Shri Vithal Education & Research Institute's
COLLEGE OF ENGINEERING, PANDHARPUR
P.B.No.54, Gopalpur - Ranjani Road, Gopalpur, Pandharpur - 413304, District: Solapur (Maharashtra)
Tel.: (02186) 216063, 9503103757, Toll Free No.: 1800-3000-4131 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, NAAC Accreditated Institute,ISO 9001:2015 Certified Institute.
Accredited by The Institution of Engineers (India), Kolkata and TCS, Pune.

Ref.:- Date:-

## 1.3.2 List of courses that include experiential learning through project work / field work / internship during last five years

**Year of offering: 2016-17**

| Programme Name | Programme Code | Name of the Course that include experiential learning through project work/field work/internship |
|---|---|---|
| Mechanical Engineering | 1-1408968339 | Applied Thermodynamics |
| | | Machine Tools and Processes |
| | | Workshop Practice- II |
| | | Manufacturing Processes |
| | | Workshop Practice – III |
| | | Fluid Machinery & Fluid Power |
| | | Workshop Practice – IV |
| | | Metrology & Mechanical Measurements |
| | | Internal Combustion Engine |
| | | Computer Aided Design & Computer Aided Manufacturing (CAD/CAM) |
| | | Tool Engineering |
| | | Workshop Practice – V |
| | | Self Learning (Technical) |
| | | Refrigeration and Air Conditioning |
| | | Automobile Engineering |
| | | Industrial Training |
| | | Project Work– I |
| | | Plastic Engineering |
| | | Project Work– II |
| Computer Science & Engineering | 1-1408968327 | Vocational Training |
| | | Lab I - Project Phase I |
| | | Lab II - Project Phase II |
| | | Mini Project |

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Date:-

## 1.3.2 List of courses that include experiential learning through project work / field work / internship during last five years

**Year of offering: 2016-17**

| Programme Name | Programme Code | Name of the Course that include experiential learning through project work/field work/internship |
|---|---|---|
| Electronics & Tele-communication Engineering | 1-1408968324 | Seminar & Project |
| | | Project |
| | | Vocational Training |
| | | Mini Project (Hardware) |
| Civil Engineering | 1-1408968331 | Engineering Geology |
| | | Environmental Engg-I |
| | | Environmental Engg-II |
| | | Mini project |
| | | Assessment of field training report |
| | | Water Resources Engg-II |
| | | Project work |
| | | Assessment of report on field training-II |
| | | Project work |
| Master of Business Administration | 1-1408968337 | Project Report & Viva |
| M.E. Mechanical-Design Engineering | 1-1408968333 | Mini Project |
| | | Dissertation Phase I : Synopsis Submission Seminar |
| | | Dissertation Phase II : Term Work |
| | | Dissertation Phase II : Progress Seminar Presentation |
| | | Dissertation Phase III : Progress Seminar Presentation and Report |
| | | Dissertation Phase IV : Term Work |
| | | Final Presentation and Viva -Voce |

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Ref.:- Date:-

## 1.3.2 List of courses that include experiential learning through project work / field work / internship during last five years

**Year of offering: 2016-17**

| Programme Name | Programme Code | Name of the Course that include experiential learning through project work/field work/internship |
|---|---|---|
| M.E. Computer Science & Engineering | 1-1408968341 | Dissertation Phase –I : Synopsis Submission Seminar |
| | | Dissertation Phase-II : Term work |
| | | Dissertation Phase II : Progress Seminar Presentation |
| | | Dissertation Phase III : Progress Seminar Presentation and report |
| | | Dissertation Phase IV: Term work |
| | | Final presentation and viva-voce |
| M.E. Electronics & Tele-communication Engineering | 1-1408968335 | Dissertation Phase-I: Synopsis Submission Seminar |
| | | Dissertation Phase-II: Term work |
| | | Dissertation Phase-II: Progress Seminar Presentation |
| | | Dissertation Phase- III: Progress Seminar |
| | | Dissertation Phase IV: Term work |
| | | Final submission of Dissertation and Viva-voce |
| M.E. Civil -Structural Engineering | 1-1408968343 | Dissertation Phase-I: Synopsis Submission Seminar |
| | | Dissertation Phase-II: Term Work |
| | | Dissertation Phase-II: Progress Seminar Presentation |
| | | Dissertation Phase-III: Progress Seminar presentation and Report |
| | | Dissertation Phase IV : Term Work |
| | | Final Submission of the Dissertation and Viva –Voce |

COLLEGE OF ENGINEERING PANDHARPUR

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# SOLAPUR UNIVERSITY, SOLAPUR
## FACULTY OF ENGINEERING & TECHNOLOGY
## Mechanical Engineering

## Structure of S.E. (Mechanical Engineering) w.e.f. from2013-14

**Semester-I**

| Sr. No. | Subject | Teaching / Week | | | | | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Dr | Total | TP | TW | OE | POE | Total |
| 1 | Analysis of Mechanical Elements | 3 | 1 | | | 4 | 100 | 25 | | | 125 |
| 2 | Applied Thermodynamics | 3 | | 2 | | 5 | 100 | 25 | 25 | | 150 |
| 3 | Engineering Mathematics-III | 3 | 1 | | | 4 | 100 | 25 | | | 125 |
| 4 | Machine Tools and Processes | 3 | | 2 | | 5 | 100 | 25 | | | 125 |
| 5 | Machine Drawing | 3 | | | 4 | 7 | 100 | 50 | | | 150 |
| 6 | Computer Programming in C++ | 1 | | 2 | | 3 | | 25 | | 50 | 75 |
| 7 | Workshop Practice- II | | | 2 | | 2 | | 25 | | #25 | 50 |
| **Total** | | **16** | **2** | **8** | **4** | **30** | **500** | **200** | **25** | **75** | **800** |
| 8 | Environmental Science | 1 | | | | 1 | | | | | |

**Semester-II**

| Sr. No. | Subject | Teaching / Week | | | | | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Dr | Total | TP | TW | OE | POE | Total |
| 1 | Theory of Machine – I | 3 | | 2 | | 5 | 100 | 25 | | | 125 |
| 2 | Manufacturing Processes | 3 | | 2 | | 5 | 100 | 25 | | | 125 |
| 3 | Fluid Mechanics | 3 | | 2 | | 5 | 100 | 25 | 25 | | 150 |
| 4 | Numerical Methods | 3 | | 2 | | 5 | 100 | 25 | | | 125 |
| 5 | Electrical and Electronics Technology | 3 | | 2 | | 5 | 100 | 25 | | | 125 |
| 6 | Computer Aided Machine Drawing | 1 | | 2 | | 3 | | 50 | | 50 | 100 |
| 7 | Workshop Practice – III | | | 2 | | 2 | | 50 | | | 50 |
| **Total** | | **16** | | **14** | | **30** | **500** | **225** | **25** | **50** | **800** |
| 8 | Environmental Science | 1 | | | | 1 | | | | | |

'#' indicates practical examination only

**Notes:**

1. The Practical batch shall be of 20 students. After formation of batches, if the number of students remaining is more than 9, a new batch shall be formed.
2. Practical / Tutorial load indicates the load per batch.
3. TW: Term work assessment shall be a continuous process based on the performance of student in assignment, class test, quizzes, homework, interaction during theory and laboratory session, hand written lab book/ hand written journal, sheet drawing, subject seminar presentation etc. as applicable.
4. Industrial Training (B.E. Part 1) of minimum 30 days in one/two slot shall be completed in any vacation after SE Part-II but before BE Part-I & the report shall be submitted in BE Part-I.
5. For the subject '**Electrical and Electronics Technology'**, answer to the two sections must be written in separate answer books.

# S.E.Mechanical Part-I

## 2. APPLIED THERMODYNAMICS

**Teaching Scheme**
**Theory:** 3 Hrs/week
**Practical:** 2 Hr/week

**Examination Scheme**
**Theory:** 100 Marks (3 Hrs.)
**Term Work:** 25 Marks
**Oral Exam:** 25 Marks

**Course Objectives:**

1. To study fundamental laws of Thermodynamics and its real life applications.
2. To study and analyze power producing devices used in practice such as boilers and turbines.
3. To study Power consuming devices used in practice such as compressor and their analysis.

**Course Outcomes**:

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

1. apply fundamental concepts of Thermodynamics to solve real life problems.
2. identify problems & analyse power producing and consuming devices.

### Section-I

**Unit 1: First Law of Thermodynamics – Analysis** **(04Hrs)**

Review of basic concepts

Applications of throttling process:

1. Throttling calorimeter 2. Refrigeration 3. Liquefaction of gases.

Transient flow processes:

1. Charging of a cylinder 2. Discharging of a cylinder.

Chemically reacting system:

1. Fuels & combustion
2. The standard enthalpy (heat) of reaction, the standard enthalpy of formation.
3. Standard enthalpy of combustion.
4. Effect of temperature on standard heat of reaction.
5. Adiabatic flame temperature.

(Numerical treatment)

**Unit 2: Second Law of Thermodynamics – Analysis.** **(06 Hrs)**

Limitation of first law of thermodynamics, cycle heat engine, refrigerator and heat pump, Kelvin- Plank and Clausius statements and their equivalence, Reversibility and Irreversibility, Carnot cycle, Carnot theorem, Absolute thermodynamic temperature scale, Clausius inequality, calculation of entropy change for:

i) Absorption of energy by a constant temperature bath
ii) Heating OR cooling of matter.
iii) Phase change
iv) Adiabatic mixing
v) Change of state of an ideal gas.
vi) Mixing of non – identical gases.

Principle of entropy increase, T – S diagram, Second law analysis of a control volume, available energy, availability.

(Numerical treatment)

**Unit 3: Performance of Boilers** **(05 Hrs)**

Classification, constructional details of high pressure boilers, Evaporation,equivalent evaporation, Boiler efficiency, heat losses in boiler plant & heat balance
(Numerical treatment)

**Unit 4: Vapour Power Cycles:** **(05 Hrs)**

Classification of cycles, vapour power cycles, carnot vapour power cycles, simple Rankine cycle, actual Rankine cycle, Effect of operating conditions on Rankine cycle efficiency, Ideal reheat cycle, Ideal regenerative cycle, supercritical Rankine cycle (Numerical treatment).

**Section-II**

**Unit 5: Steam Nozzles** **(05 Hrs)**

Types of Nozzles, flow of steam through nozzles, condition for maximum discharge, expansion of steam considering friction, super saturated flow through nozzles, General relationship between area, velocity and pressure.

**Unit 6: Steam Condensers** **(05 Hrs)**

Condensers and Cooling Towers:- Elements of steam condensing plants, advantages of using condensers, types of condensers, thermodynamic analysis of condensers, efficiencies, cooling towers.

**Unit7:Steam Turbines** **(05 Hrs)**

Steam Turbines:- Advantages and classification of steam turbines, simple impulse turbine, compounding of steam turbines, parson's reaction turbine, velocity diagrams, work one done and efficiencies, losses in turbines.

**Unit 8: Reciprocating Air Compressors** **(05 Hrs)**

Uses of compressed air, classification of compressor, constructional detail of single & multistage compressor, types of compressor valves, computation of work, isothermal work done, isothermal efficiency, effect of clearance, volumetric efficiency FAD, theoretical & actual indicator diagram, method of improving volumetric efficiency, need of multistage, work done, volumetric efficiency, condition for maximum efficiency, inter cooling & after cooling, (Numerical treatment).

**TERM WORK**

**Group – I**

Any Three Assignments on following topics

1) Study of process boilers ( Cochran, Babcock & Wilcox, Lancashire)
2) Boiler mountings & accessories
3) Study of various types of steam calorimeters
4) Lubrication – Necessity, types of lubricants, properties of
Lubricants
(oil & Greases), Selection of lubricants

**Group – II**

Any Six Experiments of following:

1) Cloud & Pour point of a lubricant
2) Flash & Fire point
3) Test on carbon residue
4) Trial on Redwood viscometer
5) Trial / Study of Bomb calorimeter
6) Test on grease penetrometer & dropping point apparatus
7) Trial on reciprocating air compressor.
8) Trial on steam calorimeter
9) Industrial visit to any process / power industry

**Text Books:**

1. An introduction to Thermodynamics – Y.V.C. Rao – Universities Presss,
2. A Course in Thermal Engineering – Domukundwar Kothandraman Dhanpat Rai & Co. Delhi.
3. Thermal Engineering R . K. Rajput – Laxmit Publication – New Delhi ( Sixth Edition)
4. Basic & Applied Thermodynamics" by P.K. Nag Tata Mcgraw Hill Publication

**Reference Books:**

1. Thermodynamics by C.P. Arora TMH New Delhi 1998 edition
2. Thermodynamics & Heat Engine – Vol 1 & Vol 2 – R. Yadav Central Book Depat.
3. Thermodynamics Cengel Boles Tata McGraw Hill New Delhi.
4. R. Yadav, Steam & Gas Turbines CPH Allahabad.

# S.E.Mechanical Part-I

## 4. MACHINE TOOLS & PROCESSES

| Teaching Scheme | Examination Scheme |
|---|---|
| **Theory:** 3 Hrs/week | **Theory:** 100 Marks (3 Hrs.) |
| **Practical:** 2 Hr/week | **Term Work:** 25 Marks |

**Course Objectives:**

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 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 student will

1. exhibit a knowledge of conventional, unconventional & modern machining processes and machine tools.
2. be able to select proper manufacturing process for the typical application.

**Section-I**

**UNIT – 1 Introduction to Manufacturing processes: (02Hrs)**

- Classification of manufacturing processes.
- Metal removal processes, principle, cutting motions, basics of metal cutting

**UNIT – 2A Centre lathe: (06 Hrs)**

- Main parts and their functions, specifications, accessories and attachments.
- Lathe operations, processing of simple component on lathe.

**UNIT – 2B Capstan and Turret lathes: (04 Hrs)**

- Principle parts, working, comparison with center lathe
- Capstan lathe vs. Turret lathe, mechanisms, tool holders.
- Introduction to Automats

**UNIT – 2C Drilling machine: (03 Hrs)**

- Classification, construction and working of Pillar type and radial drilling machines.
- Job holding devices and accessories, various operations.

**UNIT – 3 Shaper, Plainer and slotting machine: (03 Hrs)**

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

**UNIT -4 Unconventional Machining (04 Hrs)**

- Introduction, classification, significance of Unconventional machining.
- Electrical discharge machining (EDM), Electrochemical Machining (ECM), Ultrasonic machining (USM)
- Principle, working, applications, advantages, limitations.

## Section-II

**UNIT – 5A Milling machines:** **(07Hrs)**

- Classification of Milling machines, construction and working column and knee type milling machines.
- Milling methods – Up milling and down milling,
- Gear cutting on milling machines, indexing methods.

**UNIT – 5B Boring machine:** **(02 Hrs)**

- Horizontal and vertical boring machines, construction and working.
- Boring tools and bars, Jig boring machines.

**UNIT – 6 Grinding machines:** **(04 Hrs)**

- Classifications – Cylindrical, Center less, Surface grinder etc.
- Selection mounting, glazing, loading, truing, balancing.

**UNIT –7 Gear manufacturing processes:** **(02 Hrs)**

- Gear Hobbing, gear rolling.
- Gear finishing processes – gear shaving, gear burnishing.

**UNIT – 8A Broaching machine:** **(02 Hrs)**

- Classification, various operations, advantages and limitations.
- Study of Pull and Push type broach.

**UNIT – 8B Introduction to CNC machines:** **(01 Hrs)**

- Construction and working of CNC machine tools, types.

### TERM WORK

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. Tool layout and processing of one simple component on capstan lathe.
5. Study and demonstration of attachments on milling machine.
6. Study and demonstration of various types of milling cutters.
7. Setting the milling machine for gear cutting operation.
8. Setting the Hobbing machine for gear cutting operation.
9. Study and demonstration of various types of grinding wheels and their specifications
10. Visit to at least one machine shop and one CNC shop

**Note:** Any Eight of the above exercises are expected. Journal based on above exercises shall be prepared by the Students.

**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

**Reference Books**


1. Machining and Machine tools-A.B.Chatopaddhyay – Wiley India
2. Production Technology by P.C.Sharma. Production Technology – HMT Handbook.
3. Manufacturing Process and System-Phillip Ostwald and Jairo Munoj-Wiley India
4. Production Technology – HMT Handbook


- Question paper shall cover all the topics mentioned under section I and section II, as well under the heading ***TERM WORK***.

# S. E. (Mechanical) Part – I

## 7. WORKSHOP PRACTICE – II

**Teaching Scheme:**
**Practical:** 2 Hours / week

**Examination Scheme:**
**Term Work:** 25 marks
**Practical Exam:** 6 Hours

**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.

**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.

1. Tool Grinding – Demonstration and actual grinding to understand the tool geometry **(02 turns)**

2. One composite job in M.S. consisting of 2 components and inclusive of following operation shall be performed by students:
   Turning, Step turning, taper turning, Chamfering, Grooving, and Threadcutting, Knurling, drilling, Boring.
   At least one dimension of the job shall carry close tolerance **(06 turns)**

3. Inspection of the job performed (by the student) **(01 turns)**

4. Preparation of process sheet for the above job **(02 turns)**

**Note:**

- Practical examination of 6 hours duration at the end of term.
- Students shall perform one composite job consisting of two pieces, having minimum
  six operations on lathe.
- Students shall prepare a work book involving brief write up regarding machine/machines employed for job, calculation related to taper turning, calculations related to change gear train required for threading shall be part of work book. Along with this work book shall contain drawing and process sheet of the 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.

