SHRI VITHAL EDUCATION & RESEARCH INSTITUTE's
COLLEGE OF ENGINEERING, PANDHARPUR
P.B. No. 54, Gopalpur -Ranjani Road, Gopalpur, Tal.- Pandharpur- 413 304,Dist.- Solapur (Maharashtra)
Tel.: 02186-216063, 9503103757, E-mail : coe@sveri.ac.in, Website: www.sveri.ac.in
(Approved by A.I.C.T.E., New Delhi and affiliated to Solapur University, Solapur)
NBA Accredited all Eligible UG Programmes and , **NAAC**, Accredited Institute,
Accredited by the Institute of Engineers (India), Kolkata and TCS, Pune ISO 9001-2015 Certified Institute

1.3.2 List of courses that include experiential learning through project work / field work / internship

Year of offering: 2020-2021

Programme Name	Programme Code	Name of the Course that include experiential learning through project work/field work/internship	Course code
Mechanical Engineering	1-1408968339	Manufacturing Processes	ME213
		Internal Combustion Engines	ME215(B)
		Manufacturing Technology	ME222
		Power Plant and Energy Engineering	ME225(B)
		Mechanical Workshop-I	ME 226
		CAD-CAM & CAE	ME312
		Industrial Hydraulics and Pneumatics	ME 315 (B)
		Mechanical Workshop – III	ME 317
		Plastic Engineering	ME 325 (C)
		Mini Project	ME326
		Metrology	ME327
		Mechanical Workshop	ME 328
		Refrigeration and Air Conditioning	ME412
		Automobile Engineering	ME414(C)
		Project Work -I	ME416
		Industrial Training	ME417
		Plastic Engineering	ME424(C)
		Project Work -II	ME425

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Year of offering: 2020-2021

Programme Name	Programme Code	Name of the Course that include experiential learning through project work/field work/internship	Course code
Electronics & Tele-communication Engineering	1-1408968324	Mini Hardware Project	ET 326
		Seminar & Project	ET416
		Vocational Training	ET417
		Project	ET 425
Civil Engineering	1-1408968331	Building Construction and Drawing	CV213
		Engineering Geology	CV215
		Water Supply Engineering	CV221
		Waste water Engineering & Air Pollution	CV313
		Assessment of field training report	CV322
		Hydraulic Structures & Water Power Engg.	CV328
		Project work	-
		Assessment of report on field training-II	-
		Transportation Engineering-II	-
		Traffic Engineering and Control	-
Computer Science & Engineering	1-1408968327	Mini Project	CS327
		Project Phase-I	CS417
		Vocational Training	CS418
		Project Phase-II	CS426

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Year of offering: 2020-2021

Programme Name	Programme Code	Name of the Course that include experiential learning through project work/field work/internship	Course code
Electrical Engineering	1-3675277161	Power System-II	-
		Mini Hardware Project	EL327
Master of Business Administration (MBA)	1-1408968337	Project Report & Viva	-
M.Tech. Mechanical-Design Engineering	1-1408968333	Dissertation Phase I : Synopsis Submission Seminar	Dissertation
		Dissertation Phase II : Progress Seminar	Dissertation
		Dissertation Phase III : Progress Report presentation and submission	Dissertation
		Dissertation Phase IV : Final presentation and submission of report	Dissertation
		Dissertation Viva-voce	Dissertation
M. Tech. Computer Science & Engineering	1-1408968341	Dissertation Phase-I : Synopsis Submission Seminar	
		Dissertation Phase-II : ICA	
		Dissertation Phase-II : Progress Seminar	
		Dissertation Phase-III : Progress Seminar	
		Dissertation Phase-IV : Final presentation and submission of report	
		Final Submission of the Dissertation and Viva-voce	

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1.3.2 List of courses that include experiential learning through project work / field work / internship

Year of offering: 2020-2021

Programme Name	Programme Code	Name of the Course that include experiential learning through project work/field work/internship	Course code
M.Tech. Electronics & Tele-communication Engineering	1-1408968335	Dissertation Phase-I: Synopsis Submission Seminar	
		Dissertation Phase-II: ICA	
		Dissertation Phase-II: Progress Seminar	
		Dissertation Phase-III: Progress Seminar	
		Dissertation Phase IV	
		Final Submission of the Dissertation and Viva –Voce	
M.Tech. Civil - Structural Engineering	1-1408968343	Mini project	
		Dissertation Phase I : Synopsis Submission Seminar	
		Dissertation Phase II :ICA	
		Dissertation Phase II : Progress Seminar	
		Dissertation Phase III : Progress Seminar	
		Dissertation Phase IV: Final presentation and submission of report	
		Dissertation Viva –Voce	

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

NAAC Accredited-2015, 'B' Grade (CGPA 2.62)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: MACHANICAL ENGINEERING

Name of the Course: S.Y. B. Tech. (Sem.- III & IV)

(Syllabus to be implemented from June, 2019)

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

Faculty of Engineering & Technology

Credit System structure of S.Y. B. Tech. ***Mechanical Engineering*** *W.E.F. 2019-20*

Semester 3

Theory Courses

Course code	*Name of Theory Course*	*Hrs./week*				*Credits*	*Examination Scheme*			
		L	*T*	*P*	D		*ISE*	*ESE*	*ICA*	*Total*
ME211	Applied Thermodynamics	3	-	-	-	3	30	70	-	100
ME212	Mechanics of Materials	3	-	-	-	3	30	70	-	100
ME213	Manufacturing Processes	3	-	-	-	3	30	70	-	100
ME214	Machine Drawing & CAD	3	-	-	-	3	30	70	-	100
ME215	Professional Elective-I	3	-	-	-	3	30	70	-	100
	Sub Total	**15**	**-**	**-**	**-**	**15**	**150**	**350**	**-**	**500**
MEV21	Environmental Sciences	1	-	-	-	-	-	-	-	-

Semester 3: Laboratory / Tutorial Courses

Course code	*Name of Laboratory / Tutorial Course*	*Hrs./week*				*Credits*	*Examination Scheme*				
		L	*T*	*P*	D		*ISE*	*ESE*		*ICA*	*Total*
								POE	*OE*		
ME211	Applied Thermodynamics	-	-	-	-	-	-	-	-	-	-
ME212	Mechanics of Materials	-	1	-	-	1	-	-	-	25	25
ME213	Manufacturing Processes	-	-	2	-	1	-	-	25	25	50
ME214	Machine Drawing & CAD	-	-	-	4	2	-	50	-	50	100
ME215	Professional Elective-I	-	-	2	-	1	-	-	-	25	25
	Sub Total	**-**	**-**	**-**	**-**	**5**	**-**	**50**	**25**	**125**	**200**
	Grand Total	**15**	**01**	**04**	**04**	**20**	**150**	**425**		**125**	**700**

Abbreviations: *L - Lectures, P –Practical, T- Tutorial, ISE - In Semester Examination, ESE - End Semester Examination (University Examination for Theory & / POE & / Oral), ICA - Internal Continuous Assessment.*

Professional Elective-I: A. Microprocessors in Automations **B.** Internal Combustion Engines **C**. Composite Materials

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

Faculty of Engineering & Technology

Credit System structure of S.Y. B. Tech. ***Mechanical Engineering*** *W.E.F. 2019-20*

Semester 4

Course code	*Name of Theory Course*	*Hrs./week*				*Credits*	*Examination Scheme*			
		L	T	P	D		ISE	ESE	ICA	Total
ME221	Engineering Mathematics –III	3	-	-	-	3	30	70	-	100
ME222	Manufacturing Technology	3	-	-	-	3	30	70	-	100
ME223	Fluid Mechanics & Fluid Machines	3	-	-	-	3	30	70	-	100
ME224	Kinematics & Theory of Machines	3	-	-	-	3	30	70	-	100
ME225	Professional Elective-II	3	-	-	-	3	30	70	-	100
	Sub Total	**15**	**-**	**-**	**-**	**15**	**150**	**350**	**-**	**500**
MEV22	Environmental Sciences	1	-	-		-	-	-	-	-

Semester 4: Laboratory / Tutorial Courses

Course code	*Name of Laboratory / Tutorial Course*	*Hrs./week*				*Credits*	*Examination Scheme*				
		L	*T*	*P*	D		*ISE*	*ESE*		*ICA*	*Total*
								POE	*OE*		
ME221	Engineering Mathematics –III	-	1	-	-	1	-	-	-	25	25
ME222	Manufacturing Technology	-		2	-	1	-	-	-	25	25
ME223	Fluid Mechanics & Fluid Machines	-	-	2	-	1	-	-	-	25	25
ME224	Kinematics & Theory of Machines	-	-	2	-	1	-	-	25	25	50
ME225	Professional Elective-II	-	-	2	-	1	-	-	-	25	25
ME 226	Mechanical Workshop-I	-	-	2	-	1	-	-	-	50	50
ME 227	Electrical Technology	-	-	2		1	-	-	25	25	50
	Sub Total	**-**	**01**	**12**	**-**	**07**	**-**	**50**		**200**	**250**
	Grand Total	**15**	**01**	**12**	**-**	**22**	**150**	**400**		**200**	**750**

Abbreviations: *L - Lectures, P –Practical, T- Tutorial, ISE - in Semester Examination, ESE - End Semester Examination (University Examination for Theory & / POE & / Oral), ICA - Internal Continuous Assessment.*

Professional Elective-II: **A**. Mechatronic Systems **B.** Power Plant Engineering **C.** Solid Mechanics

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

S.Y.B. Tech.(Mechanical Engineering) Semester-III

ME213 MANUFACTURING PROCESSES

Teaching Scheme	**Examination Scheme**
Theory: 3Hrs/week	**ESE:** 70 Marks
Practical: 2Hrs/week	**ISE:** 30Marks
	ICA: 25Marks
	OE: 25 Marks

- **Course Introduction**:

This course covers all primary manufacturing processes like casting, forging, rolling, extrusion and Drawing along with Fabrication. These processes are basics of Mechanical Engineering Programme. The basics of this processes along with their applications and equipment and machinery required for the processes is covered in brief. This course also introduces Manufacturing Techniques for plastic products. Recent trends in various processes are also discussed in brief.

- **Course Perquisite:** Fundamentals of Mechanics, force, power and mechanical properties of materials, thermal properties of materials is required to be known to the candidate undergoing to the course.
- **Course Objective:**
  1. To introduce to the students the casting technique and its significance in manufacturing.
  2. To introduce to the students with various plastic deformation processes and their application.
  3. To introduce to the students the various fabrication techniques and their significance in Industry.
  4. To introduce to the students with various plastic manufacturing processes.
  5. To introduce to the students with recent trends in this processes.
- **Course Outcomes**: At the end of this course, the students will be able to
  1. Select appropriate manufacturing process for a given component.
  2. Understand performance of each process.
  3. Prepare manufacturing plan for the given component.

SECTION I

UNIT-1 Casting Processes **No. of lectures-06**

- Definition of casting, Basic steps in casting processes, Advantages, limitations and applications of casting process, General introduction to patterns, Types of patterns, materials used, Allowances, types of cores and core boxes, molding materials and its properties, Gating system, types of risers, Function of riser, , method to improve efficiency of risers. Riser design simple numerical problems.

UNIT-2 Molding processes **No. of lectures-09**

- Green sand molding (hand and machine molding), Shell molding, Investment casting, centrifugal casting, , gravity and pressure die casting processes.

- Induction furnace construction and working in brief of melting furnaces such as Cupola, Arc furnaces, induction furnaces, Crucible, oil and gas fired furnaces.

UNIT-3 Fettling, Cleaning and Inspection of Castings No. of lectures-05

- Need for fettling, stages in fettling, equipments used infettling and cleaning of castings, Common important defects in castings. Inspection procedure, Computer applications in foundry processes, foundry, Mechanization.

SECTION II

UNIT-4 Conventional Forming Processes: No. of lectures-07

- Introduction to forming process, Classification of forming processes, forging, types of forging, simple numerical problem on upset forging. Extrusion, Types – direct extrusion, indirect extrusion, impact extrusion, hydrostatic extrusion, Wire drawing process, Methods of tubedrawing, hot rolling, cold rolling of sheets, classification of Rolling mills, theory of rolling, simple numerical problems on rolling.

UNIT-5 Advanced Forming Processes: No. of lectures-05

- Introduction to advanced forming process, High energy rate forming process- explosive, electro-hydraulic, magnetic pulse forming. Forming with hydrostatic pressure- hydro-mechanical and hydro forming process.

UNIT–6 Introduction to Joining processes No. of lectures-08

- Welding processes, classification of welding process, arc welding, welding rod selection, TIG welding & MIG welding, submerged arc welding, gas welding, resistance welding, Brazing and soldering.

- **Internal Continuous Assessment(ICA):**

1. Design of pattern and core for a simple component.
2. Testing of silica sand for grain fineness and clay content.
3. Testing of green sand for green compression strength, permeability.
4. Study of mold for moisture content and core hardness tester.
5. Study of manufacturing sequence of upset forging with example.
6. Study of VI characteristic of welding process.
7. Visit to Foundry unit.
8. Visit to forging shop.

- **Text Books:**

1. Heine, Lopar, Rosenthal, Principles of Metal Casting.
2. N.D. Titov, Foundry Practice.
3. P.L. Jain, Principles of Foundry Technology.
4. P.N.Rao, Manufacturing Technology: Foundry, Forming and Welding.
5. Production Technology by P.C.Sharma

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

S.Y.B. Tech. (Mechanical Engineering) Semester-III

ME215 – B: Professional Elective -I

INTERNAL COMBUSTION ENGINE

Teaching Scheme	**Examination Scheme**
Theory: 3 Hrs/week	**ESE:** 70 Marks
Practical: 2 Hrs/week	**ISE:** 30 Marks
	ICA: 25 Marks

Course Objectives:

During this course, student is expected

1. Distinguish the different types of engine constructions and their thermodynamic principles.
2. Differentiate the constructional details of various fuel systems used in different types of I. C. Engines and calculate major dimensions of carburettor and fuel injection system.
3. Apply the basic knowledge to infer the different methods for enhancing the performance of I. C. engines
4. Correlate the difference in SI and CI engine combustion processes with the design of combustion chambers used in these engines
5. Evaluate the performance parameters of I. C. engines to justify their use in different applications.
6. Categorize different alternative fuels suitable for different engine applications and compare the pollutants formed in these engines and their control methods

Course Outcomes:

At the end of this course, student will be able to

1. Recognize and understand the reasons for differences in the construction of different types of internal combustion engines.
2. Understand the reasons for differences among operating characteristics of different engine types and designs
3. Select the appropriate engine for a given application.
4. Conduct performance tests on engines and Compare experimental results with Theoretical predictions.
5. Compare experimental results with theoretical predictions and make proper justifications.

Section I

Unit 1 - Introduction to I. C. Engine **No. of lectures – 05**

Introduction, Classification of I.C. Engines, Engine Cycles-Otto and Diesel Cycle, Valve timing diagram for high and low speed engines, Port timing diagram for two strokes S.I. Engines.

Unit 2–Fuel System for S. I. Engines **No. of lectures – 06**

Engine fuel requirements, Mixture requirements, Simple carburetor, and Additional systems in modern carburettor, compensating devices, Calculation of air fuel ratio (exact and approximate methods), Calculation of main dimensions of air and fuel supply (Numerical calculations of main dimensions of carburetor), Electronic Petrol injection system (MPFI).

Unit 3–Fuel System for C. I. Engines **No. of lectures – 05**

Requirements of fuel injection system for C.I. Engines, Types of injection systems-Individual pump, Common rail and Distributor systems, Unit injector, Types of fuel nozzles- single hole, multihole, pintle and pintaux, CRDI.

Unit 4–Supercharging **No. of lectures – 04**

Purpose of supercharging, Turbo charging, Thermodynamic cycle of supercharged and turbocharged Engines, Advantages and disadvantages, Limits of supercharging for S.I. and C.I. Engines.

Section II

Unit 5–Combustion in SI Engine **No. of lectures – 05**

Stages of combustion in S.I. Engines, Ignition lag, Flame propagation, Factors affecting flame speed, Abnormal combustion, Octane number, HUCR, Requirements of combustion chambers of S.I. Engines and its types.

Unit 6–combustion in C.I. Engines **No. of lectures – 05**

Stages of combustion in C.I. Engines, Delay period, Abnormal Combustion-Diesel knock, Requirements of combustion chambers for C.I. Engines and its types. Comparison of abnormal combustion in S I and C I Engines. Cetane number.

Unit 7 –Engine performance **No. of lectures – 05**

Performance parameters, Measurement of performance parameters like torque, power, and Volumetric Efficiency, Mechanical Efficiency, bsfc, Brake and Indicated Thermal efficiencies. Heat Balance Sheet. (Numerical on engine Performance and Heat Balance Sheet).

Unit 8–Alternative Fuels and Engine Emission **No. of lectures – 05**

Various alternative fuels and their suitability for I. C. Engines. S.I. Engine emissions (HC, CO, NOx),.C.I. Engines Emissions (CO, NOx, Smog, Particulate), Bharat Norms

TERM WORK

Term work (minimum 3 from group A and B, and all from Group C)

Group A (Study Group)

i. Constructional details of I.C. engines
ii. Study of Engine Cooling and Lubrication system
iii. Study of Ignition systems and Starting systems
iv. Study of fuel system for S.I. and C. I. engines

Group B (Trial Group)

i. Constant Speed Test (Influence of load on performance)
ii. Morse Test
iii. Heat balance sheet
iv. Test on computer controlled I.C. Engine/ Variable Compression Ratio Engine
v. Measurement of exhaust emissions of SI / CI engines

Group C

i. Assignment on recent trends in IC Engine.
ii. Visit to an engine manufacturing company / repairing unit.

Text books:

1 Internal Combustion Engines, Mathur and Sharma, DhanpatRai.
2 Engineering Fundamentals of the Internal Combustion Engine, Willard Pulkrabeck, Prentice Hall
3 Internal Combustion Engines, R. K. Rajput, DhanpatRai Publications.
4 Internal Combustion Engines, V.Ganesan, McGraw Hill.

Reference books:

1 Internal Combustion Engines Fundamentals, John Heywood, McGraw Hill
2 Internal Combustion Engines Emission and Control, Eran Sher, SAE
3 Engine Emissions Purandir, Narosa
4 Alternative Fuels, S.S Thipse, Jaico
5 Internal Combustion Engines Fundamentals, Maleev, McGraw Hill
6 Internal Combustion Engines Vol. 1 and Vol. 2, C.F Taylor, MIT Press
7 Internal Combustion Engines, *Obert*, McGraw Hill
8 Internal Combustion Engines: AppliedThermo sciences, Fergusson & Kirkpatrick, Wiley.
9 SAE Handbook, SAE, SAE.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

S.Y.B. Tech.(Mechanical Engineering) Semester-IV

ME222 MANUFACTURING TECHNOLOGY

Teaching Scheme	**Examination Scheme**
Theory: 3Hrs/week	**ESE:** 70 Marks
Practical: 2Hrs/week	**ISE –** 30Marks
	ICA: 25Marks

Course Introduction:

Machining is accomplished with the use of machines known asmachine tools. For production of variety of machined surfaces, different types of machinetools have been developed. The kind of surface produced depends upon the shape ofcutting, the path of the tool as it passes through the material or both depending on metalcutting processes are called either turning or planning or boring or other operationsperformed by machine tools like lathe shaper, planer drilling milling grinding gear cutting,CNC or VMC and other Non-conventional machine.

Course Perquisite:

In general manufacturing process is economic term for making goods and services available to satisfy human wants. It involves a series of related activities and operation is called production System. It is depicted as an input –output system, here the inputs elements undergo technological transformation (machine tools) to yield a set of output elements called as product.

Course Objective:

1. To study the conventional machining processes such as drilling, milling, shaping, planning carried out on typical machine tools for different applications.
2. To study unconventional machining processes such as EDM, ECM, AWJM and USM carried out on special purpose machine tools for typical applications.
3. To compare and select a suitable manufacturing process.

Course Outcomes: At the end of this course, the students will be able to

1. Exhibit knowledge of conventional, unconventional & modern machining processes and machine tools.
2. Select proper manufacturing process for the typical application.

SECTION I

UNIT-1 Conventional Lathe Machine **No. of lectures-06**

Introduction to Centre Lathe, parts and functions, specifications, accessories and attachments. Lathe operations, Taper turning methods, simple Numerical on Thread cutting. Introduction to CNC machine tools, Classification of CNC, advantages, limitations and application.

UNIT-2 Hole making machine tools **No. of lectures-08**

Classification, construction and working of Pillar type and radial drilling machines, Job & Tool holding devices and accessories, various operations. Horizontal and vertical boring machines, construction and working, Boring tools and bars, Jig boring machines. Broaching, principal, classification, pull and push type broach, advantages, limitations and application.

UNIT-3 Reciprocating motion machine tools **No. of lectures-06**

Principle, types, specifications, operations on shaper, Types of shapers, Types of planers, standard double housing plainer, construction, and operations. Introduction to construction and working of slotting machine.

SECTION II

UNIT-4 Milling & gear manufacturing **No. of lectures-09**

Classification of Milling Machines, construction and working of column and knee type milling Machines, Milling methods – Up milling and down milling, milling operations, Gear cutting on milling machines, Gear Hobbing, gear shaving, gear burnishing, indexing methods, Numerical on Indexing Methods.

UNIT-5 Finishing Processes **No. of lectures-05**

Classifications – Cylindrical, Center less, Surface grinder etc. Selection mounting, glazing, loading, truing, balancing, Surface finishing process, Honing, Lapping, super finishing.

UNIT–6 Unconventional Machining **No. of lectures-06**

Introduction, classification, significance of Unconventional machining, Electrical discharge machining (EDM), Electrochemical Machining (ECM), Ultrasonic machining (USM), Abrasive Water Jet Machining (AWJM), Principle, working, applications, advantages, limitations

- **Internal Continuous Assessment (ICA):**

1. Setting the lathe machine for taper turning by swiveling compound rest.
2. Setting the lathe machine for taper turning by set over of tail stock and taper turning attachment.
3. Setting the lathe machine for thread cutting operation.
4. Study and demonstration of attachments on milling machine.
5. Study and demonstration of various types of milling cutters.
6. Setting the milling machine for gear cutting operation.
7. Study and demonstration of various types of grinding wheels and their specifications.
8. Visit to at least one machine shop and one CNC shop.

- **Text Books:**

1. Workshop Technology (Volume II) by Hajra Chowdhary.
2. Workshop Technology (Volume II) by Raghuvanshi
3. Production Technology (Volume II) by Gupte-Patel.
4. Workshop Technology (Volume II) by W. A. J. Chapman.
5. Manufacturing Technology-P. N. Rao Vol. II.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
S. Y.-B. Tech. (Mechanical Engg.) Semester-IV
ME225 – B: Professional Elective -II
POWER PLANT AND ENERGY ENGINEERING

Teaching Scheme	**Examination Scheme**
Lectures – 3 Hours/week	**ESE–** 70 Marks
Practical – 2 Hour/week	**ISE –**30Marks
	ICA- 25Marks

Course Introduction:

Availability of power is the one key area where most of the Indian industry is facing problems. In India, even today, short fall of power generation is about 30 percent. Fuel supply and distribution is also an area where country is still developing smooth lines of supply. Since power and energy is required by every sector of economy, the growth in this sector is must if Indian economy grows in any sector. Many of the job opportunity in private as well as public sector are therefore waiting for students in this field. Hence, this course attempts to provide them basic knowledge of the technologies available at plant level and would also acquaint them with the latest technological advances taking place in this sector.

Course Prerequisite:
Basic Mechanical Engineering, Engineering Physics, Thermal Power Engineering- Boilers, thermal cycle, Thermodynamic devices

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Course Objectives: During this course, student is expected to-
1. Study of Power Station performance evaluation & economic analysis.
2. Study of various non-conventional energy sources & principles of energy
3. Explain various loads on power plant.
4. Illustrate Significance of different load curves and load factors on power plant.
5. Explain variable load on power plant.
6. Study & explain economics of power plant.
7. Study various Other Non- Conventional Energy Sources.
8. Study Process of Energy Audit.

Course Outcomes: At the end of this course, student will be able to-
1. Get basic knowledge for effective use of available energy sources by suitable planning of power generation in thermal, hydro, gas & atomic power plant. .
2. Describe energy conversion in power plants.
3. Describe role of various organizations of power sector
4. Explain load curves and load factors.
5. Explain calculation of fixed & operating cost
6. Study the Classification of WEC systems.
7. Explain duties & responsibilities of energy auditors.

Section I

Unit 1– Introduction of Energy Sources **No. of lectures – 04**

Forms & characteristics of renewable energy sources, Organization of Power Sector in India, Impact of energy sources (coal, oil, natural gas, solar, wind, biomass, hydro, geothermal, tidal, wave, ocean thermal and nuclear) on environment, Role of private sector in energy management.

Unit 2– Loads on Power Plant **No. of lectures – 05**

Introduction, Different load curves and load factors, Effect of variable load on power plant, design & operation, comparison of the various power plants. (Numerical treatment)

Unit 3– Peak Load & Base Load Power Plants **No. of lectures – 05**

Introduction & classification, Requirement of peak load plant, Types, Pumped storage plants, Compressed air storage plants, Load sharing between base load & peak load power stations. (Numerical treatment)

Unit 4– Economic Analysis of Power Plants **No. of lectures – 06**

Introduction, Cost of electric energy, Fixed and operating cost, Methods of determining depreciation, Selection of site for Power station(thermal, hydro, nuclear), Selection of generation equipment, Tariff methods. (Numerical treatment)

Section II

Unit 5– Solar Energy **No. of lectures – 05**

a) Solar radiation outside the earth's atmosphere & at the earth's surface, Solar radiation measurement – Pyranometer & Pyrheliometer, solar radiation geometry. LAT & SCT, Solar concentrators-Method and classification, Types of concentrators.
b) Liquid flat plate collector – General, Performance analysis, Effects of various parameters. (Numerical treatment)

Unit 6– Wind Energy **No. of lectures – 05**

Introduction, Power of wind, Basic components of 'WECS', Classification of WEC systems., Horizontal axis machines, Vertical axis machines, Advantages & Disadvantages of WECS, Application of wind energy. (Numerical treatment)

Unit 7.Non- Conventional Energy Sources **No. of lectures – 05**

Geothermal energy – Introduction, Types of geothermal resources, Methods of Harnessing. Tidal energy components of tidal power plant, single basin system, Double basin system, Advantages &Disadvantages of tidal energy. Ocean thermal energy – Introduction, open & closed systems. Wave Energy – wave energy, energy conversion devices- High pressure accumulator wave machines, Dolphin type wave machine, Dam Atoll wave machine.

Unit 8– Energy Audit & Energy Conservation **No. of lectures – 05**

Energy Audit - Definition & objective of Energy audit, Energy flow diagram, Energy Audit Instruments; Duties and responsibilities of energy auditors, Duties and responsibilities of energy managers.

Energy Conservation- Introduction, energy conservation act 2001 & its feature, energy conservation in industries – Chemical industry, Cement industry & Sugar industry. Energy conservation in house hold & commercial sectors.

- **Term Work:**

Group - I: Any two Experiment from Expt. No. 1 to 5

1. Solar radiation & its measurement
2. Test on solar water heater
3. Efficiency measurement of standalone solar P-V system
4. Study of components of windmill
5. Identifying & measuring the parameters of a solar PV module in the field

Group - II: Minimum Six Assignments based on following topics –

1. Study of solar collectors
2. Study of solar thermal applications- solar water heating, space heating, power
3. Study of solar pond / solar photovoltaic
4. Study of Biogas plants
5. Study of instruments of a power plant water purity, PH meter, Gas analysis, Measurement of smoke & dust.
6. Study of various pollution control devices
7. Study of various Energy storage devices.

Group - III

1. The report based on any Industrial Visit to renewable energy appliances or power generation transmission station.

- **Text Books:**

1. Generation of electrical energy – B. R. Gupta, S. Chand & Co. Ltd.
2. A course in Power Plant Engineering – Arora Domkundwar, Dhanpat Rai & Co.
3. Solar Energy – S. P. Sukhatme, Tata McGraw Hill Co.
4. Solar Energy – G. D. Rai, Khanna Publisher.
5. Energy Technology – S. Rao & Dr. B. B. Purulekar, Khanna Publishers.
6. Power Plant Engineering – P. K. Nag, Tata McGraw Hill Publishing Co.
7. Power Plant Engineering – R. K. Rajput

- **Reference Books:**

1. Power Plant Technology – M. M. El Wakil.
2. Berau of Energy efficiency Manual
3. Non-conventional Energy Sources- G.D.Rai, Khanna Publisher.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

S. Y.-B. Tech. (Mechanical Engg.) Semester-IV

ME 226 MECHANICAL WORKSHOP-I

Teaching Scheme
Practical– 2 Hrs. /Week

Examination Scheme
ICA – 50 Marks

Course Prerequisite:- fundamental machine shop instruction involving safety use and care of hand and measuring tools basic operation of all conventional machines and grinding of single point tools, screw threads and taper turning and their application classes of fits and tolerances are stressed students will be provided the opportunity to learn and practice bench work skills.

Course Objectives:

1. To get hands on experience of machining techniques such as grinding, drilling, shaping, turning etc. studied in theory subjects.
2. To develop skills to operate different machine tools.
3. To get hands on experience in pattern making, joining processes and forming processes.
4. To develop skills in pattern making and sheet metal work.

Course Outcomes: At the end of this course, the student will be able

1. To operate different machine tools such as grinders, lathes, drilling machines etc.
2. To machine the component as per specified dimensions.
3. To develop the skills necessary for engineering practices like joining and forming processes.
4. To Choose and apply the appropriate methods for pattern making & sheet metal working

Preparation of Wooden pattern (single piece) for a simple component:

Part A –

1. This shall cover – Study of component drawing, preparing casting drawing, Allowance table, Pattern drawing, Deciding parting line & Deciding pattern making process. (2 Turns)

Part B – Actual manufacturing of pattern. (2 Turns)

2. Study of gas welding & gas cutting equipments, Study of arc welding equipment, Study & demonstration of resistance welding, Study of various types of welding joints & demonstration of gas & arc welding, Manufacturing of one job on arc welding. (2 turns)
3. Demonstration Study of sheet metal operations like bending, shearing, lancing, perforating, punching etc...
4. One sheet metal job consisting of at least 3 operations. (2 Turns)
   (Either performed manually or on press) Demonstration:

OR

4. Study of various hand forging operations like upsetting, drawing dawn, piercing, swaging etc…One job involving 3 operations. (Either performed manually or on press) (2 Turns)

Note: Students shall prepare a work book involving brief write up regarding machine/machines employed for job. Students should prepare a work book which involves a process sheet for each job and inspection report of the job. Based on the job performed, attendance record, work book, internal viva, faculty members may evaluate the term work.

