# Walchand College of Engineering

(Government Aided Autonomous Institute)

## Credit System for Second Year B. Tech. (Civil Engineering) Sem-III
## Applicable to AY 2024-25 and onwards

| Sr. No. | Category | Course Code | Course Name | L | T | P | Hrs | Cr | MSE/LA1 | ISE/LA2 | ESE | Ext |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Professional Core (Theory)** | | | | | | | | | | | | |
| 01 | PCC | 7CV201 | Fluid Mechanics | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | |
| 02 | PCC | 7CV202 | Engineering Surveying | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | |
| 03 | PCC | 7CV203 | Building Materials and Construction | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | |
| **Professional Core (Lab)** | | | | | | | | | | | | |
| 04 | PCC | 7CV251 | Fluid Mechanics Lab | 0 | 0 | 2 | 2 | 1 | 30 | 30 | 40 | POE |
| 05 | PCC | 7CV252 | Engineering Surveying Lab | 0 | 0 | 2 | 2 | 1 | 30 | 30 | 40 | POE |
| **Mandatory Courses** | | | | | | | | | | | | |
| 06 | BSC | 7MA201 | Applied Mathematics for Civil Engineering | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | |
| 07 | EEM | 7EE201 | Understanding Incubation and Entrepreneurship (NPTEL) | 3 | 0 | 0 | 3 | 3 | | | | |
| 08 | VEC | 7VE201 | Value Education | 0 | 0 | 2 | 2 | 2 | 30 | 30 | 40 | |
| 09 | CEP/FP | 7CECV251 | Building Materials and Construction Lab | 0 | 0 | 2 | 2 | 1 | 30 | 30 | 40 | POE |
| 10 | VSEC | 7VSCV251 | Spread Sheet Applications for Civil Engineering | 0 | 0 | 2 | 2 | 1 | 30 | 30 | 40 | |
| | | | **Total** | **15** | **0** | **10** | **25** | **21** | | | | |

Dr. A. K. Mali
Department Academic Coordinator

Dr. G. R. Munavalli
Head, Department of Civil Engineering

Dr. A. K. Kokane
Dean Academics

# Walchand College of Engineering

(Government Aided Autonomous Institute)

## Credit System for Second Year B. Tech. (Civil Engineering) Sem-IV
## Applicable to AY 2024-25 and onwards

| Sr. No. | Category | Course Code | Course Name | L | T | P | Hrs | Cr | MSE/LA1 | ISE/LA2 | ESE | Ext |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Professional Core (Theory)** | | | | | | | | | | | | |
| 01 | PCC | 7CV221 | Open Channel Hydraulics | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | |
| 02 | PCC | 7CV222 | Building Planning and Design | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | |
| 03 | PCC | 7CV223 | Structural Analysis | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | |
| 04 | PCC | 7CV224 | Water Resource Engineering | 2 | 1 | 0 | 3 | 3 | 30 | 20 | 50 | |
| **Professional Core (Lab)** | | | | | | | | | | | | |
| 05 | PCC | 7CV271 | Open Channel Hydraulics Lab | 0 | 0 | 2 | 2 | 1 | 30 | 30 | 40 | OE |
| **Mandatory Courses** | | | | | | | | | | | | |
| 06 | AEC | 7AE201 | Employability Skills | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | |
| 07 | IKS | Refer List | IKS Elective | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | |
| 08 | VSEC | 7VSCV272 | Advanced Surveying Lab | 1 | 0 | 2 | 3 | 2 | 30 | 30 | 40 | POE |
| 09 | VSEC | 7VSCV271 | Mini Project 1: Building Planning and CAD | 0 | 0 | 2 | 2 | 1 | 30 | 30 | 40 | POE |
| **Multi-Disciplinary Minor (MDM)** | | | | | | | | | | | | |
| 10 | MDM | Refer List | MDM | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | |
| | | | Total | **19** | **1** | **6** | **26** | **23** | | | | |

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# Walchand College of Engineering, Sangli

*(Government Aided Autonomous Institute)*

**AY 2024-25**

**Course Information**

| | |
|---|---|
| **Programme** | B. Tech. (Civil Engineering) |
| **Class, Semester** | Second Year B. Tech., Sem. III |
| **Course Code** | 7CV201 |
| **Course Name** | Fluid Mechanics |
| **Desired Requisites:** | Engineering Physics, Engineering Mechanics and Mathematics |

| **Teaching Scheme** | | **Examination Scheme (Marks)** | | | |
|---|---|---|---|---|---|
| **Lecture** | 03 Hrs/week | **MSE** | **ISE** | **ESE** | **Total** |
| **Tutorial** | - | 30 | 20 | 50 | 100 |
| **Practical** | - | | | | |
| **Interaction** | - | **Credits: 03** | | | |