# S.E.Mechanical Part-II

## 2. MANUFACTURING PROCESSES

| Teaching Scheme | Examination Scheme |
|---|---|
| **Theory:** 3 Hrs/week | **Theory:** 100 Marks (3 Hrs.) |
| **Practical:** 2 Hrs/week | **Term Work:** 25 Marks |

**Course Objectives:**

1. To study the fundamentals of conventional manufacturing processes such as casting, forming and joining processes and their applications.
2. To develop the ability to select a process from the recent manufacturing practices.

**Course Outcomes**:

At the end of this course

1. The student will develop a sound knowledge & use the various manufacturing processes.
2. The student will have the ability to choose the appropriate processes for manufacturing a product.

### Section-I

**UNIT-1 Casting Processes: (06Hrs)**

Basic steps in casting processes, Importance and uniqueness of casting as a manufacturing process, advantages and limitations of casting process. General introduction to patterns, Core boxes and Gating systems. Types of patterns, Cores, Core boxes, materials used, Allowances, selection criteria. Components of gating system, functions of each part, function of riser, types of risers, method to improve efficiency of risers.

**UNIT- 2A Moulding and core making processes: (07Hrs)**

Green Moulding sand, its ingredients and properties, facing sand, backing sand, shell sand, $CO_2$ sand, Oil sand cores, and core making, $CO_2$ core making, shell core making, cold box process of core making. Green sand moulding (hand and machine moulding), shell moulding, $CO_2$ process.

Introduction to special casting techniques, such as Investment casting, centrifugal casting, continuous casting, gravity and pressure die casting processes.

**UNIT –2B Melting and pouring: (03 Hrs)**

Melting furnaces used in C.I. foundries, i.e. Cupola, Induction furnace construction and working in brief, metallurgical control, Arc furnaces used in steel foundries, Crucible, oil and gas fired furnaces, Pouring equipments.

**UNIT – 2C Fettling, Cleaning and Inspection of Castings: (01 Hrs)**

Need for fettling, stages in fettling, equipments used in fettling and cleaning of castings. Common important defects in castings. Inspection procedure.

**UNIT – 3 Computer applications in foundry processes, foundry Mechanization. (01 Hrs)**

**UNIT- 4 Processes for Plastics (03 Hrs)**

Injection moulding, Extrusion, Blow moulding, Compression moulding (Preliminary treatment only)

## Section-II

**UNIT – 5A Introduction to forming process, classification of forming processes** **(01Hrs)**

**UNIT – 5B Rolling process:** **(03 Hrs)**

Rolling mills, classification, hot rolling, rolling of billets, rods, sections, sheet, and tube rolling, cold rolling of sheets.

**UNIT – 6 Forging processes:** **(03 Hrs)**

Advantages of forging processes over other processes, basic forging equipments.
Open die forging, closed die forging, drop forging, cold heading etc.

**UNIT – 7A Extrusion:** **(02Hrs)**

Types – direct extrusion, indirect extrusion, impact extrusion, hydrostatic extrusion.

**UNIT – 7B Wire rod and tube drawing:** **(02 Hrs)**

Wire drawing process, single pass and multi pass wire drawing, wire drawing bench. Methods of rod and tube drawing.

**UNIT – 8 Introduction to Joining processes:** **(08 Hrs)**

Welding processes, such as gas welding, arc welding, submerged arc welding, TIG welding, MIG welding, resistance welding. Gas cutting, Plasma arc cutting etc. Brazing and soldering.

### TERM WORK

1. Exercise on pattern and core box design, & drawing, for a simple component
   (Drawing on sheet expected)
2. Testing of silica sand for grain fineness and clay content.
3. Testing of green sand for green compression strength, permeability, moisture content.
4. Study of mould and core hardness tester.
5. Study of manufacturing sequence of any one forged product.
6. Study of manufacturing sequence of any one rolled product.
7. Visit to Foundry unit.
8. Visit to Forging shop

   (Journal based on above term work)

**Text Books:**


1. Heine, Lopar, Rosenthall, 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


**Reference Books:**


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


- Question paper shall cover all the topics mentioned under section I and section II, as well under the heading ***TERM WORK***.

# S. E. (Mechanical) Part – II

## 7. WORKSHOP PRACTICE – III

**Teaching Scheme:**
**Practical:** 2 Hours / week

**Examination Scheme:**
**Term Work:** 50 marks

**Course Objectives:**

1. To get hands on experience in pattern making, joining processes and forming processes.
2. 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 develop the skills necessary for engineering practices like joining and forming processes.
2. To Choose and apply the appropriate methods for pattern making & sheet metal working.

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

**Part A –**
This shall cover –
Study of component drawing, preparing casting drawing, Allowance table, Pattern drawing, Deciding parting line & Deciding pattern making process.

**Part B –**
**Actual manufacturing of pattern** **(4 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 each of gas and arc welding **(4 Turns)**

**3)** Study of sheet metal operations like bending, shearing, lancing, perforating, punching etc...
One sheet metal job consisting of at least 3 operations. **(3 Turns)**
(Either performed manually or on press)

**Demonstration:**

**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) **(4 Turns)**

**5)** Students should prepare a work book involves a process sheet for each job.

**Text Books:**

1. Heine, Lopar, Rosenthall, 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. 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

# SOLAPUR UNIVERSITY, SOLAPUR

## FACULTY OF ENGINEERING & TECHNOLOGY

## Mechanical Engineering

## Structure of T.E. (Mechanical Engineering) w. e. f. from - 2016-17

TE
NEW (CGPA)

**SOLAPUR UNIVERSITY, SOLAPUR.**

**Faculty of Engineering & Technology (Revised from 2014-2015)**

**Credit System structure of T.E. Mechanical W.E.F. 2016-2017** — **Semester I**

| Theory Course Name | Hrs./week | | | Credits | Examination Scheme | | | |
|---|---|---|---|---|---|---|---|---|
| | L | T | P | | ISE | ESE | ICA | Total |
| Theory of Machine –II | 3 | – | – | 3 | 30 | 70 | – | 100 |
| Heat and Mass Transfer | 3 | – | – | 3 | 30 | 70 | – | 100 |
| Metallurgy | 3 | – | – | 3 | 30 | 70 | – | 100 |
| Machine Design – I | 3 | – | – | 3 | 30 | 70 | – | 100 |
| Professional Elective - I | 3 | – | – | 3 | 30 | 70 | – | 100 |
| Self Learning (HSS) | – | – | – | 2 | – | 50 | – | 50 |
| **Sub Total** | 15 | – | – | 17 | 150 | 400 | – | 550 |
| **Laboratory/ Workshop** | | | | | | | | |
| | – | – | – | – | – | ESE | – | – |
| | | | | | | POE / OE | | |
| Theory of Machine –II | – | – | 2 | 1 | – | – / 25 | 25 | 50 |
| Heat and Mass Transfer | – | – | 2 | 1 | – | 25 / – | 25 | 50 |
| Metallurgy | – | – | 2 | 1 | – | – / 25 | 25 | 50 |
| Machine Design – I | – | – | 2 | 1 | – | – / – | 25 | 25 |
| Professional Elective - I | – | – | 2 | 1 | – | – / – | 25 | 25 |
| Advanced Computer Programming | 1 | – | 2 | 2 | – | – / – | 25 | 25 |
| Workshop Practice – IV | – | – | 2 | 1 | – | – / – | 25 | 25 |
| **Sub Total** | 1 | – | 14 | 8 | – | 75 | 175 | 250 |
| **Grand Total** | 16 | – | 14 | 25 | 150 | 475 | 175 | 800 |

**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)**
**Note: '#' indicates Practical exam only.**

B Pawar

सोलापूर विद्यापीठ
॥ विद्यया संपन्नता ॥

## SOLAPUR UNIVERSITY, SOLAPUR.

## Faculty of Engineering & Technology (Revised from 2014-2015)

**Credit System structure of T.E. Mechanical W.E.F. 2016-2017** — **Semester II**

| Theory Course Name | Hrs./week | | | Credits | Examination Scheme | | | |
|---|---|---|---|---|---|---|---|---|
| | L | T | P | | ISE | ESE | ICA | Total |
| Metrology and Mechanical Measurements | 3 | – | – | 3 | 30 | 70 | – | 100 |
| Internal Combustion Engine | 3 | – | – | 3 | 30 | 70 | – | 100 |
| CAD/CAM | 3 | – | – | 3 | 30 | 70 | – | 100 |
| Machine Design – II | 3 | – | – | 3 | 30 | 70 | – | 100 |
| Professional Elective –II | 3 | – | – | 3 | 30 | 70 | – | 100 |
| **Sub Total** | 15 | – | – | 15 | 150 | 350 | – | 500 |
| **Laboratory/Tutorial/Workshop** | | | | | | | | |
| | | | | | | ESE | | |
| | | | | | | POE | OE | |
| Metrology and Mechanical Measurements | – | – | 2 | 1 | – | – | – | 25 | 25 |
| Internal Combustion Engine | – | – | 2 | 1 | – | – | – | 25 | 25 |
| CAD/CAM | – | – | 2 | 1 | – | – | – | 25 | 25 |
| Machine Design – II | – | – | 2 | 1 | – | – | 25 | 25 | 50 |
| Professional Elective –II | – | – | 2 | 1 | – | – | – | 25 | 25 |
| Advanced Computing Techniques | 1 | – | 2 | 2 | – | – | – | 25 | 25 |
| Workshop Practice –V | – | – | 2 | 1 | – | #50 | – | 25 | 75 |
| Self Learning (Technical) | – | 1 | - | 1 | – | – | – | *50* | *50* |
| **Sub Total** | 1 | 1 | 14 | 9 | – | 75 | | 225 | 300 |
| **Grand Total** | **16** | 1 | **14** | **24** | **150** | **425** | | **225** | **800** |

**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)**
**Note: '#' indicates Practical exam only.**

| | | | |
|---|---|---|---|
| Professional Elective- I | 1) Machine Tool Design | 2) Fluid Machinery and Fluid Power | 3) Material Handling Systems |

| | | | | |
|---|---|---|---|---|
| Professional Elective- II | 1)Experimental Stress Analysis | 2)Power Plant and Energy Engineering | 3)Tool Engineering | 4) Mechanical Vibration |

1. The Practical batch shall be of 15 students. After formation of batches, if the number of students remaining is more than 7, a new batch shall be formed.
2. Syllabus of Self learning (H.S.S.) is common for all Under Graduate Programs under the Faculty of Engineering and Technology.
3. For self learning monitoring and assessment responsibility is to be given to the faculty with one hour load per batch.
4. Practical / Tutorial load indicates the load per batch.
5. TW: Term work assessment shall be a continuous process based on the performance of student in assignment, class test, quizzes, homework, interaction during theory and laboratory session, hand written lab book/ hand written journal, sheet drawing, subject seminar presentation etc. as applicable.
6. Industrial Training (B.E. Part 1) of minimum 15 days in one slot shall be completed in any vacation after SE Part-II but before BE Part-I & the report shall be submitted in BE Part-I.
7. Professional Electives- To offer a particular subject as an elective, minimum 15 students shall opt for the same. Appropriate elective subjects may be added as and when required.

**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)**
**Note: '#' indicates Practical exam only.**

**T.E. –Mechanical - Part-I**
**Professional Elective -I**
**5.2 FLUID MACHINERY & FLUID POWER**

| | |
|---|---|
| **Teaching Scheme** | **Examination Scheme** |
| **Lectures : 3 Hrs/Week** | **Theory : 100 Marks** |
| **Practicals : 2 Hrs/Week** | **Term Work: 25 Marks** |

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**Course objectives:**

1.To study different types of water turbines, Gas turbines and Pumps, in all details..

2.To construct velocity triangles for turbines and pumps.

3.To learn the fundamentals and applications of fluid power technology, besides construction & working of different components.

4.To design various types of hydraulic & pneumatic circuits & their applications.

**Course outcomes:**

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

1.Classify turbines and pumps. Select/design water turbines, gas turbines & centrifugal pumps to meet the specific requirements.

2.Draw velocity triangles for turbines and pumps.

3.Analyse different components of hydraulic and pneumatic systems.

4.Prepare different hydraulic & pneumatic circuits needed for different applications.

**SECTION -I**

**1.Impulse Water Turbines :** **(05)**

Euler's equation for rotodynamic machines, Classification of water turbines, Pelton wheel, Work done and efficiencies of Pelton wheel, Working proportions of Pelton wheel, Design of pelton Turbine runner, Governing of Pelton turbine, Performance characteristics of Pelton turbine .(Numerical Treatment)

**2.Reaction Water Turbine:** **(05)**

Construction and Working of Francis, Kaplan turbine. Work done and efficiencies of Francis & Kaplan turbine, Working Proportions of Francis & Kaplan turbine, Specific speed of turbine (Pelton, Francis & Kaplan turbine), Model testing, unit quantities, Prediction of performance at other operating conditions, Draft tube (Theoretical treatment only), Types and function, Governing of reaction turbines, Performance characteristics of Francis & Kaplan turbine. (Numerical Treatment).

**3.Centrifugal Pumps:** **(05)**

Working principle, construction, types, various Heads, multistage pumps, Velocity triangles, Minimum starting speed, Cavitation, Maximum Suction Height & Net Positive Suction Head, Methods of priming, Calculations of efficiencies, Discharge, blade angles, Heads, Power required, impeller dimensions, specific speed of pumps, Performance characteristics of pumps. (Numerical Treatment)

**4. Gas Turbines:** **(05)**

General aspects, Classification of gas turbines, merits of gas turbines, constant pressure combustion gas turbines-open cycle gas turbine, methods for improvement of thermal efficiency of open cycle gas turbine plant-intercooling, reheating, regeneration, effect of operating variables on thermal efficiency, closed cycle gas turbine, uses of gas turbine, gas turbine fuels. (Numerical Treatment on basic Joule Cycle)

## SECTION – II

**1. Introduction to Fluid Power and Hydraulic System elements :** **(05)**

Types, advantages, applications of fluid power, Pumps- Types, working, Characteristics, Applications. Seals & Packing- Types, materials, Applications. Hydraulic Actuators- Linear & Rotary, Types, Working, Cushioning effects, Calculation of force & velocity of piston. System components: Accumulators, Intensifiers, their types, working, applications. Symbols used in hydraulic and pneumatic circuits.

**6. Pneumatic System Elements :** **(05)**

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

**7.Hydraulic and Pneumatic Control Elements :** **(05)**

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. Pneumatic -Direction control valves, Flow control valves and pressure control valves–types and working.

**8. Hydraulic and Pneumatic Circuits & their applications : (05)**

Speed control circuits, Regenerative, Sequencing, Counter balancing, Synchronizing, Traverse & Feed circuit, Hydraulic and pneumatic clamping & braking systems, Pneumatic power tools, time delay circuits

## Term-Work

**Compulsory:**

1. A drawing sheet on standard symbols of hydraulic & pneumatic components.

**List of Experiments**

**A) Fluid Machinery-**

**Minimum 3 experiments from the following**

2. Trial on a Pelton wheel.
3. Trial on a Francis/ Kaplan turbine.
4. Trial on a centrifugal pump.
5. Trial on gear pump

**B) Fluid Power**

**Minimum 3 assignments from the following**

6. Study of Pressure Control Valves & circuits using pressure control valves
7. Study of flow control valves & circuits using flow control valves
8. Study of direction control valves & check valves circuits.
9. Study of hydraulic power unit & accessories.
10. Demonstration of Minimum of Three hydraulic circuits such as :Basic hydraulic, Regenerative, Speed control(Meter in, meter out & bleed off), Sequencing, Synchronization, traverse & feed, circuit for riveting machine, automatic reciprocating, fail safe circuit, counter balance circuit, actuator locking, circuit for hydraulic press, unloading circuit, motor breaking circuit.

11. Demonstration on Pneumatic Trainer of Minimum of Three Pneumatic circuits (based on syllabus of UNIT 10 above).

**C) Industrial visit to one of the following.**

- Hydro-electric power station
- Pumping station
- Service station of Earth Moving equipment's.

Note: Students should write visit report based on the observations made during the visit.

**Text Books**


1. "A text book of Fluid Mechanics & Hydraulic Machines", Dr.R.K. Bansal, Laxmi Publications Ltd.
2. Thermal Engineering R.K. Rajput
3. "Oil Hydraulics- Principle & Maintenance", Majumadar, Tata McGraw Hill
4. "Pneumatics- Principle & Maintenance", Majumadar, Tata McGraw Hill


**Reference Books**


1. Theory of Hydraulic Machinary", V.P. Vasandani, Khanna Publishers, Delhi.
2. "Hydraulic Machines", Dr. J. Lal, Metropolitan Book Co. Pvt. Ltd., Delhi.
3. Vickers Manual on Industrial Hydraulics
4. Festo's Manual on Pneumatic Principle, applications
5. "ABC's of Hydraulic Circuits", H L Stewart, (Taraporwala Press)
6. "ABC's of Pneumatic Circuits", H L Stewart, (Taraporwala Press)
7. Hydraulics and Pneumatics'H.L.Stewart –, Industrial Press

Color, font, image, open, save dialogs, creating an application menu, adding and controlling forms, playing multimedia.

**6.Scripting:** **(02)**

VBA macros create word and excel macros, advanced macros, VB script, writing script for internet explorer, scripting activeX objects, dynamic scripts.

**7.String Processing:** **(02)**

Reading text files, Streaming lines of text, reading spreadsheets, reading XML files, creating XML dataset, RSS feed, XML attributes.

**8.Database Programming:** **(02)**

Database in excel, designing a database, creating a database, defining tables, table relationships, creating a dataset, data controls, build SQL queries.

## Termwork:

**The term work is based on the following list of Computing Assignments.**

Assignment on VB controls and events.