• **Books:**

1. Workshop Technology (Volume II) by Raghuvanshi.
2. Workshop Technology (Volume II) by Hajra Chowdhary.
3. Workshop Technology (Volume II) by W.A.J.Chapman.
4. Production Technology by P.C. Sharma.
5. Production Technology – HMT Handbook. 6. Production Technology (Volume II) by Gupte-Patel.
6. P.L. Jain, Principles of Foundry Technology.
7. P.N. Rao, Manufacturing Technology: Foundry, Forming and Welding.
8. Workshop Technology (Volume II) by W.A.J. Chapman. 6. Production Technology – HMT Handbook.

• **Reference Books:**

1. Manufacturing Processes & systems by Phillip F. Ostwald, Jairo Munoz-Wiley India.
2. Fundamentals of modern Manufacturing by Mikel P. Groover-Wiley India

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

NAAC Accredited-2015,
'B' Grade (CGPA 2.62)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: MECHANICAL ENGINEERING

Name of the Course: T.Y. B. Tech. (Sem. - V & VI)

(Syllabus to be implemented from June, 2020)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
Faculty of Science & Technology

*Credit System **MODIFIED** structure of T.Y. B. Tech. **Mechanical Engineering** W.E.F. 2020-21*

Semester -V

Theory Courses

Course code	Name of Theory Course	Hrs./week				Credits	Examination Scheme			
		L	T	P	D		ISE	ESE	ICA	Total
ME311	Machine Design –I	3	-	-	-	3	30	70	-	100
ME312	CAD-CAM & CAE	3	-	-	-	3	30	70		100
ME313	Metallurgy	3	-	-	-	3	30	70	-	100
ME314	Industrial Engineering and Operation Research	3	-	-	-	3	30	70	-	100
ME315	Professional Elective –III	3	-	-	-	3	30	70	-	100
SLH	*Self Learning: HSS*					2#		50		50
	Sub Total	**15**	**-**	**-**	-	**15**	**150**	**400**	-	**550**

Semester5 Laboratory / Tutorial Courses

Course code	*Name of Laboratory /Tutorial Course*	*Hrs./week*				*Credits*	*Examination Scheme*				
		L	*T*	*P*	D		*ISE*	*ESE*		*ICA*	*Total*
								POE	*OE*		
ME311	Machine Design –I	-	-	2	-	1	-	-	-	25	25
ME312	CAD-CAM & CAE	-	-	2	-	1		25	-	25	50
ME313	Metallurgy	-	-	2	-	1	-	-	25	25	50
ME314	Industrial Engineering and Operation Research	-	-	2	-	1	-	-	-	25	25
ME315	Professional Elective –III	-	-	2	-	1	-	-	-	25	25
ME316	Advanced ProgrammingConcepts	1		2		2	-	-	-	50	50
ME317	Mechanical Workshop –II	-	-	2	-	1	-	-	-	25	25
	Sub Total	01	-	14	-	08	-	50		200	250
	Grand Total	**16**	**-**	**14**	-	**23**	**150**	**450**		**200**	**800**

Abbreviations: L-Lectures, T-Tutorials, P-Practicals, D-Drawing, ISE- In-Semester Exam, ESE- End Semester Exam, ICA- Internal Continuous Assessment

***Professional Elective –III: A**. Gas turbines **B.** Industrial Hydraulics and Pneumatics **C.** Non Conventional Machining D. Tool Engineering*

 # indicates credits over and above.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Faculty of Science & Technology

*Credit System **MODIFIED** structure of T.Y. B. Tech. **Mechanical Engineering** W.E.F. 2020-21*

Semester -VI

Theory Courses

Course code	Name of Theory Course	Hrs./week				Credits	Examination Scheme			
		L	T	P	D		ISE	ESE	ICA	Total
ME321	Machine Design –II	3	-	-	-	3	30	70	-	100
ME322	Instrumentation & Control	3	-	-	-	3	30	70	-	100
ME323	Heat Transfer	3	-	-	-	3	30	70	-	100
ME324	Industrial & Quality Management	3	-	-	-	3	30	70	-	100
ME325	Professional Elective –IV	3	-	-	-	3	30	70	-	100
ME326	Mini Project	-	-	-	-	-	-	-	-	-
ME327	Metrology	-	-	-	-	-	-	-	-	-
SLH 32	Self-Learning Technical	-	-	-	-	2#	-	50	-	50
	Sub Total	**15**	**-**	**-**	**-**	**15**	**150**	**400**	**-**	**550**

Semester 6 Laboratory / Tutorial Courses

Course code	*Name of Laboratory / Tutorial Course*	*Hrs./week*				*Credits*	*Examination Scheme*				
		L	*T*	*P*	D		*ISE*	*ESE*		*ICA*	*Total*
								POE	*OE*		
ME321	Machine Design –II	-	-	2	-	1	-	-	--	25	25
ME322	Instrumentation & Control	-	-	2	-	1	-	-		25	25
ME323	Heat Transfer	-	-	2	-	1	-	25	-	25	50
ME324	Industrial & Quality Management	-	1	-	-	1	-	-	-	25	25
ME325	Professional Elective –IV	-	-	2		1	-	-	-	25	25
ME326	Mini Project	-	1	-	-	1	-	-	-	25	25
ME327	Metrology			2		1			25	25	50
ME328	Mechanical Workshop –III	-	-	2	-	1				25	25
	Sub Total	**-**	**02**	**12**	**-**	**08**	**-**	**50**		**200**	**250**
	Grand Total	**15**	**02**	**12**	**-**	**23**	**150**	**450**		**200**	**800**

Abbreviations: L-Lectures, T-Tutorials, P-Practical, D-Drawing, ISE- In-Semester Exam, ESE- End Semester Exam, ICA- Internal Continuous Assessment , Professional Elective –IV: A.** Project Management* **B.** Industrial Product Design ***C.** Plastic Engineering **D.** Mechanical Vibrations E. Railway Transportation.* ***# indicates credits over and above

- **Note** –

1. Batch size for the practical /tutorial shall be of 15 students. On forming the batches, if the strength of remaining student exceeds 9, then a new batch shall be formed.
2. Industrial Training (evaluated at B. Tech Sem.-VII) of minimum 15 days shall be completed in any vacation after B.Tech Sem.-III, but before B. Tech. Sem.-VII & the report shall be submitted and evaluated in B.Tech. Sem.-VII
3. Students shall select one Self Learning Module at B.Tech. Sem-V and B.Tech. Sem. VI each from Humanities and Social Sciences and Technical Groups Respectively.
4. Curriculum for Humanities and Social Sciences Self Learning Modules is common for all under graduate programmes of faculty of Engineering and Technology.

6. Self-Learning Subjects:

A. Semester-V (HSS): Student can select a Self Learning Course from Solapur University, Solapur HSS Course List and appear for its examination as and when conducted by Solapur University, Solapur.

OR

Student can enroll for National Programme on Technology Enhanced Learning (NPTEL) course, complete its assignments and Appear for certificate examination as and when conducted by NPTEL.

For more details about Self Learning Course (HSS) please refer to separate rule document available from Solapur University, Solapur. More details about NPTEL are available at http://nptel.ac.in

B. **Semester-VI (Technical) :** Students can select any one of the following self-learning technical subjects ;

- **a.** Manufacturing of Composites
- **b.** Design Practices
- **c.** Joining Technology for Metals
- **d.** Steam Power Engineering

7. ICA assessment shall be a continuous process based on student's performance in class tests, assignments, homework, subject Seminars, quizzes, laboratory books and their interaction..

T.Y. B.Tech (Mechanical Engineering) Semester- V w.e.f Year 2020-2021

ME312 CAD-CAM & CAE

Teaching Scheme	Examination Scheme
Lectures– 3 Hours/week	ESE– 70 Marks
Practical – 2 Hour/week	ISE - 30 Marks
	ICA –25Marks
	POE- 25 Marks

Course Introduction:

Now a day's industries cannot survive worldwide competition unless they introduce new products with better quality, at lower cost, and with shorter lead time. Accordingly, they have tried to use the computer's huge memory capacity, fast processing speed, and user-friendly interactive graphics capabilities to automate and bind together thus reducing the time and cost of product development and production. Computer-aided design (CAD), computer-aided manufacturing (CAM), and computer-aided engineering (CAE) are the technologies used for this purpose during the development of mechanical product with best quality and lowest cost. Students must have knowledge of CAD, CAM, and CAE. Therefore, this course contains syllabus related to CAD, CAM and CAE activities.

Course objectives:

i. To create an awareness regarding Geometric Modeling activities in Industries.
ii. To create an awareness regarding CAM activities in Manufacturing Industries.
iii. To develop part programming capabilities for CNC machines.
iv. To empower students to learn advanced tools in Automation.
v. To utilize modern tools for design, analysis and manufacturing activities.

Course Outcomes: After completion of the course the students will be able to:-

1. Apply CAD fundamentals as well as advanced manufacturing technology to industry problems.
2. Analyze application of geometric modeling and FEA to industrial products.
3. Write CNC part program Handle CAM related problems from industry and develop CNC part program.

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Section-I

Unit 1: Introduction to CAD / CAM/CAE **No. of Lectures: 04**

• Unit content:

Product Cycle and CAD / CAM/CAE, Advantages of CAD / CAM/CAE, Hardware used for CAD/CAM/CAE system, List of input/output devices, Functions of Graphics Software, `Selection of CAD / CAM/ CAE Software.

Unit 2: Computer Graphics and Geometric Modeling **No. of Lectures: 08**

• Unit content:

Geometric Transformations, Homogeneous Coordinates, Windowing and Viewing Transformations, Coordinate Transformations, Standardization in Graphics Software, CAD / CAM Data Exchange. Introduction to Geometric Modeling and its types, Parametric representation of basic entities like line and circle, Introduction to basic curves - Bezier, B-Spline, NURBS, concept of CSG and Boolean operations, Feature based modeling.

Unit 3: Finite element method and Automation **No. of Lectures: 08**

• Unit content:

FEA: Definition, Types of analysis, terms used in FEM, types of nodes and elements, General Steps of the FEM, Structural and thermal analysis of 1-D bar elements, Introduction to latest FEA software.

Automation: Concept & Definition of Automation, Types, Advantages and Limitations of Automation, Automation and CAD/CAM, CIM and CAD / CAM, Group Technology, part family, Classification and Codification System, Merits and Demerits of Group Technology, CAPP, Retrieval and Generative type of CAPP, MRP, concept of ERP, concept of Rapid Prototyping.

Section II

Unit 4: Fundamentals of NC system **No. of Lectures: 06**

- **Unit content:**

Evolution of NC and Retrofitting, Elements of NC Manufacturing System, concept of work zero and machine zero, Types of NC systems, Structure, Drives and other devices, Steps in NC Manufacturing, Advantages and Disadvantages of NC Technology, Flexible Manufacturing System (FMS), Elements of FMS, Applications of FMS, Merits and Demerits in FMS.

Unit 5: CNC- DNC Technology and Tooling **No. of Lectures: 06**

• Unit content:

Classification of CNC machine tools, CNC controllers, Features and Advantages of CNC, Adaptive Control, Advantages of Adaptive Control, Direct Numerical Control, Types of Direct Numerical Control, Advantages and Disadvantages of Direct Numerical Control, Tool holders, Adapters, Tool magazines, Automatic tool changers, Pallets, Tool setting, Modular tooling.

Unit 6: Manual Part Programming **No. of Lectures: 08**

- **Unit content:**

Principles of an NC Program, Word Address Format (WAF), Machining Formulas, Tool Length and Cutter Diameter Compensation, Canned Cycles for Lathe, Milling and Drilling, Introductory treatment of Subprogram, Subroutines, DO Loop, Macros.

ICA:
List of Experiments

1. Assignment on Modeling & Drafting of any two mechanical components.
2. Assignment on Modeling of simple Assembly of around 3-5 machine components.
3. Assignment on FEA based structural analysis of simple mechanical component.
4. Assignment on FEA based thermal analysis of simple mechanical component.
5. Part programming of one job using CAM software or Programming and manufacturing of one job on CNC lathe or CNC Milling machine.
6. Assignment based on Industrial visit and its report based on CNC/FMS/Automation.

Note:
1. The practical examination should be using suitable software.
2. Oral examination will be based on the full syllabus

Text books:

1. Introduction to CAD/CAM, Rao P.N., -Tata McGraw Hill Publishing Co.
2. Automation, Production Systems and Computer Integrated Manufacturing, Grover M.P.- Prentice Hall of India
3.Numerical Control -Computer Aided Manufacturing, Kundra, Rao, Tiwari- TMHillPub.Co.
4. CAD/CAM/CAE, Chougule N.K.- SCITECH Publications (I) Pvt. Ltd.
5. CAD/CAM/CIM, P. Radhakrishanan.

Reference Books:

1. Theory and Practice, Ibrahim Zeid – CAD/CAM - Tata McGraw Hill Publishing Co.
2. CAD/CAM - Mastering, Ibrahim Zeid –-Tata McGraw Hill Publishing Co.
3. Computer Integrated Design and Manufacturing, D.D. Bedworth, M.R Henderson & P.M. Wolfe- -Tata McGraw Hill Pub. Co.
4. CAD/CAM Theory and Concepts, Kuldeep Sareen, C. Grewal, -S.Chand & Co.Ltd.
5. Computer Graphics by Hearn and Baker.

(B) INDUSTRIAL HYDRAULICS AND PNEUMATICS

Teaching Scheme	*Examination Scheme*
Lectures– 3 Hours/week	**ESE– 70 Marks**
Practical – 2 Hour/week	**ISE –30 Marks**
	ICA-25 Marks

Course Introduction:

This course introduces hydraulic system & pneumatic system. Initially it covers the construction & working of various components of these systems. Preparation of hydraulic & pneumatic circuit diagrams for various applications using the IS symbols of hydraulic & pneumatic components is covered. Inclusion of use of catalogues of hydraulic & pneumatic component manufacturers for selection of components is also done in this course. Students will be made familiar with use of software for hydraulic & pneumatic circuit design.

Course Prerequisite:

Students shall have knowledge of basics of fluid mechanics -properties of fluids, continuity equation & various laws related to fluid.

Course Objectives: During this course, student is expected

1. To choose proper components for hydraulic & pneumatic circuits
2. To prepare hydraulic & pneumatic circuits for various applications

Course Outcomes: At the end of this course, student will be able to

1. Describe construction & working of various hydraulic components & devices
2. Draw hydraulics circuits for various applications & explain working of pneumatic actuators
3. Select proper pneumatic components & prepare pneumatic circuits for any application

Section I

Unit 1–Introduction to Hydraulic system & Hydraulic actuators

No of lectures – 06

Introduction to Fluid power system, hydraulic system Advantages, limitations & applications of hydraulic system Hydraulic Actuators - Linear & Rotary, Types, Working, Construction of linear actuator, Seals & Packing- Types, materials, Applications, Cushioning effects

Unit 2–Pumps, Accumulators, Intensifiers & Valves No of lectures – 08

Pumps- Types, working, Characteristics, Applications, Calculation of force & velocity of piston. System components: Accumulators, Intensifiers, their types, working, applications Symbols used in hydraulic circuits
Hydraulic Pressure control valves- Direct acting type, pilot operated, sequence, counter balancing, unloading, pressure reducing, Construction & Working
Direction control valves- Types, construction & working, Spool actuation methods, spool centre positions
Flow control valves- Compensated & Non-Compensated, Construction & Working, One way valve

Unit 3– Hydraulic circuits **No of lectures – 06**

Simple circuit, Speed control circuits: Meter in, Meter out & bleed off circuits, Regenerative circuit, Sequencing circuit, Counter balancing, Synchronizing, Circuits with accumulator & intensifier, Hydraulic clamping circuit, hydraulic braking system

Section II

Unit 4–Introduction to Pneumatic system & Actuators No of lectures – 06

Pneumatic system: Advantages, limitations & applications of pneumatic system, Comparison of hydraulic & pneumatic system, IS symbols used in pneumatic circuits, pneumatic cylinders and air motors, construction and working, types

Unit 5–Pneumatic System Elements & Valves **No of lectures – 08**

Piping, materials and pressure ratings, piping layout, air compressors, types, working, selection criteria, FRL unit, construction and working

Direction control valves, Flow control valves and pressure control valves – types and working, Quick Exhaust valve, time delay valve

Unit 6– Pneumatic circuits **No of lectures – 06**

Simple Pneumatic circuits, Pneumatic clamping system, Pneumatic braking systems, Pneumatic power tools, time delay circuits

ICA:

Assignments:

1. IS symbols for different components of Hydraulic and Pneumatic system
2. Study of hydraulic valves

3. Study of pneumatic valves Demonstration of Hydraulic speed control circuits

Demonstration: (Any 4)

4. Demonstration of hydraulic speed control circuits
5. Demonstration of Traverse & feed circuit
6. Demonstration of sequencing circuit
7. Demonstration of pneumatic circuits
8. Test on Gear/Vane/Piston pump and plotting of performance characteristic
9. Software use for hydraulic & pneumatic circuit design

Others:

10. Design of hydraulic/pneumatic circuit for practical application, Selection of different components such as reservoir, various valves, actuators, filters, pumps based on design. (Students are advised to refer manufacturers' catalogues)
11. Visit to Service station of Earth Moving equipment (Note: Students should write visit report based on the observations made during the visit)

Text Books:

1. "Oil Hydraulics- Principle & Maintenance", S. R. Majumadar, Tata McGraw Hill
2. "Pneumatics- Principle & Maintenance", S. R. Majumadar, Tata McGraw Hill
3. "Hydraulics and Pneumatics" H.L.Stewart –, Industrial Press

Reference Books:

1. Vickers Manual on Industrial Hydraulics
2. Festo's Manual on Pneumatic Principle, applications
3. "ABC's of Hydraulic Circuits", H L Stewart, (Taraporwala Press)
4. "ABC's of Pneumatic Circuits", H L Stewart, (Taraporwala Press)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

T.Y. B.Tech (Mechanical Engineering) Semester- V w.e.f Year 2020-2021

ME 315 Professional Elective –III

(C) NON-CONVENTIONAL MACHINING

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

T.Y. B.Tech (Mechanical Engineering) Semester- V w.e.f Year 2020-2021

ME 317 MECHANICAL WORKSHOP – III

Teaching Scheme: ***Examination Scheme*:**

Practical: 2 Hours / week **ICA: 25 marks**

Course Prerequisite

This course is important to understand fundamentals of machine shop starts from safety measures, practical use of measuring tools, use of all conventional machine tools, operations of all conventional machines, use of tolerances, fits and finally their practical use and applications.

Course Objectives

1. To learn and understand different machining operations practically studied in theory subjects.
2. To get hands on experience of machining operations such as grinding, drilling, shaping, turning etc.
3. To develop skills to operate different machine tools.

Course Outcomes

At the end of this course, the student will be able

1. To grind the tools.
2. To operate different machine tools such as grinders, lathes, milling, drilling machines etc.
3. To machine the component as per specified dimensions.

ICA

Course Contents

1. Tool Grinding Demonstration and actual grinding to understand the tool geometry (01 turns)
2. One composite job in M.S**.** consisting of one component and inclusive of following operation shall be performed by students (Any 5 Operations)

Facing, Turning, Step turning, Chamfering, Grooving, drilling, Knurling. At least one dimension of the job shall carry close tolerance (04turns)

4. Preparation of process sheet for the above job (01 turns)

Note

Students shall prepare a work book involving brief write up regarding machine/machines employed for job. Students should prepare a work book which involves a process sheet for each job and inspection report of the job. Based on the job performed, attendance record, work book, internal viva, faculty may carry internal assessment.

Books

1. Workshop Technology (Volume VI) by Raghuvanshi.
2. Workshop Technology (Volume VI) by Hajra Chowdhary.
3. Workshop Technology (Volume VI) by W .A .J. Chapman.
4. Production Technology by P. C. Sharma.
5. Production Technology – HMT Handbook.
6. Production Technology (Volume VI) by Gupte - Patel.
7. P. L. Jain, Principles of Foundry Technology.
8. P .N. Rao, Manufacturing Technology: Foundry, Forming and Welding.

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Reference Books

1. Manufacturing Processes & systems by Phillip F. Ostwald, Jairo Munoz-Wiley India.
2. Fundamentals of modern Manufacturing by Mikel P. Groover-Wiley India.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
T.Y. B.Tech (Mechanical Engineering) Semester- VI w.e.f Year 2020-2021
ME 325 Professional Elective –IV

(C) PLASTIC ENGINEERING

Teaching Scheme	*Examination Scheme*
Theory: 03 Hours / Week	**ESE– 70 Marks**
Practical – 2 Hours/week	**ISE- 30 Marks**
	ICA- 25

Course Introduction: During this course, student is exposed to following knowledge-

1. Study of extraction, manufacturing of plastic and classification.
2. Also study of various properties of plastic materials, comparative study of the plastics on the basis of parameters like structure, cost and processing time etc.
3. Study and Comparison of the different processes on the basis of parameters like cost and processing time etc.
4. Design of plastic part and molds, correct selection & design leads to compact & less cost of systems. Design & development, for an optimum process of a given job / component in a given situation.

Course Prerequisite: For this course, student is expected to have-

Knowledge of Engineering Chemistry and Polymers.
Knowledge of Basic Manufacturing Process.
Basic knowledge of welding processes
Basic Design Knowledge

Course Objectives:

1. To make students understand about the polymerization, types and applications of plastics in different areas.

2. To make the students familiar about processing and welding of plastics

3. To provide the knowledge of part design, mould design including cooling systems for injection moulds.

Course Outcomes: At the end of this course, student will be able to

1. Select the plastic materials for particular end user application.

2.Suggest the suitable plastic moulding process and welding technique for the end user application.

3. Design simple plastic component and injection & compression mould for it.

Section I

Unit –1 Introduction to Plastics: No of Lectures-7

Definition and Classification of Plastic Materials, Properties of plastics, applications, Testing methods for plastics, additives in plastics, Monomers & Polymers, Polymerization - Types of Polymerization. Applications of plastics in various areas such as: Agriculture, Packaging, Building, Transport, Electrical, Electronics, Medical and Furniture.

Unit 2- Processing and Welding of Plastics No of Lectures-7

Processes of Plastic: Injection molding, Extrusion molding, sheet forming processes, calendaring, Blow molding, Processing of thermosetting plastics, compression molding, Transfer molding, rotational molding. Welding of Plastic: Hot gas welding, hot tool welding, High frequency induction welding, laser welding, infrared welding, ultrasonic welding, friction welding

Unit3- Design of Plastic Parts No of Lectures-6

Tolerances of molded plastics parts, allowances in plastics, Design aspects of: minimum wall thickness, corners, undercuts, Holes, ribs, inserts and brief information about mold materials, design procedure of simple plastic component.

Section II

Unit 4 – Design of Compression Moulds No of Lectures-7

a) Mould heating, Mould venting, Design aspects of Ejector Pin, Basic design parameters of Compression mould such as bulk factor, projected area, clamping force, land dimension, ejector pin length and other etc, design procedure for compression mould for simple component.

b) Technology of transfer mould, types, main parts, automation in transfer mould.

Unit 5- Injection Mould Design No of lectures-7

Types of Injection moulds: Single, multi cavity, two plate-three plate moulds. Feed system, Temperature control system, Ejection System, design procedure for injection moulds for simple component.

Unit 6- Cooling of Plastic Injection Mould No of lectures-6

Determining the heat quantity dissipated with cooling, calculating the heat quantity, mass of water, water in let-outlet temperature, time require for cooling etc. Cooling systems used in Injection moulds,

- **ICA:**
    1. Introduction to basic parameters of Injection moulding.
    2. Design of Injection mould for simple component.
    3. Design of Simple plastic component.
    4. Design of Compression mould.
    5. Basic design aspects of Blow moulding.
    6. Case study for mould manufacturing
    7. Visit to Plastic industry.

- **Text Books:**

1) Prof(Dr.)Sanjay K Nayak, Fundamentals of Plastics Mould Design, Tata McGraw Hill Education Private Limited, New Delhi

- **Reference Books:**

1. J. A. Brydson, "Plastics Materials", Butter worth Heinemann Oxford,1999
2. Schwartz & good man "Plastics materials and processing"
3. Irwin Rubin "Hand book of Plastic Materials and technology"
4. Fred W. Billmeyer, JR., "Text Book of Polymer Science", John Wiley & Sons, Singapore, 1994

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

T.Y. B.Tech (Mechanical Engineering) Semester- VI w.e.f Year 2020-2021

ME326 MINI PROJECT

Teaching Scheme	*Examination Scheme*
Tutorial- 01 Hour/week	**ICA- 25 Marks**

Course Objective:

1. To identify potential problems in engineering.
2. To provide a solution for the problem identified.
3. To express technical ideas, strategies and methodologies in written form.

Course Outcomes:

At the end of this course, the student will be able to

1. Identify and analyze the potential technical problems.
2. Develop solution for a set of requirements for the problem identified.
3. Write a report with all the contents in logical order.

Course Contents:

A mini project /case study/design report is expected to be on a state of the art technical topic, related to Mechanical Engineering discipline.

ICA-

Guidelines for Project content & Mark Distribution

1. A group of maximum 04 students be formed for Mini-Project work.

2. Work diary and reporting to guide fortnightly (At least once in 15 Days)

3. The contents of work diary shall reflect the efforts taken by project group for

   i. Searching suitable mini-project work

   ii. Brief report preferably on journals/ research or conference papers/ books or literature surveyed to select and bring out the mini-project area.

   iii. Brief report of feasibility studies carried to implement the conclusion.

   iv. Rough Sketches/ Design Calculations, etc.

4. The mini-project may be based on software or experimental work.

5. It will be preferable if student will work on the area of mini project in line with their proposed final year project.

6. The group has to give a power point presentation in front of the faculty of department at the end of semester along with the spiral bound report (Limited to 20 Pages).

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

T.Y. B.Tech (Mechanical Engineering) Semester- VI w.e.f Year 2020-2021

ME327 METROLOGY

Teaching Scheme	*Examination Scheme*
Practical- 02 Hours/week	**ICA- 25 Marks**
	OE- 25 Marks

Course Introduction-

The students of Mechanical Engineering branch are basically concerned with manufacturing various machine components in shops as per given drawing. Today the industrial processing and manufacturing techniques have become complex and complicated and their control is very much difficult by human judgment only. Therefore, the exact and precise measurements are the basic need of the industries. This course of Metrology & Instrumentation, therefore, provides required knowledge and skills and creates self confidence in students so that they can work on shop floor independently for accurate and precise measurements and manufacturing.

Course Prerequisites-

Fundamental knowledge of linear and angular dimensions.

Course Objectives-

- To illustrate the theoretical concepts taught in Mechanical Measurements & Metrology through experiments.
- To illustrate the use of various measuring tools measuring techniques.
- To understand calibration techniques of various measuring devices.

Course Outcomes-

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

1. Measure the elements and assemblies using analog /digital measuring instruments &Check geometrical accuracy of given application.
2. Explain surface roughness checking instruments and derive important dimensions of various thread forms and gears.
3. Check the dimensions using the gauges and measure variables using appropriate sensors and transducers.

ICA

Compulsory Assignments-

1. Assignment based on Limits, Fits and gauge design- 2 Turns
2. Assignment based on static and dynamic characteristics of instruments- 1 Turn

Any Five Experiments from following

1. Calibration of Vernier caliper and micrometer.
2. Angle measurement using Sine bar or sine centre in combination with slip gauges.
3. Measure gear tooth elements using gear tooth vernier caliper.
4. Measure effective diameter of screw thread using profile projector or Tool maker Microscope.
5. Use dial indicator to check Lathe machine parameters like parallelism, squareness, alignment or measure run out of a cylindrical component.
6. Use of floating carriage micrometer to measure minor, major and effective diameter of screw thread.
7. Measure the surface roughness of given sample using Taylor Hobson's Taly Surf or surface roughness tester.
8. Visit to metrology lab.

Text Books-

1. Gupta. I.C., "Engineering Metrology", Dhanpatrai Publications, 2005.
2. Jain R.K. "Engineering Metrology", Khanna Publishers, 2009.
3. Rajput R K "Measurement and Metrology", S K Kataria and Sons, 2013.
4. A K Bewoor and V A Kulkarni "Metrology and Measurement", McGraw Hill Education (IND) Pvt Ltd, 2017.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
T.Y. B.Tech (Mechanical Engineering) Semester- VI w.e.f Year 2020-2021

ME 328 MECHANICAL WORKSHOP – III

Teaching Scheme: ***Examination Scheme*:**
Practical: 2 Hours / week **ICA: 25 marks**

Course Prerequisite

This course is important to make the students aware with various skills involved in manufacturing & assembly, develop skills to operate different machine tools and make students aware of operation sequence, speed, feed selection for different materials & operations along with their operational set up.

Course Objectives

1. To set the manufacturing set up of different machining operations and study the corresponding set up parameters while working on actual machine tools.
2. To select appropriate and proper process parameter for obtaining desired requirement on work piece.
3. To identify the operational / processing problems and suggest remedial solution for adopted manufacturing processes.

Course Outcomes

At the end of this course, the student will be able,

1. Operate various machine tools.
2. Selection operational and process parameters during machining operations.
3. Manufacture a small assembly of components.

Course Contents

Any one noncommercial assembly consisting of at least three components with tolerance involving use of lathe, drilling, milling, grinding and any additional machine tool or processes as per requirement. Use machining operations like boring, slotting, tapping, tapering, external taper turning, shaping, milling etc.(Any 5 Operations)

or

Development and Execution of one simple turning/milling job on CNC (Trainer) including geometric and dimensional tolerances.

Note:

1. Students shall prepare a work book involving brief write up regarding machine/machines employed for job.
2. Students should prepare a work book which involves a process sheet for each job and inspection report of the job.
3. Based on the job performed, attendance record, work book, internal viva, faculty may carry internal assessment.
4. Material specification for conventional practical job is Φ32mm MS bar and Material for CNC is as per machine requirement.
5. Development and Execution of CNC job need to cover all fundamentals of CNC programming and its execution.