**Course Objectives**

| | |
|---|---|
| 1 | To provide fundamentals of fluid mechanics. |
| 2 | To impart the necessary knowledge on pipe flow hydraulics and its applications. |
| 3 | To impart knowledge of boundary layer theory and hydraulic machines. |
| 4 | To prepare for higher studies and research in the field of fluid mechanics. |

**Course Outcomes (CO)**

| CO | Description | Blooms Taxonomy | |
|---|---|---|---|
| | At the end of the course, the students will be able to, | Descriptor | Level |
| CO1 | ***Explain*** the fundamentals of fluid mechanics, hydraulic machines and boundary layer theory. | Understand | II |
| CO2 | ***Solve*** problems on fluid statics and dynamics | Apply | III |
| CO3 | ***Use*** boundary layer theory in different fields. | Apply | III |
| CO4 | ***Estimate*** the different losses in pipe flow and efficiencies of hydraulic machines. | Apply | III |

| Module | Module Contents | Hrs |
|---|---|---|
| I | **Fluid Properties and Statics:** Scope and Importance of Fluid Mechanics, Physical Properties: density, specific weight, specific volume, specific gravity, dynamic and kinematic viscosity, compressibility, surface tension and capillarity and Vapor pressure.<br>The basic equation of hydrostatics, Pascal's law, Concept of pressure head, datum, absolute and gauge pressure, Measurement of pressure, Application of the basic equation of hydrostatics.<br>Principle of floatation and Buoyancy, Equilibrium of floating bodies, Stability of floating bodies. | 8 |
| II | **Fluid Kinematics:** Introduction of basic terms: Path line, streak line, stream line and stream tube, Velocity and acceleration of fluid particle.<br>Types of flow: steady and unsteady, uniform and non-uniform, Laminar and Turbulent, one, two, three-dimensional flow, rotational and irrotaional flow.<br>Flow net: Equation of stream line and equipotential line, methods of developing the flow net and its uses | 6 |
| III | **Fluid Dynamics:** Forces acting on fluid mass in motion, Euler's equation of the motion along a streamline, Bernoulli's equation: assumptions, applications and its limitations. Momentum equation and its application in fluid mechanics.<br>Applications of Bernoulli's Equation: Analysis of the hydraulic coefficients for the discharge measuring devices: orifices, mouthpieces, venturimeter, pitot tube, notches and weirs. Analysis of losses in closed and open channel flow. | 6 |

| | | |
|---|---|---|
| IV | **Flow in Pipes:** Laminar Flow: Reynolds's Experiment, laminar flow through the fixed parallel plate, Coutte's flow and Hazen Poiselle's equation for circular pipes.<br>Turbulent Flow: Velocity distribution and shear stresses in turbulent flow, Nikuradse's experiments, Elementary concepts of turbulent flow in smooth and rough pipes.<br>Losses in Pipes: Losses in Pipes: Darcy Weisbach equation and minor losses in flow through pipe, Concept of equivalent length of pipe and diameter of pipe.<br>Analysis of losses in pipe for the pipes connected in series, parallel and Siphon. Solving the two reservoir problem, three-reservoir problem and Pipe Network analysis. | 10 |
| V | **Boundary Layer Theory:** Concept of boundary layer, Development of boundary layer on a flat plate, different thickness. Drag and lift of submerged bodies, Hydro dynamically smooth and rough boundaries, Boundary layer separation and its control. | 5 |
| VI | **Pump and Turbine:**<br>Centrifugal pump: type, component parts and working of pump.<br>Pelton wheel turbine: type, working and principle of Pelton wheel turbine. | 5 |

| **Text Books** | |
|---|---|
| 1 | Modi P. M. and Seth S.M., "Hydraulics and Fluid Mechanics", Standard Book House<br>Standard Book House Since; 21st Edition, 2018. |
| 2 | Garde-Mirajgaonkar, "Engineering Fluid Mechanics", Scitech Publication, 1st Edition, 2010. |
| 3 | Bansal R. K., "A textbook of Fluid mechanics and hydraulic machines", Laxmi Publications (P) Ltd., New Delhi, 9th Edition, 2010. |

