and 2014-15 onwards</td></tr><tr><td>6.00</td><td>6.25</td><td>55</td></tr><tr><td>6.50</td><td>6.75</td><td>60</td></tr><tr><td>7.00</td><td>7.25</td><td>65</td></tr><tr><td>7.50</td><td>7.75</td><td>70</td></tr><tr><td>8.00</td><td>8.25</td><td>75</td></tr><tr><td>8.50</td><td>8.75</td><td>80</td></tr><tr><td>9.00</td><td>9.25</td><td>85</td></tr><tr><td>9.50</td><td>9.75</td><td>90</td></tr></table></td></tr>
<tr><td>UG: 11.12</td><td>Students admitted prior to 2014-15 and passed with CPI above 6.50 will be awarded first class else pass class. Student admitted after 2014-15 and passed with CPI above 6.75 will be awarded first class else pass class.</td><td>Students admitted prior to 2014-15 (except students admitted to first year B. Tech. in 2013-14) and passed with CPI above 6.50 will be awarded first class else pass class. B. Tech. students admitted in 2013-14 for first year/directly admitted (lateral entry) to second year in 2014-15 and passed with CPI (based on 3rd to 8th semester performance) above 6.75 will be awarded first class else pass class. Student admitted in and after 2014-15 and passed with CPI above 6.75 will be awarded first class else pass class.</td></tr>
</table>

Date: 18/7/2017

Dean Academics

WALCHAND COLLEGE OF ENGG. SANGLI

Director

Inclusions/Incorporations in academic rules and regulations (V1.6) of UG and PG

(As per the decisions in 7th Academic Council meeting)

6.3

iv) The participation by a student at state/national level and bringing credit to institute is to be considered for exemption/excuse from attendance during the period of the concerned activity. The exemption/excuse is to be considered by assigning the same grade to exemption/excuse as that of present (Normally one grade) in moodle setting for attendance record.

9.14 The achievement by a student at state/national level and bringing credit to institute is to be considered for exemption from MSE. The performance in ESE by such student will be enhanced by 1.6 factor to compensate for exemption of MSE. However, such student should get minimum of 40% marks in ESE. In case ESE is missed, such student should appear for make-up examination. No remarks will be indicated in grade card.

10.22 (UG) and 10.24 (PG)

The rules for giving extra 3% marks (E3M) for Specially Abled students (SAS)

a. The E3M for SAS shall be given only for the first attempt.
b. The E3M shall not be applicable to SAS appearing for makeup examinations. However, if such a student, due to valid reasons, does not appear for any of the evaluation in all the courses during the regular semester and if he is permitted to appear in all the courses of the concerned semester during the makeup examination of that year, in such a case E3M shall be a valid claim to the concerned SAS.
c. The total of maximum marks of the semester, for which the SAS is appearing, shall be computed based on the current academic structure in force and excluding the backlog (re-registered) courses.
d. The courses, in which SAS has failed, shall be arranged in descending order based on the scored marks (The course with least marks required for passing will be first and so on).
e. Accordingly, the 3% marks shall be computed and distributed among the courses of above two groups so as to give marks required for passing subject to the condition that, the total extra marks shall not exceed 3% of the concerned semester total.
f. While giving extra marks, first the required marks shall be given to enable the student to pass ESE and then (if needed), the required marks for passing the course shall be given. However he/she shall be pass with passing grade “DD”.
g. To be eligible for these benefits, SAS must have appeared all components of evaluations for the course.
h. The course/s, for which SAS has availed this benefit, shall be indicated with (£ pound symbol) and mention of the GR will be made on the grade card.