Books

1. Workshop Technology (Volume VI) by Raghuvanshi.
2. Workshop Technology (Volume VI) by Hajra Chowdhary.
3. Workshop Technology (Volume VI) by W .A .J. Chapman.
4. Production Technology by P. C. Sharma.
5. Production Technology – HMT Handbook.
6. Production Technology (Volume VI) by Gupte - Patel..
7. Introduction to CAD/CAM, Rao P.N.
8. CAD/CAM/CAE, Chougule N.K.

Reference Books

1. Manufacturing Processes & systems by Phillip F. Ostwald, Jairo Munoz-Wiley India.
2. Fundamentals of modern Manufacturing by Mikel P. Groover-Wiley India.
3. Theory and Practice, Ibrahim Zeid – CAD/CAM - Tata McGraw Hill Publishing Co.
4. CAD/CAM - Mastering, Ibrahim Zeid –-Tata McGraw Hill Publishing Co.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

पुण्यश्लोक अहिल्यादेवी होळकर
सोलापूर विद्यापीठ
।। विद्यया संपन्नता ।।

NAAC Accredited-2015
'B' Grade (CGPA 2.62)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: Mechanical Engineering

Name of the Course: B.E. IV (Sem.–VII & VIII)

(Syllabus to be implemented from w.e.f. June 2019)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.E. (Mechanical Engineering) Semester-1
ME412 Refrigeration and Air Conditioning

Teaching Scheme	**Examination Scheme**
Lectures – 3 Hours/week, 3 Credits	**ESE–** 70 Marks
Practical –	**ISE -** 30 Marks
	ICA- 25 Marks
	POE- 25 Marks

Course Introduction:
This course deals with study of various refrigeration processes and refrigeration cycles such as Air refrigeration cycle, Vapour Compression cycle, Vapour absorption cycle. It also covers properties of refrigerants and various alternative refrigerants. In second part study of psychometric processes and its analysis for producing required air conditions are dealt. Further it deals with human comfort requirements and study of air distribution systems.

Course Prerequisite:
Student should have knowledge of basic concepts of thermodynamics and laws of heat transfer along with equations to calculate heat flow rate by various modes of heat transfer.

Course Objectives: During this course, student is expected to

1. Familiarize with the terminology associated with refrigeration systems and air conditioning systems.
2. To understand basic refrigeration processes.
3. To understand basics of psychrometry and practice of applied psychrometric.
4. To acquire the skills required to design and analyse refrigeration and air conditioning components and systems.

Course Outcomes: At the end of this course, student will be able to

1. Explain Basic Refrigeration Processes
2. Analyze and Calculate Performance of Refrigeration Systems
3. Select proper Refrigerant for specific application
4. Define and Calculate Psychometric properties of air using chart and tables
5. Decide and Analyze Psychometric process for obtaining required air conditions
6. Explain Comfort chart and factors affecting human comfort.
7. Design Air distribution System

Section I

Unit 1. Basic Refrigeration Cycles — No of lectures – 10 hrs

- **Prerequisite:** Basics of thermodynamics.
- **Objectives:**
  1.To Study Various Refrigeration Cycles.
  2.To Analyze and Find Performance of Refrigeration Cycles.
- **Outcomes:**
  After completing this unit, student will be able to
  1.Define Refrigeration and its Units.
  2.Explain Working of Various Refrigeration Cycles and Calculate its Performance.
- **Unit Content:**
  Refrigeration, Units of refrigeration, Reversed Carnot cycle with vapour as refrigerant, Vapour compression cycle, Sub cooling, Superheating, Liquid – Suction heat exchanger, Analysis and Performance calculations of above cycles. Actual vapour compression cycle. (Numerical Treatment).
  Air Refrigeration Systems, Bell Coleman Cycle (B.C.C), Calculation of C.O.P., Advantages and Disadvantages of B.C.C. (Numerical Treatment).
  Air Craft Refrigeration-Necessity, Simple, Boot Strap, Regenerative and Reduced ambient systems. (Theoretical Treatment).
- **Content Delivery Methods:** Board, Chalk and Talk.

Unit 2– Multi Pressure Systems — No of lectures – 3 hrs

- **Prerequisite:** Basic Refrigeration cycles
- **Objectives:**
  1.To Study Multistage Refrigeration Systems.
  2.Compare with Simple V.C.C.
- **Outcomes:**
  After completing this unit, student will be able to
  1.Explain Necessity of Multistage Refrigeration Systems.
  2.Explain Types of Multistage Refrigeration Systems.
- **Unit Content:**
  Introduction, Multistage compression, Flash gas removal, Flash inter cooling, Complete Multi stage system, Multi evaporator systems (Descriptive Treatment).
- **Content Delivery Methods:** Board, Chalk and Talk

Unit 3– Refrigerants No of lectures – 3 hrs

- **Prerequisite:** Properties of pure substances

- **Objectives:**
  1.To Study Various Types & Properties of Refrigerant.
  2.To Study Effect of Refrigerant on Environment.

- **Outcomes:**
  After completing this unit, student will be able to
  1.Select Refrigerant for Specific Application.
  2.Explain Effect of Refrigerant on Environment.

- **Unit Content:**
  Classification, Desirable Properties, Nomenclature of Refrigerants, Selection of refrigerant, Secondary refrigerants, Effect on Ozone depletion and Global warming, Total equivalent warming impact (TEWI), Alternative Refrigerants.

- **Content Delivery Methods:** Board, Chalk and Talk

Unit 4– Vapour Absorption Systems No of lectures – 4 hrs

- **Prerequisite:** Properties of pure substances

- **Objectives:**
  1.To Study Vapour Absorption Systems
  2.To Find its Performance.

- **Outcomes:**
  After completing this unit, student will be able to
  1.Explain Various Types of Vapour Absorption Systems.
  2.To Find C.O.P. of Ideal Vapour Absorption system.

- **Unit Content:**
  Introduction, Simple Ammonia-Water Vapour absorption system, Practical Ammonia-Water Vapour absorption system, Comparison between Vapour Absorption and Vapour Compression system, COP of ideal Vapour Absorption System, Electrolux refrigerator, Lithium Bromide Absorption system. New Mixtures for Vapour Absorption System.

- **Content Delivery Methods:** Board, Chalk and Talk, Animations.

Section II

Unit 5– Psychrometry No of lectures – 7 hrs

- **Prerequisite:** Basics of Thermodynamics

- **Objectives:**
  1.To Study Properties of Moist Air.
  2.To Study Various Psychometric Processes.

- **Outcomes:**
  After completing this unit, student will be able to
  1.Find Properties of Moist Air.
  2.Analyze Various Psychometrics Processes.

- **Unit Content**
  Moist air as a working substance, Psychometrics properties of air, Use of psychometric tables and Charts, Processes, Combinations And Calculations, ADP, Coil condition line, Sensible heat factor, Bypass factor, Air Washer and it's applications. (Numerical Treatment)

  Content Delivery Methods: Board, Chalk and Talk.

Unit 6– Heating and Cooling Load Calculations No of lectures – 6 hrs

- **Prerequisite:** Heat transfer

- **Objectives:**
  1.To Study Various Loads on Refrigeration Systems.
  2.To Analyze Psychometric Processes for obtaining required Indoor Conditions.
- **Outcomes:**
  After completing this unit, student will be able to
  1.Calculate Loads on Refrigeration system.
  2. Decide and Analyze Psychometric Process
- **Unit Content:**
  Representation of actual air conditioning process by layout and on Psychometric chart.
  Load analysis by RSHF, GSHF, Enumeration and brief explanation of the factors forming load on refrigeration and air conditioning systems.(Numerical Treatment).

- **Content Delivery Methods:** Board, Chalk and Talk.

Unit 7– Comfort Conditions and Air Distribution Systems No of lectures – 4 hrs

- **Prerequisite:**
  Thermodynamics and Fluid Mechanics

- **Objectives**
  1.To Study Human Comfort requirements and Comfort Charts.
  2.To Study Air Distribution Systems.
- **Outcomes:**
  After completing this unit, student will be able to
  1.Explain Comfort Requirements for human.
  2.Explain Various Air Distribution Systems.
- **Unit Content:**
  Thermal exchange between human body and environment, Factors affecting comfort, Effective temperature Comfort Chart, Ventilation requirements. Duct classification, Duct material and construction, Equivalent diameter of a circular duct or rectangular duct, Duct design methods, losses in duct. (Theoretical Treatment).

  Content Delivery Methods: Board, Chalk and Talk.

Unit 8– Introduction to Cryogenics No of lectures – 3 hrs

- **Prerequisite:** Thermodynamics

- **Objectives:**

1. To Study Methods of producing low temperatures.
2. To Study Applications of Cryogenics.

- **Outcomes:**
  After completing this unit, student will be able to
  1.Explain Methods used to produce low temperatures.
  2.Explain Applications of Cryogenics.
- **Unit Content:**
  Introduction, Limitations of vapour compression systems for the production of low temperature, Cascade Refrigeration System, Claude System and Linde System for liquefaction of air. Applications of Cryogenics. (Theoretical Treatment).

  Content Delivery Methods: Board, Chalk and Talk

- **Term Work:**
  Group 1 (Study, Demonstration of minimum three assignments on following topics)
  1. Study of Refrigeration methods
  2. Study of Refrigeration Equipments
  3. Study of Refrigeration Systems–Domestic refrigerator, Split air conditioner, Ice Plant, Deep freezer etc.
  4. Study of charging, leak testing of refrigeration systems
  5. Study of nonconventional refrigeration systems

Group II (Minimum four experiments from following)

1. Trial on Refrigeration primer / bench
2. Trial on Air conditioning tutor
3. Trial on mini ice plant
4. Trial on Vapour Absorption system
5. Trial on Heat Pump
6. Trial on Vortex tube

Group III

1. Visit to Refrigeration plant or Central Air Conditioning plant
2.
3. Performance evaluation of any one trial of Group-II by using MATLAB/C Programming

- **Text Books:**
  1. 'Refrigeration & Air Conditioning' by C. P. Arora
  2. 'Refrigeration & Air Conditioning' by Arora &Domkundwar
  3. 'Refrigeration and Air-conditioning' by S. N. Sapali
- **Reference Books:**
  1. 'Principles of Refrigeration 'by Roy J Dossat
  2. 'Air Conditioning Applications & design' by W.P.Jones
  3. 'Refrigeration &Air Conditioning 'by Stocker

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.E. (Mechanical Engineering) Semester-I

ME414 (C): Professional Elective-V
Automobile Engineering

Teaching Scheme	**Examination Scheme**
Lectures– 3Hours/week, 3 Credits	**ESE–**70 Marks
Practical – 2Hour/week, 1 Credit	**ISE –**30Marks
	ICA-25 Marks
	OE-25 Marks

Course Introduction:

There is all round development in the field of design and manufacture of automobile. This has resulted in vast improvement in their efficiency, comfort and safety. There is consequential tremendous increase in production and use of automobiles worldwide. This has opened the job opportunities for Mechanical engineers in Automobile sector.

Course Prerequisites:

4. Knowledge of elementary mathematics,
5. Basic knowledge of various core subjects like Theory of Machines, Manufacturing Process , Design engineering, Fluid Mechanics and Electrical Engineering, Engineering materials

Course Objectives: During this course, a student is expected to

1. Study basic principles of actual automobile systems
2. Study important systems in an automobile
3. Study recent and modern trends in automobile sector
4. To make the student conversant with automobile safety, electrical system
5. To make students aware about the entrepreneurial opportunities in automobile engineering field.

Course Outcomes: At the end of this course, student will be able to

1. Demonstrate & explain various systems in an automobile
2. Describe importance and features of different elements like axle, differential, brakes, steering, suspension, wheel balancing etc.
3. Explain principle of operation, construction and applications of various sensors used in modern automobile and understand electric vehicles, hybrid electric vehicles and solar

Section I

UNIT 1. Introduction to Automobiles: 04

- **Prerequisite.** Knowledge of Materials
- **Objectives:**
  1. To study different layouts of an Automobile.
  2. To study different types of body and its construction of an Automobile.
- **Outcomes:**
  After completing this unit, student will be able to
  1. Apply the knowledge of different layouts of an Automobile
  2. Apply the knowledge of different types of body and its constructionof an Automobile

Unit Content: Classification of automobiles. Major automobile components and their functions. Types of vehicle layouts- Front engine rear wheel drive, Front engine front wheel drive, Rear engine rear wheel drive and All wheel drive**,** Types of automotive bodies and Body construction materials.

- **Content Delivery Methods:** 1. Chalk and Board ,Demonstrations PPT and Videos

UNIT 2. Performance of Automobiles: 05

- **Prerequisite:** Basic Knowledge of Mathematics and Strength of Materials.
- **Objective**
  1.To study different parameters of performance of Automobile
  2**.**To study performance curve of an automobile.
- **Outcomes:**

After completing this unit, student will be able to

1.Solve the problems related to performance of an Automobile
2**.**Apply the knowledge of performance curve of an automobile.

Unit Content: Resistance to vehicle motion- Air, Rolling and Gradient resistance., Acceleration, Grade ability and draw bar pull., Traction and Tractive effort., Power required for vehicle propulsion. (Numerical
Content Delivery Methods: Chalk and Board, Demonstrations PPT and Videos

UNIT 3. Transmission System: 08

- **Prerequisite:** Knowledge of Materials, Friction, Toothed gear design.
- **Objectives:**
  1. To study the principles of various transmission components.
  2. To study characteristics and classification of various transmission components and Systems.
  3. To study construction of wheels and tyres.
- **Outcomes:**
  After completing this unit, student will be able to
  4. Apply the principle on various transmission components
  5. Select the suitable transmission components and Systems.
  6. Understand the construction of wheels and tyres.

Unit Content: Necessity of transmission system, Automobile clutch- requirements, types & functions of- Single plate, Multi-plate and Centrifugal clutches. Fluid flywheel. Types of automotive gearboxes- sliding mesh, Constant mesh and Synchromesh gearbox. Overdrive, Principle of operation of automatic transmission, Torque converter, Propeller shaft, Universal and slip joint, Final drive and its types, Differential, Construction and types of rear axles, Introduction to wheels and tyres.

- **Content Delivery Methods:** 1**.** Chalk and Board
  2. Demonstrations
  3. PPT and Videos

UNIT 4. Automobile Electricals: 03

- **Prerequisite: Basic p**rinciples of Electrical Engineering.
- **Objectives:**
  7. To study the principles of various Electrical systems and accessories.
  8. To study construction and working of various Electrical systems and accessories.
- **Outcomes:**
  After completing this unit, student will be able to
  9. Apply the principle on various Electrical systems and accessories

Understand the construction of and working of various Electrical systems and accessory**Unit Content:** Automotive batteries-construction and working of lead acid battery, Head light, Electric horn, Electric fuel Gauge- thermostatic & balancing coil type, Wiper, side indicator circuit, Speedo meter.

- **Content Delivery Methods:** 1**.** Chalk and Board
  2. Demonstrations
  3. PPT and Videos

Section II

UNIT 5. Steering System: 06

- **Prerequisite: Knowledge of Materials, Principle of steering, Friction, Toothed gear design.**

- **Objectives:**
  1. To understand steering layout various types of steering gear boxes
  2. To understand steering geometry, wheel alignment
  3. To understand Power steering
- **Outcomes:**
  After completing this unit, student will be able to
  1.Get basic knowledge ofsteering layout, steering geometry, wheel alignment,wheel alignment And methods to correct it
  2. Get basic knowledge of various power steering.

  Unit Content: Function of steering, Steering system layout, Automotive steering mechanism –Ackerman and Devis,Types of steering gear boxes, Condition for true rolling, Steering geometry-Camber, Caster, King pin inclination, Included angle, Toe-in and Toe-out, Wheel alignment, Slip angle, Under steer & over steer, Types and working of power steering (Numerical).
- **Content Delivery Methods:** 1. Chalk and Board

2. Demonstrations
3. PPT and Videos

UNIT 6. Braking System: **06**

- **Prerequisite: Knowledge of Materials, Friction**, Theory of machines

- **Objectives:**

1. To understand various Braking systems

2. To understand braking force, stopping distance, dynamic load calculations

- **Outcomes:**

After completing this unit,

1.Students get basic knowledge of various Braking systems

2. Students are able to do braking force, stopping distance, dynamic load calculations

Unit Content: Requirements and Function of automotive brake system, Classification of brakes, Drum & Disc brakes. Hydraulic & Air brake systems. Power brakes, Anti-lock braking, Calculation of braking force required, stopping distance and dynamic weight transfer.(Numerical)

- **Content Delivery Methods:** 1.Chalk and Board
  2. Demonstrations
  3. PPT and Videos

UNIT 7. Suspension Systems: 04

- **Prerequisite: Knowledge** ofMaterials, springs, Machine design.
- **Objectives:**

1. To understand various Suspension systems
2. To understand Hotchkiss and Toque tube drive

- **Outcomes:**

After completing this unit, student will be having basic knowledge of

1. VariousSuspension systems
2. Reaction members, Hotchkiss and Toque tube drive

Unit Content: Suspension requirements, Sprung and Un sprung mass, Types of automotive suspension systems- Conventional and Independent, Types of springs-Leaf spring and coil springs, Shock absorber, Reaction members-Radius rod, Stabilizer bar, Air suspension system. Hotchkiss and Toque tube drive

- **Content Delivery Methods:**1. Chalk and Board
  2. Demonstrations
  3. PPT and Videos

8. Modern Trends: **04**

- **Prerequisite: Basic** Knowledge ofElectrical and Electronics

- **Objectives:**

1. To understand various Electronic control modules, sensors and Actuators
2. To understand Recent trends in Vehicles, safety devices

- **Outcomes:**

After completing this unit, student will be having basic knowledge of

1. Various Electronic control modules, sensors and Actuators
2. Recent trends in Vehicles, safety devices

Unit Content: Engine electronic control modules, Introduction to Sensors and actuators used in automobile controls, Hybrid vehicles, Electrical vehicle layouts, solar vehicles, safety devices, fuel cells.

- **Content Delivery Methods:** 1. Chalk and Board
  2. Demonstrations
  3. PPT and Videos
- **Term Work:**
  Minimum six experiments from Group A and two experiment from Group B are to be performed

- **Group A.**
  1. Study and demonstration of four wheeler chassis layout.
  2. Study and Demonstration of working of automobile clutches.
  3. Study and demonstration of synchromesh gearbox.
  4. Study and demonstration of final drive and differential.
  5. Study and demonstration of working Hydraulic braking system.
  6. Study and demonstration of steering gear boxes.
  7. Study and demonstration of suspension systems used in four-wheeler.
  8. Study and demonstration of battery and electrical starting system
  9.Study and demonstration of (a) Electric horn. (b) Electric fuel Gauge.
  (c) Flasher unit. (d) Wiper circuit
- **Group B.**
  1. Demonstration of wheel balancing and wheel alignment.
  2. Visit to servicing station for study of vehicle maintenance, repairs and report.
  3. A case study presentation and report covering recent trends in automobiles.

  Text Books:
  1. Kripal Singh - Automobile Engineering – Standard publisher.
  2. Automobile Mechanics -.N. K. Giri
  3. Automobile Electrical Equipment -P. S. Kohali
  Reference Books:
  1. K. Newton and W. Seeds, T.K. Garrett,Motor Vehicle, Elsevier publications
  2. Hans Hermann Braess, Ulrich Seiffen, handbook of Automotive Engineering, SAE Publications
  3. William H. Crouse. Automotive Mechanics - Tata McGraw Hill Publishing House
  4. Joseph Heitner, Automotive Mechanics -C.B.S Publishers And Distributors
  5. SAE Manuals and Standard
  8. Narang G. B. S - Automobile Engineering - S. Chand and Company Ltd.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.E. (Mechanical Engineering) Semester-I.

ME416 Project Work –I

Teaching Scheme	**Examination Scheme**
Practical – 04 Hour/week, 02 Credit	**ICA- 50 Marks**

Course

Objectives:

1. Application of the knowledge gained to practical situations.
2. Develop the technical problem solving ability.

Course Outcomes:

After completing Project Work –I, students will be able to;

1. Analyze the Project Problem with schematic diagram
2. Write mathematical model of the Project Problem

Guidelines for Project content & Mark Distribution:	**Marks**
a. Work diary and weekly reporting	20
b. Synopsis	10
c. Progress report submission and presentation	20

Project Term Work:

The term work under project submitted by students shall include:

a. Work diary and weekly reporting:

Work Diary maintained by group and countersigned by the guide weekly. The contents of work diary shall reflect the efforts taken by project group for

1. Searching suitable project work
2. Brief report, preferably on Journals/ research or conference papers/ books or literature surveyed to select and bring out the project.
3. Brief report of feasibility studies carried to implement the conclusion.
4. Proposed diagram/ Design calculations, etc.

b. Synopsis:

The group should submit the synopsis (of 4-5 pages) in following form.

1. Title of Project
2. Names of Students
3. Name of Guide
4. Proposed work (Must indicate the scope of the work & weekly plan up to March end)
5. Approximate Expenditure (if any)

The synopsis shall be signed by the each student in the group, approved by the guide and Endorsed by the Head of the Department

Note:- 1. The project group should consist not more than four students.

c. Progress report submission and presentation:

The group has to give a power point presentation in front of the faculty of department on the progress completed till end of first semester along with the progress report.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.E. (Mechanical Engineering) Semester-I

ME417 Industrial Training

Teaching Scheme	**Examination Scheme**
Lectures – 1 Hour/week 1Credits	**ESE– OE-25 Marks**
Practical – Hour/week, - Credit	**ISE – Marks**
	ICA- 50 Marks

Course Introduction:

Industrial training is must for a fresher. Students know the theoretical knowledge but practical application of same in industry need to be understand. Students should understand working of industry, machinery, quality process, manufacturing process etc for which training is important. Student has to undergo a training of Two weeks at core Mechanical Industry either in summer vacation after second year Part – I or Third year Part - I or after Third year Part - I, i. e in winter vacation. This will help student to understand industrial culture, working, role of an engineering etc.

Course Prerequisite:

1. Student must be aware of different manufacturing processes.
2. Student must be aware of things to be observed in industry.
3. Student should know basics of different material handling systems, design, materials

Course Objectives: During this course, student is expected to

1. Be aware of Industrial culture & Organizational setup.
2. Be aware about technical report writing.

Course Outcomes: At the end of this course, student will be able to

1. Understand the Industrial culture & Organizational setup.
2. Write technical report and give presentation.
3. Correlate theoretical knowledge with the actual in Industry
4. Responsibility and role of engineer in Industry

Procedure for Assessment of Industrial Training done by student

- Every student should do Industrial Training of minimum Two Weeks.
- Student should prepare a report of training done in a prescribed format before end of Part I Semester of BE. (along with a certificate from the concerned industry)
- Format of the report will be decided by the concerned guide.
- The report shall be comprehensive and presented in duplicate, typed on a standard A4 size sheet and bound.
- Every student should give presentation to project guide on industrial Training Report.
- The University oral examination will be based on the term work.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.E. (Mechanical Engineering) Semester- II

ME424 (C) Free Elective-II

Plastic Engineering

Teaching Scheme
Lectures – 3 Hours/week, 3 Credits
Practical – 1 Hour/week, 1 Credit

Examination Scheme
ESE– 70 Marks
ISE – 30 Marks
ISA- 25 Marks
OE- 25 Marks

Course Introduction: During this course, student is exposed to following knowledge-

1. Study of extraction, manufacturing of plastic and classification.
2. Also study of various properties of plastic materials, comparative study of the plastics on the basis of parameters like structure, cost and processing time etc.
3. Study and Comparison of the different processes on the basis of parameters like cost and processing time etc.
4. Design of plastic part and molds, correct selection & design leads to compact & less cost of systems. Design & development, for an optimum process of a given job / component in a given situation.

Course Prerequisite: For this course, student is expected to have-

Knowledge of Engineering Chemistry and Polymers.
Knowledge of Basic Manufacturing Process.
Basic knowledge of welding processes
Basic Design Knowledge

Course Objectives: During this course, student is expected to

1. To understand the mechanism of polymerization, techniques of polymerization
2. To provide the depth knowledge about different kinds of plastic materials based on their Structure and properties.
3. To make the students familiar about processing of plastics and use it for different applications.
4. To provide the knowledge of part design as well mould design for different molding processes.

Course Outcomes: At the end of this course, student will be able to

1. Select the plastic materials for particular end user application
2. Predict the structure and properties of different kind of plastic material
3. Know the processing of different plastic material based on the end user requirement.
4. Part design as well mould design for different moulding processes.

Section I

Unit 1– Introduction to Plastics — No of lectures – 4

- **Prerequisite:** Knowledge of Engineering Chemistry and Polymers.
- **Objectives:**
  1. To study characteristics and classification of Plastics.
  2. To study different methods of testing for plastics.
  3. To study the principles of various Polymerization methods.
- **Outcomes:**
  After completing this unit, student will be able to
  1. Understand the characteristics and classification of Plastics
  2. Select the suitable testing methods for particular type of plastic.
  3. Apply the principle on various Polymerization methods.
- **Unit Content:**
  Definition and Classification of Plastic Materials, Properties of plastics, applications, Testing methods for plastics, additives in plastics, Monomers & Polymers, Polymerization - Types of Polymerization.
- **Content Delivery Methods:** Board, animations, videos, Chalk and talk

Unit 2– Processing of Plastics — No of lectures – 6

- **Prerequisite:** Knowledge of Basic Manufacturing Process.
- **Objectives:**
  1. To study characteristics and classification of Plastics Manufacturing Process.
  2. To study various methods of Plastics Manufacturing Process.
- **Outcomes:**
  After completing this unit, student will be able to
  1. Understand the characteristics & classification of Plastics Manufacturing Process.
  2. Select the suitable methods of Manufacturing Process for particular type of plastic component.

- **Unit Content:**

  Injection molding, Extrusion molding, sheet forming processes, calendaring, Blow molding, Processing of thermosetting plastics, compression molding, Transfer molding, rotational molding.
- **Content Delivery Methods:** Board, animations, videos, Chalk and talk

Unit 3– Welding of Plastics No of lectures – 4

- **Prerequisite:** Basic knowledge of welding processes.
- **Objectives:**
  1. To study characteristics and classification of Plastics Joining Process.
  2. To study various methods of Plastics Joining Process.
- **Outcomes:**

  After completing this unit, student will be able to
  1. Understand the characteristics and classification of Plastics Joining Process.
  2. Select the suitable methods of Joining Process for particular plastic component.
- **Unit Content:**

  Hot gas welding, hot tool welding, High frequency induction welding, laser welding, infrared welding, ultrasonic welding, friction welding
- **Content Delivery Methods:** Board, animations, videos, Chalk and talk

Unit 4– Design of Plastic Parts No of lectures – 6

- **Prerequisite:** Basic Design Knowledge.
- **Objectives:**
  1. To study characteristics of basic elements for proper *plastic* part *design*.
  2. To study design procedure of all basic elements for proper *plastic* part *design*.
- **Outcomes:**

  After completing this unit, student will be able to
  1. Understand the characteristics of basic elements for proper *plastic* part *design*.
  2. Integrate the design of all basic elements for proper *plastic* part *design*.
- **Unit Content:**

  Tolerances of molded plastics parts, allowances in plastics, Design corners, undercuts, curing time, ribs, minimum wall thickness, design of inserts, cores mold materials.
- **Content Delivery Methods:** Board, animations, videos, Chalk and talk

Section II

Unit 5– Design of compression and transfer molds No of lectures – 6

- **Prerequisite:** Knowledge of compression and transfer moulding process.
- **Objectives:**

  After completing this unit, student will be able to

1. To study types and main parts of compression and transfer moulds.
2. To carry out design of compression mould.

- **Outcomes:**
  After completing this unit, student will be able to
1. Explain types and main parts of compression and transfer moulds.
2. Design compression mould for thermoset plastic part.

- **Unit Content:**

a) Design and main parts of compression mould, standard insert mould body, design of loading chamber, design of punch, ejectors, stripper guided pin.
b) Technology of transfer mould, types, main parts, automation in transfer mould.

- **Content Delivery Methods:** Board, animations, videos, Chalk and talk

Unit 6– Injection Mould Design No of lectures – 6

- **Prerequisite:** Knowledge of Injection moulding process.
- **Objectives:**
  After completing this unit, student will be able to
1. To study types and main parts of Injection mould.
2. To study Feed system, Temperature control system and Ejection System for Injection moulding.
3. To carry out design of injection mould.
- **Outcomes:**
  After completing this unit, student will be able to
1. Explain types and main parts of Injection mould.
2. Explain Feed system, Temperature control system and Ejection System for Injection moulding.
3. Design Injection mould for a thermoplastic part.
- **Unit Content:**
  Injection mould design, Single, multi cavity, semi-automatic and automatic moulds. Types of injection mould, detailed structure and working. Feed system, Temperature control system, Ejection System, application.
- **Content Delivery Methods:** Board, animations, videos, Chalk and talk

Unit 7– Cooling of plastic injection mould No of lectures – 5

- **Prerequisite:** of coolants used for mould cooling and concept of curing time.
- **Objectives:**
  After completing this unit, student will be able to
1. To study the heat quantity dissipated with cooling, cooling time required and amount of coolant required to cool the injection mould.
2. To understand summary of dimension and construction of correct cooling system.

- **Outcomes:**
  After completing this unit, student will be able to

1. Calculate the heat quantity dissipated with cooling, cooling time required and amount of coolant required to cool the injection mould.
2. Explain summary of dimension and construction of correct cooling system.

- **Unit Content:**
  Determining the heat quantity dissipated with cooling, heat dissipation with natural cooling, mean temperature, thermal resistance of mold body, summery of dimension and construction of correct cooling system.
- **Content Delivery Methods:** Board, animations, videos, Chalk and talk

Unit 8– Introduction of advanced Plastics No of lectures – 3

- **Prerequisite:** Knowledge of thermoplastic and thermosetting plastic materials and their basic applications.
- **Objectives:**
  After completing this unit, student will be able to

1. To study the concept of composite plastics, polymer degradation and biodegradable plastics.
2. To study advanced application of plastics in various fields.

- **Outcomes:**
  After completing this unit, student will be able to

1. Explain the concept of composite plastics, polymer degradation and biodegradable plastics.
2. Explain advanced application of plastics in various fields

- **Unit Content:**
  Introduction to composite plastics, Introduction of polymer degradation and biodegradable plastics, advanced application like Agriculture, Packaging, Building, Transport, Electrical, Electronics, Medical and Furniture
- **Content Delivery Methods:** Board, animations, videos, Chalk and talk

- **Term Work:**

1. Introduction to plastic material and processes 2 Turns
2. Injection mould design for simple component 2 Turns
3. Design of Blow Mould 2 Turns
4. Design of Compression mould 2 Turns
5. Case study for mould manufacturing 2 Turns
6. Visit to Plastic industry (Thermo sets & Thermo Plasts)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

B.E. (Mechanical Engineering) Semester-I.