1) Programming exercises on Variables and parameters.
2) Programming exercises on branching and looping
3) Assignment on object methods and function procedures. .
4) Programming exercises on Arrays.
5) Assignment on multimedia.
6) Programming exercises on VBA macros and scripting.
7) Programming exercises on string processing
8) Assignment on database.
9) Assignment on object oriented programming.

**Text Books:**


1. Introduction to Programming using Visual Basic
   -David Schneider (Pearson Education System)
2. Microsoft Visual Basic 2010 Step by Step
   -Michael Halvorson (Microsoft Press)
3. Visual Basic 6: The Complete Reference
   -Noel Jerke (MGH)


**Reference Books:**


1. Visual Basic -Mike McGrath (TMH)
2. Visual Basic 2010 in Simple Steps -Kogent Learning Solutions ( Dreamtech Press)


**T.E. –Mechanical - Part-I**

**7. 0 Workshop Practice – IV (T.E. Part - I)**

**Teaching Scheme**
**Practical:** 2hrs/week

**Examination Scheme**
**Term- Work** – 25 Marks

==========

**Course Objective:**

i) To make the students aware with various skills involved in manufacturing &Assembly.

ii) To develop skills to operate different machine tools.

iii) To make the students aware of limits, fits & tolerance while manufacturing assembly.

iv) To make students aware of operation sequence, speed feed selection for different materials & operations

**Course Outcomes:**

i) To create confidence amongst the students in Production / manufacturing activities.

ii) Students should get experience about manual skills required to perform machining operations.

iii) To create confidence in students while designing limits, fits & tolerances during manufacturing.

iv) To create awareness in students regarding time management, work study, method study & tool engineering

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1. A composite job consisting of three components machined from **Φ32 mm MS bar**.
(Excluding commercial components)requiring minimum five operations listed below:

1.Turning
2.Drilling
3.Boring
4.Hand tapping
5.Milling
6.Internal & External V-threading
7.Grinding

2. The components of the composite job shall carry at least two specified close tolerance operations.In addition to the above, following operations are to be demonstrated during the term. (These are not to be included in the job operations for term work & exams.)

1.Shaping

2.Slotting

3.Grinding

4.Form Turning

5.Knurling

6. Grooving

4. Journal should contain detailed process sheet of above job.

5. Assessment of Workshop Practice-IV-Term work shall be done for 50 % Work or one majorComponent & Workshop Practice-V-Term work shall be done for remaining work at the end of T.E. (Mech.) Part II.

6.Practical examination of 6 Hrs. duration having component of 2 to 3 parts.

**Note:** Material specification for practical work & examination is raw material **Φ32mm MS bar**.

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**Books:**

1. Workshop Technology (Volume II) by Raghuvanshi.

2. Workshop Technology (Volume II) by HajraChowdhary.

3. Workshop Technology (Volume II) by W.A.J.Chapman.

**Reference Books:**

1. Production Technology by P.C.Sharma.

2. Production Technology – HMT Handbook.

3. Production Technology (Volume II) by Gupte-Patel.

4.HGerling, All About Machine Tools, New Age International, 1995.

**T.E. –Mechanical - Part-I**
**8.0 Self Learning (HSS)**

**Examination Scheme**
**Theory Paper : 50 Marks**

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**Note: Syllabus is common for all branches of Engineering Faculty.**

## T.E.(Mech.)Part-II

**Metrology & Mechanical Measurements**

| | |
|---|---|
| **Teaching Scheme :** | **Examination Scheme :** |
| **Lectures-3hours per week** | **TheoryPaper:100 Marks** |
| **Practical- 2 hours per week** | **Term Work: 25 Marks** |

**Course Objectives**:

1. To study the principles of measurement of various mechanicalproperties such as geometrical, dimensional, pressure, temperature etc.
2. To learn the use of various measuring instruments with different setups for accurate measurements.
3. To get acquainted with various standards of measurements & the calibration process of Instruments.

**Course Outcomes :**

1. Students will understand the design & construction of measuring instruments.
2. Students will setup the Instruments & accessories for measurement of properties by avoiding errors.
3. Students will calibrate the simple instruments using more accurate standards.
4. Students will use the instruments for various industrial applications such as quality control, process control etc.

## Section- I

**1. Introduction : Standards of Measurement & Principles of measurement: (05)**

Need & Concept of measurement, Precision and accuracy. Classification of standards, International standards of length, Line, End & Wave length standards, Slip gauges: Slip-gauge set (M-45,M-87) specification, Selection of slip Gauges including numerical problems. Measuring principles of vernier caliper & micrometer

**2. Systems of Limits, Fits & Tolerances and Limit Gauging: (05)**

Terminology, Types of tolerances, Accumulation of tolerances, Types of fits, Hole & shaft base systems of limits, fits and tolerances, Use of tolerance charts, Numerical problems based on fundamental deviations & fundamental tolerance grades. Taylor's Principal of gauge design, types of gauges, Design of limit gauges, Disposition of gauge tolerances & wear allowances, numerical problem on gauge design.

**3. Comparators & angular measurements: (05)**

Introduction to comparators, Characteristics, Classification of comparators, mechanical comparators-Johnson Mikrokator, Sigma Comparators dial indicators, Optical Comparators –Principles ,Pneumatic Comparators, Angular Measurements - Bevel Protractor, Spirit level, Clinometers, Principle & use of Sine Bars, Sine Centre, Use of angle gauges (Numerical on Building of angles) Autocollimator.

**4. Screw-Threads & Gear Metrology & Recent trends in measurement: (05)**

Basic elements of screw-thread measurement, Methods of measurement of effective diameter, floating carriage micrometer. Basic elements of spur-gear measurement, Methods of measurement of gear tooth thickness. Introduction to modern measurement techniques- Co-ordinate Measuring Machine, Profile projector, Introduction tolaser

Measurement, Metroscope & Automatic inspection system.

## Section- II

**5. Introduction to Mechanical Measurement:** **(05)**

Need of Mechanical Measurement, Instruments, Measurement methods, Generalized measurement system & its functional elements, Instrument characteristics-Static & Dynamic characteristics, Calibration, Classification of transducers.

**6. Measurement of temperature, Pressure & Vacuum:** **(05)**

Importance of temperature measurement, Thermometer, Thermocouple-Principle, Types, Calibration, RTD, Thermistor. Importance of pressure & Vacuum measurement, Range of high pressure & vacuum Bourdon tubes, Dead weight pressure-gauge tester, Diaphragm gauge, LVDT, Piezo-electrical pressure gauge, Low vacuum gauges-McLeod gauge, Pirani gauge.

**7. Measurement of angular speed & flow:** **(05)**

Importance of angular speed measurement, Mechanical tachometers, Electrical tachometers-Drag cup, Inductive, Photoelectric pickup, Stroboscope. Importance of Flow measurement, Turbine meter, Rotameter, Gas flow meter, Hot wire anemometer.

**8. Measurement of Force, Torque & Strain:** **(05)**

Force measurement- Balance, Proving Ring, Hydraulic, Pneumatic Load Cell, Torque measurement-Hydraulic, Eddy Current.Classification of strain gauges, Principle of electrical strain gauge, Gauge factor (Analytical treatment), Wheatstone's network using strain gauges. Simple Numerical problems.

(5)

## TERM-WORK

***A )Metrology Laboratory :***

Any five of the following experiments (Experiment No. 1 is compulsory).

1. Uses of various measuring instruments .Vernier instruments, Micrometer instruments, Dial instruments and Auxiliary instruments for carrying out measurements.
2. Calibration of Vernier caliper / Micrometer using slip gauges.
3. Use of at least one type of each class of comparator such as mechanical, optical, pneumatic, etc.
4. Measurement of angle using Bevel protractor and sine bar / sine centre. Use of Clinometer and Angle gauges.
5. Measurement of Gear tooth thickness using gear tooth vernier caliper/ plate type micrometer
6. Measurement of diameters of screw threads.
7. Use of advanced measuring equipment such as Co-ordinate Measuring Machine / Metro scope/ Profile projector.

**B)** **Mechanical Measurements Laboratory**

Any five out of the following experiments:

1. Temperature Measurement using thermo couples, RTD, Thermistor.
2. Testing of mechanical pressure gauge using Dead Weight pressure tester.
3. Vacuum measurement using U tube manometer & Mechanical Vacuum Gauge.
4. Angular speed measurement using mechanical tachometer ,stroboscope, photo electric pick up, inductive pick-up.
5. Flow measurement using Rotameter.
6. Measurement of bending strain or load using strain gauges.
7. Use of proving ring,load cells.
8. Measurement of torque.

* Industrial Visit (Recommended for modern measuring instruments/ Calibration Lab)

**Text Books:**

1. Engineering Metrology: I.C. Gupta
2. Mechanical Measurement & Control: Dr.D.S. Kumar
3. A Text Book Metrology : M. Mahajan

***Reference Books :***

1. Practical Engineering Metrology: Sharp KWB, Pitman, London.
2. Engineering Metrology: R.K.Jain, Khanna Publishers.
3. Mechanical Measurement: Sohni & Dr. Radhakrikshan.
4. Mechanical Measurement: Beckwith, Buck, Roy

***(NOTE: SEPARATE ANSWER BOOKS FOR SECTION –I & SECTION-II)***

**T.E. (Mechanical) Part – II**

## 2.0 Internal Combustion Engine

**Teaching Scheme**
**Lecturers: 3 Hrs/ Week**
**Practical: 2 Hrs/ Week**

**Examination Scheme**
**Theory: 100 Marks**
**Term work: 25 Marks**

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**Course Objective:**

1. Learn to classify different types of internal combustion engines and their applications.
2. To make students familiar with the design and operating characteristics of internal combustion engines.
3. To study the thermodynamics, combustion, heat transfer, friction and other factors affecting engine power, efficiency and emissions.
4. To introduce students to future internal combustion engine technology and market trends.

**Course Outcomes :**

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

**Section I**

**1. Introduction to I.C. Engines & Engine Cycles: (06)**

Introduction, Basic engine components and nomenclature, Classification of I. C. Engines. Engine cycles, Deviation of actual cycles from air standard cycles, Valve timing diagram for high & low speed engine, Port timing diagram. Engine selection.
(*Theoretical treatment only*)

**2. Fuel systems for S.I. Engines: (05)**

Engine fuel requirements, Elementary and complete carburetor (Float, Idling and Acceleration system, Choke, Compensating system, economizer), Derivation for calculation of A/F ratio (exact and approximate method), Design of carburetor - Calculation of main dimensions of air and fuel supply, Effect of altitude on Air fuel ratio. Electronic Petrol injection system (MPFI)
*(Numerical on calculations of main dimension of carburetor)*

**3. Fuel Systems for C.I. Engines:** **(05)**

Requirements of injection system, Fuel metering, pressurizing and injecting system, Types of. injection system- Individual pump, Common rail and Distributor systems, Unit injector, Types of fuel nozzles- single hole, multi hole, pintle, and pintaux, Formation of Spray, Atomization and penetration. Governing of C.I. engines. Electronic control for diesel engine management,

*(Numerical on calculations of main dimension of fuel injection system).*

**4. Engine systems.** **(04)**

a. Ignition system: (Magneto, CDI, Electronic)
b. Lubrication system (types of lubrication systems and lubricants)
c. Engine starting system. (Starter motor, Bendix drive,)
d. Engine cooling system ( Cooling system types, coolants)
e. Intake and exhaust systems (Intake manifold, intake runners, exhaust manifold, muffler)

(*Theoretical treatment only*)

## Section II

**5. Combustion in Engines:** **(06)**

**Combustion In SI Engine**: Stages of combustion, Ignition lag, Flame propagation, Factors affecting flame speed, Abnormal combustion, Influence of engine design and operating variables on detonation, Requirements of combustion chambers of S. I. Engines. (*Theoretical treatment only*)

**Combustion in C.I. Engines:** Stages of combustion, Delay period, Factors affecting delay period, Abnormal combustion - Diesel knock, Influence of engine design and operating variables on diesel knock, Comparison of abnormal combustion in S I and C I engines,. Requirements of combustion chambers for C. I. engines. (*Theoretical treatment only*)

**6. Engines testing and performance enhancement:** **(06)**

**Engines testing:-** Performance parameters, Performance curves, Measurement of performance parameters like torque, power, Volumetric Efficiency, Mechanical Efficiency, BSFC, Brake and Indicated Thermal efficiencies. Heat Balance Sheet. *(Numerical on engine performance)*

**Performance enhancement**: Introduction to method of improving engine performance.

***Supercharging*:-** Purpose of supercharging, Thermodynamic cycle of supercharged engine, Types of superchargers, Turbo charging, Advantages and disadvantages, Limitations of supercharging for S.I. and C.I. Engines. (*Theoretical treatment only*)

**7. Fuels** **(04)**

*SI Engine fuel*: Fuel rating, Octane number, Fuel additives, HUCR

*CI Engine fuel*: Cetane number, Additives
*Alternative fuels*: Alternative fuel for S. I. Engines & C. I. engines, Blending, Use of CNG, Bio-gas, Non-edible oils, Ethanol, Methanol, Hydrogen, Electronic engine management system for variable valve timing, fuel supply and pollution control. Introduction to hybrid vehicles. (*Theoretical treatment only*)

**8.Engine Emission and Engine electronics: (04)**
S.I. engine emission (HC, CO, NOx) Control methods- Evaporative (ELCD), Thermal, Catalytic converters, C.I. Engines Emission (CO, NOx, Smog, Particulate), Control methods- Chemical, EGR, Standard pollution Norms – Bharat-I,II,III. Introduction to carbon credit. Engine electronics. (*Theoretical treatment only*)

## Term Work

Minimum **four** experiments from Study Group and Test Group Each.

**Study Group:**
1 Constructional details of I.C. engines
2 Study of Engine systems: Air, exhaust, Cooling, Lubrication
3 Study of ignition systems, Starting systems.
4 Dismantling and assembly of Carburetor or injection system.
5 Dismantling and assembly of engine
6 Study of fuel injection system of diesel engine
7 Assignment on latest trends in IC Engine.

**Text Group:**

1.Test on four stroke Diesel Engine.
2 Test on four stroke Petrol Engine.
3 Morse Test.
4 Test on computer controlled I.C. Engine
5 Measurement of exhaust emissions of SI / CI engines.
6 Test on variable compression ratio engine, to predict the effect of variable compression ratio on I.C.Engine performance.
7 Visit to an engine manufacturing company / repairing unit

**Text book**

1 Internal Combustion Engines Mathur and Sharma Dhanpat Rai
2 Engineering Fundamentals of the Internal Combustion Engine Willard Pulkrabeck, Prentice Hall
3 Internal Combustion Engines Rajput, Dhanpat Rai Publications
4 Internal Combustion Engines – Ganesan, Tata McGraw Hill

**Reference Books**

| Sr. No | Title | Author / Authors | Publisher |
|---|---|---|---|
| 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: Applied Thermo sciences | Fergusson & Kirkpatrick | Wiley |
| 9 | SAE Handbook | SAE | SAE |
| 10 | Performance Testing of Internal Combustion Engines | SAE | SAE |

**T.E. (Mech) Part –II**
**3.0 Computer Aided Design & Computer Aided Manufacturing (CAD/CAM)**

**Teaching Scheme:** **Examination Scheme**
**Lectures: 3Hrs/Week** **Paper: 100 Marks**
**Practical: 2Hrs/Week** **Term Work: 25 Marks**

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**Course objectives:**

1. To create an awareness regarding Geometric Modeling activities in Industries.
2. To create an awareness regarding CAM activities in Manufacturing Industries.
3. To develop part programming capabilities for CNC machines.
4. To empower students to learn advanced tools in Automation.

**Course Outcomes:**

1. To handle CAD related problems from industries.
2. To handle CAM related problems of manufacturing industries.
3. To learn CAD/CAM softwares to be updated with time.
4. To design NC Part Programs to suit Industrial requirements.

**Section-I**

1. **Introduction to CAD / CAM**: **(04)**

Product Design Concept, Product Cycle and CAD / CAM, Advantages of CAD / CAM, Hardware for standalone CAD system, Graphics Workstation, Types of Input Devices, CPU and Output Devices, Softwares for CAD / CAM, Functions of a Graphics Software, Selection of CAD / CAM Software

**2. Computer Graphics**: **(05)**

Geometric Transformations, Homogeneous Coordinates, Windowing and Viewing Transformations, Coordinate Transformations, Standardization in Graphics Software, CAD / CAM Data Exchange.

**3. Geometric Modeling**: **(05)**

Introduction, Types of Geometric Modeling, Parametric representation of basic entities like line and circle, Introduction to basic curves - Hermite, Bezier, B-Spline, NURBS, concept of CSG and Boolean operations, Feature based modeling.

**4. Automation:** **(06)**

Concept & Definition of Automation, Types, Advantages and Limitations of Automation, Group Technology, part family, Classification and Codification System, Merits and Demerits of Group Technology, Concept of a Machine Cell, CAPP, Retrieval and Generative type of CAPP, Computer Integrated Manufacturing (CIM) concept and elements, MRP, concept of ERP, concept of Rapid Prototyping.

**Section-II**

**5. Fundamentals of NC system:** **(06)**

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.

**6. CNC- DNC Technology**: **(03)**

Classification of CNC machine tools, CNC controllers, Features and Advantages of CNC, Adaptive Control, Advantages of Adaptive Control, Direct Numerical Control (DNC), Types of DNC, Advantages and Disadvantages of DNC.

**7. Tooling for CNC Machines**: **(03)**

Tool holders, Adapters, Tool magazines, Automatic tool changers, Pallets, Tool setting, Modular tooling.

**8.Manual Part Programming**: **(08)**

Principles of an NC Program, Word Address Format (WAF), Machining Formulas, Tool Length and Cutter Diameter Compensation, Canned Cycles for Lathe, Milling and Drilling, Subprogram or Subroutines, DO Loop, Macros, Diameter versus Radius Programming, CAD / CAM Systems for Part Programming.