Amendments in UG and PG RRs

CPI improvement		
RR	Present	Amended
UG 10.21 iii.	A student who has passed final B. Tech. shall apply for CPI improvement within 15 days after declaration of makeup examination result. He/she shall re-register for the course/s of final and third year in which the student wants to apply for grade improvement. Such students shall return all the concerned original grade cards to CoE.	A student who has passed final B. Tech. may apply for CPI improvement. He/she shall re-register for the course/s of final and third year in which the student wants to apply for grade improvement. Such students shall return all the concerned original grade cards to CoE.
PG 10.23 iii.	A student who has passed M. Tech. shall apply for CPI improvement within 15 days after declaration of makeup examination result. He/she shall re-register for the course/s of first year in which the student wants to apply for grade improvement. Such students shall return all the concerned original grade cards to CoE.	A student who has passed M. Tech. may apply for CPI improvement. He/she shall re-register for the course/s of first year in which the student wants to apply for grade improvement. Such students shall return all the concerned original grade cards to CoE.
Passing Criteria/Grace Marks		
UG PG 10.4	A student will be given maximum of two grace marks per course to obtain passing grade in maximum of two courses provided he/she has passed in all other courses for that semester. If a student has failed in more than two courses, no grace marks will be applicable in any course.	A student shall be given maximum of two grace marks [(for ESE or (ISE1 +MSE+ISE2)] per course to obtain passing grade in maximum of two courses provided he/she has passed in all other courses for that semester. If a student has failed in more than two courses, no grace marks will be applicable in any course.
UG PG 10.6	FF grade shall be assigned to a student in a theory course in the following cases; i. Sum of marks obtained by the student in ISE-1, ISE-2, MSE, ESE, and grace (if any) is less than 40. ii. Marks obtained in ESE are less than 20.	FF grade shall be assigned to a student in a theory course in the following cases; i. Sum of marks obtained by the student in ISE 1, ISE 2, MSE, ESE, and grace (if any) is less than 40. ii. Marks obtained in ESE are less than 20 (with grace if any).

Walchand College of Engineering, Sangli (An Autonomous Institute)

Academic Calendar for Semester I Academic Year 2018-19 (9th July to 31st December. 2018)

1. Academic Activities	Dates for Classes		
	F.Y. B.Tech and F.Y. M.Tech.	S.Y to Final Year B.Tech.	S.Y. M.Tech.
Admission without fine Admission with fine	As per DTE schedule	July 9 - 14 July 16 - 31	July 16 - 17 July 18-31
Induction programme	August 1 - 18 (Subjected to DTE admission schedule)		
Commencement of classes	As per DTE schedule (Tentatively August 20th)	July 16th	
Course re-registration	July 23 - 27	July 16 - 21	July 16 - 21
Display of course delivery and evaluation plan on moodle	August 24th	July 21st	
Dissertation Phase I (ISE)			August 20 - 31
Display of mid semester attendance and ISE I marks (Theory)	October 10th	September 15th	September 1st
Mid Semester Examination	October 10- 17 (7 days)	September 17-24 (6 days)	
Last day for showing evaluated MSE answer scripts	October 29th	October 8th	
Course feedback	October 8-9	September 10 -11	
Dissertation Phase II (ISE)			November 19- 30
End of classes and Display and reporting of end semester attendance and XX1 cases	November 30th (70 Academic days)	November 6th (81 Academic days)	
Display of ISE marks for lab. courses and Submission of ISE II (Theory) marks	December 3rd	November 13th	
Submission of Dissertation ISE phase II marks			December 1st
UG Pre- project evaluation		November 1- 6	
End Semester Examination for theory courses	December 3-17 (FYB.Tech.) (12 days) December 3-12 (FYM.Tech.) (8 days)	November 15-30 (11 days)	
End Semester Examination for laboratory courses	December 13-17 (4 days) [FY M.Tech.]	December 1-7 (7 days)	
Last day for showing evaluated ESE answer scripts	December 19th	December 7th	
Course exit survey	December 17-19	December 1-7	
Grade moderation	December 21st	December 10-15	
Dissertation Phase II (ESE)			December 10 - 18
Result declaration	December 21st	December 21st	December 21st
Revaluation (Application and declaration of result)	December 22 to January 15	December 22 to January 15	
Commencement of classes for next semester	Jan. 1st 2019	Jan. 1st 2019	Jan. 1st 2019

2. Audit, Review and Ph.D Progress seminar	
Internal Academic Audit	July 23 - 27
Question paper auditing	August 13 - 18
Ph.D Synopsis (QIP)	August 20 - 31
Ph.D Progress seminar	December 15- 31

3. Committee Meetings	
Planning and evaluation, Library	August 18th
Grievance appeal/disciplinary, Student welfare, Ladies and boys hostel	September 1st
Anti ragging, Sexual harassment for ladies	September 15th
Department Advisory Board	July last week
Internal Quality Assurance Committee	Sept. 2nd week
Academic Standing Committee	Nov. 13th. and Dec. 1st
Board of Examination	December 21st
College Management Committee	Every alternate Wednesday
Departmental meeting	Every fortnight
Departmental academic and programme evaluation committee (review academic performance of students in MSE, ISE and Counsel course teacher based on student feedback)	October 30 - 31