ME425 Project Work -II

Teaching Scheme	**Examination Scheme**
Practical – 04 Hour/week, 02 Credit	**Oral Exam –100 Marks**
	ICA- 100 Marks

Course Objectives:

1. Manufacturing/modeling the project work.
2. Analyzing/comparing/evaluating the result of the project work.

Course Outcomes:

After completing Project Work –I, students will be able to;

1. Present the work in the Journal/conference/workshop
2. Apply for patent/IPR

Guidelines for Project contents & mark distribution:

a) Work diary and weekly reporting:		20
b) Project Report	:	40
c) Presentation	:	40

Project Report:

Project report should be of 25 to 50 pages (More pages can be used if needed). For Standardization of the project reports the following format should be strictly followed.

1. Page size: Trimmed A4
2. Top Margin: 1.00 Inches
3. Bottom Margin: 1.32 Inches
4. Left Margin: 1.5 Inches
5. Right Margin: 1.0 Inches
6. Para Text: Times New Roman 12 point font
7. Line Spacing: 1.5 Lines
8. Page Numbers: Right aligned at footer, font 12 point Times New Roman
9. Headings: New Times Roman, 14 point, Boldface
10. Certificate:

All students should attach standard format of Certificate as described by the Department. Certificate should be awarded to batch and not individual student Certificate should have signatures of Guide, Principal, and External Examiner. Entire Report has to be segmented chapter wise as per the requirement.

11. Index of Report:

i) Title Sheet
ii) Certificate from Guide/ College
iii) Acknowledgement
iv) Abstract (Brief content of the work)
v) List of Figures
vi) List of Table

1. Introduction (History, Importance of Project Area, Problem identification, Objective of the Project)

2. Literature Review
3. Design/ Experimentation/ Fabrication/ Production/ Actual work carried out for the same.
4. Observation/ Analysis/ Findings/Results
5. Discussion on Results and Conclusion
References:
12. References or Bibliography: References should have the following format
For Books: "Title of Book"; Authors; Publisher; Edition;
For Papers: Authors, Year of Publication, "Title of Paper"; Conference Details/
General Details; Page No.

b) Presentation:

The group has to prepare a power point presentation on project report, project and present it in front of the faculty of department along with the demonstration of the project.

One copy of the report should be submitted to Institute/ Department, One copy to Guide and one copy should remain with each student of the project group. (Sample Format for Project Work Diary):

Project Progress Sheet

Activity Week: Date from…… to……..
Description of the Work Performed by the student:
(Literature Survey /Design/ Drawings /Purchase/ Manufacturing / Testing/Data Collection/Analysis/Algorithm/Flowchart/Simulation)
……
Space for Drawings:
Constraint / Problem Found:
……
……
……
Activity to be carried out in next week:
……
……
Remarks by the Guide/ Co-Guide:
……
……
……
Date: Sign of Guide/Co-Guide:

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

NAAC Accredited-2015
'B' Grade (CGPA 2.62)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: ELECTRONICS & TELECOMMUNICATION ENGINEERING

Name of the Course: T.Y.B. Tech (Sem.– I & II)

(Syllabus to be implemented from w.e.f. June 2020)

PUNYASHLOK AHILYADEVI HOLKAR

SOLAPUR UNIVERSITY, SOLAPUR

Faculty of Science & Technology

Credit System structure of T.Y. B.Tech. Electronics & Telecommunication Engineering ***W.E.F. 2020-21***

Semester I

Course Code	***Theory Course Name***	***Hrs./week***			***Credits***	***Examination Scheme***			
		L	***T***	***P***		***ISE***	***ESE***	***ICA***	***Total***
ET311	Electromagnetic Field Theory	3	1	--	4	30	70	25	125
ET312	Digital Design & HDL	4	--	--	4	30	70	25	125
ET313	Digital Signal Processing	4	--	--	4	30	70	25	125
ET314	Microcontrollers and Applications	4	--	--	4	30	70	25	125
ET315	Open Elective-I	3	1	--	4	30	70	25	125
SLH31	Self Learning Module-I	--	--	--	2	--	50	--	50
Sub Total		18	2	--	22	150	400	125	675
Course Code	***Laboratory Course Name***								
							ESE		
							POE	***OE***	
ET312	Digital Design & HDL	--	--	2	1	--	50	--	--	50
ET313	Digital Signal Processing	--	--	2	1	--	50	--	--	50
ET314	Microcontrollers and Applications	--	--	2	1	--	50	--	--	50
ET316	Electronic Software Lab-III	--	1	2	2	--	--	--	25	25
Sub Total		--	1	8	5	--	150		25	175
Grand Total		**18**	**3**	**8**	**27**	**150**	**550**		**150**	**850**

Abbreviations: L- Lectures, P –Practical, T- Tutorial, ISE- In Semester Exam, ESE - End Semester Exam, OE-Oral Examination, POE- Practical Oral Examination
ICA- Internal Continuous Assessment ESE - University Examination (Theory &/ POE &/Oral examination)

PUNYASHLOK AHILYADEVI HOLKAR

SOLAPUR UNIVERSITY, SOLAPUR

Faculty of Science & Technology

Credit System structure of T.Y. B.Tech. Electronics & Telecommunication Engineering ***W.E.F. 2020-21***

Semester II

Course Code	***Theory Course Name***	***Hrs./week***			***Credits***	***Examination Scheme***			
		L	***T***	***P***		***ISE***	***ESE***	***ICA***	***Total***
ET321	Antenna & Wave Propagation	4	--	--	4	30	70	25	125
ET322	Embedded System	4	--	--	4	30	70	25	125
ET323	Electronic System Design	4	--	--	4	30	70	25	125
ET324	Advanced Mobile Communication	3	1	--	4	30	70	25	125
ET325	Open Elective-II	3	--	--	3	30	70	25	125
SLH32	Self Learning Module II	--	--	--	2	--	50	--	50
Sub Total		18	1	--	21	150	400	125	675
Course Code	***Laboratory Course Name***								
							ESE		
							POE	***OE***	
ET321	Antenna & Wave Propagation	--	--	2	1	--	--	25	--	25
ET322	Embedded System	--	--	2	1	--	50	--	--	50
ET323	Electronic System Design	--	--	2	1	--	#50	--	--	50
ET325	Open Elective-II	--	--	2	1	--	--	--	--	--
ET326	Mini Hardware Project	--	--	2	1	--	--	--	50	50
Sub Total		--	--	10	5	--	125		50	175
Grand Total		**18**	**1**	**10**	**26**	**150**	**525**		**175**	**850**

Abbreviations: L- Lectures, P –Practical, T- Tutorial, ISE- In Semester Exam, ESE - End Semester Exam, OE-Oral Examination, POE- Practical Oral Examination

ICA- Internal Continuous Assessment ESE - University Examination (Theory &/ POE &/Oral examination)

Note - # Practical and Oral Examination of Electronics System Design is combined with Mini Hardware Project.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

T. Y. B.Tech (Electronics& Telecommunication Engineering)

Semester-II

ET326: MINI HARDWARE PROJECT

Teaching Scheme:
Practical – 2 Hours/week, 1 Credit

Examination Scheme:
ICA –50 Marks

This course is introduced to enable students to apply the knowledge and skills learned out of courses studied to solve/implement predefined practical problem. The Project work may be beyond the scope of curriculum of courses for learning additional skills, developing the ability to define, design, analysis and implementation of the problem and lead to its accomplishment with proper planning.

Course Prerequisite:
Student shall have knowledge of PCB designing, circuit designing, testing, soldering.

Course Objectives:

1. To produce PCB artwork using an appropriate EDA tool.
2. To practice good soldering, testing, fault detection and effective trouble-shooting.
3. To design and implement application based hardware project.
4. To present technical seminar and display the project.

Course Outcomes:

At the end of this course, Students will be able to,

1. Produce PCB artwork using an appropriate EDA tool.
2. Practice good soldering, testing, fault detection and effective trouble-shooting.
3. Design and implement application based hardware project.
4. Present technical seminar and display the project.

- **Guidelines for project implementation:**

1) Project group should be not more than 3 students per group.
2) Domains for projects may be based on a particular application from the following, but not limited to:

   i. Instrumentation and Control Systems
   ii. Electronic Communication Systems
   iii. Biomedical Electronics
   iv. Power Electronics
   v. Audio, Video Systems

vi. Embedded Systems

vii. Mechatronics Systems

3) Week 1 & 2: Formation of groups, searching of an application based hardware project

4) Week 3 & 4: Finalization of Mini project & Distribution of work.

5) Week 5 & 6: PCB artwork design using an appropriate EDA tool & Simulation.

6) Week 7 & 8: Procurement of electronic components for the project & PCB manufacturing.

7) Week 9, 10 & 11: Hardware assembly, testing, fabrication

8) Week 12: Demo, Group presentation & report submission

- **Internal Continuous Assessment (ICA):**

1. The seminar shall consist of the Literature Survey, Market survey, Basic project work and applications of Mini project.
2. Seminar Assessment shall be based on Innovative Idea, Presentation skill, depth of understanding, Applications, Future Scope and Individual Contribution.
3. A certified copy of seminar/ project report shall be required to be presented at the time of final submission.

- **Text Books:**

1. Thomas C Hayes, Paul Horowitz, ―The Art of Electronics, Newens Publication
2. Jim Williams (Editor) ― Analog Circuit Design: Art, Science and Personalities, EDN series for Design Engineers
3. M Ashraf Rizvi ― Effective Technical Communication, Tata McGraw Hill Education Pvt. Ltd.

- **Reference Books:**

1. Robert Boylested, ― Essentials of Circuit Analysis‖, PHI Publications
2. Meenakshi Raman, Sangeeta Sharma ― Technical Communication, Principles and Practice, Oxford University Press
3. A.E. Ward, Angus ― Electronic Product Design, Stanley thornes Publishers, UK.
4. C Muralikrishna, Sunita Mishra, ― Communication Skills for Engineers, Pearson

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

NAAC Accredited-2015
'B' Grade (CGPA 2.62)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: Electronics and Telecommunication Engineering

Name of the Course: B.E.- IV (Sem. VII & VIII)

(Syllabus to be implemented from w.e.f. June 2019)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Faculty of Engineering & Technology

CBCS structure of B.E.Electronics & Telecommunication Engineering W.E.F. 2019-20

Semester I

Course Code	*Theory Course Name*	*Hrs./week*			*Credits*	*Examination Scheme*			
		L	*T*	*P*		*ISE*	*ESE*	*ICA*	*Total*
ET411	Computer Communication Network	4	--	--	4	30	70	25	125
ET412	Embedded System Design	4	--	--	4	30	70	25	125
ET413	Satellite Communication	3	1	--	4	30	70	25	125
ET414	Database Management System (DBMS)	3	1	--	4	30	70	25	125
ET415	Elective - I	4	--	--	4	30	70	25	125
ET416	Seminar & Project	--	--	--	--	--	--	25	25
ET417	Vocational Training	--	--	--	--	--	--	25	25
Sub Total		18	2	--	20	150	350	175	675
Course Code	*Laboratory Course Name*								
							ESE		
							POE	*OE*	
ET411	Computer Communication Network	--	--	2	1	--	50	--	--	50
ET412	Embedded System Design	--	--	2	1	--	50	--	--	50
ET413	Satellite Communication	--	--	--	--	--	--	--	--	--
ET414	Database Management System (DBMS)	--	--	--	--	--	--	--	--	--
ET415	Elective - I	--	--	2	1	--	--	--	--	--
ET416	Seminar & Project	--	--	4	2	--	--	50	--	50
ET417	Vocational Training	--	--	--	1	--	--	--	--	--
Sub Total		--	--	10	6	--	150		--	150
Grand Total		**18**	**2**	**10**	**26**	**150**	**500**		**175**	**825**

Elective I

ET415A--- Image & Video Processing
ET415B---Optimization Techniques
ET415C---Electronic Product Design
ET415D---Advanced DSP

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Faculty of Engineering & Technology (Revised from 2018-19)

CBCS structure of B.E. Electronics & Telecommunication Engineering W.E.F. 2019-20

Semester II

Course Code	Theory Course Name	Hrs./week			Credits	Examination Scheme			
		L	T	P		ISE	ESE	ICA	Total
ET421	Internet of Things (IoT)	3	1	--	4	30	70	25	125
ET422	Multimedia Communication Technique	4	--	--	4	30	70	25	125
ET423	VLSI Design	4	--	--	4	30	70	25	125
ET424	Elective – II	4	--	--	4	30	70	25	125
ET425	Project	--	--	--	--	--	--	100	100
Sub Total		15	1	--	16	120	280	200	600
Course Code	**Laboratory Course Name**								
							ESE		
							POE	OE	
ET421	Internet of Things (IoT)	--	--	--	--	--	--	25	--	25
ET422	Multimedia Communication Technique	--	--	2	1	--	--	50	--	50
ET423	VLSI Design	--	--	2	1	--	50	--	--	50
ET424	Elective – II	--	--	2	1	--	--	--	--	--
ET425	Project	--	--	8	4	--	100	--	--	100
Sub Total		--	--	14	7	--	225		--	225
Grand Total		**15**	**1**	**14**	**23**	**120**	**505**		**200**	**825**

Elective – II

ET424A---Network Security
ET424B---Soft Computing
ET424C---DSP Processors & Application
ET424D---Data Analytics

Note:

- Minimum strength of the students for Elective is 15.
- Term work assessment shall be a continuous process based on student's performance in class tests, assignments, homework, subject seminars, quizzes, and laboratory books and their interaction and attendance for theory and lab sessions as applicable.
- The batch size for the practical's/tutorials is of 15 students. On forming the batches, if the strength of remaining students exceeds 7 students, then a new batch be formed. For project the group shall be of three students.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

NAAC Accredited-2015
'B' Grade (CGPA 2.62)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: CIVIL ENGINEERING

Name of the Course: S.Y. B.Tech.- II (Sem. III & IV)

(Syllabus to be implemented from w.e.f. June 2019)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

FACULTY OF SCIENCE & TECHNOLOGY

Program Educational Objectives (PEOs):
B. Tech. (Civil Engineering)

The Program Educational Objectives for B. Tech. Civil Engineering program are designed to produce competent civil engineers who are ready to contribute effectively to the advancement of civil engineering and to fulfill the needs of the community. These objectives are as follows:

1. Graduates will be prepared with strong engineering fundamentals leading to excellent performance in professional career in planning, designing, construction, operation & maintenance of the built environment and global infrastructure that meet the societal needs.
2. Graduates will exhibit strong technical ability to create and synthesize data using relevant tools and concepts, for providing sustainable solutions to civil engineering problems and projects.
3. Graduates will exhibit excellent interpersonal communication and resource management skills as leaders in the civil engineering profession while working as a part of multidisciplinary team.
4. Graduates will be prepared with sound foundation in mathematics, science and in Civil Engineering to prepare them for higher studies and research.
5. Graduates will possess a breadth of knowledge and engage themselves in the life-long learning to meet challenges of globalization.
6. Graduates will have a sense of responsibility, respect towards society & its heritage and will follow the professional ethics.

Program Outcomes (POs)
B. Tech. (Civil Engineering)

The program outcomes of B. Tech. Civil Engineering Program are summarized as following:

a) Students will demonstrate the basic knowledge of mathematics, science and engineering.
b) Students will demonstrate ability to design and conduct experiments, interpret & analyze data and report results.
c) Students will demonstrate an ability to design a system, component, or a process that meets desired specifications within realistic constraints.
d) Students will demonstrate an ability to function in multidisciplinary team.
e) Students will demonstrate the ability to identify, formulate and solve Civil engineering problems.
f) Students will demonstrate the understanding of their professional Responsibilities ethically.
g) Students will be able to communicate effectively to all concerned.
h) Students will have the confidence to apply engineering solutions in global and social context.
i) Students will recognize the need for and an ability to engage in life-long learning.
j) Students will have broad education for understanding the impact of engineering solutions in a global, economic, environmental, and societal context.
k) Students will possess an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

PROGRAM SPECIFIC OUTCOMES (PSOs)

B. Tech. Civil Engineering

a) Graduates will be able to survey, conduct geo-technical investigations, plan, analyse, design, estimate and construct residences, public buildings, industrial buildings, townships and infrastructural projects by adopting appropriate construction methods.

b) Graduates will analyse and design the water resources systems, municipal and industrial waste treatment plants with due consideration to pollution free environment.

c) Graduates will use appropriate application software, develop skills necessary for professional practice as a Civil Engineer and prepare themselves for competitive examinations for higher education & for public service commissions.

PUNYASHLOK AHILYADEVI HOLKARSOLAPUR UNIVERSITY, SOLAPUR
Faculty of Science & Technology
Credit System structure of S. Y. B. Tech. Civil Engg., Semester- III, (W.E.F. 2019-2020)

Course Code	Theory Course Name	Hrs./week				Credits	Examination Scheme				
		L	T	P	D		ISE	ESE		ICA	Total
CV211	Concrete Technology, Material Testing & Evaluation	3	-	-	-	3	30	70		-	100
CV212	Surveying & Geomatics	3	-	-	-	3	30	70		-	100
CV213	Building Construction & Drawing	2	-	-	-	2	30	70		-	100
CV214	Introduction to Fluid mechanics	3	-	-	-	3	30	70		-	100
CV215	Engineering Geology	**2**	-	-	-	2	30	70		-	100
CV216	Introduction to Solid Mechanics	3	1	-	-	4	30	70		-	100
CV217	Energy Science & Engineering	1	-	-	-	1	25	-		-	25
	Total	**17**	**1**	**_**	-	**18**	**205**	**420**		**-**	**625**
	Laboratory/Drawings							**POE**	**OE**		
CV211	Concrete Technology, Material Testing & Evaluation	-	-	2	-	1	-	-	-	25	25
CV212	Surveying & Geomatics	-	-	2	-	1	-	25	-	25	50
CV213	Building Construction & Drawing	-	-	-	2	1	-	-	-	25	25
CV214	Introduction to Fluid mechanics	-	-	2	-	1	-	25	-	25	50
CV215	Engineering Geology	-	-	2	-	1	-	25	-	25	50
CV218	Lab practice	-	-	2	-	1	-	-	-	25	25
	Total	**-**	**-**	**10**	**-**	**6**	**-**	**75**		**150**	**225**
	Grand Total	**17**	**1**	**10**	**2**	**24**	**205**	**495**		**150**	**850**
	Environmental Science	**1**	–	–	-	–	–	–		–	–

Abbreviations: L- Lectures, P –Practical, T- Tutorial, D- Drawing, ISE -Internal Tests, ESE - University Examination (Theory &/ POE &/Oral examination), ICA- Internal Continuous Assessment.

Note:

(1) The number of students in a practical/Tutorial batch shall be 20. New batch shall be formed if the number of remaining students (after forming batches of 20) exceeds 9.

(2) Term work assessment: Term Work assessment shall be a continuous process based on the performance of the student in assignments, class tests, quizzes, attendance and interaction during theory and lab sessions, journal writing, report presentation etc., as applicable.

(3) Student is required to study and pass Environmental Science subject in Second Year of Engineering to become eligible for award of degree.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

Faculty of Science & Technology

Credit System structure of S. Y. B. Tech. Civil Engg., Semester – IV, W. E.F. 2019-2020

Course Code	Theory Course Name	Hrs./week				Credits	Examination Scheme				
		L	T	P	D		ISE	ESE		ICA	Total
CV221	Water Supply Engineering	3	-	-	-	3	30	70		-	100
CV222	Building Planning & Design	3	-	-	-	3	15	35		-	**50**
CV223	Hydraulic Engineering	3	-	-	-	3	30	70		-	**100**
CV224	Open Elective-I: ICT for development	2	-	-	-	2	50	-		-	**50**
CV225	Structural Analysis	3	-	-	-	3	30	70		25	**125**
CV226	Engineering Mathematics-III	3	1	-	-	4	30	70		25	**125**
	Total	**17**	**1**	**-**	**-**	**18**	**185**	**315**		**50**	**550**
	Laboratory/Drawings:							**POE**	**OE**		
CV221	Water Supply Engineering	-	-	2	-	1	-	-	-	25	25
CV222	Building Planning & Design	-	-	-	2	1	-	75	-	50	**125**
CV223	Hydraulic Engineering	-	-	2	-	1	-	-	-	25	**25**
CV224	Open Elective- I : ICT for development	-	-	2	-	1	-	-	-	50	**50**
CV227	Computer Programming & Numerical Methods	2	-	2	-	3	-	50	-	25	75
	Total	**2**	**0**	**8**	**2**	**7**	**-**	**125**		**175**	**300**
	Grand Total	**19**	**1**	**8**	**2**	**25**	**185**	**415**		**225**	**850**
	Environmental Science	**1**	–	–		–	–	–		–	–

Abbreviations: L- Lectures, P –Practical, T- Tutorial, D- Drawing, ISE -Internal Tests, ESE - University Examination (Theory &/ POE &/Oral examination), ICA- Internal Continuous Assessment.

Note:

(1) The number of students in a Practical/Tutorial batch shall be 20. New batch shall be formed if the number of remaining students (after forming batches of 20) exceeds 9.

(2) Term work assessment: Term Work assessment shall be a continuous process based on the performance of the student in assignments, class tests, quizzes, attendance and interaction during theory and lab sessions, journal writing, report presentation etc., as applicable.

(3) Student is required to study and pass Environmental Science subject in Second Year of Engineering to become eligible for award of degree.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

S. Y. B. Tech. (Civil Engineering) Semester- III

CV213: BUILDING CONSTRUCTION AND DRAWING

Teaching Scheme
Lectures – 2 Hours/week, 2 Credits
Drawings – 2 Hour/week, 1Credit

Examination Scheme
ESE – 70 Marks
(Theory Paper of 4 Hours duration)
ISE – 30 Marks
ICA- 25 Marks

Course Objectives:

1) To introduce students to functional requirements of buildings.
2) To introduce students to Scale and various types of Scale.
3) The impart knowledge of various building components such as door, windows, arches, floors etc along with its functions and method of construction.
4) To explain methodology adopted for design of various types of staircases.
5) To enable students to draw perspective view of a building.
6) To make the student conversant with various building finishes, ventilation and air conditioning principles

Course Outcomes:

After successful completion of this course the students will be able to:

1) Elucidate functional requirements of buildings and types of foundation and its suitability.
2) Draw neat drawings of different building components such as doors, windows, stairs etc with the suitable scale using CADD software.
3) Design different types of staircases commonly used in residential and public buildings.
4) Draw neat perspective view drawings of an object and given small residential building.
5) Select appropriate ventilation systems and building finishes.

SECTION – I

Unit 1: Building functional Requirements, Building Type and Foundation (5 Hrs)

- Building functional Requirements - Strength, Stability, Comfort, Convenience, Safety, Damp Prevention, Water Proofing, Heat Insulation, Day Lighting, Ventilation, Termite Resistance.
- Building Types – Framed and Load Bearing and Composite structures, Comparison between all the three types. Building components (elements), Methods of transfer of building loads to foundation strata.
- Foundation: - Importance of foundation as load transferring building element. Shallow Foundations – Wall footing, Isolated footing, Combined Footing, Strap Footing, Continuous or Strip Footing, Cantilever Footing, Raft Foundation. (Reinforcement placement not expected)

Unit 2: Types of Masonry and Walls (4 Hrs)

- Introduction to Scale and various types of Scale.
- Introduction to Stone masonry walls, bonding and breaking of Joints.
- Brick masonry walls – Standard Brick size and Properties of good brick-work. Bonds- Stretcher, Header, Flemish & English bond (up to 1 ½ Brick thick)
- Concrete Block masonry – Hollow and Solid blocks, Construction method and bonds.
- Concept of Main Wall and Other wall, External wall and internal wall, Load bearing wall and Partition wall. Glass Block wall and Curtain wall.
- Introduction to Autoclaved Aerated Concrete , Size, weight, etc.

Unit 3: Doors, Windows, Stairs and Arches (4 Hrs)

- Doors Types: - Paneled, Flush, Glazed. Door elements, Fixtures and Fastenings.
- Window: - Types: Steel Glazed, Wooden Paneled, Aluminum Glazed Sliding Ventilators and Fixed Glass windows.
- Staircase: - Functional requirements of stair, design of stair, types of stairs, technical terms.
- Arches: - Types of Arches based on shape, mechanism of load transfer.

Unit 4: Floors and Roofs **(3 Hrs)**

- Flooring and types of flooring, floor tiles, selection factors and fixing procedures of floorings.
- Roofing and types of roofs, Selection factors for Roofing materials
-

SECTION –II

Unit 5: Perspective Drawing **(3 Hrs)**

- Elements of Perspective drawings, parallel perspective (One Point) and angular perspective (Two Point) drawing.
- Perspective drawing of objects and perspective drawing of one G+1 Residential building (Readymade plan to be given to the students).

Unit 6:- Lighting, Ventilation, Thermal Insulation, and Air Conditioning. **(5 Hrs)**

- Lighting: - Definition and objective of lighting, Principles of Good lighting, Day lighting.
- Ventilation: - Definition and objective of ventilation, types of ventilation and its functional requirements, various systems and selection criteria.
- Thermal insulation: - General concept and Principles, Various methods and use of materials for thermal insulation, Computation of Heat loss and Heat gain in buildings.
- Air conditioning: - Purpose, classification, principles, systems and Components of the Air conditioning.

Unit 7- Building Finishes **(4 Hrs)**

- Plastering, Pointing and various techniques.
- Paints: - Different types and application methods.
- Varnishes and application methods.
- Tiles cladding, skirting, dado work with various materials.

INTERNAL CONTINUOUS ASSESSMENT (ICA)

- For drawing session

(A) Sketching in sketchbook consisting of the following 9 drawing exercises:

1. Lettering, Symbols and line work.
2. Building structures (Load bearing & Framed structures)
3. Foundations- Isolated footing, combined footing, Strap footing and Pile footing.
4. Brick bonds
5. Arches and Roofs.

6. Doors
7. Windows
8. Staircases
9. Perspective drawing of object and one G+1 Residential building (Ready plan).

(B) Drawing using CADD software to be done:

1. Double leaf paneled doors
2. Double leaf paneled window
3. Open well staircase

Prints of these CADD drawings will form a part of 'Term work'.

- Site Visit for learning construction details of a residential building. A visit report to be drafted and submitted as a part of term work.

TEXT BOOKS

1) A text book of Building Construction- Arora & Bindra- Dhanpat Rai Publication, New Delhi.
2) Building Construction- Sushil Kumar- Standard Publishers, Delhi.
3) Building Construction – Arora & Gupta –Satya Prakashan, New Delhi.
4) Principles of Building Drawing- M.G. Shah and C.M. Kale.
5) A course in Civil Engineering Drawing- V.B. Sikka – S.K.Katariya & Sons, Delhi.
6) Civil Engineering Construction Materials, S.K. Sharma, KBP House
7) Engineering Drawing + AutoCAD , by K.Venugopal , New Age International Publishers
8) Mastering AutoCAD 2019 and AutoCAD LT 2019, George Omura and Brian C. Benton, SYBEX Publishers.

REFERENCE BOOKS

1. Building Technology- Ivor H. Seely.
2. Building Construction-Makay vol. I & II
3. National Building Code of India-SP7- Indian Standards Delhi.
4. Various IS Specifications for Drawings, Symbols, Conventional Signs as per IS 962-1967- Indian Standards Delhi.
5. Building Construction A to Z – Mantri.
6. Building Materials- TTTI, Chandigadh.
7. Building Construction- S.S. Bhavikatti- Vikas Publishing House Pvt. Ltd., Noida.
8. Building Materials- S.S. Bhavikatti- Vikas Publishing House Pvt. Ltd., Noida.

PUNYASHLOK AHILYADEVI HOLKAR

SOLAPUR UNIVERSITY, SOLAPUR

S. Y. B. Tech. (Civil Engineering) Semester- III

CV215: ENGINEERING GEOLOGY

Teaching Scheme	**Examination Scheme**
Lectures – 2 Hrs/Week, 2 Credits	**ESE – 7**0 Marks
Practical – 2 Hr/Week, 1 Credit	**ISE** - 30 Marks
	ICA- 25 Marks
	ESE (**POE) -** 25 Marks

Course Objectives:

1) To identify the main and most common igneous, sedimentary and metamorphic rocks encountered by foundations and construction.
2) To identify and define the main morphological and geological characteristics as shown on maps.
3) Analyse geological parameters important in geotechnical engineering studies.
4) To establish and describe topographical and geological sections,
5) Identify potential geological hazards such earthquakes, landslides, flooding to various civil engineering structures and ways of preventing and dealing with them

Course Outcomes: At the end of course students will be able to:

1) To describe issues concerning the geological formations and geological structure of a region
2) To distinguish the characteristics of the most important geological formations and problems that may arise in the various civil engineering projects in such formations.
3) To interpret and explain the geological structures in the geological maps and cross sections.
4) To assess and appropriately adjust the results of geological study in order to ascertain secure construction and operation of a civil engineering projects like dams, reservoirs hilly roads and railway tracks.
5) To receive, analyze and evaluate data and appropriately and solve technical as well as ground water related problems.

SECTION - I

Unit 1: **(3 Hrs)**

Introduction-Branches of geology useful to civil engineering, scope of geological studies in various civil engineering projects. Mineralogy- Mineral, Origin and composition. Physical properties of minerals, susceptibility of minerals to alteration, SEM, XRD, Rock forming minerals, megascopic identification of common primary & secondary minerals.

Unit 2: **(8 Hrs)**

Petrology-Rock forming processes. Specific gravity of rocks, Ternary diagram.

Igneous petrology- Volcanic Phenomenon and different materials ejected by volcanoes. Types of volcanic eruption, Hot spring and Geysers, Characteristics of different types of magma, Division of rock on the basis of depth of formation, and their characteristics, Chemical and Mineralogical Composition, Texture and its types, Various forms of rocks, Field Classification chart, Structures, Classification of Igneous rocks on the basis of Chemical composition, Detailed study of Acidic Igneous rocks like Granite, Rhyolite or Tuff, Felsite, Pegmatite, Hornfels, Metamorphic Aureole, Kaolinization, Landform as Tors, Engineering aspect to granite, Basic Igneous rocks Like Gabbro, Dolerite, Basalt, Engineering aspect to Basalt.