**List of Experiments**

1. One assignment on CAD/CAM fundamentals/basics.
2. Assignment on Modeling & Drafting of any two mechanical components.
3. Assignment on Modeling of simple Assembly of around 3-5 machine components.
4. Assignment based on group technology and /or Computer Aided Process Planning (preferably based on small part family).
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.

**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- Tata McGraw Hill Pub.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.

**TE (Mech) Part- II**
**Professional Elective – II**
**5.3 Tool Engineering**

**Teaching Scheme :**
**Lectures : 3 / week**
**Practicals : 2 hrs./ week/ batch**

**Examination Scheme :**
**Theory : 4 hrs. 100 marks**
**Term work -25 marks**

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**Course Objectives**

1. To enlighten the students about the basics in mechanics of cutting & non cutting operations.
2. To explain the concepts, principles & practices in designing various tools .
3. To explain the students about the basics in economics of cutting & non cutting operations.
4. To explain the concepts, principles & practices in designing various toolings.

**Course Outcomes**

1. Students are able to do the calculations involved in the mechanics & economics of operations.
2. Students are able to design & draw the tools & toolings for the given situation & operation.
3. Students are able to conceive & develop solutions, devices, contrivances to overcome present problems of the real world.

**SECTION - I**

**1. Theory of Metal cutting**

a) Orthogonal cutting & Oblique cutting, Force analysis for orthogonal cutting **(1)**
b) Chip formation, types of chips, wedge action, shear plane angle, cutting ratio, shear stress & strain, velocity relationship, Merchant's theory, Merchant's circle & force relationship **(3)**
c) Tool dynamometers- types, applications. **(1)**
d) Machinability Index, factors affecting machinability **(1)**
e) Tool life- Flank & crater wear, effect of variables on tool life, Taylor's equation of tool life **(2)**
f) Coolants- Heat generation, types of coolants. **(1)**
g) Tool Materials **(1)**

**2. Press Tools**

a) Elements of press tools, types of dies, types of operations. **(2)**
b) Design of die for cutting operation, mechanics of shearing, cutting force estimation, punch & die clearance, stock strip lay out, design of punches & die block functioning & place of other elements. Centre of pressure, selection of die set & press **(5)**
c) Design of drawing dies, determination of blank size, no. of draws, stage wise component drawing, drawing radii, clearance, estimation of drawing force, time & power **(2)**
d) Types of Bending dies, related estimates. **(1)**

## SECTION –II

**3. Geometry & Nomenclature of cutting tools**

a) Single point cutting tools- Geometry & Tool signature as per ASA system & ORS system, effect of geometry on tool life, cutting force, surface finish. **(2)**

b) Types of Multipoint cutting tools like Milling cutters, Drills, Broaches, Reamers **(2)**

**4. Design of Jigs & Fixtures**

a) Introduction, necessity & applications, basic concepts **(1)**

b) Location & clamping systems- Principle, types, applications **(2)**

c) Design of Jigs- Principles of Jig design, types & applications, types of bushes & selection, use of standard parts, design procedure & drawing. **(4)**

d) Design of Fixtures- Principles of Fixture design, standard elements & types of fixtures, design of milling fixtures. **(4)**

**5. Economics of Tooling**

a) Elements of cost: methods of depreciation **(1)**

b) Estimation of total cost & sales price **(1)**

c) Break- even analysis for equipment selection **(1)**

d) Economics of small tool selection, equipment replacement **(1)**

e) Economic Order Quantity for Batch production **(1)**

## TERM WORK

(**Minimum Six of the following )**

1. Study of cutting tools : Classification, Nomenclature, Geometry
2. Exercise on Theory of metal cutting.
3. Demonstration of Lathe tool & Drill tool dynamometer & calculation of cutting forces.
4. Exercises on Mechanics & Economics of Machining & Tooling
5. Sheet on Press tool design- Cutting & drawing operation, necessary calculation
6. Sheet on Jig design- Exercise & drawing
7. Sheet on Fixture design- Exercise & drawing
8. Industrial visit

## RECOMMENDED BOOKS:

### TEXT BOOKS


1. Text Book of Production Engineering – P.C.Sharma (S.Chand Publication)
2. Machine Tool Engineering – G.R. Nagpal (khanna Publication)
3. Press Tools – P.H.Joshi (S.Chand Publication)
4. Jigs & Fixtures - P.H.Joshi (S.Chand Publication)


### REFERENCE BOOKS


1. Metal cutting Theory & tool design- Mr. Arshinnov (MIR Publication)
2. Fundamentals of Tool design- ASTME Publication
3. Tool design – Donaldson (TMH Publication)
4. Jig & Fixture Design – Kempster (ELBS Publication)
5. Die Design Fundamentals-J.R.Paquin

**T.E. (Mechanical) Part – II**

**7.0 Workshop Practice – V**

**Teaching Scheme**
**Practical:** 2hrs/week

**Examination Scheme**
**Term- Work –** 25 Marks
**Practical Examination**-50Marks

Practical Exam duration- 6 Hrs.

==========

**Course Objective:**

v) To make the students aware with various skills involved in manufacturing &Assembly.

vi) To develop skills to operate different machine tools.

vii) To make the students aware of limits, fits & tolerance while manufacturing assembly.

viii) To make students aware of operation sequence, speed feed selection for different materials & operations

**Course Outcomes:**

i) To create confidence amongst the students in Production / manufacturing activities.

ii) Students should get experience about manual skills required to perform machining operations.

iii) To create confidence in students while designing limits, fits & tolerances during manufacturing.

iv) To create awareness in students regarding time management, work study, method study & tool engineering

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1. A composite job consisting of three components machined from **Φ32 mm MS bar**.
   (Excluding commercial components) requiring minimum five operations listed below:
   1.Turning
   2.Drilling
   3.Boring
   4.Hand tapping
   5.Milling
   6.Internal & External V-threading
   7.Grinding

2. The components of the composite job shall carry at least two specified close tolerance operations. In addition to the above, following operations are to be demonstrated during the term. (These are not to be included in the job operations for term work & exams.)

1.Shaping

2.Slotting

3.Grinding

4.Form Turning

5.Knurling

6. Grooving

4. Journal should contain detailed process sheet of above job.

5. Assessment of Workshop Practice-IV-Term work shall be done for 50 % Work or one majorComponent & Workshop Practice-V-Term work shall be done for remaining work at the end of T.E. (Mech.) Part II.

6.Practical examination of 6 Hrs. duration having component of 2 to 3 parts.

**Note:** Material specification for practical work & examination is raw material **Φ32mm MS bar**.

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**Books:**

1. Workshop Technology (Volume II) by Raghuvanshi.

2. Workshop Technology (Volume II) by HajraChowdhary.

3. Workshop Technology (Volume II) by W.A.J.Chapman.

**Reference Books:**

1. Production Technology by P.C.Sharma.

2. Production Technology – HMT Handbook.

3. Production Technology (Volume II) by Gupte-Patel.

4.HGerling, All About Machine Tools, New Age International, 1995.

**T.E. (Mechanical), Semester - II**

**Self Learning (Technical)**

**Teaching Scheme:-- Nil**

**Examination Scheme: Nil** **Term Work – 50 Marks**

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**Course Objective:**
i) To develop the ability for self study
i) To make the students acquainted with various skills involved in presenting a data.
ii) Student is expected to understand & analyze the basic problems in engineering.

**Course Outcomes:**
i) Outcome is to create confidence amongst the students in the field of engineering.
ii) Students should get experience about case study.

**1. Mini Project/Case study: 30 Marks**

A mini project /case study is expected to be on a state of the art technical topic, related to Mechanical Engineering discipline. Every individual or a group of maximum two students shall work on a area/topic, selected or assigned from any engineering/allied/applied fields, for the academic or industrial interest.
The task may be like:
-A work/task can be completed using software tools like CAD tools, MALAB SCILAB, AUTOLISP, or any Programming Languages.
-Animation, simulation oriented task.
-Making a prototype, working model, attachment/extension to machine tool/equipment.
-Design of element, mechanism, product, subassembly etc.
-Experimentation with critical task like using IC engine, Hydraulic trainer circuit, Vibration analysis or using any working experimental set-up.
Such similar kind of task/case in the field of Mech. Engg., can be taken for mini project.
# For this mini project the report should be prepared and student has to present it and demonstration to the expert panel appointed by HOD.
The Term work marks will be allotted as per the following :
i) Report 10 Marks
ii) Theme/content, Presentation and question-answer : 20 Marks

**2. A) Paper Presentation 20 Marks**
OR
**B) Seminar 20 Marks**

**A) Paper Presentation :**

A research paper is expected to be on a state of the art technical topic, related to Mechanical Engineering discipline. Every individual or a group of maximum two students shall work on a area/topic, selected or assigned from any engineering/allied/applied fields, for the academic or industrial interest. Student shall work on a recent/advanced topic, recent development/research work, may be selected by them or assigned from any engineering/allied/applied fields, for the academic or industrial interest. The student shall prepare the research paper and participate/submit for any competition/conference may be of university level/state level/national level/international level. The student has to produce the proof for the same in the form of certificate of selection/attendance/paper presentation, at the competition/conference, a copy of souvenir/proceeding etc.

For this the report including research paper should be prepared and student has to present it to the expert panel appointed by HOD.

The Term work marks will be allotted as per the following:

i) Research paper: 10 Marks

ii) Presentation and question-answer: 10 Marks

**B) Seminar:**

A seminar is expected to be on a state of the art technical topic, related to Mechanical Engineering discipline. Every individual student shall work on a recent topic selected or assigned from any engineering/allied/applied fields for the seminar of academic or industrial interest. It is expected that the student may collect information on a topic which is not covered in curriculum of the under graduate course. Student has to refer hand book, latest research papers, research journals, reference books, proceeding of conference through library or internet and record of references considered for seminar is too preserved in hard copy or soft copy, which shall be produced at the time of seminar. The seminar report & its presentation are to be based on content material, mainly collected & analyzed from above.The report of seminar should be submitted in printed volume (about10-20 pages) duly certified by guide. The student should deliver a seminar talk at least for 20 minutes based on the work done by him/her. The performance will be judged by expert panel appointed by HOD.

Presentation shall be made with help of Power point (Guidelines)-

a. Preferably each slide shall have plain white or faint yellow or navy blue or maroon colored back ground with contrast matching font.

b. Each slide shall be numbered and header - footer shall be added similar to report.

c. Figure / Graph / Table shall be labeled with Figure No. / Graph No. / Table No. and with reference nos. Shown in seminar report

d. Only brief points are to be highlighted on slides

e. Points are not to be read directly from slide at the time of presentation.

f. Presentation shall be based on Figure, Graph, Table, Charts and points etc.

g. First slide shall be identical to cover page of report.

h. Second slide should contain introduction / abstract of seminar and content of presentation with bullets.

i. Third slide shall focus on literature review.

j. Fourth slide on wards core content of presentation shall be discussed.

l. Slides at the end shall consist of merits, demerits, future scope, conclusion and references.

**The Term work marks for seminar will be allotted as per the following**

i) Seminar Report : 08 Marks
iii) Presentation and question-answer : 12 Marks

**Recommended Books:**

**Text Books :**

1.Communication Skills for Engineers –S. Mishra, C. Muralikrishna, Pearson Education.
2.Professional Communication Skills -Pravil S. R. Bhatia, S. Chand and Co., New Delhi.
3. Soft Skills,know Yourself & Know the world-Dr.K.Alex.S. Chand & Company Ltd.,N.Delhi.
4. Awaken the Giant Within: Tony Robbins HarperCollins Publishers, ISBN-139780743409384

**Reference Books:**

1. Entrepreneur Development by Vasant Desai, Himalaya Publication
2. Thinks and Grow Rich: Napoleon Hill, Ebury Publishing, ISBN 9781407029252
3. Change Your Thoughts, Change Your Life: Wayne Dyer, Hay House India, ISBN-139788189988050
4. Habits of Highly Effective People: Stephen Covey Pocket Books, ISBN-13
5. Organizational Behaviour-Fred Luthans, McGraw Hill.

**SOLAPUR UNIVERSITY, SOLAPUR**
**FACULTY OF ENGINEERING & TECHNOLOGY**
**Mechanical Engineering**
**Structure of B.E. (Mechanical Engineering) w.e.f. from2015-16**

**Semester-I**

| Sr. No. | Subject | Teaching / Week | | | | | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Dr | Total | TP | TW | OE | POE | Total |
| 1 | Automatic Control Engineering | 3 | | 2 | | 5 | 100 | 25 | | | 150 |
| 2 | Operations Research | 3 | | 2 | | 5 | 100 | 25 | | | 125 |
| 3 | Refrigeration and Air Conditioning | 3 | | 2 | | 5 | 100 | 25 | 25 | | 125 |
| 4 | Professional Elective - 3 | 3 | | 2 | | 5 | 100 | 25 | 25 | | 150 |
| 5 | Free Elective - I | 3 | 2 | | | 5 | 100 | 25 | | | 125 |
| 6 | Industrial Training | | | 1 | | 1 | | 50 | 25 | | 75 |
| 7 | Project Work– I | | | 4 | | 4 | | 50 | | | 50 |
| **Total** | | **15** | 2 | 13 | | **30** | **500** | **225** | **75** | - | **800** |

| | | | |
|---|---|---|---|
| **Professional Elective III** | Finite Element Methods | Automobile Engineering | Process Engineering |

| | | | | |
|---|---|---|---|---|
| **Free Elective I** | Industrial Robotics | Sugar Engineering | Textile Engineering | Entrepreneurship Development |

**Semester-II**

| Sr.No. | Subject | Teaching / Week | | | | | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Dr | Total | TP | TW | OE | POE | Total |
| 1 | Industrial and Quality Management | 3 | | 2 | | 5 | 100 | 25 | | | 125 |
| 2 | Industrial Engineering | 3 | | 2 | | 5 | 100 | 25 | | | 125 |
| 3 | Professional Elective - 4 | 3 | | 2 | | 5 | 100 | 25 | 25 | | 150 |
| 4 | Free Elective - II | 3 | 2 | | | 5 | 100 | 25 | 25 | | 150 |
| 5 | Project Work – II | | | 8 | | 8 | | 100 | 100 | | 200 |
| 6 | General Proficiency | 2 | | | | 2 | | 50 | | | 50 |
| **Total** | | **14** | 2 | 14 | | **30** | **400** | **250** | **150** | - | **800** |

| | | | |
|---|---|---|---|
| **Professional Elective IV** | Mechatronics | Computational Fluid Dynamics | Production and Operation Management |

| | | | | |
|---|---|---|---|---|
| **Free Elective II** | Software Engineering & cyber security | Agro Machine Engineering | Plastic Engineering | Economics for Engineers |

*w.e.f. academic year 2015-16*

**Note** –

1. The Practical batch shall be of 15 students. After formation of batches, if the number of students remaining is more than 7 a new batch shall be formed.
2. Project group shall not be of more than four students.
3. Practical / Tutorial load indicates the load per batch.
4. TW: Term work assessment shall be a continuous process based on the performance of student in assignment, class test, quizzes, homework, interaction during theory and laboratory session, hand written lab book/ hand written journal, sheet drawing, subject seminar presentation etc. as applicable.
5. For Elective -: To offer a particular subject as an Elective, minimum 15 students should opt for the same. Appropriate Electives Subjects may be added when required.

# 3. Refrigeration And Air Conditioning

**Teaching Scheme:**
Lectures: 3 Hrs. / Week
Practical: 2 Hrs. / Week

**Examination Scheme:**
Theory Paper: 100 Marks
Term work: 25 marks

Oral Exam.: 25Marks

**Course objective:**

1. To Study basic refrigeration cycles and air refrigeration systems.
2. To study different refrigerants and multi pressure refrigeration systems
3. To Study Psychometric properties of air and human comfort conditions

4 To study and design of air conditioning systems

**Course outcomes:**

**At the end of course a student can be able to**

1. Analyze basic refrigeration cycles and air refrigeration systems
2. Select proper refrigerant and appropriate refrigeration system based on application
3. Define and estimate psychometric properties
4. Estimate cooling and heating load calculations and design air conditioning system

for different applications

## Section – I

**1. a )Basic Refrigeration Cycles:**

Refrigeration, Units of Refrigeration, Reversed Carnot cycle, Bell-Colemon cycle, Types of Vapour Compression Cycles, Calculations & performance of above cycles, Actual vapour compression cycle.

(Numerical Treatment) (7 hrs)

**b) Air Refrigeration systems for Air Craft Refrigeration:**

Necessity of air cooling for air craft, Simple system, Boot strap system, Regenerative system, Reduced ambient system (Descriptive Treatment) (3hrs)

**2. Multi pressure systems**:

Introduction, Multistage compression, Flash gas removal, flash inter cooling, complete multistage compression system, Multi evaporator systems (Descriptive Treatment) (3 hrs)

**3. Refrigerants**:

Classification, Desirable properties, Nomenclature of refrigerants, Selection of refrigerant, Secondary refrigerants, Effect on ozone depletion & Global warming, Total equivalent warming impact (TEWI), Alternative refrigerants, Nan refrigerant (Descriptive Treatment) (3hrs)

**4. Vapour Absorption System:**

Simple aqua-ammonia vapour absorption system, Practical aqua-ammonia vapour absorption system, Comparison between vapour absorption & vapour compression systems, Lithium Bromide absorption refrigeration systems, Electrolux refrigerator. (Descriptive Treatment) .
(4hrs)

# Section – II

**5. Psychrometry**

Moist air as a working substance, Psychrometry properties of air, Use of psychometric tables & charts, Processes, Combinations & calculations, ADP, Coil condition line, Sensible heat factor, Bypass factor, Air washer &it's applications.(Numerical Treatment) (7 hrs)

**6. Heating & Cooling Load Calculation:**

Representation of actual air conditioning process by layouts & on Psychometric charts, Load analysis RSHF, GSHF, Enumeration & brief explanation of the factors forming the load on refrigeration & air conditioning system (Numerical Treatment) (6hrs)

**7. Comfort Conditions & Air Distribution System:**

Thermal exchange between human body & environment, Factors affecting comfort, effective temperature comfort chart, Ventilation requirements.