4. List of Holidays (excluding holidays declared by Director) and Vacation	
Independence Day	August 15th
Parsi New Year	August 17th
Bakari Id	August 18th
Ganesh Chathurthi	September 13th
Moharam	September 20th
Gandhi Jayanti	October 2nd
Dasara	October 18th
Diwali	November 7- 9
Id-E-Milad	November 21st
Gurunanak Jayanti	November 23rd
Christmas	December 25th
Winter Vacation 30 days	November 15 - December 31

	July-18						Aug-18					Sep-18					Oct-18				
Mon		2	9	16	23	30		6	13	20	27		3	10	17	24	1	8	15	22	29
Tue		3	10	17	24	31		7	14	21	28		4	11	18	25	2	9	16	23	30
Wed		4	11	18	25		1	8	15	22	29		5	12	19	26	3	10	17	24	31
Thu		5	12	19	26		2	9	16	23	30		6	13	20	27	4	11	18	25	
Fri		6	13	20	27		3	10	17	24	31		7	14	21	28	5	12	19	26	
Sat		7	14	21	28		4	11	18	25		1	8	15	22	29	6	13	20	27	
Sun	1	8	15	22	29		5	12	19	26		2	9	16	23	30	7	14	21	28	

	Nov-18						Dec-18				
Mon		5	12	19	26		31	3	10	17	24
Tue		6	13	20	27			4	11	18	25
Wed		7	14	21	28			5	12	19	26
Thu	1	8	15	22	29			6	13	20	27
Fri	2	9	16	23	30			7	14	21	28
Sat	3	10	17	24			1	8	15	22	29
Sun	4	11	18	25			2	9	16	23	30

Date: 13/7/2018

Controller of Examination
(Shri. M. K. Chavan)

Dean Academics
(Dr. G. R. Munavalli)

Director
(Dr. G. V. Parishwad)

Walchand College of Engineering, Sangli (An Autonomous Institute)

Academic Calendar for Semester II Academic Year 2018-19 (1st Jan. to 15th July 2019)

1. Academic Activities	Dates for Classes	
	F.Y. B.Tech to Final Year B.Tech and F.Y. M.Tech	S.Y. M.Tech.
Commencement of classes	January 1st	January 1st
Display of course delivery and evaluation plan on moodle	January 7th	
Course feedback	February 15th	
Display of mid semester attendance and ISE I marks (Theory)	February 16th	
Mid Semester Examination	February 18– 27 (7 days)	
Dissertation Phase III (ISE)		February 25-March 8
Last day for showing evaluated MSE answer scripts	March 8th	
Submission of Dissertation ISE phase III marks		March 8th
UG Project evaluation (ISE)	April 15 – 23	
End of classes and Display and reporting of end semester attendance and XX1 cases	April 23rd (76 academic days)	
Display of ISE marks for lab. courses and Submission of ISE II (Theory) marks	April 24th	
End Semester Examination for theory courses	April 29- May 15 (14 days)	
UG Project evaluation (ESE)	May 1- 10	
Last date of conducting ESE for laboratory courses	May 24th (8 days)	
Last day for showing evaluated ESE answer scripts	May 20th	
Dissertation Phase IV (ISE)		June 1 - 13
Submission of Dissertation ISE phase IV marks		June 14th
Graduate exit survey	May 30th	June 10 – 29
Dissertation Phase IV(ESE)		June 14 – 30
Course exit survey	May 10– 15	
Grade moderation	May 17th (Final B. Tech.) May 26- 29 (FY to TY B. Tech. and FY M.Tech.)	
Result declaration	May 20th (Final B. Tech.) May 30th (FY to TY B. Tech. and FY M.Tech.)	
Revaluation (Application and declaration of result)	May 31- June 15	
Graduation day (Tentative date)	May 25th	
Registration for the courses of semester I and II in summer term	June 1-3	
Summer term	June 4-22	
Makeup examination	June 24 - July 12	
Result declaration makeup examination and SY M.Tech.	July 15th	July 15th
Revaluation makeup examination (Application and declaration of result)	July 16- 22	
Admission (Individual dates for different classes will be displayed separately)	July 8– 13 (Last date July 31st) (Except FY B.Tech.& FY M,Tech.)	July 8– 13 (Last date July 31st)
Commencement of classes for next semester	July 15th	July 15th