| **References** | |
|---|---|
| 1 | Kumar D. S., "Fluid Mechanics and Fluid Power Engineering", Kataria S K and Sons, 2nd Edition, 2010. |
| 2 | Jain A. K., "Fluid Mechanics Including Hydraulic Machines", Khanna Publishers, New Delhi, 8th Edition, 2003. |
| 3 | Streeter, V. L. and Wylie E.B. "Fluid Mechanics", McGraw Hill, New York, 8th Edition,1985. |

| **Useful Links** | |
|---|---|
| 1 | https://www.youtube.com/watch?v=-d67xfgJV98&list=PLwdnzlV3ogoV-ATGY2ptuLS9mwLFOJoDw&index=3 |
| 2 | https://www.youtube.com/watch?v=dlsMHsM2V88&list=PLwdnzlV3ogoV-ATGY2ptuLS9mwLFOJoDw&index=13 |
| 3 | https://www.youtube.com/watch?v=pZh5_AWvBuU&list=PLwdnzlV3ogoV-ATGY2ptuLS9mwLFOJoDw&index=23 |

**CO-PO Mapping**

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

The strength of mapping: - 1: Low, 2: Medium, 3: High

**Assessment**

- The assessment is based on MSE, ISE, and ESE.
- MSE shall be typically on modules 1 to 3.
- ISE shall be taken throughout the semester in the form of a teacher's assessment. The mode of assessment can be field visits, assignments, etc., and is expected to map at least one higher-order PO.
- ESE shall be on all modules with around 25-30% weightage on modules 1 to 3 and 70-75% weightage on modules 4 to 6.
- For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed, and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

| Prepared by | DAC/BoS Secretary | Head/BoS Chairman |
|---|---|---|

# Walchand College of Engineering, Sangli

*(Government Aided Autonomous Institute)*

**AY 2024-25**

**Course Information**

| | |
|---|---|
| **Programme** | B. Tech. (Civil Engineering) |
| **Class, Semester** | Second Year B. Tech, Sem III |
| **Course Code** | 7CV202 |
| **Course Name** | Engineering Surveying |
| **Desired Requisites:** | - |

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

**Course Objectives**

| | |
|---|---|
| 1 | To impart basic principles of conventional surveying through class instructions. |
| 2 | To develop a basic understanding of computations made in topographic mapping, and land Surveys. |
| 3 | To develop an ability to analyze land profiles in a logical manner and will be able to apply well-understood principles in planning and design of engineering structures on the Earth's surface. |

**Course Outcomes (CO)**

| CO | Description | Blooms Taxonomy | |
|---|---|---|---|
| | | Descriptor | Level |
| CO1 | Identify Surveying techniques to work in a team to collect the topographical data with due consideration to errors and blunders. | Remembering | I |
| CO2 | Apply their knowledge to evaluate alternate surveying techniques suitable for the scope of the project and site situation. | Applying | III |
| CO3 | Perceive modern surveying equipment and techniques for land surveying. | Understanding | II |

| **Module** | **Module Contents** | **Hrs** |
|---|---|---|
| I | **Introduction to Land Survey Systems**<br>Basic measurements in surveying, Application of land survey techniques in Civil engineering works, Historical development of surveying, Brief review of basic classification, principles and variety of drawings, Phases and stages of surveying, Types of measurements and range of minor and major instrumentation, Traversing & Trilateration, Accuracy and Precision in Survey measurements, probable errors in measurements | 6 |
| II | **Linear measurement of distances and Compass surveying**<br>Concept of horizontal control, Selection of stations for surveying, Methods and equipment for horizontal distance measurement and offsetting, obstacles in measurement, errors and corrections, Chain survey with triangulation, and offsets, the concept of well–conditioned triangle, plotting of chain survey<br>Need of compass in surveying, Construction and use of Prismatic compass, Bearings, Magnetic Declination, local attraction and corrections, Chain and compass traversing – fieldwork, computations and plotting | 6 |
| III | **Levelling, Contouring; and Precise Levelling**<br>Concept of vertical control, Methods and equipment for levelling, construction, use, and adjustments of levelling equipment, reduction of levels, Plotting of cross sections and profiles, sensitivity of level tube, Reciprocal levelling, Curvature and refraction corrections, Contouring methods, types, characteristics and use of contour maps, Precise levelling need, instrumentation and methods | 7 |