Sedimentary petrology- mode of formation, Mineralogical Composition, Texture and its types, Structures, Gradation of Clastic rocks, Classification of sedimentary rocks and their characteristics, Detailed study of Conglomerate, Breccia, Sandstone, Mudstone and Shale, Limestone

Metamorphic petrology- Agents and types of metamorphism, metamorphic grades, Mineralogical composition, structures & textures in metamorphic rocks, Important Distinguishing features of rocks as Rock cleavage, Schistosity, Foliation, Classification, Detailed study of Gneiss, Schist, Slate with engineering consideration.

Unit 3: **(4 Hrs)**

Physical Geology- Weathering. Erosion and Denudation. Factors affecting weathering and product of weathering. Engineering consideration.

Superficial deposits and its geotechnical importance: Water fall and Gorges, River meandering, Alluvium, Glacial deposits, Laterite (engineering aspects), Desert Landform, Loess, Residual deposits of Clay with flints, Solifluction deposits, mudflows, Coastal deposits.

Unit 4: **(4 Hrs)**

Strength Behavior of Rocks- Stress and Strain in rocks. Concept of Rock Deformation & Tectonics. Dip and Strike. Outcrop and width of outcrop. Inliers and Outliers. Fold- Types and nomenclature, Criteria for their recognition in field. Faults: Classification, recognition in field, effects on outcrops. Joints & Unconformity; Types, Stresses responsible, geotechnical importance. Importance of structural elements in engineering operations. Consequences of failure as land sliding, Earthquake and Subsidence. Strength of Igneous rock structures.

SECTION - II

Unit 5: **(4 Hrs)**

Geological Hazards- Rock Instability and Slope movement: Concept of sliding blocks. Different controlling factors. Instability in vertical rock structures and measures to prevent collapse. Types of landslide, Prevention by surface drainage, slope reinforcement by Rock bolting and Rock anchoring, retaining wall, Slope treatment. Case study on black clay.

Ground water: Factors controlling water bearing capacity of rock. Pervious & impervious rocks and ground water, Lowering of water table and Subsidence.

Earthquake: Magnitude and intensity of earthquake. Seismic sea waves. Revelation from Seismic Records of structure of earth. Case Study on Elevation and Subsidence in Himalayan region in India. Seismic Zone in India.

Unit 6: **(3 Hrs)**

Rock masses as construction material: Definition of Rock masses. Main features constituting rock mass. Main features that affects the quality of rock engineering and design. Basic element and structures of rock those are relevant in civil engineering areas. Main types of works connected to rocks

and rock masses. Important variables influencing rock properties and behavior such as Fresh rock Influence from some minerals. Effect of alteration and weathering. Measurement of velocity of sound in rock. Classification of Rock material strength. Core logging .Rock Quality Designation. Rock mass description.

Unit 7: **(3 Hrs)**

Geology of dam and reservoir site- Required geological consideration for selecting dam and reservoir site. Failure of Reservoir. Favorable & unfavorable conditions in different types of rocks in presence of various structural features, precautions to be taken to counteract unsuitable conditions, significance of discontinuities on the dam site and treatment giving to such structures.

Unit 8: **(3 Hrs)**

Rock Mechanics- Sub surface Investigations in rocks and engineering characteristics or rocks masses; Structural geology of rocks. Classification of rocks, Field & laboratory tests on rocks, Stress deformation of rocks, Failure theories and sheer strength of rocks, Bearing capacity of rocks.

Practicals:

1) Study of physical properties of minerals.
2) Study of different group of minerals.
3) Study of Crystal and Crystal system.
4) Identification of minerals: Silica group: Quartz, Amethyst, Opal; Feldspar group: Orthoclase, Plagioclase; Cryptocrystalline group: Jasper; Carbonate group: Calcite; Element group: Graphite; Pyroxene group: Talc; Mica group: Muscovite; Amphibole group: Asbestos, Olivine, Hornblende, Magnetite, Hematite, Corundum, Kyanite, Garnet, Galena, Gypsum.
5) Identification of rocks (Igneous Petrology): Acidic Igneous rock: Granite and its varieties, Syenite, Rhyolite, Pumice, Obsidian, Scoria, Pegmatite, Volcanic Tuff. Basic rock: Gabbro, Dolerite, Basalt and its varieties, Trachyte.
6) Identification of rocks (Sedimentary Petrology): Conglomerate, Breccia, Sandstone and its varieties , Laterite, Limestone and its varieties, Shales and its varieties.
7) Identification of rocks (Metamorphic Petrology): Marble, slate, Gneiss and its varieties, Schist and its varieties. Quartzite, Phyllite.
8) Study of topographical features from Geological maps. Identification of symbols in maps.
9) Study of structural Geological models. (at least 5)

10) Identification of Subsurface rock with the help of Resistivity Instrument.

A Study tour to the place worth visiting from Engineering Geological point of view.

A journal containing complete record of above practical work shall be examined as 'Internal Continuous Assessment'. Practical Examination shall be based on practical course. Case study of any engineering structure with respect to geological investigation

Text Books:

1) Engineering and General Geology, Parbin Singh, 8th Edition (2010), S. K. Kataria & Sons. Text Book of Engineering Geology, N. Chenna Kesavulu, 2nd Edition (2009), Macmillan Publishers India.
2) Geology for Geotechnical Engineers, J. C. Harvey, Cambridge University Press (1982).
3) A Text Book of Engineering Geology by R.B. Gupte -P.V.G. Publications, Pune
4) A Text Book of Engineering Geology by N. Chenna Kesavulu.
5) Text Book of Engineering Geology, N. Chenna Kesavulu, Macmillan Publishers
6) Engineering Geology for Civil Engineers, Varghese P.C, PHI
7) Engineering Geology, Subinoy Gangopadhyay, Oxford University

Reference Books

1) Geology and Engineering by R. Legget- McGraw Hill Book Co., London.
2) Physical Geology by Arthur Holmes-ELBS Publication.
3) Principles of Petrology by G.W. Tyrrel.

PUNYASHLOK AHILYADEVI HOLKAR

SOLAPUR UNIVERSITY, SOLAPUR

S. Y. B. Tech. (Civil Engineering) Semester- IV
CV221: WATER SUPPLY ENGINEERING

Teaching Scheme	**Examination Scheme**
Lectures – 3 Hrs/Week, 3 Credits	**ISE –** 30 Marks
Practicals- 2 Hrs/Week, 1 Credit	**ESE –**70 Marks
	ICA-25 Marks

Course Objectives:

1. To acquaint the students with drinking water quality standards and forecast water demands.
2. To study the various units of water treatment plants, treatment procedures and sequencing of water treatment units for various sources of water.
3. To enable the students to carry out design of water distribution systems and appurtenances using appropriate methods.
4. To acquaint the students with various water supply systems, and their operation and maintenance.

Course Outcomes

Upon successful completion of course the student will be able to:

1. Plan and design water conveyance systems for a rural/urban area based on population forecasts.
2. Design various water treatment units and plan their operations on the basis of raw water quality and water demand.
3. Apply knowledge of advanced water treatment processes for individual water purification units.
4. Plan and design water distribution systems
5. Identify operation and maintenance problems in water supply systems and suggest suitable solutions.

SECTION I

Unit 1: Quantity and Quality of Water (6 Hrs)

Sources of water, Quality & Quantity of water sources, Intake work, Demand of water, factors affecting demand, Fluctuation in water demand and its effect, Design period, Population forecast. Calculations for fire demand, Water quality parameters, characteristics and their significance, Drinking water quality standards.

Unit 2: Primary Treatment Units **(8 Hrs)**

a. **Water Treatment:** Principles of water treatment operations and processes, water treatment flow sheets.
b. **Aeration:** principle and concepts, necessity, methods, Removal of test and odor
c. **Sedimentation:** Plain and chemical assisted- principle, efficiency of an idle settling basin, settling velocity, types of sedimentation tanks, design of sedimentation tanks, introduction and design of tube settlers.
d. **Coagulation and flocculation:** Principle of coagulation, common coagulants, alum and ferric salts, introduction to other coagulants aids like bentonite clay, lime stone silicates and Polyelectrolytes, introduction to natural coagulants, Concept of Flocculation chamber, Design of Clari-flocculator.

Unit 3: Secondary Treatment Units **(9 Hrs)**

a. **Filtration:** Theory of filtration, mechanism of filtration, filter materials, Types: Rapid, Gravity, Pressure filter, Multimedia and Dual media filters, components, Under drainage system, Working and cleaning of filter, Operational troubles, Design of rapid and gravity filters.
b. **Disinfection**: Mechanisms, factors affecting disinfection, Types of disinfections, Types and methods of chlorination, Break point chlorination, Bleaching powder chlorination.
c. **Demineralization methods**: Lime- soda, Ion-Exchange, Reverse Osmosis, Ultra filtration and Electro dialysis.
d. Fluoridation and Defluoridation

SECTION II

Unit 4: Conveyance of Water **(8 Hrs)**

Transmission of water, pumping and gravity mains, choice of pipe materials, stresses in pipes, economic size of conveying main.

Distribution reservoir, service storage, necessity, location, and Design (head and capacity) requirements.

Unit 5: Distribution of Water **(9 Hrs)**

Water distribution systems, method of distributing water, system configuration, appurtenances, basic system requirements, hydraulic analysis head balance method, quantity balance method, equivalent pipe concept,

Unit 6: Maintenance of water supply System **(5 Hrs)**

Operation & Maintenance of conveyance system, Types of Corrosion and control measures. Maintenance of water distribution systems, leak detection, variations in Water quality and pressure distribution systems. Water pollution and control act -Terminology and significance

INTERNAL CONTINUOUS ASSESSMENT (ICA)

The ICA includes practical work to find the characteristics of water and assignments on each unit operations

(A) Experiments for the determination of the following (Min. 10)

1. p^H value
2. Alkalinity
3. Acidity
4. Chloride content
5. Hardness
6. Turbidity
7. Residual Chlorine
8. Total Dissolved Solids through measurement of conductivity
9. Solids – Total, Suspended, dissolved, volatile and fixed
10. Dissolved Oxygen
11. Most Probable Number
12. Optimum dose of alum by jar test
13. Fluorides
14. Nitrogen
15. Irons and Manganese

(B) Design /Analysis Problems on each water treatment unit / distribution system

(C) Visit to water treatment plant

Internal Continuous Assessment (ICA) submission shall consist of journals containing

1. Above mentioned Experiments
2. Visit report describing the water treatment units of the plants visited.
3. Design of distribution system by using software or programming.

TEXT BOOKS

1) Environmental Engineering by Peavey, H. S. Rowe, D.R. and Tchobanoglous McGraw Hill Book Company.
2) Water Supply and Pollution Control by Viessman W. and Hammer M.J. Harper Collins College Publishers.
3) Water and Waste Water Technology by Hammer M.J. Prentice-Hall of India Private ltd.
4) Water and Wastewater Technology by G.S. Birdie and J.S. Birdie
5) Water Supply by Duggal K.N., S. Chand and Company.
6) Water Supply by Garg S.K., Khanna Publishers.
7) Water Supply and Waste water Disposal by Fair and Gayes, John Wiley Publication.
8) Water Supply Engineering by B.C. Punmia, Ashok Jain, Arun Jain, Laxmi Publications
9) Environmental Engineering, S.C. Sharma, Khanna Publishing House
10) Basic Environmental Engineering, R.C. Gaur, Newage Publications
11) Water Supply and Sanitary Engineering, Rangwala, Charotar Publications

Reference Books

1. Manual on Water Supply and Treatment- Government of India Publication.-1993.
2. “Water and Waste Water Engineering Vol. I & II”, John Wiley Publication, 1966. Fair G.M, Geyer J. C, and Okun D. A.
3. “Water and Waste Water Technology”, Prentice Hall of India Private Limited, 1996. Hammer M. J.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus

T.Y. B. Tech (Civil Engineering)

w. e. f. Academic Year 2020-21

PUNYASHLOK AHILYADEVI HOLKAR
SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE & TECHNOLOGY
B. Tech. Civil Engineering

Program Educational Objectives (PEOs)
B. Tech. Civil Engineering

The Program Educational Objectives for B. Tech. Civil Engineering program are designed to produce competent civil engineers who are ready to contribute effectively to the advancement of civil engineering and to fulfill the needs of the community. These objectives are as follows:

PEO1: Practice civil engineering in construction industry, public sector undertaking or as an entrepreneur for successful professional career.

PEO2: Pursue higher education for professional development.

PEO3: Exhibit leadership qualities with demonstrable attributes in lifelong learning to contribute to the societal needs.

Program Outcomes (POs)
B. Tech. Civil Engineering

The program outcomes of B. Tech. Civil Engineering Program are as following:

i) **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

ii) **Problem Analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

iii) **Design/Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

iv) **Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems:

v) **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

vi) **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

vii) **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

viii) **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

ix) **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

x) **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to

comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

xi) **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

xii) **Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

B. Tech. Civil Engineering

1) Graduates will be able to survey, conduct geo-technical investigations, plan, analyze, design, estimate and construct residences, public buildings, industrial buildings, townships and infrastructural projects by adopting appropriate construction methods.

2) Graduates will analyze and design the water resources systems, municipal and industrial waste treatment plants with due consideration to pollution free environment.

3) Graduates will use appropriate application software, develop skills necessary for professional practice as a Civil Engineer and prepare themselves for competitive examinations for higher education & for public service commissions.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

CBCS Curriculum for First Year B. Tech. (All Branches)

W.E.F. 2018-19

1. Semester I : Theory Courses

Course Code	Name of the Course	Engagement Hours			Credits	FA	SA		Total
		L	T	P		ESE	ISE	ICA	
C011/ C012	Engineering Physics / Engineering Chemistry$	3 3			3	70	30		100
C112	Engineering Mathematics I	3			3	70	30		100
C113	Basic Electrical & Electronics Engineering	4			4	70	30		100
C114	Engineering Mechanics	3			3	70	30		100
C115	Basic Mechanical Engineering	3			3	70	30		100
C116	Communication Skills	1			1		25		25
Total		**17**			**17**	**350**	**175**		**525**

- **Semester I : Laboratory / Tutorial Courses**

Course Code	Name of the Course	Engagement Hours			Credits	FA	SA		Total
		L	T	P		ESE	ISE	ICA	
C011/ C012	Engineering Physics / Engineering Chemistry$			2	1			25	25
C112	Engineering Mathematics I		1		1			25	25
C113	Basic Electrical & Electronics Engineering			2	1			25	25
C114	Engineering Mechanics			2	1			25	25
C115	Basic Mechanical Engineering			2	1			25	25
C116	Communication Skills			2	1			25	25
C117	Workshop Practice			2	1			25	25
Total			**1**	**12**	**7**			**175**	**175**
Grand Total		**17**	**1**	**12**	**24**	**350**	**175**	**175**	**700**
C118	Induction Program	*# (Please see note below)*							

- **Semester II : Theory Courses**

Course Code	Name of the Course	Engagement Hours			Credits	FA	SA		Total
		L	T	P		ESE	ISE	ICA	
C011/ C012	Engineering Physics / Engineering Chemistry$	3			3	70	30		100
C122	Engineering Mathematics II	3			3	70	30		100
C123	Engineering Graphics & Design	3			3	70	30		100
C124	Basic Civil Engineering	3			3	70	30		100
C125	Programming for Problem Solving	2			2		25		25
C126	Professional Communication	1			1		25		25
Total		**15**			**15**	**280**	**170**		**450**
C127	Democracy, Elections and Good Governance					30			30

- **Semester II : Laboratory / Tutorial Courses**

Course Code	Name of the Course	Engagement Hours			Credits	FA	SA		Total
		L	T	P		ESE (POE)	ISE	ICA	
C011/ C012	Engineering Physics / Engineering Chemistry$			2	1			25	25
C122	Engineering Mathematics II		1		1			25	25
C123	Engineering Graphics & Design			4	2			50	50
C124	Basic Civil Engineering			2	1			25	25
C125	Programming for Problem Solving			4	2	50#		50	100
C127	Professional Communication			2	1			25	25
Total			1	14	8	50		200	250
Grand Total		**15**	**1**	**14**	**23**	**330**	**170**	**200**	**700**
C128	Democracy, Elections and Good Governance							20	

1. Legends used :

L	Lecture	**FA**	Formative Assessment
T	Tutorial	**SA**	Summative Assessment
P	Lab Session	**ESE**	End Semester Examination
		ISE	In Semester Evaluation
		ICA	Internal Continuous Assessment

Notes:

1. $ - Indicates approximately half of the total students at F.Y B. Tech. will enroll under Group A and remaining will enroll under Group B.
2. Group A will take up course of Engineering Physics (theory & laboratory) in Semester I and will take up course of Engineering Chemistry (theory & laboratory) in semester II.
3. Group B will take up course of Engineering Chemistry (theory & laboratory) in Semester I and will take up course of Engineering Physics (theory & laboratory) in semester II
4. # - Indicates the subject 'Programming for Problem Solving' shall have a University 'Practical and Oral Examination' at the end of the semester assessing student's programming skills.
5. In Semester Evaluation (ISE) marks shall be based upon student's performance in minimum two tests & mid-term written test conducted & evaluated at institute level
6. Internal Continuous Assessment Marks (ICA) are calculated based upon student's performance during laboratory sessions / tutorial sessions
7. Democracy, Elections & Good Governance is mandatory course. The marks earned by student with this course shall not be considered for calculation of SGPA/CGPA. However, student must complete ICA of 20 marks and End Semester Examination (ESE) of 30 marks (as prescribed by university, time to time) for fulfillment of this course. This course is not considered as a passing head for counting passing heads for ATKT. However, student must pass this subject for award of the degree
8. Student must complete induction program of minimum five days before commencement of the regular academic schedule at the first semester.

GUIDELINES FOR INDUCTION PROGRAM (C128)

New entrants into an Engineering program come with diverse thoughts, mind set and different social, economical, regional and cultural backgrounds. It is important to help them adjust to the new environment and inculcate in them the ethos of the institution with a sense of larger purpose.

An induction program for the new UG entrant students is proposed at the commencement of the first semester. It is expected to complete this induction program before commencement of the regular academic schedule.

Its purpose is to make new entrants comfortable in their new environment, open them up, set a healthy daily routine for them, create bonding amongst the peers as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.

The Induction Program shall encompass (but not limited to) below activity –

1. Physical Activities
2. Creative Arts
3. Exposure to Universal Human Values
4. Literary Activities
5. Proficiency Modules
6. Lectures by Experts / Eminent Persons
7. Visit to Local Establishments like Hospital / Orphanage
8. Familiarization to Department

Induction Program Course do not have any marks or credits however performance of students for Induction Program is assessed at institute level using below mandatory criteria –

1. Attendance and active participation
2. Report writing

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

Faculty of Science & Technology

Credit System structure of S. Y. B. Tech. Civil Engineering, Semester- I, (W.E.F. 2019-2020)

Course Code	Theory Course Name	Hrs./week				Credits	Examination Scheme			
		L	T	P	D		ISE	ESE	ICA	Total
CV211	Concrete Technology, Material Testing & Evaluation	3	-	-	-	3	30	70	-	100
CV212	Surveying & Geomatics	3	-	-	-	3	30	70	-	100
CV213	Building Construction & Drawing	2	-	-	-	2	30	70	-	100
CV214	Introduction to Fluid mechanics	3	-	-	-	3	30	70	-	100
CV215	Engineering Geology	**2**	-	-	-	2	30	70	-	100
CV216	Introduction to Solid Mechanics	3	1*	-	-	4	30	70	-	100
CV217	Energy Science & Engineering	1	-	-	-	1	25	-	-	25
	Total	**17**	**1**	_	-	**18**	**205**	**420**	**-**	**625**
	Laboratory/Drawings							**POE** **OE**		
CV211	Concrete Technology, Material Testing & Evaluation	-	-	2	-	1	-	- -	25	25
CV212	Surveying & Geomatics	-	-	2	-	1	-	25 -	25	50
CV213	Building Construction & Drawing	-	-	-	2	1	-	- -	25	25
CV214	Introduction to Fluid mechanics	-	-	2	-	1	-	25 -	25	50
CV215	Engineering Geology	-	-	2	-	1	-	25 -	25	50
CV218	Lab practice	-	-	2	-	1	-	- -	25	25
	Total	**-**	**-**	**10**	**-**	**6**	**-**	**75**	**150**	**225**
	Grand Total	**17**	**1**	**10**	**2**	**24**	**205**	**495**	**150**	**850**
	Environmental Science	**1**	–	–	-	–	–	–	–	–

Abbreviations: L- Lectures, P-Practical, T- Tutorial, D-Drawing, ISE -Internal Tests, ESE- University Examination (Theory&/ POE&/Oral examination), ICA- Internal Continuous Assessment.

Note:

(1) The number of students in a practical/Tutorial batch shall be 20. New batch shall be formed if the number of remaining students (after forming batches of 20) exceeds 9.

(2) Internal Continuous Assessment (ICA) shall be a continuous process based on the performance of the student in assignments, class tests, quizzes, attendance and interaction during theory and lab sessions, journal writing, report presentation etc., as applicable.

(3) Student is required to study and pass Environmental Science subject in Second Year of Engineering to become eligible for award of degree.

(4) *Laboratory tests and experiments included in syllabus of 'Introduction to Solid Mechanics' shall be conducted in laboratory. Just essential number of tutorial hours, be used for this purpose. The remaining tutorial turns shall be used for problem solving in the subject.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

Faculty of Science & Technology

Credit System structure of S. Y. B. Tech. Civil Engineering, Semester – II, (W. E.F. 2019-2020)

Course Code	Theory Course Name	Hrs./week				Credits	Examination Scheme				
		L	T	P	D		ISE	ESE		ICA	Total
CV221	Water Supply Engineering	3	-	-	-	3	30	70		-	100
CV222	Building Planning & Design	3	-	-	-	3	15	35		-	**50**
CV223	Hydraulic Engineering	3	-	-	-	3	30	70		-	**100**
CV224	Open Elective-I: ICT for development	2	-	-	-	2	50	-		-	**50**
CV225	Structural Analysis	3	-	-	-	3	30	70		25	**125**
CV226	Engineering Mathematics-III	3	1	-	-	4	30	70		25	**125**
	Total	**17**	**1**	**-**	**-**	**18**	**185**	**315**		**50**	**550**
	Laboratory/Drawings:							**POE**	**OE**		
CV221	Water Supply Engineering	-	-	2	-	1	-	-	-	25	25
CV222	Building Planning & Design	-	-	-	2	1	-	75	-	50	**125**
CV223	Hydraulic Engineering	-	-	2	-	1	-	-	-	25	**25**
CV224	Open Elective- I : ICT for development	-	-	2	-	1	-	-	-	50	**50**
CV227	Computer Programming & Numerical Methods	2	-	2	-	3	-	50	-	25	75
	Total	**2**	**0**	**8**	**2**	**7**	**-**	**125**		**175**	**300**
	Grand Total	**19**	**1**	**8**	**2**	**25**	**185**	**415**		**225**	**850**
	Environmental Science	**1**	–	–		–	–	–		–	–

Abbreviations: L- Lectures, P-Practical, T- Tutorial, D-Drawing, ISE-Internal Tests, ESE- University Examination (Theory &/ POE &/Oral examination), ICA-Internal Continuous Assessment.

Note:

(1) The number of students in a Practical/Tutorial batch shall be 20. New batch shall be formed if the number of remaining students (after forming batches of 20) exceeds 9.

(2) Internal Continuous Assessment (ICA) shall be a continuous process based on the performance of the student in assignments, class tests, quizzes, attendance and interaction during theory and lab sessions, journal writing, report presentation etc., as applicable.

(3) Student is required to study and pass Environmental Science subject in Second Year of Engineering to become eligible for award of degree.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

Faculty of SCIENCE & TECHNOLOGY

Credit System structure of T. Y. B. Tech. Civil Engineering, Semester- I, (W.E.F. 2020-2021)

Course Code	Theory Course Name	Hrs./week				Credits	Examination Scheme				
		L	T	P	D		ISE	ESE		ICA	Total
CV311	Design of Steel Structures	3	1	-	-	4	30	70		25	125
CV312	Geotechnical Engineering	4	-	-	-	4	30	70		-	100
CV313	Waste water Engineering & Air Pollution	3	-	-	-	3	30	70		-	100
CV314	Highway & Tunnel Engineering	4	-	-	-	4	30	70		-	100
CV315	Hydrology and Water Resources Engineering	3	1	-	-	4	30	70		25	**125**
CV316	Self Learning Module-I (H. S. S.)	-	-	-	-	2	-	50		-	50
	Total	**17**	**2**			**21**	**150**	**400**		**50**	**600**
	Laboratory/Drawings							**POE**	**OE**		
CV312	Geotechnical Engineering	-	-	2	-	1	-	25	-	25	50
CV313	Waste water Engg. & Air Pollution	-	-	2	-	1	-	-	25	25	50
CV314	Highway & Tunnel Engineering	-	-	2	-	1	-		-	25	25
CV317	Planning & Design of Public Buildings	**1**	-	-	2	2	-	50	**-**	25	75
CV318	Mini Project *	-	-	2	-	1	-	-	-	50	50
	Total	**1**	**-**	**8**	**2**	**6**	**-**	**100**		**150**	**250**
	Grand Total	**18**	**2**	**8**	**2**	**27**	**150**	**500**		**200**	**850**

Abbreviations: L- Lectures, P -Practical, T- Tutorial, D-Drawing., ISE -Internal Tests, ESE– University Examination (Theory&/ POE &/Oral examination), ICA- Internal Continuous Assessment.

*The students shall carry out 'Mini Project' using suitable application software /Carry out suitable Experimental work/ Carry out variety of Civil Engineering Surveys and present a report. The Mini project shall be assessed by the respective guide for ICA.

Self-Learning Module- I at T.Y. B. Tech. Civil Engineering, Semester – I

Curriculum for Humanities and Social Sciences, 'Self Learning Module – I' is common for all under graduate engineering programs.

(A) Student can select & enroll a 'Self Learning Module- I' Course from P.A.H Solapur University, Solapur HSS Course List (SL31-A) and appear for University examination.

SL31(A): Self Learning Module – I (HSS)

P. A. H. Solapur University, Solapur: HSS Course List

No	Course title
1	Economics
2	Intellectual Property Rights for Technology Development and Management
3	Introduction to Sociology
4	Stress and Coping
5	Professional Ethics & Human Value

OR

(B) Student can select and enroll for university approved minimum eight weeks NPTEL HSS course (SL31-B), complete its assignments and appear for certificate examination conducted by NPTEL.

More details about NPTEL are available at http://nptel.ac.in

SL31-B: Self Learning Module-I (HSS)

University approved NPTEL- HSS course List (SL31-B)

No	Course title	No	Course title
1	Soft skills	15	Management of Inventory Systems
2	Introduction to Modern India Political Thought	16	Economic Growth and Development
3	Intellectual Property	17	Ethic in Engineering Practice
4	Technical English for Engineers	18	Corporate Social Responsibility
5	Developing Soft Skills and Personality	19	Marketing Management –I
6	Educational Leadership	20	Marketing Research and Analysis
7	Microeconomics: Theory & Applications	21	Selected Topics in Decision Modeling
8	Engineering Economics	22	Innovation, Business Models and Entrepreneurship
9	Human Resource Development	23	Simulation of Business Systems: An Applied Approach
10	Project Management for managers	24	Sustainability through Green Manufacturing Systems: An Applied Approach
11	Data Analysis and Decision Making - I	25	Total Quality Management - I
12	E-Business	26	Introduction to Operations Research
13	Working Capital Management	27	Knowledge Management
14	Industrial Safety Engineering		

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

Faculty of SCIENCE & TECHNOLOGY

Credit System structure of T. Y. B. Tech. Civil Engineering, Semester – II, (W. E.F. 2020-2021)

Course Code	Theory Course Name	Hrs./week				Credits	Examination Scheme				
		L	T	P	D		ISE	ESE		ICA	Total
CV321	Foundation Engineering	4	-	-	-	4	30	70		-	100
CV322	Hydraulic Structures & Water Power Engg.	3	-	-	-	3	30	70		-	100
CV323	Professional Elective Course-I	3	-	-	-	3	30	70		-	100
CV324	Design of Concrete Structures-I	4	-	-	-	4	30	70		-	100
CV325	Principles of Management and Quantitative Techniques	3	1	-	-	4	30	70		25	125
CV326	Self Learning Module-II (Technical)	-	-	-	-	2	-	50		-	50
	Total	**17**	**1**	**-**	**-**	**20**	**150**	**400**		**25**	**575**
	Laboratory/Drawings:						-	**POE**	**OE**		
CV321	Foundation Engineering	-	-	2	-	1	-	-	-	25	**25**
CV322	Hydraulic Structures & Water Power Engg.	-	-	2	-	1	-	-	25	25	50
CV323	Professional Elective Course-I	-	-	2	-	1	-	-	-	25	**25**
CV324	Design of Concrete Structures-I	-	-	2		1	-	-	-	25	**25**
CV327	Project on Steel Structures	-	-	-	4	2	-	-	50	50	**100**
CV328	Assessment of field training report	-	-	-	-	1	-	-	-	25	**25**
	Total	**-**	**-**	**8**	**4**	**7**		**75**		**150**	**225**
	Grand Total	**17**	**1**	**8**	**4**	**27**	**150**	**475**		**200**	**825**

Abbreviations: L- Lectures, P -Practical, T- Tutorial, D-Drawing., ISE -Internal Tests, ESE– University Examination (Theory&/ POE&/Oral examination), ICA- Internal Continuous Assessment.

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Note:

1) Students shall undergo a field training of 15 days in the winter vacation after T.Y. B. Tech. Part I and submit the field training report, which shall be assessed by faculty associated with 'Principles of Management and Quantitative Techniques' , in T.Y.B. Tech Part II.
2) Students shall undergo a field training of 15 days in the summer vacation after T.Y.B. Tech Part II. The training report shall be assessed in B.E. Part - I by the concerned project guides.
3) Internal Continuous Assessment (ICA) shall be a continuous process based on the performance of the student in assignments, class tests, quizzes, attendance and interaction during theory and lab sessions, syllabus, report presentation etc., as applicable.
4) The batch size for the practical/tutorial is of 15 students. On forming the batches, if the number of remaining students exceeds 7 students, then a new batch be formed.

Self-Learning Module II at T.Y. B. Tech. Civil Engineering, Semester- II

(A) Student can select a 'Self Learning Module II' (Technical Course) from Course List (SL32) and appear for university examination.