Duct classification, duct material, duct construction, duct design, Methods for duct design, determination of duct size, losses in duct (Theoretical Treatment)
(4hrs)

**8. Introduction to Cryogenics:**

Introduction, Limitation of VCRS For production of low temp., Cascade refrigeration, Linde system for liquefaction of air, production of low temperature by adiabatic demagnetization of paramagnetic salt. (Theoretical Treatment)
(3hrs)

## Term Work

**Group I (Study, Demonstration & minimum four assignment on following topics)**

01. Study of Refrigeration methods

02. Study of Refrigeration Equipments

03. Study of Refrigeration systems – domestic refrigerator, Split air conditioning, Ice plant, Deep freezer etc.

04. Study of food preservation, Methods of food freezing

05. Study of charging, leak testing of refrigeration systems

06. Study of non conventional refrigeration systems

**Group II (Minimum three experiments on following list)**

01. Trial on Refrigeration primer / bench
02. Trial on Air conditioning tutor

03. Trial on mini ice plant

04. Trial on Vapour Absorption system

05. Trial on Heat Pump

**Group III**

1. Visit to refrigeration plant or Central Air conditioning plan

2. Performance evaluation of any one trial of Group-II by using MATLAB/C Programming

## Text Books:

01. 'Refrigeration & Air Conditioning' by C.P. Arora

02. 'Refrigeration & Air Conditioning' by Arora & Domkundwar

03. 'Refrigeration and Air-conditioning' by Khurmi R.S.,Gupta

**Reference Books:**

01. 'Principle of Refrigeration' by Roy J Dossat

02. 'Air Conditioning Applications & design' by W.P. Jones

03. 'Refrigeration & Air Conditioning' by Stocker

# 4.2 Automobile Engineering

**Teaching Scheme**
**Lecturers:** 3 Hrs/ Week
**Practical's:** 2 Hrs/ Week

**Examination Scheme**
**Theory:** 100 Marks
**Term work:** 25 Marks
**Oral:** 25 Marks

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## Objectives

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 students aware about the entrepreneurial opportunities in automobile engineering field.

## Outcomes: Learner 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

## Section – I

**1. Introduction to Automobiles:** **04**

Broad classification of Automobiles. Major Components and their functions. Types of vehicle layouts, Front engine rear wheel drive, Front engine front wheel drive, Rear engine rear wheel drive, All wheel drive**,** specifications of vehicles. Types of bodies, Body construction and materials, and safety devices.

**2. Performance of Automobiles:** **05**

Resistance to vehicle motion, Air, Rolling and Gradient resistance, Acceleration, Grade ability and draw bar pull, Traction and Tractive effort, Distribution of weight, Power required for vehicle propulsion, Selection of gear ratio, Rear axle ratio. (Numerical)

**3. Transmission System:** **08**

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

**4. Automobile Electrical Systems:** **03**

Automotive batteries, automotive lighting system. Starting system, charging system, Electric horn, Electric fuel Gauge- thermostatic & balancing coil type, Wiper & side indicator circuit, electric Speedo meter.

## Section – II

**5. Steering System:** **06**

Function of steering, Steering system layout, Automotive steering mechanism- Ackerman and Davis, 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)

**6. Braking System:** **06**

Function of automotive brake system, Types of braking mechanism, internal expanding & Disc brake, Mechanical, Hydraulic & Air brake system, power brakes, Anti lock braking, Calculation of braking force required, stopping distance and dynamic weight transfer.(Numerical)

**7. Suspension Systems:** **05**

Suspension requirements, Sprung and Un sprung mass, Types of automotive suspension systems. Conventional and Independent, Shock absorber, Types of springs, Hotch- kiss and Torque tube drive, Reaction members-Radius rod, Stabilizer bar, Air suspension system.

**8. Modern Trends:** **03**

Engine electronic control modules, Introduction to Sensors and actuators used in automobile controls, Electronic Control Unit, traction control devices, fuel cells Hybrid vehicles-Electrical vehicle, solar vehicles.

## 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. Two-wheel & four wheel drive layouts.
2. Study and Demonstration of working of single plate automobile clutch.
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 front wheel steering geometry and steering mechanism.
7. Study and demonstration of suspension system of a 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. Experiment on wheel balancing & front 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.

## Books Recommended

**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.
9. Singh Kripal - Automobile Engineering –Standard publisher

# 6. Industrial Training

**Teaching Scheme :**

**Practical :** 1 Hour / week

**Examination Scheme:**

**Term work :** 50 Marks

**Oral Exam:** 25 Marks

**Course Objectives** :

1. To make the students aware of Industrial culture & Organizational setup.
2. To create awareness about technical report writing among the student.

**Procedure for Assessment of Industrial Training done by student**

- Every student should prepare a report of training done ( minimum 15 days ) in a prescribed format before end of Part I Semester.
- 
- 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.

- Guidelines for conducting vocational training practical's

# 7. Project Work - I

| Teaching Scheme | Examination Scheme |
|---|---|
| **Practical**: 4 Hrs/ Week | **Term work**: 50 Marks |

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**Course Objectives:**

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

| 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. Rough Sketches/ Design Calculations, etc.

**b. Synopsis:**
The group should submit the synopsis (of 4-5 pages) in following form.
2. Title of Project
3. Names of Students
4. Name of Guide
5. Proposed work (Must indicate the scope of the work & weekly plan up to March end)
6. 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.

**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.

# 4.3 Plastic Engineering

**Teaching Scheme :**
***Lectures :*** 3 Lectures / weeks
***Tutorial :*** 2 Hours / week

**Examination Scheme:**
***Theory Exam.:*** 100 Marks
***Term work :*** 25 Marks
***Oral Exam:*** 25 Marks

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**OBJECTIVES**

1. To understand the mechanism of polymerization, techniques of polymerization and the significance of different molecular weight averages.
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 properties and processing of plastics and use it for different applications.

**OUTCOMES**

At the end of the course, the student should 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.

## Section I

**Unit –I Introduction to Plastics** **4**

Definition and Classification of Plastic Materials, Properties of plastics, applications, Testing methods for plastics, additives in plastics, Monomers & Polymers, Polymerization - Types of Polymerization.

**Unit –II Processing of Plastics** **6**

Injection moulding, Extrusion moulding, sheet forming processes calendaring, Blow moulding, Processing of thermosetting plastics, compression moulding, Transfer moulding, rotational moulding.

**UNIT III Welding of Plastics** **4**

Hot gas welding, hot tool welding, High frequency induction welding, nuclear welding, Intra-red welding.

**UNIT IV Design of Plastic Parts** **6**

Tolerances of molded plastics parts, allowances in plastics, Design corners, undercuts, curing time, ribs, minimum wall thickness, design of inserts, cores mould materials,

## Section II

**UNIT V Design of compression and transfer molds** **6**

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.

**Unit VI Injection Mould Design** **6**

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.

**UNIT VII Cooling of plastic injection mould** **5**

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.

**UNIT VIII Introduction of advanced Plastics** **3**

Introduction to composite plastics, Introduction of polymer degradation and biodegradable plastics, advanced application like Agriculture, Packaging, Building, Transport, Electrical, Electronics, Medical and Furniture

**Term Work-**

1. Injection mould design for simple component 2 Turns
2. Design of Blow Mould 2 Turns
3. Design of Compression mould 2 Turns
4. Two Case studies for mould manufacturing 2 Turns
5. Visit to Plastic industry (Thermo sets & Thermo Plasts)

**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”
7. Fred W. Billmeyer, JR., “Text Book of Polymer Science”, John Wiley &Sons,Singapore,1994.

## 5. Project Work – II

**Teaching Scheme:**

**Practical's**: 8 Hrs/ Week

**Examination Scheme:**

**Term work:** 100 Marks

**Oral Exam:** 100 Marks

**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:


# SOLAPUR UNIVERSITY, SOLAPUR

## FACULTY OF ENGINEERING & TECHNOLOGY

### COMPUTER SCIENCE & ENGINEERING

**Structure & syllabus for**

**B.E. (Computer Science & Engineering)**

**w.e.f. Academic Year 2015-16**

# SOLAPUR UNIVERSITY, SOLAPUR

## Computer Science and Engineering

## Structure of B. E. (Computer Science & Engineering.) w.e.f. July 2015

### SEMESTER – I

| Sr. No | Name of the Subject | Teaching Scheme | | | Examination Scheme | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Paper | T/W | OE | POE | |
| 1 | Advanced Computer Architecture | 3 | - | - | 100 | 25 | - | - | 125 |
| 2 | Distributed Systems | 3 | - | 2 | 100 | 25 | - | - | 125 |
| 3 | Modern Database Systems | 4 | - | 4 | 100 | 25 | - | 50 | 175 |
| 4 | Elective – I | 3 | - | - | 100 | 25 | - | - | 125 |
| 5 | Elective – II | 3 | - | - | 100 | 25 | | | 125 |
| 6 | Vocational Training | - | - | - | - | 25 | - | - | 25 |
| 7 | Lab I - Project Phase I | - | - | 4 | - | 50 | - | 50 | 100 |
| 8 | Lab-II - Python | 2 | | 2 | | 50 | | - | 50 |
| | **Total** | **18** | **-** | **12** | **500** | **250** | **-** | **100** | **850** |

### SEMESTER -II

| Sr. No | Name of the Subject | Teaching Scheme | | | Examination Scheme | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Paper | T/W | OE | POE | |
| 1 | Management Information System | 3 | -- | | 100 | 25 | | | 125 |
| 2 | Information & Cyber Security | 3 | -- | 2 | 100 | 25 | | 25 | 150 |
| 3 | Elective -III | 3 | -- | | 100 | 25 | | | 125 |
| 4 | Elective – IV | 3 | -- | | 100 | 25 | | | 125 |
| 5 | Lab I - Web Technology | 2 | -- | 4 | | 25 | | 50 | 75 |
| 7 | Lab II - Project Phase II | | -- | 6 | | 100 | | 100 | 200 |
| 8 | Lab-III -Open Source Technology | 2 | -- | 2 | | 50 | | | 50 |
| | **Total** | **16** | **-** | **14** | **400** | **275** | | **175** | **850** |

| | |
|---|---|
| **Elective – I**<br>1. Human Computer Interaction<br>2. Digital Signal Processing<br>3. Software Testing & Quality Assurance<br>4. Business Intelligence | **Elective – II**<br>1. Object Oriented Modeling & Design<br>2. Wireless Ad hoc Networks<br>3. Intelligent Systems<br>4. Mobile Application Development |
| **Elective – III**<br>1. Data Warehousing & Mining<br>2. Image Processing<br>3. Information Retrieval<br>4. Cloud Computing | **Elective – IV**<br>1. Storage Area Network<br>2. Web 2.0 & Rich Internet Application<br>3. Artificial Neural Network<br>4. Big Data Analytics |

# SOLAPUR UNIVERSITY, SOLAPUR

## B.E. (COMPUTER SCIENCE & ENGINEERING)

## SEMESTER - II

## VOCATIONAL TRAINING

**Examination Scheme**
**Termwork:** 25 marks

---

The student should attend vocational training arranged at Industry or Institute and should complete a mini project on the technology on which training was given. A report regarding satisfactory completion of the training should be submitted to the college by competent authority from Industry / Institute. The evaluation of Term Work will be carried out by a panel of Examiners decided by the institute.

# SOLAPUR UNIVERSITY, SOLAPUR

## B. E. (COMPUTER SCIENCE & ENGINEERING)

## SEMESTER - I

## LAB I : PROJECT PHASE I

**Teaching Scheme**
**Practical :** 4 Hours /Week

**Examination Scheme**
**Termwork :** 50 Marks
**POE :** 50 Marks

---

**COURSE OBJECTIVES**:

1) Formulate a realistic problem statement using SDLC.
2) Follow an appropriate designing technique for further development of a project.
3) Get acquainted to work in a team.
4) Develop soft skills including presentation, writing & convincing.

---

**COURSE OUTCOMES**:

1) Define a realistic problem statement.
2) Select & apply an appropriate technique to create a design.
3) Work in teams with good coordination.
4) Present their work through oral communication & writing skills.

---

**Strategy:**

1) A project group shall be about 4 students.
2) Students have to study existing system, problems in existing system, proposed system, its definition, scope, design, introduction to programming tools, hardware and software platforms, planning, activity charts, planning for testing, test case design etc.
3) Project leader should maintain the progress register in which each member weekly contribution should be written and the guide will countersign the same.
4) A project design report will be submitted as a term work document at the end of semester.

# SOLAPUR UNIVERSITY, SOLAPUR

## B.E. (COMPUTER SCIENCE & ENGINEERING)

## SEMESTER - II

## LAB II – PROJECT PHASE II

**Teaching Scheme**
**Practical : 6** Hours/Week

**Examination Scheme**
**Termwork:** 100 marks
**POE :** 100 marks

---

**COURSE OBJECTIVES**:

1) Formulate a realistic problem statement using SDLC.
2) Follow an appropriate designing technique for further development of a project.
3) Get acquainted to work in a team.
4) Develop soft skills including presentation, writing & convincing.

---

**COURSE OUTCOMES**:

1) Define a realistic problem statement.
2) Select & apply an appropriate technique to create a design.
3) Work in teams with good coordination.
4) Present their work through oral communication & writing skills.

---

1) Project – II should contain the work like Design review, Implementation details, coding, Technologies used, Testing, Task distribution. Project leader should maintain the progress register in which each members weekly contribution should be written and the guide will countersign the same.
2) A project report will be submitted as a term work document at the end of semester. Report must include References, Appendix, User manual / Technical reference manual, CD containing Project documentation, implementation, code, required utilities, Software and Manuals.
3) Every student must prepare well formatted, printed and hard bound report.


# SOLAPUR UNIVERSITY, SOLAPUR

## FACULTY OF ENGINEERING & TECHNOLOGY

## COMPUTER SCIE[illegible]ND ENGINEERING

**Syllabus Structure and detailed syllabus of**

**T.E. (Computer Science & Engineering)**

**w.e.f. Academic Year 2014-15**

# SOLAPUR UNIVERSITY, SOLAPUR
## Computer Science and Engineering

### Structure of T. E. (Computer Science & Engineering) w.e.f. July 2014

### Semester – I

| Sr. No | Name of the Subject | Teaching Scheme | | | Examination Scheme | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Paper | T/W | OE | POE | |
| 1 | Operating System Concepts | 3 | 1 | 2 | 100 | 25 | - | 50 | 175 |
| 2 | System Programming | 3 | - | 2 | 100 | 25 | - | - | 125 |
| 3 | Computer Networks | 4 | - | 2 | 100 | 25 | - | 50 | 175 |
| 4 | Design and Analysis of Algorithm | 3 | 1 | - | 100 | 25 | - | - | 125 |
| 5 | Computer Organization | 3 | - | - | 100 | 25 | - | - | 125 |
| 6 | Lab – Java Programming | 2 | | 4 | - | 25 | - | 50 | 75 |
| 7 | Self Learning (HSS) | | | | 50 | | | | 50 |
| | **Total** | **18** | **2** | **10** | **550** | **150** | | **150** | **850** |

### Semester -II

| Sr. No | Name of the Subject | Teaching Scheme | | | Examination Scheme | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Paper | T/W | OE | POE | |
| 1 | Compiler Construction | 3 | - | 2 | 100 | 25 | - | - | 125 |
| 2 | Unix Operating System | 3 | - | 2 | 100 | 25 | | | 125 |
| 3 | Mobile Computing | 3 | 1 | - | 100 | 25 | - | - | 125 |
| 4 | Database Engineering | 4 | - | 2 | 100 | 25 | - | 50 | 175 |
| 5 | Software Engineering | 3 | 1 | - | 100 | 25 | - | - | 125 |
| 6 | Lab - Programming in C#.net | 2 | - | 2 | - | 25 | - | 50 | 75 |
| 7 | Mini project | - | - | 2 | - | 25 | 25 | - | 50 |
| 8 | Self Learning (HSS /Technical) | | | | 50 | | | | 50 |
| | **Total** | **18** | **2** | **10** | **550** | **175** | **25** | **100** | **850** |

| **Subjects for Self Learning for Humanities and Social Sciences (HSS)** | **Subjects for Self Learning for Technical Subjects** |
|---|---|
| 1. Economics<br>2. Psychology<br>3. Philosophy<br>4. Sociology<br>5. Humanities | 1. Computer Modeling and Simulation<br>2. Software licenses and practices<br>3. Network set up & management tools |

**Note:**

1. The term-work will be assessed based on continuous internal evaluation including class tests, assignments, performance in laboratories, Interaction in class, quizzes and group discussions as applicable.
2. The batch size for practical/tutorials be of 15 students. On forming the batches, if the strength of remaining students exceeds 7 students, then a new batch may be formed.
3. Mini Project shall consist of developing small software based on tools & technologies learnt in SE and TE.
4. Project group for T.E.(CSE) Part II Mini Project shall be of 4 / 5 students
5. 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
6. Student shall select one Self Learning Module from HSS at T.E. Part I and oneself learning module either from HSS or from technical at T.E. Part II
7. Curriculum for Humanities and Social Sciences Self Learning Modules is common for all under graduate programmes under faculty of Engineering and Technology.