2. Audit, Review and Ph.D Progress seminar	
Internal Academic Audit	January 7- 11
Question paper auditing	January 21- 25
Ph.D Progress seminar	June 15-29
3. Extra-Curricular Activities	
VISION 2K17	March 4-6
Annual Social Gathering	March 7-9
4. Committee Meetings	
Departmental academic and programme evaluation committee (Review academic performance of students in MSE, ISE and Counsel course teacher based on student feedback)	March 16th
Board of Examination	May 20th, May 30th, July
College Management Committee	Wednesday
Departmental meeting	Every fortnight
Board of Studies	May last week
Academic Council	June last week
Planning and evaluation, Library	January 19th
Grievance appeal/disciplinary, Student welfare, Ladies and boys hostel	February 16th
Admission	June 1st

5. List of Holidays* and Vacation	
Shiv Jayanti	February 19th
Mahashivratri	March. 4th
Holi	March. 21st
Gudi Padwa	April 6th
Mahavir Jayanti	April 17th
Good Friday	April 19th
Maharashtra Day	May 1st
Buddha Poornima	May 18th
Ramjan Id	June 5th
Summer Vacation 40 days	May 2 - July 12

*Excluding holidays declared by Director and subjected to declaration of holidays by Government/University.

	Jan-19					Feb-19					Mar-19					Apr-19				
Mon		7	14	21	28		4	11	18	25		4	11	18	25	1	8	15	22	29
Tue	1	8	15	22	29		5	12	19	26		5	12	19	26	2	9	16	23	30
Wed	2	9	16	23	30		6	13	20	27		6	13	20	27	3	10	17	24	
Thu	3	10	17	24	31		7	14	21	28		7	14	21	28	4	11	18	25	
Fri	4	11	18	25		1	8	15	22		1	8	15	22	29	5	12	19	26	
Sat	5	12	19	26		2	9	16	23		2	9	16	23	30	6	13	20	27	
Sun	6	13	20	27		3	10	17	24		3	10	17	24	31	7	14	21	28	

	May-19					Jun-19					Jul-19				
Mon		6	13	20	27		3	10	17	24	1	8	15	22	29
Tue		7	14	21	28		4	11	18	25	2	9	16	23	30
Wed	1	8	15	22	29		5	12	19	26	3	10	17	24	31
Thu	2	9	16	23	30		6	13	20	27	4	11	18	25	
Fri	3	10	17	24	31		7	14	21	28	5	12	19	26	
Sat	4	11	18	25		1	8	15	22	29	6	13	20	27	
Sun	5	12	19	26		2	9	16	23	30	7	14	21	28	

Date: 13/7/2018

Controller of Examination
(Shri. M. K. Chavan)

Dean Academics
(Dr. G. R. Munavalli)

Director
(Dr. G. V. Parishwad)

Walchand College Of Engineering, Sangli

(An Autonomous Institute)

Time Table

Class: F.Y. B. Tech. (Mechanical Engineering) Class Room: 7 & 8

Day	10.15 to 11.15	11.15 to 12.15	12.15 to 1.15	1.15 to 2.15	2.15 to 3.15	3.15 to 3.30	3.30 to 4.30	4.30 to 5.30
Mon.	ME 1- Engineering Chemistry Laboratory, ME2 – Civil and Mechanics Laboratory, ME3 – Engineering Graphics		Lunch Break	Engineering Mathematics I (8)	Engineering Mechanics (8)	Tea Break	ME1, ME2 Engineering Mathematics I (T)	
Tue.	Basic Civil Engineering (7)	Chemistry for Civil and Mechanical Engineers (7)		ME 1 – Engineering Graphics ME2- Engineering Chemistry Laboratory, ME3- Civil and Mechanics Laboratory			ME3 - Engineering Mathematics I (T)	
Wed.	Engineering Mathematics I (7)	Chemistry for Civil and Mechanical Engineers (7)		Engineering Graphics (8)	Engineering Mechanics (8)		ME 1- Civil and Mechanics Laboratory , ME2- Engineering Graphics, ME3- Engineering Chemistry Laboratory	
Thur.	ME 1, ME2, ME3 – Engineering Graphics			Engineering Mathematics I (8)	Basic Civil Engineering (8)		Elective course on basic science Biology for Engineers./ Introduction to Geoscience./ Life Science / Material Science (1,2,7,8)	
Fri.	Engineering Mechanics (7)	Chemistry for Civil and Mechanical Engineers (7)		ME 1, ME2, ME3- Workshop practice			Elective course on basic science Biology for Engineers./ Introduction to Geoscience./ Life Science / Material Science (1,2,7,8)	

****Number in Bracket Indicates Class Room Number**

Chairman Time Table Committee

21/8/18

Dean Academics