P. A. H. Solapur University, Solapur: Technical Course List Course List

SL32: Self Learning Module – II (Technical Courses)

No	Course title
1	Geosynthetics and Reinforced Soil Structures
2	Rural Roads
3	Planning for Sustainable Development
4	TQM and MIS in Civil Engineering
5	Earthquake Resistant Non Engineered Construction

OR

(B) Student can select & enroll for university approved minimum eight week technical course from various NPTEL technical courses, complete its assignments and appear for certificate examination conducted by NPTEL.

Self learning module –II (Technical courses) shall be from the list approved by BOS Chairman at the start of semester.

Professional Elective Courses: Student shall choose any one course of the following

Elective No	Semester	(I) Structural Engineering	(II) Geotechnical Engineering & Transportation Engg	(III) Construction Engineering & Management	(IV) Environmental Engineering &Hydraulics, Hydrology & Water Resources Engineering
Prof Elective-I	**T.Y.B.Tech Civil Semester-II**	(A) Masonry Structures	(D) Structural Geology	(H) Construction Engineering Materials	(K) Ecological Engineering
		(B) Structural Analysis by Matrix Methods	(E) Urban Transportation Planning.	(I) Systems Engineering & Economics	(L) Solid and Hazardous Waste Management
		(C)Structural Dynamics	(F) Pavement Design	(J) Infrastructure Planning and Management	(M) Physico-Chemical Processes for Water and Wastewater Treatment
			(G) Metro Systems and Engineering		(N)Hydraulic modelling
					(O)Urban Hydrology and Hydraulics
					(P) Instrumentation & Sensor Technologies for Civil Engg. Applications
					(Q) Open Channel flow & River Hydraulics

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

T.Y. B. Tech Civil – Part I

CV- 313 WASTE WATER ENGINEERING & AIR POLLUTION

.

Teaching Scheme	**Examination Scheme**
Lectures :- 3Hrs/Week, 3 Credits	**ISE:** 30 Marks
Practical :- 2 Hrs/Week, 1 Credit	**ESE:** 70 Marks
	OE:- 25 Marks
	ICA: 25 Marks

Course Outcomes:

Upon successful completion of course the student will be able to:

1. Plan the layout of sewage collection system, matching with topography of the region and characterization of sewage.
2. Select aerobic or anaerobic wastewater treatment processes and decide their sequence.
3. Design of aerobic and anaerobic wastewater treatment units and disposal of treated wastewater into the streams.
4. Elaborate the novel decentralized wastewater treatment systems.
5. Select appropriate methods of Solid waste Disposal and Management of hazardous waste based on their characteristics.
6. Analyze air pollution and adopt various measures to control air pollution.

SECTION-I

Unit -1: Collection and conveyance of Sewage (08)

Components of wastewater flows, waste water sources and flow rate. Variation in flow rates, Waste water constituents, Characteristics of various types of waste waters, Sewerage system, layout, types of sewers, collection system. Appurtenances, Design of sanitary and storm water sewers, Maintenance of sewerage systems, Sewage and sludge pumping, location, capacity and pumping station design.

Unit-2: Unit Operations **(10)**

Primary treatment- Screening, comminuting, grit removal, oil and grease trap, chemical precipitation.

Secondary treatment- Activated sludge process, Process design and operating parameters, modification of ASP, operational problems, MBBR, SBR and MBR, Trickling filter, classification, process design considerations, Secondary Clarifications.

Unit -3: Anaerobic treatment and Low cost treatment **(06)**

Fundamentals of anaerobic treatment, sludge characteristics, Treatment and disposal, Concept of different anaerobic reactors.

Low cost waste water treatment methods- Principle of waste stabilization pond, Design and operation of oxidation pond, aerobic and anaerobic lagoons, Oxidation ditch, septic tank, Selection of alternative treatment process flow sheets.

SECTION-II

Unit-4: Disposal of waste water **(08)**

Disposal of waste water stream pollution, Self-purification, DO sag curve, Streeter Phelp's Equation

Emerging Technology for wastewater Treatment- Centralized Sewage Treatment System, objectives of small & decentralized wastewater Treatment system

i. Root zone Technology,
ii. Constructed Wetlands,
iii. Duckweed Ponds,
iv. Fluidized aerobic bed Technology,
v. UASB

Unit -5: Solid Waste Disposal **(06)**

Solid waste management - Solid waste definition, Types, sources, characteristics. Functional outlines- storage, collection, processing techniques, Treatments of solid waste-Composting, Incineration, Pyrolysis and sanitary land filling.

Unit -6: Air Pollution **(07)**

Air Pollution- Definition, Sources and classification of pollutants, Effects. Introduction to meteorological aspects of control of industrial air pollution- Settling Chamber, Bag filter, Cyclone separator, Scrubbers, Electrostatic precipitators. Control of vehicular air pollution. Air quality standards

LABORATORY WORK

INTERNAL CONTINUOUS ASSESSMENT (ICA)

The Internal Continuous Assessment (ICA) work includes practical work to find the characteristics of wastewater and demonstration of Air monitoring equipments and design of sewage treatment plant

Internal Continuous Assessment (ICA) work shall consist of the following:-

(A) List of Experiments (Any Eight)

Analysis of Waste Water,

1. pH Value
2. Total Solids
3. Dissolved Oxygen
4. Biochemical Oxygen Demand
5. Chemical Oxygen Demand
6. Chlorides
7. Oil & Grease
8. Sulphate Content
9. Total Nitrogen
10. Demonstration of High Volume Sampler
11. Demonstration of Auto Exhaust Analyzer.

(B) Design of sewerage system & Treatment system for a small urban area.

(C) Visit to sewage treatment plant

Internal Continuous Assessment (ICA) submission shall consist of the following –

Journal containing experiments carried out in part A of the Internal Continuous Assessment (ICA) and visit Report on (C).

Detail design and appropriate drawings required for part B of the Internal Continuous Assessment (ICA) work.

END SEMESTER EXAMINATION (Oral)

Oral examination will be based on the above syllabus.

TEXT BOOKS

1. Environmental Engineering by Peavey- H. S. Rowe, D.R. and Thobanoglous, McGraw – Hill Book Company
2. Water supply and pollution control - Viessman W. and Hammer M.J. Harper Collins College Publishers.
3. Waste Water Engineering Treatment & Disposal - Metcalf & Eddy, Tata McGraw Hill, 1982
4. Sewage Disposal and Air Pollution Engineering - Garg S.K., Khanna Publishers
5. Waste water Supply Engineering by B. C. Punmia
6. Solid Waste Management in Developing countries - Bhide A.D. and Sundersen B.B. Indian National Scientific Documentation Centre, New Delhi
7. Air Pollution- Rao M.N. and Rao H.V.N. Tata McGraw Hill, 1990
8. Environmental Engineering, S.C. Sharma, Khanna Publishing House
9. Basic Environmental Engineering, R.C. Gaur, Newage Publications
10. Environmental Engineering, Dr. AK Jain (ISBN: 978-93-86173560),Khanna Publishers

REFERENCE BOOKS

1. Manual on sewerage & sewage Treatment published by Ministry of Urban Development Govt. of India Msy-2000. 35 PDOP-4-59-85-97, Ministry of Urban development
2. Water and waste water Technology - Hammer M.J, Prentice-Hall of India Private ltd.
3. Masters. G.M. Introduction to Environmental Engineering and Science
4. Manual on Municipal Solid Waste Management- Ministry of Urban Development, Govt. of India.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
T.Y. B. Tech Civil – Part II

CV- 322 HYDRAULIC STRUCTURES AND WATER POWER ENGINEERING

.

Teaching Scheme	**Examination Scheme**
Lectures :- 3Hrs/Week, 3 Credits	**ISE:** 30 Marks
Practical :- 2 Hrs/Week, 1 Credit	**ESE:** 70 Marks
	OE: 25 Marks
	ICA: 25 Marks

Course Outcomes:

After studying this subject the students will be able to

1. Plan and design the reservoirs depending upon the water resources potential.
2. Analyze and design Gravity dams and Earth dams (Simple Designs).
3. Elaborate the design principles of Arch dams.
4. Carry out Hydraulic Design of spillways
5. Select appropriate method of river training depending upon river characteristics
6. Estimate water power potential at a site.

SECTION – I

Unit 1: **(5)**

a. Planning of Reservoirs: Storage calculations, Control levels, silting of reservoirs, reservoir sedimentation surveys, reservoir losses. Use of remote sensing for reservoir sedimentation surveys.

b. Dams – Necessity, types of dams, selection of site for dams, selection of type of dam, Introduction to dam instrumentation

Unit 2: **(8)**

Gravity Dams - Forces acting on dam, design criteria, theoretical and practical profile, high and low dam, stability calculations, materials and methods of Construction, Galleries, joints, Dam Instrumentation, Computer Application for Design of Dam. Decommissioning of dams

Arch Dams – Types, Layout of Constant angle and Constant radius arch dam, Forces acting on arch dams.

Unit 3: **(5)**

Earth Dams: Components and their functions, Design Criterions; Seepage through and below earth dam, Application of Slip circle method, Inverted Filters, Downstream Drainage, relief wells, Construction of earth dam.

Unit 4: **(5)**

a. Spillways: Necessity and different types , factors affecting choice and type of spillway, elementary hydraulic design, jump height and tail water rating curve, energy dissipation below spillway, gates for spillway. Spillway operations for different discharge values.
b. Outlets through Dams: types and energy dissipation in outlets transition

SECTION – II

Unit 5: **(6)**

Weirs on Permeable Foundations: Theories of seepage, Bligh's creep theory, Khosla's theory exit gradient, Piping and undercutting, Concept of flow net etc. Kolhapur type weirs- working principles, suitability and construction.

Unit 6: **(6)**

a. Canals: Types, Alignment, Design – Kennedy's and Lacey's Silt theories, Canal losses, Typical canal sections, canal lining – Necessity and types, Economics of canal lining.
b. Canal Structures (Introduction): Cross drainage works and canal regulatory works - Aqueduct, Culvert, Super passage, Level Crossing, Cross and Head regulator, Canal Siphon, Canal Escape, canal fall, canal outlets.

Unit 7: **(5)**

a. River and River Training Works: Types of rivers, Meandering phenomenon, Types of river training works, river navigation.
b. Water Logging and Drainage: Causes, effects, preventive and curative measures, alkaline soils, soil efflorescence, drainage arrangements.

Unit 8: **(5)**

Elements of Hydropower Engineering: Power crisis and competing uses of water, need of harnessing solar energy. Types of water power plants, small hydropower plants, layout and components of each type, Intakes, Conveyance system, Surge tanks, Power house types, components and layout, tail race. Managing power demand using various sources of power.

INTERNAL CONTINUOUS ASSESSMENT (ICA)

A) Minimum seven assignments from the following:

1. Determination of height of dam: Reservoir capacity calculations based on demand and Supply, fixing control levels of dam for completed project or ongoing project.
2. Design of gravity dam: Elementary and practical profile with stability calculations
3. Earth dam
    a. Design- Determination of section – slip circle calculations.
    b. Filters and Drainage arrangements.
4. Spillway: Geometrical section, Design of spillway; Energy dissipation arrangements and gates.
5. Arch dam layout of constant angle and constant radius
6. Drawing sheet: Outlets through earth dam. Masonry dam, layout.
7. Drawing sheet: Typical plan and section of Kolhapur type barrage.
8. A typical layout of Hydropower plant and its functioning. Calculating reservoir capacity for hydropower plant
9. Design of any one Canal Structure / Cross Drainage Works

B) Report based on Field visits to Irrigation and Water Power Engineering Projects

END SEMESTER EXAMINATION - ORAL EXAMINATION

Oral Examination will be based on the ICA.

TEXT BOOKS:

1. Irrigation Engineering – S. K. Garg , Khanna Pub. Delhi
2. Irrigation and Water Power Engineering - Priyani , Charoter pub. House, Anand
3. Irrigation and Water Power Engineering – Punmia, B. C.
4. Irrigation – Bharat Singh, NEW CHAND & bros. Roorkee
5. Irrigation Engineering Vol. I – Varshhey and Gupta
6. Engineering Hydrology - K. Subramanya
7. Design of Canals – Circular of Government of Maharashtra, 18 February 1995
8. Irrigation Water Power & Water Resource Engineering, Arora, Standard Publishers

REFERENCE BOOKS:

1. Design of Small Dam – U. S. B. R., OXFORD & IBH pub.co.
2. Engineering for Dam Vol. I, II, III – Justinn, Creager and Hinds
3. Design of Hydraulic Structures Vol. I & II – Leliavsky
4. River Behaviour, Management and Training - CBIP Publication

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
T.Y. B. Tech Civil – Part II

CV- 328 ASSESSMENT OF FIELD TRAINING REPORT

.

Teaching Scheme	**Examination Scheme**
Credits :- 1 Credit	**ICA:** 25 Marks

Students shall undergo a field training of at least 15 days in the winter vacation after T. Y. B. Tech. Civil Part I and submit the field training report, which shall be assessed by faculty associated with Principles of Management and Quantitative Techniques, in T. Y. B. Tech. Civil Part II

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF SCIENCE & TECHNOLOGY

CIVIL ENGINEERING

Syllabus for

B.E. (Civil Engineering)

Choice Based Credit System (CBCS)

With Effect from Academic Year 2019-20

w. e. f. Academic Year 2019-20

PUNYASHLOK AHILYADEVI HOLKAR
SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF SCIENCE & TECHNOLOGY

Program Educational Objectives (PEOs):
B. E. (Civil Engineering)

The Program Educational Objectives for B. Tech. Civil Engineering program are designed to produce competent civil engineers who are ready to contribute effectively to the advancement of civil engineering and to fulfill the needs of the community. These objectives are as follows:

1. Graduates will be prepared with strong engineering fundamentals leading to excellent performance in professional career in planning, designing, construction, operation & maintenance of the built environment and global infrastructure that meet the societal needs.
2. Graduates will exhibit strong technical ability to create and synthesize data using relevant tools and concepts, for providing sustainable solutions to civil engineering problems and projects.
3. Graduates will exhibit excellent interpersonal communication and resource management skills as leaders in the civil engineering profession while working as a part of multidisciplinary team.
4. Graduates will be prepared with sound foundation in mathematics, science and in Civil Engineering to prepare them for higher studies and research.
5. Graduates will possess a breadth of knowledge and engage themselves in the life-long learning to meet challenges of globalization.
6. Graduates will have a sense of responsibility, respect towards society & its heritage and will follow the professional ethics.

w. e. f. Academic Year 2019-20

Program Outcomes (POs)
B. E. (Civil Engineering)

The program outcomes of B. Tech. Civil Engineering Program are summarized as following:

a) Students will demonstrate the basic knowledge of mathematics, science and engineering.
b) Students will demonstrate ability to design and conduct experiments, interpret & analyze data and report results.
c) Students will demonstrate an ability to design a system, component, or a process that meets desired specifications within realistic constraints.
d) Students will demonstrate an ability to function in multidisciplinary team.
e) Students will demonstrate the ability to identify, formulate and solve Civil engineering problems.
f) Students will demonstrate the understanding of their professional Responsibilities ethically.
g) Students will be able to communicate effectively to all concerned.
h) Students will have the confidence to apply engineering solutions in global and social context.
i) Students will recognize the need for and an ability to engage in life-long learning.
j) Students will have broad education for understanding the impact of engineering solutions in a global, economic, environmental, and societal context.
k) Students will possess an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

w. e. f. Academic Year 2019-20

PROGRAM SPECIFIC OUTCOMES (PSOs)

B. E. Civil Engineering

a) Graduates will be able to survey, conduct geo-technical investigations, plan, analyse, design, estimate and construct residences, public buildings, industrial buildings, townships and infrastructural projects by adopting appropriate construction methods.

b) Graduates will analyse and design the water resources systems, municipal and industrial waste treatment plants with due consideration to pollution free environment.

c) Graduates will use appropriate application software, develop skills necessary for professional practice as a Civil Engineer and prepare themselves for competitive examinations for higher education & for public service commissions.

w. e. f. Academic Year 2019-20

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

Faculty of Science & Technology

Choice Based Credit System structure of B. E. Civil –I; Semester – VII, W. E.F. 2019-2020

Theory Course Name	Hrs./week				Credits	Examination Scheme				
	L	T	P	D		ISE	ESE		ICA	Total
Design of Concrete Structures-I	3	1	-	-	4	30	70		25	**125**
Quantity Surveying & Valuation	3	-	-	-	3	30	70		-	**100**
Earthquake Engg.	3	-	-	-	3	30	70		-	**100**
Engineering Management- II	3	-	-	-	3	30	70		-	**100**
Elective - II	3	-	-	-	3	30	70		-	**100**
Total	**15**	**1**	-	-	**16**	**150**	**350**		**25**	**525**
Laboratory/Drawings:							**POE**	**OE**		
Quantity Surveying & Valuation	-	-	4	-	2	-	50	-	50	**100**
Earthquake Engg.	-	-	2	-	1	-	-	-	50	**50**
Engineering Management- II	-	-	2	-	1	-	-	25	-	**25**
Elective - II	-	-	2	-	1	-	-	25	25	**50**
Seminar	-	-	2	-	1	-	-	-	50	**50**
a) Project work b) Assessment of report on field training-II	- -	- -	2 -	- -	1 1	- -	- -	- -	25 25	**25** **25**
Total	**-**	**-**	**14**	**-**	**8**	**-**	**100**		**225**	**325**
Grand Total	**15**	**1**	**14**	**-**	**24**	**150**	**450**		**250**	**850**

Abbreviations: L- Lectures, P –Practical, T- Tutorial, D- Drawing, ISE -Internal Tests, ESE - University Examination (Theory &/ POE &/Oral examination), ICA- Internal Continuous Assessment.

w. e. f. Academic Year 2019-20

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

Faculty of Science & Technology

Choice Based Credit System structure of B. E. Civil –II, Semester – VIII, W. E.F. 2019-2020

Theory Course Name	Hrs./week				Credits	Examination Scheme				
	L	T	P	D		ISE	ESE		ICA	Total
Design of Concrete Structures-II	4	-	-	-	4	30	70		-	**100**
Construction Practices and Town Planning	4	-	-	-	4	30	70		25	**125**
Transportation Engineering-II	4	-	-	-	4	30	70		25	**125**
Elective - III	4	-	-	-	4	30	70		-	**100**
Total	**16**	**-**	**-**	**-**	**16**	**120**	**280**		**50**	**450**
Laboratory/Drawings							**POE**	**OE**		
Design of Concrete Structures-II	-	-	2	-	1	-	-	-	50	**50**
Elective - III	-	-	2	-	1	-	-	25	25	**50**
Project on R. C. C. Structures	-	-	-	4	2	-	-	50	50	**100**
Project work	-	-	6	-	3	-	-	100	100	**200**
Total	**-**	**-**	**10**	**4**	**7**	**-**	**175**		**225**	**400**
Grand Total	**16**	**-**	**10**	**4**	**23**	**120**	**455**		**275**	**850**

Abbreviations: L- Lectures, P –Practical, T- Tutorial, D- Drawing, ISE -Internal Tests, ESE - University Examination (Theory &/ POE &/Oral examination), ICA- Internal Continuous Assessment.

.**Note:**

(1) Project group be of @ 7 students.
(2) Elective subject can be offered from the following list, if minimum 15 students opt for that subject.
(3) Term work assessment: Term Work assessment shall be a continuous process based on the performance of the student in assignments, class tests, quizzes, attendance and interaction during theory and lab sessions, journal writing, report presentation etc., as applicable.

w. e. f. Academic Year 2019-20

LIST OF ELECTIVE SUBJECTS

B. E. Civil Part-I		B. E. Civil Part-II	
ELECTIVE II		**ELECTIVE III**	
1	Open Channel & River Hydraulics	1	Advanced Engg. Geology
2	Air Pollution & Control	2	Ground improvement Techniques
3	Design of Foundations	3	Traffic Engg. & Control
4	Advanced Design of Concrete Structures	4	Infrastructural Engineering
5	Managerial Techniques	5	Project Appraisal
6	Computer Applications in Civil Engg.	6	Solid and Hazardous & Waste Management
7	Advanced structures	7	Dynamics of Structures
8	Entrepreneurship	8	Environmental Management
9	Remote Sensing and GIS Applications	9	Design of Bridges

w. e. f. Academic Year 2019-20

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

B.E. (Civil) Part-I

7. PROJECT WORK

Teaching Scheme:	**Examination Scheme:**
Practical – 2 Hrs/Week, 1 Credits	**ICA –**25 Marks

Course Objectives:

1) To carry out a thematic design project in one of the specializations of civil engineering
2) To carry out a project that will make the students aware of the different facets of civil engineering.
3) To explore the skill and abilities of student to work in team

Course Outcome:

At the end of the course student will be able

1) Develop an ability to apply the basic knowledge of mathematics, science and engineering to real-life problems.
2) Identify the real life problem and present the solution by conducting experimental/ analytical study and in and off the laboratory.
3) Apply modern tools such as different application software, modern instrumentation for the most precise study of the project undertaken
4) Demonstrate a commitment to teamwork while working with other students of diverse culture and different intellectual backgrounds.

The topic for the Project Work may be from any Civil Engineering and inter-disciplinary area related to Civil Engineering as mentioned in content at B.E. (Civil) Part-I. Practical work at B.E. (Civil) part-I will comprise of literature survey / problem formulation / preparation of experimental setup as the case may be of the identified problem.

w. e. f. Academic Year 2019-20

7. ASSESSMENT OF REPORT ON FIELD TRAINING- II

Credit - 1 **ICA –** 25 Marks

The students are required to undergo training in any of the areas of Civil Engineering for 30 working days beyond the academic schedule between the completion of T.E. (Civil) Part-I and B.E. (Civil) Part-I term end.

The training may be may be related to any of the Civil Engineering areas or inter-disciplinary areas such as:

1) Structural Engineering
2) Environmental Engineering
3) Geotechnical Engineering
4) Transportation Engineering
5) Infrastructural Engineering
6) Water Resources Engineering
7) Town & Country Planning
8) Construction Engineering
9) Surveying & Remote Sensing Techniques
10) Project Management
11) Legal Aspects in Civil Engineering
12) Earthquake Engineering
13) Disaster Management

Student shall submit a report of the field training undergone. The students should obtain a certificate of completion of training from the concerned organization and submit it to the department office. Assessment of the training report will be done by the 'Project Guide' to whom the concerned student is allotted.

w. e. f. Academic Year 2019-20

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

B.E. Civil –Part II (CBCS)

TRANSPORTATION ENGINEERING II

Teaching Scheme:	**Examination Scheme:**
Lectures – 4 Hrs/Week, 4 Credits	**ISE –** 30 Marks **ESE –**70 Marks **ICA –**25 Marks

Course objectives:

1. To Study various components of a railway track and geometric design of curves along railway tracks.
2. To impart knowledge of functioning of railway points, crossings, permanent way construction and junctions.
3. To learn about the aircraft characteristics, airport planning and air traffic control.
4. To introduce the students to docks and harbour engineering.

Course outcomes:

On completion of the course, the students will be able to:

1. Perform geometric design for the Railway tracks.
2. Evaluate engineering properties of the materials, to calculate the material quantities required for construction.
3. Design simple turnout at points and crossings and describe the working principles of railway interlocking system.
4. Design and plan airport layout, design facilities required for runway, taxiway and impart knowledge about visual aids.
5. Describe components of Docks and Harbour and their working principles

SECTION-I

RAILWAY ENGINEERING

UNIT 1: Introduction to Railway Engineering (5)

History of Indian Railways- Component parts of railway track, Wheel and axle arrangements, Coning of wheels, Various resistance and their evaluation, Hauling capacity, Tractive effort, Stresses in railway tracks, Stresses in rail, Stresses in sleepers, Stresses in ballast, Formation.

Unit 2: Permanent way component parts **(5)**

Types of rail section, Creep- wear and failure in rails, Rail Joint, Welding of rails, Sleeper Requirements and types, Tracks fixtures and fastenings, Bearing plates, Anti-creep device, Check and guard rails. Ballast requirements, Blanketing layer, Formations, Cross sections and Drainage.

Unit 3: Railway Construction and Maintenance: **(6)**

Earthwork – Stabilization of track on poor soil, Calculation of Materials required for track laying – Construction and maintenance of tracks – Modern methods of construction & maintenance – Railway stations and yards and passenger amenities- Urban rail – Infrastructure for Metro, Mono and underground railways. RDSO specifications

Unit 4: Geometric Design **(5)**

Alignment, Horizontal curves, Super elevation, Equilibrium cant and cant deficiency, Length of transition curves, Gradients and grade compensation, Vertical curves.

Unit 5: Points and Crossing: **(5)**

Functions of turn outs, Design of simple turn out, various types of track junction and their configurations.

Unit 6: Signalling and Interlocking: **(4)**

Control of Train movement and monitoring, Types of signals, Modern signalling Installations. Principle of interlocking, Modernization of railway and railway tracks, High speed tracks.

SECTION- II

AIRPORT ENGINEERING

Unit 7: Air transport development: **(3)**

Airport scenario in India-Stages of development, Aircraft characteristics, Airport planning, Site selection, Obstruction and zoning laws, Imaginary surfaces. Approach zone and turning zones.

Unit 8: Runway and Taxiway design: **(8)**

Typical Airport layout, Element of runway, Orientation and configuration, Basic runway length and correction by ICAO and FAA specification, Geometric design elements, Taxiway design

by ICAO and FAA specification, Exit taxiway, Separation clearance, Holding Aprons, Terminal building, Gate position.

Visual Aids and Air traffic Control:

Airport marking and lighting, Air way and airport traffic control, Instrumental landing Systems and other navigation aids.

Unit 9: DOCK AND HARBOURS ENGINEERING: (4)

Harbours: Classification of ports – Requirement of a good port – classification of Harbours – Docks – Dry & wet docks – Transition sheds and workhouses – Layouts; Quays – construction of Quay walls – Wharves – Jetties – Tides – Tidal data and Analysis – Break waters – Dredging – Maintenance of Ports and Harbours – Navigational aids.

INTERNAL CONTINIUOS ASSESSMENT (ICA)

Assignment on each chapter and field visit report shall be submitted by the students.

TEXT BOOKS

- Railway Engineering by Satish Chandra and Agarwal M.M., Oxford University Press, New Delhi
- Airport Engineering by Khanna & Arora – Nemchand Bros, New Delhi.
- Docks and Harbour Engineering by Bindra S.P. – Dhanpathi Rai & Sons, New Delhi.
- RDSO Codes

REFERENCES

- 'Railway Engineering'by Saxena & Arora – Dhanpat Rai, New Delhi.
- 'Transportation Engineering Planning Design' by Wright P.H. & Ashfort N.J. – John Wiley & Sons.
- 'Airport Engineering' by Virendra Kumar, Dhanpat Rai Publishers, New Delhi.
- 'Transportation Engineering' by Srinivasa Kumar R, University Press, Hyderabad
- Railway and track Engineering- by Mundrey J.S.- Tata McGraw-Hill Education
- . Docks and Harbour Engineering Oza, Charotar Publication House

w. e. f. Academic Year 2019-20

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

B.E. (CIVIL) PART-II (CBCS)

4. ELECTIVE III

4.3 TRAFFIC ENGINEERING AND CONTROL

Teaching Scheme:	**Examination Scheme:**
Lectures – 3 Hrs/Week, 3 Credits	**ISE –** 30 Marks
Practical – 2 Hrs/Week, 1 Credits	**ESE –**70 Marks
	ICA –25 Marks
	ESE (OE) – 25 Marks

Course Objective: -

1. Students should learn basics of traffic engineering, road user characteristics and vehicular characteristics.
2. Familiarizing the students to various traffic studies their methodologies, application and analysis of traffic data.
3. To learn about nature of traffic flow, capacity studies for urban and rural roads and concept of Passenger Car Unit (PCU).
4. To know the various traffic control regulations, traffic control devices, design intersections and signals.
5. To learn the applications of various modern instruments used in traffic studies.

Course Outcomes:

On completing this course, the students will be able to

1. Undertake various traffic studies and analysis of traffic data including parking studies and calculation of parking demand.
2. Distinguish relation between flow, density, speed, concept of level of service for urban and rural area.
3. Describe the regulations on vehicle, driver and speed and Vehicle as per Motor Vehicle Rules.
4. Design intersections and signals and propose various traffic signs, road marking and lighting at various locations.
5. Apply principles of various modern instruments used in traffic studies.

w. e. f. Academic Year 2019-20

SECTION-I

Unit-1: **8**

a) Introduction: Components of road traffic, the vehicle, driver and road, Objectives-Scope of Traffic Engineering.

b) Traffic characteristics: Road user characteristics, vehicular characteristics-static and dynamic characteristics, power performance of vehicles, Road Characteristics, Resistance to the motion of vehicles – Reaction time of driver.

Unit-2: **8**

Traffic parameter studies and Analysis: Objectives and Method of study – Definition of study area- Sample size – Data Collection and Analysis- Interpretation of following Traffic Studies- Volume, Spot Speed, Speed and Delay , Origin and Destination, - parking on street and off street Parking- space consideration, parking demand, parking load and duration, space demand relation. Accidents- Causes, Analysis, Measures to reduce Accident. Statistical applications in traffic studies and traffic forecasting.

Unit-3: **6**

Traffic Flow and Capacity: Nature of Traffic flow, Approaches to understand Traffic Flow, Parameters connected with Traffic Flow, Categories of traffic flow, uninterrupted traffic flow model, Analysis of speed, flow and density relationship, Empirical studies of traffic stream Characteristics. Highway Capacity and level of service, capacity of urban and rural roads, PCU concept.

SECTION-II

Unit-4: **8**

Traffic Regulation: General regulations, regulations on vehicles- Vehicle registration requirements and accessories, vehicle inspection, inspection coverage, general control for motorist pedestrian, regulations on drivers- driver licensing, speed control- methods of control devices speed zoning, one way street – necessity, requirements, advantages and disadvantages. Central Motor Vehicle Rules

Unit-5: **7**

Traffic Control Devices: Traffic signs, traffic Markings, islands, types of intersection and channelization, Rotary intersection design and traffic signal design by IRC and Webster's method- vehicle actuated and synchronized signals, signal coordination, Road Lighting and Intelligent Transport System- Definition, Necessities, Application in the present traffic scenario.

w. e. f. Academic Year 2019-20

Unit-6: **8**

a) Automated Traffic Measurement – Traffic volume measurement – In-situ Technologies (Intrusive and non- Intrusive technologies), detectors and magneto-meter/ Passive magnetic systems, pneumatic tube detector, Inductive Detector Loop (IDL), Weigh in motion (WIM) detector system, Video image detection (VID), Infrared Sensors. Speed and delay survey-Floating Car Data (FCD), GPS-based FCD, application of Radio-frequency identification (RFID), Travel Time Data collection Technique, ITS probe vehicle data collection systems. Bump Integrator, Portable skid resistance tester, sideways force test vehicle and miscellaneous equipment.