# SOLAPUR UNIVERSITY, SOLAPUR

**T.E. (Computer Science and Engineering)**

**Semester - II**

## 7. Mini Project

**Teaching Scheme**
**Practical –** 2 Hrs/week

**Examination Scheme**
**Termwork:** 25 Marks
**Oral Exam:** 25 Marks

---

**COURSE OBJECTIVES:**

1. To undertake investigation of complex problems.
2. To motivate students to undertake design of a product, which is sustainable and meaningful to society
3. To enable students to acquire and develop professional skills.
4. To make students learn to work in team.
5. To encourage independent critical thinking, creativity and discipline.
6. To use modern tools and simulation packages
7. To prepare students to implement their acquired engineering knowledge for society.

---

**COURSE OUTCOMES:**

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

1. Identify and define the problem.
2. Develop a sustainable product or offer a effective solution to industrial problem.
3. Present proposal within budgetary and time constraints with effective communication and writing skills.
4. Develop leadership qualities.
5. Criticize and refine own solution or product.
6. Apply modern tools and simulation packages to develop product.
7. Develop a strong sense of social responsibility and accountability.

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**Note:**

1. There should be a group of preferably 4 students.
2. Students should be given projects in hardware, software, embedded or any contemporary topic in CSE and/or IT
3. One guide should be allocated per batch.

---

**Mini Project ideas (but not limited to):**

1. Online Examination module (Multiple choice questions)
2. Attendance recording and analysis software module
3. Examination Result analysis software module
4. Hardware exhibitors such as display board exhibiting all types of mouse / keyboards, HDDs, Monitors etc.), Internal architecture and working
5. Departments / College website
6. Library Management System
7. Hotel Management System
8. Time table generation
9. CD Library management system
10. Admission procedure automation

11. Online passport registration automation
12. Student Feedback system automation
13. Ice Cream parlor management system
14. Pizza hut – account management system
15. Multi player strategy game – Project ideas on Visual Basic, Java, Database
16. A speech response application using some hardware interface using the Microsoft SAPI SDK
17. LAN administrator tool (socket programming comes easy in VB) which will monitor application on a LAN and provide functions.
18. Voice mail systems
19. Computer telephony integration
20. Student Informat
21. Traffic Control s
22. Airline reservatic
23. Simulation for B
24. Mini Calculator i
25. Moving ball gam
26. Tic-tac-toe game
27. Design a persona

# SOLAPUR UNIVERSITY, SOLAPUR

## FACULTY OF ENGINEERING & TECHNOLOGY

## ELECTRONICS & TELECOMMUNICATION ENGINEERING

**Syllabus for**

## B.E. (E & TC Engineering) w.e.f. Academic Year 2015-16

# SOLAPUR UNIVERSITY, SOLAPUR

**FACULTY OF ENGINEERING & TECHNOLOGY**

**STRUCTURE OF B.E (Electronics & Telecommunication Engineering)**

**W.E.F 2015-16**

## B. E. (Electronics & Telecommunication Engineering) Semester- I

| Sr. No. | Subject | Teaching Scheme | | | | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | L | Tut | P | Total | Th. | TW | POE | OE | Total |
| 1 | Computer Communication Network | 4 | -- | 2 | 6 | 100 | 25 | 50 | -- | 175 |
| 2 | VLSI Design | 4 | -- | 2 | 6 | 100 | 25 | 50 | -- | 175 |
| 3 | Satellite Communication | 3 | 1 | -- | 4 | 100 | 25 | -- | -- | 125 |
| 4 | Coding Theory | 3 | 1 | -- | 4 | 100 | 25 | -- | -- | 125 |
| 5 | Elective – I | 4 | -- | 2 | 6 | 100 | 25 | -- | -- | 125 |
| 6 | Seminar & Project | -- | -- | 4 | 4 | -- | 25 | -- | 50 | 75 |
| 7 | Vocational Training | -- | -- | -- | -- | -- | 25 | -- | -- | 25 |
| | **Total** | **18** | **2** | **10** | **30** | **500** | **175** | **100** | **50** | **825** |

**Elective – I Advanced Telecommunication Network**
**Image Processing**
**Advance DSP.**

## B. E. (Electronics & Telecommunication Engineering) Semester- II

| Sr. No. | Subject | Teaching Scheme | | | | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | L | Tut | P | Total | Th. | TW | POE | OE | Total |
| 1 | Broadband Communication | 3 | 1 | -- | 4 | 100 | 25 | -- | 25 | 150 |
| 2 | Multimedia Communication Techniques | 4 | -- | 2 | 6 | 100 | 25 | -- | 50 | 175 |
| 3 | Embedded Systems | 4 | -- | 2 | 6 | 100 | 25 | -- | 50 | 175 |
| 4 | Elective – II | 4 | -- | 2 | 6 | 100 | 25 | -- | -- | 125 |
| 5 | Project | -- | -- | 8 | 8 | -- | 100 | 100 | -- | 200 |
| | **Total** | **15** | **1** | **14** | **30** | **400** | **200** | **100** | **125** | **825** |

**Elective – II Wireless Sensor Network**
**Pattern Recognition**
**DSP Processors & Application**

**Note**:

- Minimum strength of the students for Elective be 15.
- 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.

# SOLAPUR UNIVERSITY, SOLAPUR

## FACULTY OF ENGINEERING & TECHNOLOGY

## Electronics & Telecommunication Engineering

**PROGRAM EDUCATIONAL OBJECTIVES AND PROGRAM OUTCOMES FOR**

**Electronics & Telecommunication Engineering Program**

**STRUCTURE OF T.E (Electronics & Telecommunication Engineering) W.E.F 2016-17**

# SOLAPUR UNIVERSITY, SOLAPUR

**FACULTY OF ENGINEERING & TECHNOLOGY**

**STRUCTURE OF T.E (Electronics & Telecommunication Engineering) W.E.F 2016-17**

## T. E. (Electronics & Telecommunication Engineering) Semester- I

Credit system structure of T.E. (Electronics & Telecommunication) Engineering W.E.F. 2016-17 Semester -I

| Theory<br>Course Name | Hrs. /Week | | | Credits | Examination Scheme | | | |
|---|---|---|---|---|---|---|---|---|
| | L | T | P | | ISE | ESE | ICA | Total |
| Electro Magnetic Engg. & Radiating System | 3 | -- | -- | 4 | 30 | 70 | 25 | 125 |
| Principles of Digital Communication | 4 | -- | -- | 4 | 30 | 70 | -- | 100 |
| Software Engineering & Project Management System | 3 | 1 | -- | 3 | 30 | 70 | 25 | 125 |
| Digital Signal Processing | 4 | -- | -- | 4 | 30 | 70 | -- | 100 |
| Microprocessors | 4 | -- | -- | 4 | 30 | 70 | -- | 100 |
| Self-Learning (HSS)* | | -- | -- | -- | -- | 50 | -- | 50 |
| **Sub Total** | **18** | **1** | **--** | **19** | **150** | **400** | **50** | **600** |
| **Laboratory** | | | | | | | | |
| | | | | | | **ESE** | | |
| | | | | | | **POE** | **OE** | |
| Electro Magnetic Engg. & Radiating System | -- | -- | 2 | 1 | -- | | -- | -- | -- |
| Principles of Digital Communication | -- | -- | 2 | 1 | -- | 50 | -- | 25 | 75 |
| Digital Signal Processing | -- | -- | 2 | 1 | -- | 25 | -- | 25 | 50 |
| Microprocessors | -- | -- | 2 | 1 | -- | 50 | -- | 25 | 75 |
| Electronic Software Lab-II | -- | 1 | 2 | 2 | -- | -- | -- | 25 | 25 |
| **Sub Total** | -- | **1** | -- | **6** | -- | **125** | | **100** | **225** |
| **Grand Total** | **18** | **2** | **10** | **25** | **150** | **525** | | **150** | **825** |
| | | | | | | | | | |

*** Self Learning (HSS)**

**Humanity and Social Science (HSS) of Semester – I will be common for Engineering and Technology.**

# SOLAPUR UNIVERSITY, SOLAPUR

**FACULTY OF ENGINEERING & TECHNOLOGY**

**STRUCTURE OF T.E (Electronics & Telecommunication Engineering) W.E.F 2016-17**

## T. E. (Electronics & Telecommunication Engineering) Semester- II

Credit system structure of T.E. (Electronics & Telecommunication) Engineering W.E.F. 2016-17
Semester -II

| Theory Course Name | Hrs. /Week | | | Credits | Examination Scheme | | | |
|---|---|---|---|---|---|---|---|---|
| | L | T | P | | ISE | ESE | ICA | Total |
| Radar & Microwave Engineering | 4 | -- | -- | 4 | 30 | 70 | 25 | 125 |
| Microcontroller & Applications | 4 | -- | -- | 4 | 30 | 70 | -- | 100 |
| Electronics Applications & System Design | 4 | -- | -- | 3 | 30 | 70 | -- | 100 |
| Optical Communication | 4 | -- | -- | 4 | 30 | 70 | -- | 100 |
| Mobile Communication | 3 | 1 | -- | 4 | 30 | 70 | -- | 100 |
| Self Learning* | -- | -- | -- | -- | -- | 50 | -- | 50 |
| **Sub Total** | **19** | **1** | **--** | **19** | **150** | **400** | **25** | **575** |
| **Laboratory** | | | | | | | | |
| | | | | | | **ESE** | | |
| | | | | | | **POE** | **OE** | |
| Radar & Microwave Engineering | -- | -- | 2 | 1 | -- | | -- | -- | -- |
| Microcontroller & Applications | -- | -- | 2 | 1 | -- | 50 | -- | 25 | 75 |
| Electronics Applications & System Design | -- | -- | 2 | 1 | -- | -- | #50 | 25 | 75 |
| Optical Communication | -- | -- | 2 | 1 | -- | -- | 25 | 25 | 50 |
| Mobile Communication | -- | -- | -- | 1 | -- | -- | -- | 25 | 25 |
| Mini Project(Hard Ware) | -- | -- | 2 | 1 | -- | -- | | 25 | 25 |
| **Sub Total** | -- | -- | **10** | **6** | -- | **125** | | **125** | **250** |
| **Grand Total** | **19** | **1** | **10** | **25** | **150** | **525** | | **150** | **825** |

# Solapur University, Solapur

**T.E. (Electronics and Telecommunication Engineering)**
**Semester-II**
**6. MINI PROJECT (HARDWARE)**

**Teaching Scheme:**
**Practical :** 2 Hr/Week

**Examination Scheme:**
**Term-Work: 25** Marks

**Course Objectives**

1) To understand PCB designing processes and techniques.
2) To make students familiar with PCB artwork and fabrication.
3) To design, implement, analyze, and test Hardware/Software mini project.

**Course Outcome**

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

1) Understand and design PCB technique.
2) Understand and design PCB artwork and fabrication techniques.
3) Design, implement, analyze, and test Hardware mini project.

---

**1. Maximum Group Size:** Minimum 2 and maximum 3 students can form a group for the mini project.

**2. Project Type:** The selected mini project must be based on development of a prototype electronic system/product mandatorily having a hardware component with supporting software.

**3. Execution steps for Mini Projects:**

(i) Complete Paper work Design using datasheets specifying: Selection criteria of the components to be used. Specifications of system i/p and desired o/p. Module based hardware design. Test points at various stages in various modules

(ii) The circuit should be simulated using any of the standard simulation software available (either complete circuit to be simulated, if possible or an appropriate part of the circuit can be simulated.)

(iii) Algorithm and the flow chart of the software part must be defined.

(iv) Result verification for hardware and testing the algorithms.

(v) Comparison with the paper design to identify the discrepancies, if any. Justification of the same must be given.

(vi) Verified circuit should be assembled and tested on breadboard or general purpose board.

(vii) Simulation results and/or the snapshots indicating the current and voltage readings or detailing

the test point results at various stages must be preserved and included in the project report.

(viii) Art work / layout of the circuit using standard layout tools.

(ix) Assembling and testing of circuit on final PCB.

(x) Design and fabrication of suitable enclosure and outside fittings such as switches, Buttons, knobs, meters, indicators, displays etc.

(xi) Final testing of the circuit using the earlier defined test points.

(xii) Preparing Bill of components and materials.

(xiii) Drawing entire circuit diagram (Component level), outlining various blocks indicating test points, inputs and outputs at various stages on A3 graph sheet

**4. Guidelines for the Seminar:**

Seminar is based on the Mini Project topic.

The seminar shall consist of the Literature Survey, Market survey, Basic project work and Applications of Mini project.

Seminar Assessment shall be based on Innovative Idea, Presentation skill, depth of understanding, Applications, Future Scope and Individual Contribution.

Maximum three students can deliver a seminar on one topic.(Three students per group) Each group shall be given time of 20 mins for presentation and 5 mins for question answer session.

A certified copy of seminar/ project report shall be required to be presented to external examiner at the time of final examination.

S.E
New [CGPA]

# SOLAPUR UNIVERSITY, SOLAPUR

## Faculty of Engineering & Technology (Revised from 2013-2014)

## Credit System structure of S. E. Civil- I, W. E. F. 2015-2016; Semester- I

| Theory Course Name | Hrs./week | | | | Credits | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L | T | P | D | | ISE | ESE | | ICA | Total |
| Concrete Technology | 2 | - | - | - | 2 | 30 | 70 | | - | 100 |
| Structural Mechanics-I | 3 | - | - | - | 3 | 30 | 70 | | - | 100 |
| Surveying –I | 3 | - | - | - | 3 | 30 | 70 | | - | 100 |
| Building Construction & Drawing | 3 | - | - | - | 3 | 30 | 70 | | - | 100 |
| Fluid Mechanics-I | 3 | - | - | - | 3 | 30 | 70 | | - | 100 |
| Engg. Geology | 3 | - | - | - | 3 | 30 | 70 | | - | 100 |
| **Total** | 17 | | – | | 17 | 180 | 420 | | - | 600 |
| **Laboratory/Drawings** | | | | | | | POE | OE | | |
| Concrete Technology | - | - | 2 | - | 1 | - | - | - | 25 | 25 |
| Structural Mechanics-I | - | - | 2 | - | 1 | - | - | - | 25 | 25 |
| Surveying –I | - | - | 2 | - | 1 | - | 25 | - | 25 | 50 |
| Building Construction& Drawing | - | - | - | 2 | 1 | - | - | - | 25 | 25 |
| Fluid Mechanics-I | - | - | 2 | - | 1 | - | 25 | - | 25 | 50 |
| Engg. Geology | - | - | 2 | - | 1 | - | 25 | - | 25 | 50 |
| Lab. Practice | - | - | 2* | - | 0.5 | - | - | - | 25 | 25 |
| **Total** | - | - | 11 | 2 | 6.5 | – | 75 | | 175 | 250 |
| **Grand Total** | 17 | - | 11 | 2 | 23.5 | 180 | 495 | | 175 | 850 |
| Environmental Science | 1 | – | – | | – | – | – | | – | – |

**Abbreviations:** L- Lectures, P –Practical, T- Tutorial, D- Drawing. *- Alternate week, 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.

# Solapur University, Solapur

**S.E. (Civil Engineering) Semester-III**

**ENGINEERING GEOLOGY**

| **Teaching Scheme** | **Examination Scheme** |
|---|---|
| **Theory –** 3 Hrs/Week | **Theory –** 100 Marks |
| **Practical –** 2 Hr/Week | **Term Work –** 25 Marks |
| | **Pract-Oral**: 25 Marks |

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**Course Objectives**

1) The students will be introduced to the scope and relation of geology with civil engineering.
2) The students will learn physical geology, mineralogy, petrology, structural geology, and hydrology.
3) The students will be able to identify types of stones and minerals.
4) The students will be introduced to Geological aspects of earthquakes, landslides.
5) They will learn site investigation for dams, reservoir, bridges and various other civil engineering structures.

**Course Outcomes:**

At the end of this course:

1) Students will be able to identify different type of rocks and minerals.
2) Students will be able to draw geological maps.
3) This course will help them for preliminary geological investigation of site related to civil engineering projects.

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## SECTION – I

**Unit 1.** **(04 Hrs.)**

(a) General Geology: Introduction, Definition, Scope and Subdivision of the Geology subject, interrelation between Geology and civil Engineering.
(b) Physical Geology: Major relief features of earth, External and Internal forces modifying the surface of earth, Interior of earth.

## PRACTICAL WORK

1) Mineralogy: Physical properties of Minerals. Study of Physical properties.
2) Identification of the following Minerals: Crystalline, Cryptocrystalline and amorphous Varieties of Silica, Orthoclase, Plagioclase, Zeolite, Muscovite, Biotite, Augite, Hornblende, Olivine, Talc, Serpentine, Chlorite, Kyanite, Asbestos, Beryl, Tourmaline, Garnet, Calcite, Gypsum, Fluorite, Corundum etc. Important ores such as Hematite, Magnetite, Limonite, Pyrite, Psilomelane, Chromites, Chalcopyrite, Galena, Malachite, Graphite
3) Petrology: Study and Identification of the following Rock types
4) Igneous Rocks: Granite, Pink Granite, Porphyritic Granite, Syenite, Diorite, Gabbro, Rhyolite, Pumice, Trachyte, Andesite,Varieties of Basalt, Obsidian, volcanic breccia, tachylite, Pegmatite, Graphic Granite, Dolerite.
5) Secondary Rocks: Laterite, Bauxite, Conglomerate, Breccia, Sandstone, ferruginous Sandstone, Grit, Arkose Shales, Mudstone, chemical and organic Limestone, coal.
6) Metamorphic Rocks: Slate, Phyllite, marble, serpentine, marble, Mica Schist, Biotite schist, muscovite Schist, Chlorite Schist, Talc Schist, Talc Chlorite Schist, Kyanite Schist, Granite Gneiss, banded granite Gneiss, Augen Gneiss.
7) Study of different types of geological maps, Section and their engineering significance. (at least 10)
8) Study of structural Geological models. (at least 5)
9) Study tour to the place worth visiting from Engineering Geological point of view.
10) Study of core samples, Core Logging.
11) Identification of Subsurface rock with the help of Resistivity Instrument.