INTERNAL CONTINIUOS ASSESSMENT (ICA)

The ICA shall consist

a) Field studies on traffic volume at midblock, intersection; O-D studies; speed studies, spot speed, speed and delay; parking demand studies and accident studies. Preparation and submission of report on all field surveys.

b) Assignment on each chapter and field visit report shall be submitted by the students.

c) Brief report on applications of software's used in traffic studies and analysis, such as VISSIM, SIDRA, PASSER III, TSIS, AIMSUN, Dynameq, Dynasmart, and SimTraffic and Transyt-7F.

TEXT BOOKS:

1. Traffic Engineering by Matson, Smith and Hurd *McGraw Hill & Co publication.*
2. Traffic Engineering and Transport Planning by Dr. L.R.Kadiyali., *Khanna Publishers*.
3. Highway Engineering by Khanna and Justo, *Nem Chand & Bros publication.*
4. Traffic Engineering – An Introduction by Wells, G.R., *Griffin, London publication.*

REFERENCE BOOKS:

1. Traffic Engineering by Pignataro, *Prentice Hall publications*
2. Highway Traffic Analysis and Design by Salter, R.J and Hounsell, N.B., *Mac Millan publishers, 1996.*
3. Highway capacity Manual-*2000.*
4. An Introduction to Transportation Engineering by Jotin Khistey and Kent Lall, *Prentice Hall publication, 2002.* Traffic Engineering by Roger P. Roess, Elena S. Prassas & William R. McShane, Fourth Edition, Pearson Education, South Asia

w. e. f. Academic Year 2019-20

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF SCIENCE & TECHNOLOGY

COMPUTER SCIENCE & ENGINEERING

Syllabus Structure for

First Year (All Branches) w.e.f. Academic Year 2018-19

Second Year B. Tech. (Computer Science & Engineering) w.e.f. Academic Year 2019-20

Third Year B. Tech. (Computer Science & Engineering) w.e.f. Academic Year 2020-21

Choice Based Credit System

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE & TECHNOLOGY
Credit System Structure of Third Year B.Tech. (CSE) wef. 2020-2021
Semester – I

Course Code	*Theory Course Name*	*Hrs./Week*			*Credits*		*Examination Scheme*		
		L	*T*	*P*		*ISE*	*ESE*	*ICA*	*Total*
CS311	System Programming	3	--	--	3	30	70	--	100
CS312	Operating Systems	3	--	--	3	30	70	--	100
CS313	Software Engineering	3	--	--	3	30	70	--	100
CS314	$ Database Engineering	4	--	--	4	30	70	--	100
CS315	Design and Analysis of Algorithm	3	--	--	3	30	70	--	100
CS316	Python Programming	2	--	--	2	25	--	--	25
CS317	Java Programming	2	--	--	2	25	--	--	25
SL31	Self Learning Module I (HSS)	--	--	--	2	--	50	--	50
	Sub Total	20	--	--	22	200	400	--	600
Course Code	**Laboratory Course Name**								
							ESE	**ICA**	
							POE	**OE**	
CS311	System Programming	--	--	2	1		--	--	25	25
CS313	Database Engineering	--	--	2	1		50	--	25	75
CS314	Design and Analysis of Algorithm	--	--	2	1		--	--	25	25
CS316	Python Programming	--	--	2	1		50	--	25	75
CS317	Java Programming	--	--	2	1		50	--	25	75
	Sub Total	--	--	10	5		150	--	125	275
	Grand Total	**20**	**--**	**10**	**27**	**200**	**550**		**125**	**875**

- *Abbreviations: L - Lectures, P –Practical, T - Tutorial, ISE - In Semester Exam., ESE- End Semester Exam, ICA - Internal Continuous Assessment, ISE - Internal Tests, ESE University Examination (Theory &/ POE &/Oral examination)*

$ - The theory courses for Computer Sci. and Engg. and Information Technology are same, therefore paper for ESE will be common to both.

Note :

1. Batch size for the practical/tutorial shall be of 15 students. On forming the batches, if the strength of remaining student exceeds 7, then a new batch shall be formed.

2. Vocational Training (evaluated at Final Year B.Tech. Part-I) of minimum 15 days shall be completed in vacation/s after S.Y. B.Tech. Part-II but before Final Year B.Tech. Part-I & the report shall be submitted and evaluated in Final Year B. Tech Part-I.

3. ICA assessment shall be a continuous process based on student's performance in – class tests, assignments, homework, subject seminars, quizzes, laboratory books and their interaction and attendance for theory and lab sessions as applicable.

4. **Self-Learning Module-I (HSS) at T.Y. B.Tech. – I**

   Curriculum for Humanities and Social Sciences, Self Learning Module-I (HSS) is common for all under graduate engineering programs.

   A. Student can select & enroll a Self Learning Module-I (HSS) Course from P.A.H. Solapur University, Solapur Course List (SL31-A) and appear for university examination.

SL31-A: P. A. H. Solapur University, Solapur: HSS Course List

1. Economics	4. Stress and Coping
2. Intellectual Property Rights for Technology Development and Management	5. Professional Ethics & Human Value
3. Introduction to Sociology	

OR

B. Student can select and enroll for university approved minimum eight weeks NPTEL HSS course (SL31-B), complete its assignments and appear for certificate examination conducted by NPTEL. The list of courses as shown in Table SL31-B will be updated from time to time by University authorities. Latest updated list will be valid for selection of self learning Module-I (HSS) courses

More details about NPTEL are available at http://nptel.ac.in.

SL31-B: University approved NPTEL- HSS course List

1. Soft skills	15. Management of Inventory Systems
2. Introduction to Modern India Political Thought	16. Economic Growth and Development
3. Intellectual Property	17. Ethic in Engineering Practice
4. Technical English for Engineers	18. Corporate Social Responsibility
5. Developing Soft Skills and Personality	19. Marketing Management –I
6. Educational Leadership	20. Marketing Research and Analysis
7. Microeconomics: Theory & Applications	21. Selected Topics in Decision Modeling
8. Engineering Economics	22. Innovation, Business Models and Entrepreneurship
9. Human Resource Development	23. Simulation of Business Systems: An Applied Approach
10. Project Management for managers	24. Sustainability through Green Manufacturing Systems: An Applied Approach
11. Data Analysis and Decision Making - I	25. Total Quality Management - I
12. E-Business	26. Introduction to Operations Research
13. Working Capital Management	27. Knowledge Management
14. Industrial Safety Engineering	

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE & TECHNOLOGY
Credit System Structure of Third Year B.Tech. (CSE) wef. 2020-2021
Semester – II

Course Code	***Theory Course Name***	***Hrs./Week***			***Credits***		***Examination Scheme***		
		L	***T***	***P***		***ISE***	***ESE***	***ICA***	***Total***
CS321	Compiler Construction	4	--	--	4	30	70	--	100
CS322	Unix Operating System	3	--	--	3	30	70	--	100
CS323	Computer Organization and Architecture	3	--	--	3	30	70	--	100
CS324	Artificial Intelligence	3	--	--	3	30	70	--	100
CS325	Mobile Application Development	2	--	--	2	25	--	--	25
CS326A to CS326C	Elective – I	3	--	--	3	30	70	--	100
SL32	Self Learning Module II (Technical)	--	--	--	2	--	50	--	50
	Sub Total	18	--	--	20	175	400	--	575
Course Code	***Laboratory Course Name***								
							ESE	***ICA***	
							POE	***OE***	
CS321	Compiler Construction	--	--	2	1		--	--	25	25
CS322	Unix Operating System	--	--	2	1		50	--	25	75
CS324	Artificial Intelligence	--	--	2	1		--	--	25	25
CS325	Mobile Application Development	--	--	2	1		50	--	25	75
CS326A to CS326C	Elective – I	--	--	2	1		--	--	25	25
CS327	Mini Project	--	--	2	1		--	50	25	75
	Sub Total	18	--	12	6		100	50	150	300
	Grand Total	**18**	**--**	**12**	**26**	**175**	**550**		**150**	**875**

- *Abbreviations: L - Lectures, P –Practical, T - Tutorial, ISE - In Semester Exam., ESE- End Semester Exam, ICA - Internal Continuous Assessment, ISE - Internal Tests, ESE University Examination (Theory &/ POE &/Oral examination)*

Elective-I

CS326A - Object Oriented Modelling and Design
CS326B - $ Artificial Neural Network
CS326C - $ Data Science

$ - The theory courses for Computer Sci. and Engg. and Information Technology are same, therefore paper for ESE will be common to both.

Note :

1. Batch size for the practical /tutorial shall be of 15 students. On forming the batches, if the strength of remaining student exceeds 7, then a new batch shall be formed.

2. Vocational Training (evaluated at Final Year B.Tech. Part-I) of minimum 15 days shall be completed in vacation/s after S.Y. B.Tech. Part-II but before Final Year B.Tech. Part-I & the report shall be submitted and evaluated in Final Year B. Tech Part-I.

3. ICA assessment shall be a continuous process based on student's performance in – class tests, assignments, homework, subject seminars, quizzes, laboratory books and their interaction and attendance for theory and lab sessions as applicable.

4. Mini Project shall consist of developing software, based on various tools &technologies.

5. Project groups shall not be of more than **five** students.

6. **Self-Learning Module II at T.Y. B.Tech. – II (HSS)**

   A. Student can select a Self Learning Module II (Technical Course) from Course List (SL32) and appear for university examination.

SL32 : Self Learning Module-II (Technical)

SL32A - UI or UX technology
SL32B - Software Licensing and Practices

OR

B. Student can select & enroll for university approved minimum eight week technical course from various NPTEL technical courses, complete its assignments and appear for certificate examination conducted by NPTEL.

BOS Chairman / Coordinator will announce the list of approved NPTEL online courses of minimum eight weeks duration for 'Self Learning Module-II (Technical)' on commencement of the Sem-II of respective academic year from the available NPTEL courses through university system and will make available to student through University / institute website.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
Faculty of Science and Technology
Third Year B. Tech (Computer Science & Engineering)
Semester – II
CS327 : Mini Project

Teaching Scheme	**Examination Scheme**
Practical: 2 Hrs/week, 1 Credit	ICA : 25 Marks
	POE – 50 marks

Course Outcomes :

At the end of this course, student will be able to

1. Select mini project problem of societal relevance in selected domain
2. Design system architecture with due consideration of environment, sustainability and ethics.
3. Develop the solution to the problem using tools, resources and frameworks.
4. Engage in teamwork and communicate effectively, while observing professional ethics.
5. Inculcate habit of self study and lifelong learning.

Note :

1. There should be a group of preferably 4/5 students.
2. Students should be given projects in Hardware, Software, Embedded or any contemporary topic.
3. One guide should be allocated per group.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

NAAC Accredited-2015
'B' Grade (CGPA 2.62)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: Computer Science & Engineering

Name of the Course: B.E.- IV (Sem. VII & VIII)

(Syllabus to be implemented from w.e.f. June 2019)

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

Faculty of Engineering & Technology

Structure of B.E.Computer Science and Engineering wef. 2019-2020

Choice Based Credit System Syllabus

Semester I

Course Code	Theory Course Name	Hrs./week			Credits	Examination Scheme				
		L	T	P		ISE	ESE		ICA	Total
CS411	Advanced Computer Architecture	3	1	--	4	30	70		25	125
CS412	Distributed Systems	3	--	--	3	30	70		--	100
CS413	Modern Database Systems	4	--	--	4	30	70		--	100
CS 414A to CS 414C	Elective –I	3	--	--	3	30	70		--	100
CS 415A to CS 415C	Elective-II	3	1	--	4	30	70		25	125
CS416	# Programming with Python	2	--	--	2	--	--		25	25
	Sub Total	**18**	**02**		**20**	**150**	**350**		**75**	**575**
	Laboratory						**POE**	**OE**		
CS412	Distributed Systems	--	--	2	1	--	--	--	25	25
CS413	Modern Database Systems	--	--	2	1	--	50	--	25	75
CS416	Programming with Python	--	--	2	1	--	50	--	--	50
CS417	Project Phase-I	--	--	4	2	--	50	--	25	75
CS418	Vocational Training	--	--			--	--	--	25	25
	Sub Total				5		**150**	**--**	**100**	**250**
	Grand Total	**18**	**02**	**10**	**25**	**150**	**500**		**175**	**825**

Abbreviations: L- Lectures, P –Practical, T- Tutorial, ISE- In Semester Exam, ESE - End Semester Exam, ICA- Internal Continuous Assessment, ESE - University Examination (Theory &/ POE &/Oral examination)

Semester II

Course Code	Theory Course Name	Hrs./week			Credits	Examination Scheme				
		L	T	P		ISE	ESE		ICA	Total
CS421	Management Information System	3	1	--	4	30	70		25	125
CS422	Information and Cyber Security	3	--	--	3	30	70		--	100
CS423A to CS423C	Elective-III	3	1	--	4	30	70		25	125
CS424A to CS424C	Elective-IV	3	--	--	3	30	70		--	100
CS425	# Web Technology	2	--	--	2	25	--		--	25
	Sub Total	**14**	**02**	**--**	**16**	**145**	**280**		**50**	**475**
	Laboratory						**POE**	**OE**		
CS422	Information and Cyber Security	--	--	2	1	--	50	--	25	75
CS425	Web Technology	--	--	4	2	--	50	--	25	75
CS424	Elective-IV	--	--	2	1		--	--	25	25
CS426	Project Phase-II	--	--	6	3	--	100	--	75	175
	Sub Total		--		**7**		**200**		**150**	**350**
	Grand Total	**14**	**02**	**14**	**23**	**145**	**480**		**200**	**825**

Abbreviations: L- Lectures, P –Practical, T- Tutorial, ISE- In Semester Exam, ESE - End Semester Exam, ICA- Internal Continuous Assessment, ESE - University Examination (Theory &/ POE &/Oral examination)

Elective I CS414A : Internet of Things CS414B : Wireless Adhoc Networks CS414C : Artificial Intelligence	**Elective II** CS415A : Business Intelligence CS415B : Data Mining CS415C : Object Oriented Modeling and Design
Elective III CS423A : Big data Analytics CS423B : Human Computer Interaction CS423C : Artificial Neural Network	**Elective IV** CS424A : Software Testing and Quality Assurance CS424B : Cloud Computing CS424C : Machine Learning

Note: Appropriate electives may be added or deleted as and when required.

Note :

- Batch size for the practical /tutorial shall be of 15 students. On forming the batches, if the strength of remaining student exceeds 7, then a new batch shall be formed.
- Vocational Training (evaluated at B.E. Part-I) of minimum 15 days shall be completed in any vacation after S.E. Part-II but before B.E. Part-I & the report shall be submitted and evaluated in B.E. Part-I
- Appropriate Elective I & II Subjects may be added when required.
- Curriculum for Humanities and Social Sciences Self Learning Modules is common for all under graduate programmes of faculty of Engineering and Technology
- Project group for B.E.(CSE) Part I and Part II shall be of size 4 to 5 students
- Term work assessment shall be a continuous process based on student's performance in – class tests, assignments, homework, subject seminars, quizzes, laboratory books and their interaction and attendance for theory and lab sessions as applicable

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

NAAC Accredited-2015
'B' Grade (CGPA 2.62)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: ELECTRICAL ENGINEERING

Name of the Course: S.Y. B.Tech

(Syllabus to be implemented from w.e.f. June 2019)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
S. Y. B. Tech. Electrical Engineering Semester-I
POWER SYSTEM-I

Teaching Scheme	Examination Scheme
Theory: - 3 Hrs/Week,1 Credits	**ESE** – 70 Marks
Tutorial: - 1 Hrs/Week, 1 Credit	**ICA-**25Marks
	ISE- 30Marks

This course introduces power plant which deals with generation of electrical energy The course also introduces economic aspects of different power plants

Course Prerequisite:

Knowledge of Basic Electrical Engineering, simple mathematical calculations Student shall have knowledge of energy conversion Student shall also have basic knowledge types of energy sources

Course Objectives:

- To develop conceptual understanding of operation of different power plants
- To learn economic aspects of power system.
- To study necessity and types of non-conventional energy sources
- To make students understand overhead structure of power system.

Course Outcomes:

After successful completion of this course,

- Student will be able to understand operation of different power plants
- Student will be able to analyze economic aspects of power system
- Student will be able to investigate need and areas of application for non-conventional energy sources
- Students will be able to understand overhead structure of power system.

SECTION-I

Unit 1 Economic Aspects of Power Generation **No of lectures-08**

- **Prerequisite:**
  Knowledge of Basic Electrical Engineering, simple mathematical calculations

- **Objectives:**
  - To introduce to student basic terms used in power system operation
  - To make student understand load curve
  - To introduce student to types of loads
  - To familiarize the students with the tariff methods for electrical energy consumptions

- **Outcomes:**
  After completing this unit, students –
  - Can define different terms in power system operation
  - Can analyze selection of generating units
  - Can calculate usage of electrical power & tariff

- **Unit Content:**
  Review of terms commonly used in system operations, Variable load on power station, Peak load, Base load, Diversity factor, Plant utility factor, Maximum demand, Load curves, load duration curves, Types of loads, Selection of generation units, Interconnected grid systems, Cost of electrical energy, Tariff & different types of tariff

- **Content Delivery Methods:**
  Chalk and talk, power point presentation

- **Assessment Methods:**
  Numerical problems related to cost of electrical energy and tariff, Theory questions related to above content

Unit 2 Base Load Power Plants **No of lectures-08**

- **Prerequisite:**
  Energy sources, Energy conversion methods

- **Objectives:**
  - Revision of Energy Sources.
  - To introduce student to different Conventional & non-Conventional Energy sources.
  - To make student understand different base load power plants.

- **Outcomes:**
  After completing this unit, students -
  - Can define conventional & non-conventional sources
  - Can compare different base load power plants

- **Unit Content:**
  Different types of conventional and non-conventional energy sources, Structure of power industry,
  Hydro Power Plant: Typical layout, Site selection, Classification, Hydrograph, Flow duration curves, Hydrology, Types of turbines.
  Thermal Power Plant: Typical layout, Site selection, Fuels & their handling, Combustion process, Ash handling, Dust collection.
  Nuclear Power Plant: Typical layout, Site selection, Nuclear reaction, Classification of nuclear reactor (AGR,PWR,BWR), Nuclear waste disposal, Environmental Aspects

- **Content Delivery Methods:**
  Chalk and talk, Power point presentations on Energy Sources

- **Assessment Methods:**

Theory questions related to above content.

Unit 3 Peak Load Power Plants **No of lectures-5**

- **Prerequisite:**
  Knowledge of Basic Electrical Engineering & nuclear reaction
- **Objectives:**

  1) To introduce student to Diesel & Gas Turbine Power Plants
  2) To introduce student to solar & Wind Power Plants
  3) To make student analyze typical layout of solar & Wind Power Plants

  Outcomes:
  After completing this unit, students –
  1. Can apply the operation of Diesel & Gas Turbine Power Plants
  2. Can apply the operation of solar & Wind Power Plants
- **Unit Content:**
  Review of Diesel Plants (advantages & disadvantages), Typical layout of power plant, site selection, Review of Gas Turbine Plants (advantages & disadvantages), Typical layout of power plant, Site selection, Review of Solar Energy (advantages & disadvantages), Typical layout of solar thermal power plant, Site selection, Review of wind energy (advantages & disadvantages), Typical layout of wind power plant, Site selection
- **Content Delivery Methods:**
  Chalk and talk, power point presentation
- **Assessment Methods:**
  Theory questions related to above content

SECTION II

Unit 4– General structure of power system **No of lectures – 08**

- **Prerequisite:**
  DC system, single phase & three phase systems, ohms law
- **Objectives:**
  1. To learn basic structure of power systems
  2. To make student understand different transmission systems
- **Outcomes:**
  After completing this unit, students -
  1. Can distinguish between different supply systems
  2. Can compare between AC and DC transmission System.
  3. Can compare between overhead and underground System.

Unit Content:
Review of Electrical supply system, typical AC power supply scheme, Comparison DC and AC systems, comparison between overhead and underground system

- **Content Delivery Methods:**

Chalk and talk, power point presentations

- **Assessment Methods:**
  Theory questions related to above content

Unit 5– Economic Aspects of Transmission System **No of lectures – 08**

- **Prerequisite:**
  DC system, single phase & three phase systems, ohms law

- **Objectives:**
  1) To make student understand conductor cost of different AC transmission systems
  2) To make student understand Economics of power transmission

- **Outcomes:**
  After completing this unit, students -
  1) Can calculate voltage, conductor cost for various transmission systems
  2) Can calculate Economic conductor size for given transmission system (Kelvin's law)

- **Unit Content:**
  Comparison of conductor cost for various Overhead AC transmission systems, comparison of conductor cost for various Underground AC transmission systems, Economic choice of conductor size by kelvins law

- **Content Delivery Methods:**
  Chalk and talk, power point presentations

- **Assessment Methods:**

  Numerical problems and derivation related to conductor cost for different transmission systems and Kelvin's law Theory questions related to above content

Unit 6– Mechanical design of overhead lines **No of lectures – 05**

- **Prerequisites:**
  Electrical Material**s** & their properties**,** Capacitance

- **Objectives:**
  1. To introduce concept of overhead transmission line
  2. To introduce different conducting material & their application
  3. To introduce different insulators & their application
  4. To make student understand string efficiency & methods to improve it

- **Outcomes:**
  After completing this unit, students -
  1. Can describe construction and use of different insulators, conductor, line supports
  2. Can calculate string efficiency of given string insulators

- **Unit Content:**
  Review of overhead transmission line, main components, conductor materials, line supports, overhead line insulators, types- pin type, suspension type, strain type insulators, string efficiency, methods of improving string efficiency

- **Content Delivery Methods:**

Chalk and talk, power point presentations, videos lectures on insulators, line supports

- **Assessment Methods:**
  Numerical problems and derivation related to string efficiency, Theory questions related to above content

- **Internal Continuous Assessment (ICA) :**
  ICA shall consist of Minimum **FOUR** drawing Sheetson above syllabus and **report on visit** to any one of the generating power plant

- **Text Books:**

1) "A course in Electrical Power", S K Kataria & Sons, J B Gupta

2) "Generation of Electrical Energy", S Chand Publication, B R Gupta

3) "Power System Engineering", Laxmi Publications, R K Rajput

4) "Power Plant Engineering", New Age International Publication, A K Raja

- **Reference Books:**
  1) " Power Plant Technology", Tata Mc Graw Hill,MMEI-Wakil
  2) "Power Plant Engineering", S Chand Publications, Samsher Gautam

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Punyashlok Ahilyadevi Holkar Solapur University, Solapur
Faculty of Science & Technology
T. Y. B.Tech. (Electrical Engineering)

Choice Based Credit System Structure of T.Y.B .Tech. Electrical Engineering W.E.F. 2020-21

Semester II

Course Code	*Theory Course Name*	*Hrs./week*			*Credits*	*Examination Scheme*			
		L	*T*	*P*		*ISE*	*ESE*	*ICA*	*Total*
EL 321	Electrical Machine Design	4	-	-	4	30	70	-	100
EL 322	Electrical Utilisation	3	1	-	4	30	70	25	125
EL 323	Power Electronics	4	-	-	4	30	70	-	100
EL 324	Signals & Systems	4	1	-	5	30	70	25	125
EL 325	Open Elective-II	3	-	-	3	30	70	-	100
EL 326	Self-Learning Module-II	-	-	-	2	--	50	-	50
Sub Total		**18**	**2**	**-**	**22**	**150**	**400**	**50**	**600**
Laboratory Course Name									
							ESE		
							POE	OE		
EL 321	Electrical Machine Design	-	-	2	1	-		25	25	50
EL 323	Power Electronics	-	-	2	1	-	50	-	25	75
EL 325	Open Elective-II	-	-	2	1				25	25
EL 327	Mini Hardware Project	-	-	2	1	-	-	25	25	50
Sub Total		**-**	**-**	**8**	**4**	**-**	**100**		**100**	**200**
Grand Total		**18**	**2**	**8**	**26**	**150**	**500**		**150**	**800**

Abbreviations: L- Lectures, P –Practical, T- Tutorial, ISE- In Semester Exam, ESE - End Semester Exam, ICA- Internal Continuous Assessment, ESE - University Examination (Theory &/ POE &/Oral examination)

Self-Learning Module-II:

1. Special Purpose Machines
2. Electrical Safety
3. Solar Photovoltaic System Design & Installation
4. NPTEL Courses

Solapur University, Solapur

Faculty of Commerce and Management

Master of Business Administration (MBA)

Syllabus for Year II Sem. III & IV

Choice Based Credit System (CBCS)

(w.e.f. June, 2018)

Solapur University, Solapur

MBA Part II Syllabus (CBCS) with effect from 2018-19

Semester III						Semester IV					
Paper No.	**Subject**	**Weekly Theory/ Credits**	**Internal Marks**	**Univ. Exam Marks**	**Total Marks**	**Paper No.**	**Subject**	**Weekly Theory/ Credits**	**Internal Marks**	**Univ. Exam Marks**	**Total Marks**
17	Strategic Management	04	30	70	100	25	Entrepreneurship Development	04	30	70	100
18	Management Accounting	04	30	70	100	26	Quality Management	04	30	70	100
19	Skill Development	04	30	70	100	*27	*Elective I - Paper III*	04	30	70	100
20	Project Report & Viva	--	50	50	100	*28	*Elective II - Paper-III*	04	30	70	100
*21	*Elective I - Paper I*	04	30	70	100	*29	*Elective I - Paper IV*	04	30	70	100
*22	*Elective II - Paper-I*	04	30	70	100	*30	*Elective II - Paper-IV*	04	30	70	100
*23	*Elective I - Paper II*	04	30	70	100	*31	*Elective I - Paper V*	04	30	70	100
*24	*Elective II - Paper-II*	04	30	70	100	*32	*Elective II - Paper-V*	04	30	70	100

*** Electives:**

Group	Elective Specialization
A	• Marketing Management
B	• Financial Management • Production and Materials Management
C	• Human Resource Management • International Business Management • Systems Management • Agriculture & Co-operative Management

Sem. III Paper XX - Project Report & Viva

Objectives:

1. To expose students to the working of any organization and managers.
2. To relate the concepts learnt by the students to the working of the organization.
3. To work on a problem identified by the organization / student and thus understand the practical aspects of the working of an organization.

Guidelines:

1. The project work shall be for a minimum period of 30 days immediately after IInd semester examinations.
2. Students should join the organization by 05th June. Deadline for project completion is 15th July.
3. No two Students shall work on the same topic in the same organization.
4. The student should **Collect a Certificate of Minimum 30 Days Project Work Completion** mentioning the period (From ____ to ____) on the Company's letter head.
5. The student shall submit the Final Project Report before 30th September of the Academic Year.

Project Report 'Table of Contents'

Chapter 1 – Introduction of the Study

1.1 Introduction – Overview of the sector, organization and the Study

1.2 Objectives of the study.

This should give a clear picture of the project. Objective should be clearly specified. There should be minimum 4 to 5 objectives of the project report. What the project intends to find out should be clearly specified.

1.3 Scope and limitations of the study

1.4 Research Methodology

The methodology comprises of Research Design, Hypothesis, Types of data, Data collection techniques, sampling techniques, Sample size, etc.

1.5 Significance of the study.

What the project intends to find out and how it would be helpful to the organization.

Chapter 2 – Company Profile

2.1 Introductions to Organization.

2.1.1 Background and Inception of the Organization

2.1.2 Ownership Pattern

2.1.3 Nature of the Business

2.1.4 Vision, Mission and Quality Policy

2.1.5 Types of Products and Services

2.2 Market Scenario

2.2.1 Area of Operation – Global / National / Regional

2.2.2 Competitors' Information

2.2.3 Achievement/Award if any

2.3 Various departments in the organization.

2.4 Organization chart.

Chapter 3 - Theoretical Background.

3.1 Brief Review of Literature

3.2 Conceptual framework

Chapter 4 - Data Analysis and Interpretation.

Should include Tables, Graphs / Diagrams, Mean, Median, Mode, Std. Deviation as Applicable.