## TERM WORK

A journal containing complete record of above practical work shall be examined as a term work. Practical Examination shall be based on practical course.

## TEXT BOOKS


1. Principles of Petrology – By G.W. Tyrrell
2. Principles of physical Geology-By A. Holmes- ELBS, London
3. Textbook of Geology by P. K. Mukherjee
4. A text book of Engineering Geology –By R. V. Gupte- Pune Vidyarthi Griha Prakashan Pune.
5. Engineering Geology for civil Engineering – By Dr. D.V.Reddy.
6. Engineering Geology –by B. S. Sathynarayan Swami.
7. Rutley's Elements of Mineralogy- By H.H. Read –CBS Pub. Delhi.

## SOLAPUR UNIVERSITY, SOLAPUR

### Faculty of Engineering & Technology (Revised from 2013-2014)

### Credit System structure of T. E. Civil-II, W. E.F. 2016-2017; Semester - VI

| Theory Course Name | Hrs./week | | | | Credits | Examination Scheme | | | |
|---|---|---|---|---|---|---|---|---|---|
| | L | T | P | D | | ISE | ESE | ICA | Total |
| Structural Mechanics-III | 4 | - | - | - | 4 | 30 | 70 | - | 100 |
| Geotechnical Engg.II | 4 | - | - | - | 4 | 30 | 70 | - | 100 |
| Environmental Engg.II | 3 | - | - | - | 3 | 30 | 70 | - | 100 |
| Engineering Management- II | 4 | - | - | - | 4 | 30 | 70 | - | 100 |
| Transportation Engg.-II | 3 | - | - | - | 3 | 30 | 70 | 25 | 125 |
| Self Learning (Technical course) | - | - | - | - | 2 | - | 50 | - | 50 |
| **Total** | 18 | - | - | - | 20 | 150 | 400 | 25 | 575 |
| **Laboratory/Drawings:** | | | | | | - | POE / OE | | |
| Structural Mechanics-III | - | - | 2 | - | 1 | - | - / - | 25 | 25 |
| Geotechnical Engg.II | - | - | 2 | - | 1 | - | - / - | 25 | 25 |
| Environmental Engg.II | - | - | 2 | - | 1 | - | - / 25 | 25 | 50 |
| Engineering Management- II | - | - | 2 | - | 1 | - | - / 25 | 25 | 50 |
| Steel Structural Design & Drawing | - | - | | 4 | 2 | - | - / 25 | 50 | 75 |
| Mini project (Any subject in Civil Engg.) | - | - | - | - | 1 | - | - / - | 25 | 25 |
| Assessment of field training report | - | - | - | - | - | | | 25 | 25 |
| **Total** | - | - | 8 | 4 | 7 | | 75 | 200 | 275 |
| **Grand Total** | 20 | - | 8 | 2 | 27 | 150 | 475 | 225 | 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) Students shall undergo a field training of 15 days in the winter vacation after T.E. Part I and submit the field training report, which shall be assessed by faculty associated with Engineering Management- II in T.E. Part II.

(2) Students shall undergo a field training of 15 days in the summer vacation after T.E. Part II. The training report shall be assessed in B.E. Part -I by the concerned project guides.

(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, syllabus, report presentation etc., as applicable.

(4) Syllabus of Self learning (H.S.S.) is common for all Under Graduate Programs under Faculty of Engineering and Technology.

(5) 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.

# T.E. (CIVIL ENGINEERING) PART- I
# ENVIRONMENTAL ENGINEERING –I

**Teaching Scheme**

Lectures: 3 hours per week
Practical: 2 hours per week

**Examination Scheme**

Theory papers: 100 Marks
Term Work: 25 Marks

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**Course Objectives**

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

**Course Outcomes**

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

1. Plan and design water supply 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. Design and supervise building plumbing systems and their maintenance.

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 and distribution system.

(C)Visit to water treatment plant

Term work submission shall consist of journals containing

1. Above mentioned Experiments
2. Visit report describing the water treatment units of the plants visited.
3. Design problems mentioned in B

## 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

# T.E. (CIVIL ENGINEERING) PART II
# ENVIRONMENTAL ENGINEERING –II

**Teaching Scheme**

Lectures: 3 Hours per week
Practical: 2 Hours per week

**Examination Scheme**

Theory papers: 100 Marks
Term Work: 25 Marks
Oral Examination: 25 Marks

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**Course Objectives**

1. To acquaint the students with the characterization of municipal waste, as well as sewage collection & conveyance systems.
2. Study of Primary and Secondary treatment methods of sewage, and concept of recycling the wastewater.
3. Familiarize the students with stream pollution due to waste disposal and suitable centralized/decentralized wastewater Treatment system
4. Learning solid waste and hazardous waste management systems for urban areas.
5. Understanding various sources of air pollution, its measurement and control.

**Course Outcomes**

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

1. Plan the layout of sewage collection system, matching the topography of the region and characterisation of sewage.
2. Decide sequence and design of wastewater treatment units to meet the sewage treatment standards.
3. Design the wastewater treatment plant using Trickling filter, anaerobic treatment and low cost treatment methods
4. Adopt appropriate methods of Solid waste Disposal and Management of hazardous waste.
5. Measure air pollution and adopt control measures to control of industrial air pollution.

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

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

(C) Visit to sewage treatment plant

Term work submission shall consist of the following –

1. Journal containing experiments carried out in part A of the term work and visit Report on C
2. Detail design and appropriate drawings required for part B of the term work.

## 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 - Mertcalf & Eddy, [Tata McGraw Hill, 1982]
4. Sewage Disposal and Air Pollution Engineering - Garg S.K., [Khanna Publishers]
5. Sewage Disposal and Air Pollution Engineering - Garg S.K., [Khanna Publishers]
6. Waste water Supply Engineering by B. C. Punmia
7. Solid Waste Management in Developing countries - Bhide A.D. and Sundersen B.B. [Indian National Scientific Documentation Centre, New Delhi]
8. Air Pollution- Rao M.N. and Rao H.V.N. [Tata Mcgraw Hill, 1990]

**Solapur University, Solapur**
**Structure of B .E. (Civil Engineering)**
**w. e. f. Academic Year 2015-16.**

**B.E. (Civil Engineering) Semester –VII**

| Sr. No. | Subject | Teaching/Week | | | | | Examination scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | Pr. | Tu. | Dr. | Total | Theory | TW | POE | OE | Total |
| 1 | Design of Concrete Structures-I | 3 | - | 1 | - | 4 | 100 | 25 | - | - | 125 |
| 2 | Quantity Surveying & Valuation | 3 | 4 | - | - | 7 | 100 | 50 | 50 | - | 200 |
| 3 | Earthquake Engg. | 3 | 2 | - | - | 5 | 100 | 25 | - | - | 125 |
| 4 | Water Resources Engg. II | 3 | 2 | - | - | 5 | 100 | 25 | - | 25 | 150 |
| 5 | Elective - I | 3 | 2 | - | - | 5 | 100 | 25 | - | 25 | 150 |
| 6 | Seminar | - | 2 | - | - | 2 | - | 50 | - | - | 50 |
| 7 | a) Project work<br>b) Assessment of report on field training-II | - | 2 | - | - | 2 | - | 25<br>25 | - | - | 25<br>25 |
| | **Total** | 15 | 14 | 1 | - | 30 | 500 | 250 | 50 | 50 | 850 |

**B.E. (Civil Engineering) Semester –VIII**

| Sr. No. | Subject | Teaching/Week | | | | | Examination scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L | Pr. | Tu. | Dr. | Total | Theory | TW | POE | OE | Total |
| 1 | Design of Concrete Structures-II | 4 | 2 | - | - | 6 | 100 | 25 | - | - | 125 |
| 2 | Construction Practices and Town Planning | 4 | - | - | - | 4 | 100 | 25 | - | - | 125 |
| 3 | Elective - II | 3 | 2 | - | - | 5 | 100 | 25 | - | 25 | 150 |
| 4 | Elective - III | 3 | 2 | - | - | 5 | 100 | 50 | - | | 150 |
| 5 | R. C. C. Structural Design & Drawing-II | - | - | - | 4 | 4 | - | 50 | - | 50 | 100 |
| 6 | Project work | - | 6 | - | - | 6 | - | 100 | - | 100 | 200 |
| | **Total** | 14 | 12 | - | 4 | 30 | 400 | 275 | - | 175 | 850 |

Notes:

(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

**B.E. Civil – Part I**

## 4. WATER RESOURCES ENGINEERING – II

| **Teaching Scheme:** | **Examination Scheme** |
|---|---|
| Lecture : 3 Hrs / Week | Theory Paper: 100 marks |
| Practical: 2 Hrs / Week | Term Work: 25 marks |
| | Oral Exam: 25 Marks |

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**Course Objectives:**

1) To study the different aspects of design of hydraulic structures
2) To design different types of dams
3) To provide knowledge on various hydraulic structures such as energy dissipaters, head and, Cross regulators canal falls and structures involved in cross drainage works
4) To understand the analysis of seepage and hydraulic jump

**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) Demonstrate the design principles of Arch dams.
4) Solve seepage problems for Weirs on Permeable Foundations
5) Demonstrate the knowledge of water power engineering and river training.

### 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 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.

**TERM WORK**

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.
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

**ORAL EXAMINATION**

Oral Examination will be based on the TERM WORK.

**B.E. (Civil) Part-I**

**7. a) PROJECT WORK**

**Teaching Scheme:**
Practical: 2 hours / week

**Examination Scheme:**
Term Work: 25 marks

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**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.

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.

**B.E. (Civil) Part-I**

**7. b) ASSESSMENT ON REPORT OF FIELD TRAINING**

**Examination Scheme:**

**Term Work – 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.

**B.E. (Civil) Part-II**

## 6. PROJECT WORK

**Teaching Scheme:**

Practical - 6 hrs/week/batch

**Examination Scheme:**

Term Work – 100 Marks

Oral Exam. – 100 Marks

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Project work at B.E. (Civil) Part-II is continuation of Project Work of B.E. (Civil) Part-I on any topic from Civil Engineering area or interdisciplinary area related to Civil Engineering. The project work should be completed at B.E. (Civil) Part-II level.

# Solapur University, Solapur


**Faculty of Commerce**

**Master of Business Administration (MBA)**

**Choice Based Credit System (CBCS)**

(June, 2016)

# Solapur University, Solapur

# MBA Part II Syllabus (CBCS) w.e.f. 2016-17

| SEMESTER – III | | | | | | SEMESTER – IV | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Paper No. | Subject | Weekly Theory | Internal Marks | Uni Exam Marks | Total Marks | Paper No. | Subject | Weekly Theory | Internal Marks | Uni Exam Marks | Total Marks |
| 17 | Corporate Planning & Strategic Mgt | 4 | 30 | 70 | 100 | 25 | Entrepreneurial Development & Project Mgt. | 4 | 30 | 70 | 100 |
| 18 | Management Accounting | 4 | 30 | 70 | 100 | 26 | Excellence in Management | 4 | 30 | 70 | 100 |
| 19 | Business Ethics | 4 | 30 | 70 | 100 | 27 | Elective-I<br>Paper-III | 4 | 30 | 70 | 100 |
| 20 | Elective-I<br>Paper-I | 4 | 30 | 70 | 100 | 28 | Elective-I<br>Paper-IV | 4 | 30 | 70 | 100 |
| 21 | Elective-I<br>Paper-II | 4 | 30 | 70 | 100 | 29 | Elective-I<br>Paper-V | 4 | 30 | 70 | 100 |
| 22 | Elective-II<br>Paper-I | 4 | 30 | 70 | 100 | 30 | Elective-II<br>Paper-III | 4 | 30 | 70 | 100 |
| 23 | Elective-II<br>Paper-II | 4 | 30 | 70 | 100 | 31 | Elective-II<br>Paper-IV | 4 | 30 | 70 | 100 |
| 24 | Project Report & Viva | - | 50 | 50 | 100 | 32 | Elective-II<br>Paper-V | 4 | 30 | 70 | 100 |

**SOLAPUR UNIVERSITY, SOLAPUR**
**FACULTY OF ENGINEERING & TECHNOLOGY**
**Structure of M.E.-Mechanical (Design Engineering) Part-II W.E.F 2016-17**

## SEM- III

| Sr No. | Course | Teaching Scheme | | | Examination Scheme | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|
| | | L | P | Credits | AM | Theory | ICA | Oral (ESE) | |
| 1. | Mini Project | -- | -- | 2 | ISE | -- | 50 | 25 | 75 |
| 2 | Lab Practice | -- | 2 | 2 | ISE | -- | 50 | -- | 50 |
| 3 | Dissertation Phase I Synopsis Submission Seminar | -- | 4 | 3 | ISE | -- | 75 | -- | 75 |
| | Dissertation Phase II Term work | -- | -- | 6 | ISE | -- | 200 | | 200 |
| | Dissertation Phase II Progress Seminar presentation | -- | -- | 3 | ESE | -- | 100 | | 100 |
| Total | | -- | 6 | 16 | | -- | -- | -- | 500 |

## SEM- IV

| Sr No. | Course | Teaching Scheme | | | Examination Scheme | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|
| | | L | P | Credits | AM | Theory | ICA | Oral | |
| 1 | Dissertation Phase III Progress Seminar Presentation & Report | -- | 4 | 4 | ISE | -- | 100 | -- | 100 |
| 2 | Dissertation Phase IV Term work | -- | 2 | 6 | ISE | -- | 200 | -- | 200 |
| 3 | Final Presentation & Viva-voce | -- | -- | 6 | ESE | -- | -- | 200 | 200 |
| Total | | -- | 6 | 16 | | -- | 300 | 200 | 500 |

**Mini Project is to be completed in the vacation after Sem-II Examination.**

- **Lab Practice**: Students are expected to learn the contemporary tools/softwares used in industries. It is desirable to use such software for their dissertation purpose. They should learn these with self learning approach. They are supposed to complete 5 assignments based on these tools/ software learnt and report progress to concerned guide weekly.

- **Dissertation Phase I Synopsis submission Seminar (ISE):** This presentation is to be evaluated by the panel of three PG teachers headed by guide at college level.

**SOLAPUR UNIVERSITY, SOLAPUR**
**ME PART-II, SEM-III**
# M.E.-Mechanical (Design Engineering) Syllabus W.E.F 2016-17

## Course: MINI PROJECT

Teaching Scheme: Not Applicable

Practical: Not Applicable

Examination Scheme:

ICA: 50 marks

ESE- Oral : 25 Marks

A Mini Project based on the subjects studied during **Semester-I** and **Semester-II**, shall be undertaken and completed by the candidate during vacation after **Semester-II examination**. The report of this project shall be submitted at the beginning of Semester-III. It will be approved by the guide and endorsed by the Head of Department. It will be assessed as ISE in Semester-III, by the evaluation committee appointed by the Head of the Department.

**SOLAPUR UNIVERSITY, SOLAPUR**
**ME PART-II, SEM-III**

# M.E.-Mechanical (Design Engineering) Syllabus W.E.F 2016-17

## Course: Dissertation Phase I- Synopsis Submission Seminar

Teaching Scheme-Not Applicable

Practical: 4 hours a week

Examination Scheme

ISE: 25 Marks

ICA : 75 Marks

The synopsis shall include the problem definition, literature survey, and approaches for handling the problem, finalizing the methodology for the dissertation work and design calculations / experimental design etc., resources used, references for the literature survey, Cost estimation and sponsorship letter if any.

Students have to present the seminar based on this synopsis in front of a redressal committee of 3 persons.

The Principal shall appoint this redressal committee comprising of the Guide and two experts to review and approve the synopses before submitting them to the University for approval. This committee shall evaluate work (ISE) and submit the one page report of the suggestions/modifications in the synopsis. The candidates shall submit the synopsis to the University authorities for approval in before the due date.

The reports to be submitted to the university shall be in 8 copies. (1 Copy: Candidate, 1 Copy: Guide, 6 Copies: University)

**SOLAPUR UNIVERSITY, SOLAPUR**
**ME PART-II, SEM-III**

## M.E.-Mechanical (Design Engineering) Syllabus W.E.F 2016-17

## Course: Dissertation Phase II-Term Work

Teaching Scheme-Not Applicable

Practical: Not Applicable

Examination Scheme

ICA: 200 Marks

The term work under this submitted by the student shall include.

1) Work diary maintained by the student and countersigned by his guide.

2) The content of work diary shall reflect the efforts taken by candidates for

(a) Searching the suitable project work.
(b) Visits to different factories or organizations.
(c) Brief report on web sites, journals and various papers referred for project work.
(d) The brief report of feasibility studies carried to come to final conclusion.
(e) Rough sketches.
(f) Design calculations etc. carried by the student.

**ME PART-II, SEM-III**

## M.E.-Mechanical (Design Engineering) Syllabus W.E.F 2016-17

## Course: Dissertation Phase II-Progress Seminar Presentation

Teaching Scheme-Not Applicable

Practical: Not Applicable

Examination Scheme

ICA: 100 Marks

The student has to make a presentation of the preliminary work prescribed the syllabus in front of panel of experts in addition to guide as appointed by head of department.

**SOLAPUR UNIVERSITY, SOLAPUR**
**ME PART-II, SEM-IV**
**M.E.-Mechanical (Design Engineering) Syllabus W.E.F 2016-17**

## Course: Dissertation Phase III Progress Seminar Presentation & Report

| Teaching Scheme-Not Applicable | Examination Scheme |
|---|---|
| Practical: Not Applicable | ICA: 100 Marks |

The student has to make a presentation of the progress work (analysis/experimental work/testing/validation) in front of panel of 2 experts in addition to guide as appointed by head of department.

**SOLAPUR UNIVERSITY, SOLAPUR**
**ME PART-II, SEM-IV**

# M.E.-Mechanical (Design Engineering) Syllabus W.E.F 2016-17

## Course: Dissertation Phase IV Term work

Teaching Scheme-Not Applicable

Practical: 2 Hrs/Week

Examination Scheme

ICA: 200 Marks

**Preparation of Dissertation Report:** The dissertation to be submitted by the student on topic already approved by university authorities on the basis of synopsis shall be according to the following guide lines.

### Format of dissertation report:

The dissertation work report shall be typed on A4 size bond paper. The total No. of minimum pages shall not be less than 60. Figures, graphs, annexure etc. should be added as per the requirement.

The report should be written in the format as given below-

1. Title sheet
2. Certificate
3. Acknowledgement
4. List of figures, Photographs/Graphs/Tables
5. Abbreviations.
6. Abstract
7. Contents.
8. Text with usual scheme of chapters.
9. Discussion of the results and conclusions
10. Bibliography (the source of illustrative matter be acknowledged clearly at appropriate place as per IEEE/ASME/Elsevier Format).

Annexure: May contain photographs, paper presented in the conference/journals on the dissertation topic

The reports to be submitted to the university shall be hard bound (6 copies).

**SOLAPUR UNIVERSITY, SOLAPUR**
**ME PART-II, SEM-IV**

## M.E.-Mechanical (Design Engineering) Syllabus W.E.F 2016-17

## Course: Final Presentation and Viva Voce

Teaching Scheme-Not Applicable

Practical: Not Applicable

Examination Scheme

ESE: 200 Marks

Final viva voce (ESE) is to be conducted by the examiner panel appointed by the university. Student has to give a presentation comprising of the dissertation work.


# SOLAPUR UNIVERSITY, SOLAPUR

## FACULTY OF ENGINEERING & TECHNOLOGY

## COMPUTER SCIENCE AND ENGINEERING

**Syllabus Structure and detailed syllabus of**

**M.E. (Computer Science & Engineering) Part II**
**Choice Based Credit System Syllabus**
**w.e.f. Academic Year 2016-17**

## Structure of M. E. (Computer Science & Engineering) Part-II
## w.e.f. Academic Year 2016 - 17

### Semester – III

| Sr. No. | Course | Teaching Scheme | | | | | Evaluation Scheme | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Credits | | Scheme | Theory (Marks) | Practical (Marks) | Total |
| 1 | Self learning | -- | -- | -- | 3 | | ISE | 30 | -- | 30 |
| | | | | | | | ESE | 70 | -- | 70 |
| 2 | Lab Practice | -- | -- | 2 | 1 | | ISE | -- | 25 | 25 |
| 3 | **Dissertation Phase –I** : Synopsis Submission Seminar | -- | -- | 6 | 3 | | ISE | -- | 75 | 75 |
| | **Dissertation Phase-II :** Termwork | -- | -- | -- | 3 | | ISE | -- | 100 | 100 |
| | **Dissertation Phase II** Progress Seminar Presentation | -- | -- | -- | 6 | | ESE | -- | 200 | 200 |
| | **Total** | **--** | **--** | **08** | **16** | | | **100** | **400** | **500** |

**Note:**

1. Student shall select one Self Learning course from the following list.
   i) Big Data
   ii) Open Source Technology
   iii) Computer Network Administration

### Semester – IV

| Sr. No. | Course | Teaching Scheme | | | Evaluation Scheme | | |
|---|---|---|---|---|---|---|---|
| | | P | Credits | | Scheme | Practical (Marks) | Total |
| 1 | **Dissertation Phase III** : Progress Seminar Presentation and report | 4 | 4 | | ISE | 100 | 100 |
| 2 | **Dissertation Phase IV**: Term work | 2 | 6 | | ISE | 200 | 200 |
| 3 | Final presentation and viva-voce | - | 6 | | ESE | 200 | 200 |
| | **Total** | **6** | **16** | | | **500** | **500** |

**ISE – IN SEMESTER EVALUATION**
**ESE – END SEMESTER EVALUATION**

# SOLAPUR UNIVERSITY, SOLAPUR

**M.E. (Computer Science and Engineering) Part - II**

**Semester - III**

**3. Dissertation Phase - I**

| **Teaching Scheme** | **Examination Scheme** |
|---|---|
| **Practical: 6Hrs/Week** | **Credits:3** |
| | **ISE: 75 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 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.

# SOLAPUR UNIVERSITY, SOLAPUR

**M.E. (Computer Science and Engineering) Part - II**

**Semester - III**

**3. Dissertation Phase - II**

**Examination Scheme**

**ISE** Credits:3
**ISE:** 100 marks

**ESE** Credits: 6
**ESE**: 200 marks

**Phase II Term Work (ISE)**

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.

**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

# SOLAPUR UNIVERSITY, SOLAPUR

**M.E. (Computer Science and Engineering) Part - II**

**Semester - IV**

**1. Dissertation Phase - III**

**Teaching Scheme**
**Practical**: 4Hrs/Week

**Examination Scheme**
**Credits**: 4
**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

# SOLAPUR UNIVERSITY, SOLAPUR

**M.E. (Computer Science and Engineering) Part - II**

**Semester - IV**

**2. Dissertation Phase – IV Termwork**

**Teaching Scheme**
**Practical**: 2Hrs/Week

**Examination Scheme**
**Credits**: 6
**ISE**: 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)**

# SOLAPUR UNIVERSITY, SOLAPUR

**M.E. (Computer Science and Engineering) Part - II**

**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 & TELECOMMUNICATION ENGINEERING

**Syllabus Structure for**

**M.E. (Electronics & Telecommunication Engineering)**

**4 Semester PG Programme**

**To be effective from** 2016-17

Choice Based Credit System Syllabus

# Semester-I

| Sr. No. | Subject | Teaching Scheme | | Examination Scheme | | | | Credits Assigned | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory | | Pract/TW | | | |
| | | Theory | Pract | ESE | ISE | ESE | ISE | Theory | Pract |
| 1 | Research Methodology | 3 | 1(T) | 70 | 30 | - | - | 3 | 1(T) |
| 2 | Antenna Theory and Design | 3 | 2 | 70 | 30 | - | 25 | 3 | 1 |
| 3 | Probability & Stochastic Processes | 3 | 2 | 70 | 30 | - | 25 | 3 | 1 |
| 4 | Advanced Network Systems | 3 | 2 | 70 | 30 | - | 25 | 3 | 1 |
| 5 | Elective - I | 3 | 1(T) | 70 | 30 | - | 25 | 3 | 1(T) |
| 6 | Seminar- I | - | 2 | - | - | - | 50 | - | 2 |
| | Total | 15 | 10 | 350 | 150 | - | 150 | 15 | 7 |
| | | **Total=25** | | **Total=650** | | | | **Total=22** | |

**Elective- I :** 1. Optical Networks

2. Speech & Video Processing

3. Advanced VLSI Design

***Note*** –

***Students have to select any one course from Elective -I***

# Semester-II

| Sr. No. | Subject | Teaching Scheme | | Examination Scheme | | | | Credits Assigned | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory | | Pract/TW | | | |
| | | Theory | Pract | ESE | ISE | ESE | ISE | Theory | Pract |
| 1 | RF and Microwave Circuit Design | 3 | 2 | 70 | 30 | - | 25 | 3 | 1 |
| 2 | Advanced Signal Processing | 3 | 2 | 70 | 30 | - | 25 | 3 | 1 |
| 3 | Wireless Communication | 3 | 1(T) | 70 | 30 | - | - | 3 | 1(T) |
| 4 | Cryptography & Network Security | 3 | 2 | 70 | 30 | - | 25 | 3 | 1 |
| 5 | Elective - II | 3 | 1(T) | 70 | 30 | - | 25 | 3 | 1(T) |
| 6 | Seminar- II | - | 2 | - | - | - | 50 | - | 2 |
| Total | | 15 | 10 | 350 | 150 | - | 150 | 15 | 7 |
| | | **Total=25** | | **Total=650** | | | | **Total=22** | |

**Elective- II :** 1. Wireless Sensor Network & Optimization.

2. Wavelet Transform & Applications.

3. Advanced Embedded Systems.

***Note*** –

- ***Students have to select any one course from Elective –II***

# Semester-III

| Sr. No. | Subject | Teaching Scheme | | Examination Scheme | | | | Credits Assigned | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory | | Pract/TW | | | |
| | | Theory | Pract | ESE | ISE | ESE | ISE | Theory | Pract |
| 1 | **Self Learning** | $ | - | 70 | 30 | - | - | 3 | - |
| 2 | **Lab Practice** | - | 2 | - | - | - | 25 | - | 1 |
| 3 | **Dissertation Phase-I:** Synopsis Submission Seminar*(Format to designed)(ISE) | - | 4@ | | | - | 75 | - | 3 |
| | **Dissertation Phase-II:** Term work *(ISE) | - | - | | | - | 100 | - | 3 |
| | **Dissertation Phase-II:** Progress Seminar* Presentation(ESE) | - | - | | | 200 | - | - | 6 |
| Total | | - | 6 | 70 | 30 | 200 | 200 | 3 | 13 |
| | | **Total=6** | | **Total=500** | | | | **Total=16** | |



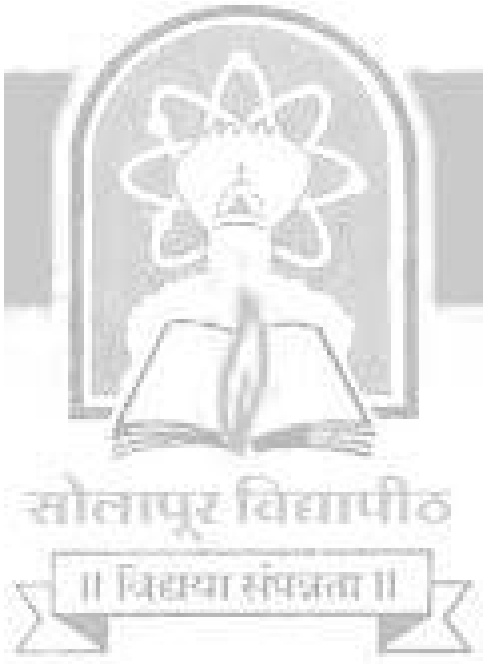
## Self Learning Corses :

1. Internet of Things
2. Software Defined and Cognitive Radio
3. Modeling & Simulation of Communication System

- $-Being a self learning subject ,student shall prepare for examination as per specified syllabus.
- ***-For all activities related to desertation phase I (Synopsis submission seminar and progress seminar) student must interact regularly every week with the adviser.\
- Synopsis submission seminar shall cover detailed synopsis of the proposed work.Student shall submit synopsis of desertation work only after delivering this seminar.
- Progress seminar shall be delivered capturing details of the work done by student for desertation.

- Student shall deliver all seminar using modern presentation tools. A hard copy of report shall be submitted to the department before delivering the seminar .A PDF copy of report must be submitted to the adviser along with other details if any.
- Lab practice shall include any of the below activities related to desertation work and recommended by advisor.Student shall submit report after completion of the activity to the advisior –

  Software assignments ,learning new software ,hardware realization ,literature survey,filed work,Industrial traing etc.
- @ Indicates contact hours of student for interaction with advisior.
- Details of mode of assignment of seminar and desertation shall be as specified in 7(III) of PG Engineering ordinance of Solapur University ,Solapur



## Semester-IV

| Sr. No. | Subject | Teaching Scheme | | Examination Scheme | | | | Credits Assigned | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory | | Pract/TW | | | |
| | | Theory | Practical | ESE | ISE | ESE | ISE | Theory | Pract |
| 1 | **Dissertation Phase-III:**Progress Seminar #(ISE) Dissertation Phase IV: Term work #(ISE) | - | 4@ | - | - | - | 100 | - | 4 |
| 2 | **Dissertation Phase-IV:**Term Work#(ISE) | - | 2@ | - | - | - | 200 | - | 6 |
| 3 | **Final submission of Dissertation** and Viva-voce(ESE) | - | - | - | - | 200 | - | - | 6 |
| **Total** | | - | | - | - | 200 | 300 | - | 16 |
| | | **Total = 6** | | **Total=500** | | | | **Total=16** | |

- #-For all activities related to dissertation phase-II student must interact regularly every week with the advisior .
- Progress seminar shall be delivered capturing details of the work done by student for desertation.
- Student shall deliver all seminar using modern presentation tools. A hard copy of report shall be submitted to the department before delivering the seminar .A PDF copy of report must be submitted to the adviser along with other details if any.
- Student must submit hard copy of project report to the department .
- @ Indicates contact hours of student for interaction with advisior.
- Details of mode of assignment of seminar and desertation shall be as specified in 7(III) of PG Engineering ordinance of Solapur University ,Solapur.


# Solapur University, Solapur

## Revised Structure and Syllabus
## (W.E.F. 2012-13)

## For

## M.E. (Civil-STRUCTURES)

## Choice Based Credit System (CBCS) - CGPA

**For M.E. Civil (Struct) - First Year: With effect from- 2015-16**
**For M.E. Civil(Struct) - Second Year: With effect from- 2016-17**

# SOLAPUR UNIVERSITY, SOLAPUR
# FACULTY OF ENGINEERING & TECHNOLOGY
## Curriculum for M.E. Civil-Structures
## Choice Based Credit System (CBCS)-CGPA (WEF 2016-17)

## Semester III: Laboratory / Tutorial Courses

| *Course Code* | *Name of the Course* | *Engagement Hours* | | | *Credits* | *SA* | *FA* | | *Total* |
|---|---|---|---|---|---|---|---|---|---|
| | | *L* | *T* | *P* | | *ESE* | *ISE* | *ICA* | |
| 13 | Lab. Practice | - | - | 1* | 1 | - | - | 25 | 25 |
| 14 | **Dissertation Phase-I** Synopsis Submission Seminar | - | - | 3* | 3 | - | 75 | - | 75 |
| 15 | **Dissertation Phase-II** Term work | - | - | - | 3 | - | 100 | - | 100 |
| 16 | **Dissertation Phase-II** Progress Seminar presentation | - | - | -- | 6 | 200 | - | - | 200 |
| | **Total** | **--** | | **4*** | **13** | **200** | **175** | **25** | **400** |

| | | | |
|---|---|---|---|
| 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 |

Note: * Indicates contact hours per student.

- 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.

# SOLAPUR UNIVERSITY, SOLAPUR
# FACULTY OF ENGINEERING & TECHNOLOGY
## Curriculum for M.E. Civil-Structures
## Choice Based Credit System (CBCS)-CGPA (WEF 2016-17)

## Semester IV: Laboratory / Tutorial Courses

| *Course Code* | *Name of the Course* | *Engagement Hours* | | | *Credits* | *SA* | *FA* | | *Total* |
|---|---|---|---|---|---|---|---|---|---|
| | | *L* | *T* | *P* | | *ESE* | *ISE* | *ICA* | |
| 17 | **Dissertation Phase III**: Progress Seminar presentation and Report | - | - | 5* | 4.0 | - | 100 | - | 100 |
| 18 | **Dissertation Phase-IV** Term work | - | - | - | 6.0 | - | 200 | - | 200 |
| 19 | Final submission of the dissertation and Viva voice | - | - | - | 6.0 | 200 | - | - | 200 |
| | **Total** | **-** | **-** | **5*** | **16.0** | **200** | **300** | **-** | **500** |

| | | | |
|---|---|---|---|
| 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 |

Note: * Indicates contact hours per student

- 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.

**M.E. (CIVIL-STRUCTURES)**

## Semester – III

**Choice Based Credit System (CBCS)**

# 14. Dissertation Phase- I

## Synopsis Submission Seminar

**Teaching scheme:**
**Contact Hours:** 3 hour per week per student
**Credits: 3**

**Assessment scheme:**
**ISE:** 75 marks

……

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.

**Solapur University, Solapur**
**M.E. (CIVIL- STRUCTURES)**
**Choice Based Credit System (CBCS)**
**Semester – III**

## 15. Dissertation Phase II

## Term Work

**Credits: 3** **Assessment scheme:**
**ISE:** 100 marks

……

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.

**Solapur University, Solapur**
**M.E. (CIVIL- STRUCTURES)**
**Choice Based Credit System (CBCS)**
**Semester – III**

# 16. Dissertation Phase II

## Progress Seminar Presentation

**Credits: 6** **Assessment scheme: ESE:** 200 marks

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 three departmental PG recognized faculty members.

**M.E. (CIVIL- STRUCTURES)**

**Semester – IV**

**Choice Based Credit System (CBCS)**

# 17. Dissertation Phase III

## Term Work

## Progress seminar Presentation and Report

**Teaching scheme:**
**Contact Hours:** 5 hour per week per student
**Credits: 4**

**Assessment scheme:**
**ISE:** 100marks

……

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.

**M.E. (CIVIL- STRUCTURES)**

## Semester – IV

**Choice Based Credit System (CBCS)**

## 18. Dissertation Phase-IV

## Term Work

**Credits: 6** **Assessment scheme:**

**ISE:** 200 marks

……

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 ISE for 200 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.

**M.E. (CIVIL- STRUCTURES)**

## Semester – IV

**Choice Based Credit System (CBCS)**

# 19. Dissertation Phase IV

## Final Submission of the dissertation and Viva-Voce

**Credits: 6** **Assessment scheme:**

**ESE:** 200 marks

……

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.