Chapter 5 - Findings

Chapter 6 - Suggestions *OR* **Conclusion.**

Annexure
(Should contain a copy of Questionnaire if used for Data Collection)

Bibliography
(*Students should refer and mention at least 5 reference books, 3 National and 3 international journals and websites referred.)*

Format for Writing and presenting the summer project:

1. **Font type** – Times New Roman.
2. **Font size** – Headings – 14 pts., Normal Text – 12 pts.
3. **Spacing** – Line - 1.5 lines, Paragraph – 12 pts.
4. **Page margins** – Left - 1.5 inch Right - 1.0 inch
   Top - 1.0 inch Bottom - 1.0 inch
5. **Header** – *(College Name/Abbrn.)* - MBA Dept (*Left Side*)
   Solapur University, Solapur. (*Right Align*)
6. **Footer** – Page No. *(Center)*. "MBA Program *(yyyy - yy)*" *(Right side)*
7. Use of colour fonts, Company Logos, Photographs are not allowed in the report.
8. Organisation Information Brochures/leaflets, etc. can be inserted as part of Annexure.
9. Only graphs can be inserted in colour.
10. The report should contain Principal Certificate, Guide Certificate and Student Declaration certificate (formats will be provided by the college).
11. Project should be of minimum 40 pages.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

NAAC Accredited-2015
'B' Grade (CGPA 2.62)

Name of the Faculty: Science & Technology

Revised Structure and Syllabus

CHOICE BASED CREDIT SYSTEM

Syllabus: Mechanical-Design Engineering

Name of the Course: M.Tech.- Semester I, II, III & IV

(Syllabus to be implemented from w.e.f. June 2018-19 & 2019-20)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

FACULTY OF ENGINEERING & TECHNOLOGY
Curriculum for M. Tech. (Mechanical-Design Engineering)
Four Semester Course
Choice Based Credit System (CBCS) - (WEF 2019-20)

Semester III: Theory /Tutorial/ Lab Courses

Course Code	*Name of the Course*	*Engagement Hours*			*Credits*	*SA*	*FA*		*Total*
		L	*T*	*P*		*ESE*	*ISE*	*ICA*	
Dissertation	Lab Practices	-	-	2	2	-	-	50	50
	Open Elective	3	-	-	3	70	30	-	100
	Dissertation Phase I : Synopsis Submission Seminar*	-	-	2	2	-	50	-	50
	Dissertation Phase II : Progress Seminar	-	-		8	100	200	-	300
Total		**3**	**-**	**4**	**15**	**170**	**280**	**50**	**500**
Note:- * indicates student engagement against which faculty contact hour is 2 hours per candidate									

L Lecture
T Tutorial
P Lab Session

FA Formative Assessment
SA Summative Assessment
ESE End Semester Examination
ISE In Semester Evaluation
ICA Internal Continuous Evaluation

List of open Elective

1. Business Analytics
2. Operation Research
3. Cost Management of Engineering Projects
4. Non conventional Energy

- For all activities related to dissertation Phase I (synopsis submission seminar and progress seminar) student must interact regularly every week with the advisor.
- Synopsis submission seminar shall cover detailed synopsis of the proposed work. Student shall submit Synopsis of the Dissertation Work only after delivering this seminar.
- Progress seminar shall be delivered capturing details of the work done by student for dissertation.
- Student shall deliver all seminars using modern presentation tools. A hard copy of the report shall be submitted to the Department before delivering the seminar. A PDF copy of the report must be submitted to the advisor along with other details if any.
- Lab Practice shall include any of the below activities as recommended by Advisor and student shall submit a report after completion of the activity to Advisor along with other details if any. Software / hardware assignments, learning new software, literature survey, filed work, industrial training etc. related to dissertation work.
- Details of modes of assessment of seminar and dissertation shall be as specified in 7(III) of PG Engineering Ordinance of Solapur University, Solapur.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

FACULTY OF ENGINEERING & TECHNOLOGY

Curriculum for M. Tech. (Mechanical-Design Engineering)
Four Semester Course
Choice Based Credit System (CBCS) - (WEF 2019-20)

Semester IV: Laboratory / Tutorial Courses

Course Code	*Name of the Course*	*Engagement Hours*			*Credits*	*SA*	*FA*		*Total*
		L	*T*	*P*		*ESE*	*ISE*	*ICA*	
Dissertation	**Dissertation Phase –III** Progress Report presentation and submission		-	4	3	-	-	100	100
	Dissertation Phase –IV Final presentation and submission of report	-	-	2	6	-	-	100	100
	Dissertation Viva voice	-	-	-	6	200	-	-	200
Total		**-**	**-**	**6**	**15**	**200**		**200**	**400**
Note:- * indicates student engagement against which faculty contact hour is 3 hours per candidate									

L	Lecture	**FA**	Formative Assessment
T	Tutorial	**SA**	Summative Assessment
P	Lab Session	**ESE**	End Semester Examination
		ISE	In Semester Evaluation
		ICA	Internal Continuous Evaluation

- For all activities related to dissertation Phase III, student must interact regularly every week with the advisor.
- Progress seminar shall be delivered capturing details of the work done by student for dissertation.
- Student shall deliver all seminars using modern presentation tools. A hard copy of the report shall be submitted to the Department before delivering the seminar. A PDF copy of the report must be submitted to the faculty advisor along with other details if any.
- Details of modes of assessment of seminar and dissertation shall be as specified in 7(III) of PG Engineering Ordinance of Solapur University, Solapur.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF SCIENCE & TECHNOLOGY

M.Tech. (COMPUTER SCIENCE & ENGINEERING)

Four Semester Course

Choice Based Credit System

Semester-III

Sr. No.	Subject	Teaching Scheme		Credits			Evaluation Scheme			
		L	P	Credits (L)	Credits (P)	Total Credits	Scheme	Theory Marks	ICA-P Marks	Total Marks
1	Self Learning Course	$	--	3.0	--	3.0	ISE	30	--	100
							ESE	70	--	
2	Open Elective Course#	3	--	3.0	--	3.0	ISE	30	--	100
							ESE	70	--	
3	Dissertation Phase-I : Synopsis Submission Seminar*		@4	--	3.0	3.0	ISE	--	100	100
							ESE	--		
4	Dissertation Phase-II : ICA*	--	--	--	3.0	3.0	ISE	--	100	100
							ESE	--		
5	Dissertation Phase-II : Progress Seminar*	--	--	--	3.0	3.0	ISE	--		100
							ESE	--	100	
	Total	**3**	**4**	**6.0**	**9.0**	**15.0**		**200**	**300**	**500**

L- Lectures, P-Practical, T-Tutorial, ISE- In Semester Evaluation, ESE – End Semester Evaluation, ICA- Internal Continuous Assessment

Note -

- **$-** Being a Self Learning Course, student shall prepare for examination as per specified syllabus
- *- For all activities related to dissertation Phase I (synopsis submission seminar and progress seminar) student must interact regularly every week with the adviser.
- # - This course is common for all branches of Technology (i.e. for all M.Tech. Programs)
- Synopsis submission seminar shall cover detailed synopsis of the proposed work. Student shall submit synopsis of the dissertation work only after delivering this seminar.
- Progress seminar shall be delivered capturing details of the work done by student for dissertation
- Student shall deliver all seminars using modern presentation tools. A hard copy of the report shall be submitted to the department before delivering the seminar. A PDF copy of the report must be submitted to the adviser along with other details if any
- @ Indicates contact hours of students for interaction with adviser.
- Details of modes of assessment of seminar and dissertation shall be as specified in 7(III) of PG Engineering Ordinance of P.A.H. Solapur University, Solapur

Self Learning Course	
Sr. No.	Subject
1	Big Data
2	Computer Network Administration
3	Open Source Technologies
4	Usability Engineering

Open Elective Course	
Sr. No.	Subjects
1	Business Analytics
2	Operation Research
3	Cost Management of Engineering Projects
4	Non Conventional Energy

- New Self Learning Courses and New Open Elective Courses may be added as and when required

3. Dissertation Phase – I : Synopsis Submission Seminar

Teaching Scheme
Practical: 4 Hrs/Week

Examination Scheme
Credits:3
ISE: 100 marks

Phase I Synopsis Submission Seminar (ISE): A student shall be expected to carry out intensive literature survey for a period of about two months in the field of interest and to select a topic for his/her dissertation in consultation with the faculty adviser assigned. The student shall then submit a report and deliver a seminar on the problem chosen by him/her to the panel of three departmental PG recognized faculty members. It shall be expected that a student justifies the gravity and also the relevance of the problem through his/her seminar. This shall be for the approval of synopsis.

4. Dissertation Phase – II : ICA

Examination Scheme
Credits:3
ICA : 100 marks

Phase II Term Work (ICA)

Phase II evaluation consists of term-work evaluation (ICA) based on the efforts put in by the student to carry out his/her work & the results obtained thereof.

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5. Dissertation Phase – II : Progress Seminar

Examination Scheme
Credits:3
ESE : 100 marks

Phase II Progress Seminar Presentation (ESE):

The End Semester Evaluation (ESE) consisting of submission of progress report and presentation of progress seminar followed by demonstration before a panel three departmental PG recognized faculty members.

Guidelines for Assessment of Dissertation Phase I & II

1. Quality of Literature survey and Novelty in the problem
2. Clarity of Problem definition and Feasibility of problem solution
3. Clarity of objective and scope

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE & TECHNOLOGY
M.Tech. (COMPUTER SCIENCE & ENGINEERING)
Four Semester Course
Choice Based Credit System
Semester-IV

Sr. No.	Subject	Teaching Scheme		Credits			Evaluation Scheme		
		L	P	Credits (L)	Credits (P)	Total Credits	Scheme	ICA-P Marks	Total Marks
1	Dissertation Phase-III : Progress Seminar #	--	@4	--	3.0	3.0	ISE	100	100
2	Dissertation Phase-IV : #	--	@2	--	6.0	6.0	--	200	200
3	Final Submission of the Dissertation and Viva-voce	--	--	--	6.0	6.0	ESE	200	200
	Total	--	6	--	15.0	15.0		500	500

Note –

- #- For all activities related to dissertation Phase-III and Phase IV student must interact regularly every week with the adviser.
- Progress seminar shall be delivered capturing details of the work done by student for dissertation.
- Student shall deliver all seminars using modern presentation tools. A hard copy of the report shall be submitted to the Department before delivering the seminar. A PDF copy of the report must be submitted to the adviser along with other details if any.
- Student must submit a hard copy of Project Report to the department
- @ indicates contact hours of the student for interaction with the adviser.
- Details of modes of assessment of seminar and dissertation shall be as specified in 7 (III) of PG Engineering Ordinance of P.A.H. Solapur University, Solapur.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE & TECHNOLOGY
M.Tech. (COMPUTER SCIENCE & ENGINEERING)
Four Semester Course
Choice Based Credit System
Semester - IV

1. Dissertation Phase – III : Progress Seminar

Teaching Scheme
Practical: 4 Hrs/Week

Examination Scheme
Credits: 3
ISE: 100 marks

Phase III Term Work and Progress Seminar Presentation and report (ISE):
The student who has cleared his/her Phase II evaluation shall submit a report and present the status of work carried out on the dissertation, after 8-10 weeks of Phase II ESE, to three departmental PG recognized faculty members.

Guidelines for Assessment of Dissertation Phase III

1. Quality of work attempted
2. Presentation skills
3. Relevance to the specialization

2. Dissertation Phase – IV : Termwork

Teaching Scheme
Practical: 2 Hrs/Week

Examination Scheme
Credits: 6
ICA: 200 marks

After completing the dissertation work to the satisfaction, the student shall submit the dissertation report in the prescribed format to the university.

Guidelines for Assessment of Dissertation Phase IV Termwork

1. Fulfilment of objectives
2. Validation of results
3. Quality of Written Presentation

- **Students should publish at least one paper based on his/her work in reputed International Journal (desirably in Referred Journal)**

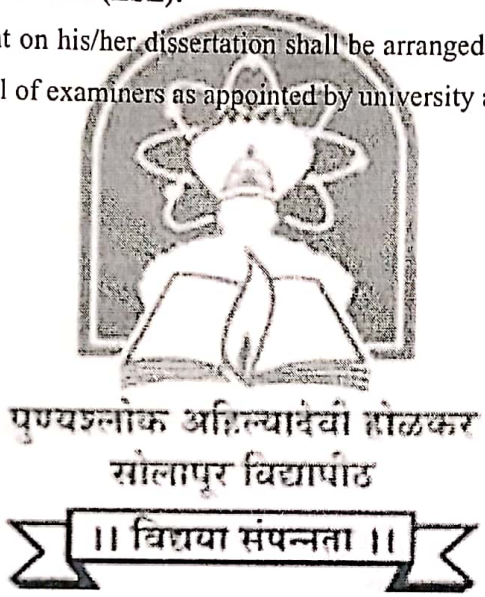
PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE & TECHNOLOGY
M.Tech. (COMPUTER SCIENCE & ENGINEERING)
Four Semester Course
Choice Based Credit System
Semester - IV

3. Final Presentation and Viva-voce

Examination Scheme
Credits: 6
ESE: 200 marks

Final Presentation and Viva-voce (ESE):

Open defense of the student on his/her dissertation shall be arranged by the university. This defense shall be in front of the panel of examiners as appointed by university authority.



SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF ENGINEERING & TECHNOLOGY

ELECTRONICS and TELECOMMUNICATION ENGINEERING

CBCS Syllabus for

First Year M. Tech.

w.e.f. Academic Year 2018-19

SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF ENGINEERING & TECHNOLOGY

STRUCTURE of M.Tech. (ELECTRONICS and TELECOMMUNICATION ENGINEERING)

Four Semester Course

Choice Based Credit System (CBCS) Syllabus w.e.f. A.Y. 2018 -19

Semester-I

Sr. No.	*Subject*	*Teaching Scheme*				*Credits*				*Evaluation Scheme*				
		L	*T*	*P*	*Total*	*Credits (L)*	*Credits (T)*	*Credits (P)*	*Total Credits*	*Scheme*	*Theory Marks*	*ICA- P Marks*	*ICA-T Marks*	*Total Marks*
1	Research Methodology & IPR	3	1	-	4	3.0	1.0	-	4.0	ISE	30	--	25	125
										ESE	70	--	--	
2	Antenna Design and Application	3	-	2	5	3.0	-	1.0	4.0	ISE	30	25	--	125
										ESE	70	--	--	
3	Soft Computing Methods	3	-	2	5	3.0	-	1.0	4.0	ISE	30	25	--	125
										ESE	70	--	--	
4	Advanced Network System	3	-	2	5	3.0	-	1.0	4.0	ISE	30	25	--	125
										ESE	70	--	--	
5	Elective I	3	1	-	4	3.0	1.0	-	4.0	ISE	30	--	25	125
										ESE	70	--	--	
6	Seminar- I	-	-	2	2	-	-	2.0	2.0	ISE	--	50	--	50
										ESE	--	--	--	
Total		**15**	**2**	**8**	**25**	**15.0**	**2.0**	**5.0**	**22.0**		**500**	**125**	**50**	**675**

Note: *L- Lectures, P-Practical, T-Tutorial, ISE- In Semester Evaluation, ESE- End Semester Evaluation, ICA- Internal Continuous Assessment*

SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF ENGINEERING & TECHNOLOGY

STRUCTURE of M.Tech. (ELECTRONICS and TELECOMMUNICATION ENGINEERING)
Four Semester Course
Choice Based Credit System (CBCS) Syllabus w.e.f. A.Y. 2018-19
Semester-II

Sr. No.	Subject	Teaching Scheme				Credits				Evaluation Scheme				
		L	T	P	Total	Credits (L)	Credits (T)	Credits (P)	Total Credits	Scheme	Theory Marks	ICA- P Marks	ICA-T Marks	Total Marks
1	Advanced Internet of Things	3	-	2	5	3.0	-	1.0	4.0	ISE	30	25	--	125
										ESE	70	--	--	
2	RF Circuit Design	3	-	2	5	3.0	-	1.0	4.0	ISE	30	25	--	125
										ESE	70	--	--	
3	Artificial Intelligence & Machine Learning	3	-	2	5	3.0	-	1.0	4.0	ISE	30	25	--	125
										ESE	70	--	--	
4	Cryptography and Network Security	3	1	-	4	3.0	1.0	-	4.0	ISE	30	--	25	125
										ESE	70	--	--	
5	Elective – II	3	1	-	4	3.0	1.0	-	4.0	ISE	30	--	25	125
										ESE	70	--	--	
6	Seminar- II	-	-	2	2	-	-	2.0	2.0	ISE	--	50	--	50
										ESE	--	--	--	
Total		**15**	**2**	**8**	**25**	**15.0**	**2.0**	**5.0**	**22.0**		**500**	**125**	**50**	**675**

Note : *L- Lectures, P-Practical, T-Tutorial, ISE- In Semester Evaluation, ESE- End Semester Evaluation, ICA- Internal Continuous Assessment*

- Seminar I shall be delivered on a topic related to student's broad area of interest for dissertation work selected in consultation with the advisor after compiling the information from the latest literature. Student shall deliver seminar using modern presentation tools. A hard copy of the report (as per format specified by the department) shall be submitted to the Department before delivering the seminar. A PDF copy of the report must be submitted to the advisor along with other details if any.

- Seminar II shall be delivered on a topic related to student's particular area of interest for dissertation work selected in consultation with the advisor after compiling the information from the latest literature. Student shall deliver seminar using modern presentation tools. A hard copy of the report (as per format specified by the department) shall be submitted to the Department before delivering the seminar. A PDF copy of the report must be submitted to the advisor along with other details if any.

- **List of elective courses for semester I and II -**

Sr.	***Elective - I***	***Elective – II***
1.	Biomedical Signal Processing	Communication System Design
2.	Advanced Embedded System	Multimedia Processing
3.	Automotive Electronics	Automation and Industrial Robotics

- Courses may be added in the list of Elective I and II as and when required

SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF ENGINEERING & TECHNOLOGY
STRUCTURE of M.Tech. (ELECTRONICS and TELECOMMUNICATION ENGINEERING)
Four Semester Course
Choice Based Credit System (CBCS) Syllabus w.e.f. A.Y. 2018-19
Semester-III

Sr. No.	*Subject*	*Teaching Scheme*		*Credits*			*Evaluation Scheme*			
		L	*P*	*Credits (L)*	*Credits (P)*	*Total Credits*	*Scheme*	*Theory Marks*	*ICA Marks*	*Total Marks*
1	Self Learning Course	$	-	3.0	-	3.0	ISE	30	--	100
							ESE	70		
2	Open Elective Course#	3		3.0		3.0	ISE	30		100
							ESE	70		
3	Dissertation Phase I : Synopsis Submission Seminar*		@4		3.0	3.0	ISE	--	100	100
							ESE	--	--	
4	Dissertation Phase II : ICA*		-		3.0	3.0	ISE	--	100	100
							ESE	--	--	
5	Dissertation Phase II Progress Seminar*		-		3.0	3.0	ISE	--		100
							ESE	--	100	
Total		**3**	**4**	**6.0**	**9.0**	**15.0**		**200**	**300**	**500**

L- Lectures, P-Practical, T-Tutorial, ISE- In Semester Evaluation, ESE- End Semester Evaluation, ICA- Internal Continuous Assessment

Note -

- $- Being a Self Learning Course, student shall prepare for examination as per specified syllabus
- *- For all activities related to dissertation Phase I (synopsis submission seminar and progress seminar) student must interact regularly every week with the advisor.
- # - This course is common for all branches of Technology (ie for all M.Tech. Programs)

- Synopsis submission seminar shall cover detailed synopsis of the proposed work. Student shall submit synopsis of the dissertation work only after delivering this seminar.
- Progress seminar shall be delivered capturing details of the work done by student for dissertation
- Student shall deliver all seminars using modern presentation tools. A hard copy of the report shall be submitted to the department before delivering the seminar. A PDF copy of the report must be submitted to the advisor along with other details if any
- @ Indicates contact hours of students for interaction with advisor.
- Details of modes of assessment of seminar and dissertation shall be as specified in 7(III) of PG Engineering Ordinance of Solapur University, Solapur

List Self Learning Courses -

Sr.	***Self LearningSubject***
1	Semiconductor Device Modelling
2	Programmable System on Chip (PSoC)
3	Remote Sensing
4	Multimedia Network

List of Open Elective Courses-

Sr.	***Self LearningSubject***
1	Business Analytics
2	Operation Research
3	Cost Management of Engineering Projects
4	Non conventionalEnergy

- New Self Learning Courses and New Open Elective Courses may be added as and when required

SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF ENGINEERING & TECHNOLOGY
STRUCTURE of M.Tech.(ELECTRONICS and TELECOMMUNICATION ENGINEERING)
Four Semester Course
Choice Based Credit System (CBCS) Syllabus w.e.f. A.Y. 2018-19
Semester-IV

Sr. No.	*Subject*	*Teaching Scheme*			*Credits*			*Evaluation Scheme*		
		L	*P*	*Total*	*Credits (L)*	*Credits (P)*	*Total Credits*	*Scheme*	*ICA Marks*	*Total Marks*
1	Dissertation Phase III : Progress Seminar #	-	4@	4	-	3.0	3.0	ISE	100	100
2	Dissertation Phase IV: #	-	2@	2	-	6.0	6.0	--	200	200
3	Final Submission of the Dissertation and Viva –Voce	-	-	-	-	6.0	6.0	ESE	200	200
Total		**-**	**-**	**6**	**--**	**15.0**	**15.0**	**-**	**500**	**500**

Note –

- #- For all activities related to dissertation Phase III & IV student must interact regularly every week with the advisor.
- Progress seminar shall be delivered capturing details of the work done by student for dissertation
- Student shall deliver all seminars using modern presentation tools. A hard copy of the report shall be submitted to the Department before delivering the seminar. A PDF copy of the report must be submitted to the advisor along with other details if any.
- Student must submit a hard copy of Project Report to the department
- @ indicates contact hours of the student for interaction with the advisor
- Details of modes of assessment of seminar and dissertation shall be as specified in 7 (III) of PG Engineering Ordinance of Solapur University, Solapur.

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE & TECHNOLOGY
STRUCTURE OF M.Tech. CIVIL (STRUCTURAL ENGINEERING)
Four Semester Course
Choice Based Credit System Syllabus wef 2018-19
Semester-II

Sr. No.	*Subject*	*Teaching Scheme*				*Credits*				*Evaluation Scheme*				
		L	*T*	*P*	*Total*	*Credits (L)*	*Credits (T)*	*Credits (P)*	*Total Credits*	*Scheme*	*Theory Marks*	*ICA- P Marks*	*ICA-T Marks*	*Total Marks*
1	FEM in structural Engineering	3	1	-	4	3	1	-	4	ISE	30	--	25	125
										ESE	70	--	--	
2	Theory of plates and shells	3	1	-	4	3	1	-	4	ISE	30	--	25	125
										ESE	70	--	--	
3	Seismic design of multistoried buildings	3	1	-	4	3	1	-	4	ISE	30	--	25	125
										ESE	70	--	--	
4	Elective – II	3	1	-	4	3	1	-	4	ISE	30	--	25	125
										ESE	70	--	--	
5	Elective – III	3	1	-	4	3	1	-	4	ISE	30	--	25	125
										ESE	70	--	--	
6	Advanced concrete Lab	-	-	2	2	-	-	1	1	ISE		25	--	25
										ESE	--	--	--	
7	Mini project	-	-	2	2	-		2	2	ISE	--	50	--	50
										ESE	--	--	--	
Total		**15**	**5**	**4**	**24**	**15**	**5**	**3**	**23**		**500**	**75**	**125**	**700**

Note : *L- Lectures, P-Practical, T-Tutorial, ISE- In Semester Evaluation, ESE- End Semester Evaluation, ICA- Internal Continuous Assessment*

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE & TECHNOLOGY
STRUCTURE OF M.Tech. CIVIL (STRUCTURAL ENGINEERING)
Four Semester Course
Choice Based Credit System Syllabus w.e.f. 2019-20

Semester-III

Sr. No.	*Subject*	*Teaching Scheme*			*Credits*			*Evaluation Scheme*			
		L	*P*	*Total*	*Credits (L)*	*Credits (P)*	*Total Credits*	*Scheme*	*Theory Marks*	*ICA- P Marks*	*Total Marks*
1	Lab. Practice	-	4	4	-	2	2	ISE	--	50	50
								ESE	--	--	
2	Open Elective Course#	3	-	3	3		3	ISE	30	--	100
								ESE	70	--	
3	Dissertation Phase I : Synopsis Submission Seminar*		@4	4	-	2	2	ISE	--	50	50
								ESE	--	--	
4	Dissertation Phase II : ICA*				-	4	4	ISE	--	100	100
								ESE	--	--	
5	Dissertation Phase II Progress Seminar*				-	4	4	ISE	--	--	100
								ESE	--	100	
Total		**3**	**8**	**11**	**3**	**12**	**15**		**100**	**300**	**400**

L- Lectures, P-Practical, T-Tutorial, ISE- In Semester Evaluation, ESE- End Semester Evaluation, ICA- Internal Continuous Assessment

Note –

- Lab Practice shall include any of the below activities as recommended by Advisor and student shall submit a report after completion of the activity to Advisor along with other details if any. Software / hardware assignments, learning new software, literature survey, filed work, industrial training etc. related to dissertation work.
- *- For all activities related to dissertation Phase I (synopsis submission seminar and progress seminar) student must interact regularly every week with the advisor.
- # - This course is common for all branches of Technology (i.e. for all M.Tech. Programs)
- Synopsis submission seminar shall cover detailed synopsis of the proposed work. Student shall submit synopsis of the dissertation work only after delivering this seminar.
- Progress seminar shall be delivered capturing details of the work done by student for dissertation
- Student shall deliver all seminars using modern presentation tools. A hard copy of the report shall be submitted to the department before delivering the seminar. A PDF copy of the report must be submitted to the advisor along with other details if any
- @ Indicates contact hours of students for interaction with advisor.
- Details of modes of assessment of seminar and dissertation shall be as specified in 7(III) of PG Engineering Ordinance of Solapur University, Solapur

- **List of open Elective Courses-**

Sr.	***Subject***
1	Business Analytics
2	Operation Research
3	Cost Management of Engineering Projects
4	Non conventional Energy

- New Open Elective Courses may be added as and when required

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF SCIENCE & TECHNOLOGY
STRUCTURE OF M.Tech. CIVIL (STRUCTURAL ENGINEERING)
Four Semester Course
Choice Based Credit System Syllabus w.e.f. 2019-20
Semester-IV

Sr. No.	*Subject*	*Teaching Scheme*			*Credits*			*Evaluation Scheme*		
		L	*P*	*Total*	*Credits (L)*	*Credits (P)*	*Total Credits*	*Scheme*	*ICA- P Marks*	*Total Marks*
1	Dissertation Phase III : Progress Seminar #	-	4@	4	-	3	3	ISE	100	100
2	Dissertation Phase IV: Final presentation and submission of report #	-	2@	2	-	6	6	--	200	200
3	Dissertation Viva – Voce	-	-	-	-	6	6	ESE	200	200
Total		**-**	**6**	**6**	**--**	**15**	**15**	**-**	**500**	**500**

Note –

- #- For all activities related to dissertation Phase III & IV student must interact regularly every week with the advisor.
- Progress seminar shall be delivered capturing details of the work done by student for dissertation
- Student shall deliver all seminars using modern presentation tools. A hard copy of the report shall be submitted to the Department before delivering the seminar. A PDF copy of the report must be submitted to the advisor along with other details if any.
- Student must submit a hard copy of Project Report to the department
- @ indicates contact hours of the student for interaction with the advisor
- Details of modes of assessment of seminar and dissertation shall be as specified in 7 (III) of PG Engineering Ordinance of Solapur University, Solapur.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

M.Tech. Civil (Structural Engineering) - II

Choice Based Credit System (CBCS)

MINI PROJECT

Lab Scheme:
2 hours per week, 2 Credits

Examination Assessment Scheme:
ICA: 50 marks

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Course Outcomes:

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

1. Identify structural engineering problems reviewing available literature.
2. Study different techniques used to analyze complex structural systems.
3. Work on the solutions given and present solution by using his/her technique applying engineering principles.

Syllabus Contents:

Mini Project shall consist of detailed analysis, design along with working drawings of any one structure.

Mini Project will have mid semester presentation and end semester presentation. Mid semester presentation will include identification of the problem based on the literature review on the topic referring to latest literature available.

The student shall submit report on the subject chosen and make a presentation at the end of Semester-I. End semester presentation should be done along with the report on identification of topic for the work and the methodology adopted involving scientific research, collection and analysis of data, determining solutions highlighting individuals' contribution.

Continuous assessment of Mini Project at Mid Sem and End Sem will be monitored by the Advisor.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

M.Tech. Civil (Structural Engineering) - III

Choice Based Credit System (CBCS)

DISSERTATION PHASE- I
SYNOPSIS SUBMISSION SEMINAR

Contact hour of student: 4 **Examination Assessment Scheme:**

Credits: 2 ICA: 50 marks

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The student is expected to carry out intensive literature survey for a period of about two months in the field of interest and to select a topic for his/her dissertation in consultation with the faculty advisor assigned. The student shall then submit a report and deliver a seminar on the problem chosen by him/her to the panel of three departmental PG recognized faculty members. It shall be expected that a student justifies the gravity and also the relevance of the problem through his/her seminar. This shall be for the approval of synopsis.

The assessment of Synopsis Submission Seminar shall be done by aforesaid panel of three departmental PG recognized faculty members.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

M.Tech. Civil (Structural Engineering) - III

Choice Based Credit System (CBCS)

DISSERTATION PHASE- II: ICA

Contact hour of student: 4 **Examination Assessment Scheme:**

Credits: 4 ICA: 100 marks

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Student shall submit a report to the faculty advisor, on the basis of work carried out in accordance with instructions given by faculty advisor, throughout the semester. Dissertation Phase II evaluation consists of term-work evaluation (ISE) based on the efforts put in by the student to carry out his/her work & the results obtained thereof.

The faculty advisor shall complete the assessment of the report and accordingly allocate the marks to the student out of maximum 100 marks.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

M.Tech. Civil (Structural Engineering) - III

Choice Based Credit System (CBCS)

DISSERTATION PHASE- II: PROGRESS SEMINAR

Contact hour of student: 4 **Examination Assessment Scheme:**

Credits: 4 ESE: 100 marks

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Progress seminar shall be delivered capturing details of the work done by the student for dissertation. Student shall deliver seminar using modern presentation tools. A hard copy of report shall be submitted to the faculty advisor before delivering the seminar. A PDF copy of the report must be submitted to the faculty advisor along with other details if any.

End Semester Evaluation (ESE) shall consist of presentation of progress seminar on the report submitted by the student, followed by demonstration before a panel of three departmental PG recognized faculty members.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

M.Tech. Civil (Structural Engineering) - IV

Choice Based Credit System (CBCS)

DISSERTATION PHASE- III: PROGRESS SEMINAR

Contact hour of student: 4 **Examination Assessment Scheme:**

Credits: 3 ICA: 100 marks

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For all activities related to Phase III, student must interact regularly every week with the faculty advisor. The student who has cleared his/her Phase II evaluation, shall submit a report and present the status of work carried out on the dissertation after 8-10 weeks of Phase II ESE to three departmental PG recognized faculty members.

Progress seminar shall be delivered capturing details of the work done by student for dissertation. Student shall deliver seminar using modern presentation tools. A hard copy of report shall be submitted to the faculty advisor before delivering the seminar. A PDF copy of the report must be submitted to the faculty advisor along with other details if any.

The evaluation will be done by the aforesaid panel of three departmental PG recognized faculty members based on the requirements of completion of dissertation work for the dissertation Phase-III.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

M.Tech. Civil (Structural Engineering) - IV

Choice Based Credit System (CBCS)

DISSERTATION PHASE- IV:
FINAL PRESENTATION AND SUBMISSION OF REPORT

Contact hour of student: 2 **Examination Assessment Scheme:**

Credits: 6 ICA: 200 marks

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After completing the dissertation work to the satisfaction of faculty advisor, the student shall submit the dissertation report to the University in the prescribed format. The final approved dissertation shall be submitted in black bound hard copy along with soft copy on CD/DVD.

The evaluation of dissertation is to be carried out by the faculty advisor as ICA for 100 marks. This evaluation shall be on the basis of the requirements of completion of dissertation work. The faculty advisor shall submit mark list of term work marks, along with the submission of dissertation to university as mentioned in assessment scheme.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

M.Tech. Civil (Structural Engineering) - IV

Choice Based Credit System (CBCS)

DISSERTATION VIVA- VOCE

Examination Assessment Scheme:

Credits: 6 ICA: 200 marks

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Open defense of the student on his/her dissertation shall be arranged by the university. This defense shall be in front of the panel of examiners as appointed by university authority. The evaluation will be done by panel of examiners as appointed by university authority.