| | | |
|---|---|---|
| IV | **Theodolite Surveying**<br>Vernier Theodolite construction, applications for horizontal and vertical angle measurement, Permanent adjustments, Applications for lineout, lining in, locations of intersections, establishing line beyond control, etc., Theodolite traverse – fieldwork, computations, use of transit rule, Bowditch rule , Gales traverse table and plotting, Checks in open and closed traverse, omitted measurements, errors and precautions, Stadia tacheometry and trigonometrical levelling | 8 |
| V | **Plane Table survey**<br>Conventional plane table construction, use, accessories, setting up, orientation, fieldwork and limitations, use for direct contouring | 6 |
| VI | **Use of modern tools in Project Surveying**<br>Detailed project surveys, Horizontal Control, Vertical Control, Methods for Location, Survey for Route, Bridge, Dam, Reservoir and Tunnel; Overview of system functions and applications; of EDM and digital instrumentation like Aerial, Remote Sensing, GIS, GPS, LIDAR, 3D Scanner, Fundamental parameters for calculation, correction factors and constants; data retrieval and processing | 7 |

| **Text Books** | |
|---|---|
| 1 | Punmia B. C. and Jain, "Surveying", Vol. 1, 2 & 3, Laxmi Publications, New Delhi. 17th edition, 2015. |
| 2 | Basak N. N., "Surveying and Levelling", Tata Mcgraw Hill Education Pvt. Ltd, New Delhi, 2nd Edition, 2017. |
| 3 | Arora K. R. "Surveying", Vol. 1 & 2, Standard Book House, Kota 16th edition, 2018,. |

| **References** | |
|---|---|
| 1 | Duggal S. K, "Surveying", Tata Mcgraw Hill Education Pvt Ltd, 4th edition, Delhi, 2017. |
| 2 | Bannister and Raymond, "Surveying", ELBS, Longman Group Ltd., England. |
| 3 | Davis R. E., F. Foote and J. Kelly, "Surveying; Theory and Practice", McGraw Hill Book Company, New York. |

| **Useful Links** | |
|---|---|
| 1 | https://www.youtube.com/playlist?list=PLIaVyn1ykyAiC87uyMQB-XcC0C8f4YMc5 |

**CO-PO Mapping**

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

The strength of mapping: - 1: Low, 2: Medium, 3: High

**Assessment**

- The assessment is based on MSE, ISE, and ESE.
- MSE shall be typically on modules 1 to 3.
- ISE shall be taken throughout the semester in the form of a teacher's assessment. The mode of assessment can be field visits, assignments, etc., and is expected to map at least one higher-order PO.
- ESE shall be on all modules with around 25-30% weightage on modules 1 to 3 and 70-75% weightage on modules 4 to 6.
- For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed, and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

| Prepared by | DAC/BoS Secretary | Head/BoS Chairman |
|---|---|---|

# Walchand College of Engineering, Sangli

*(Government Aided Autonomous Institute)*

**AY 2024-25**

**Course Information**

| | |
|---|---|
| **Programme** | B. Tech. (Civil Engineering) |
| **Class, Semester** | Second Year B.Tech., III Semester |
| **Course Code** | 7CV203 |
| **Course Name** | Building Materials and Technologies |
| **Desired Requisites:** | Civil Engineering Infrastructure -7CV101 |

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

**Course Objectives**

| | |
|---|---|
| 1 | Impart in-depth knowledge of the various materials and techniques in Building Construction. |
| 2 | Articulate the role played by various building components and their interactions for an integrated behaviour of the building as a whole. |
| 3 | Establish the representation of building components in terms of sketches and drawings. |

**Course Outcomes (CO)**

| CO | Description | Blooms Taxonomy | |
|---|---|---|---|
| | | Descriptor | Level |
| CO1 | **Distinguish** the strengths and weaknesses of various building materials by assessment and comparison of quality parameters as per IS codes. | Understand | 2 |
| CO2 | **Interpret** applications of various materials in building components in the context of strength and durability parameters. | Apply | 2 |
| CO3 | **Classify** the various components and their relationships in buildings with different structural systems. | Apply | 3 |
| CO4 | **Assign** the materials and construction techniques to be adopted based on different structural systems. | Apply | 3 |
| CO5 | **Illustrate** the various building components in terms of scaled engineering drawings. | Apply | 3 |

| Module | Module Contents | Hours |
|---|---|---|
| I | **Introduction to Building Systems:**<br>The need for buildings, Structural systems; Load bearing, Framed, Prefabrication, Pre Engineered Construction, Types of Loads on Building, Buildings Components and their functions, Stresses in Building Components, General properties of materials and their role in Construction, Sustainability in Construction, Energy Efficiency in buildings. | 7 |
| II | **Building Materials – Properties and Applications:**<br>General properties of materials, Origin, types, Qualitative parameters, Engineering properties and Applications of important building materials ; Stone, Brick, Lime, Cement, Mortar/s, Steel, Specifications as per IS codes. | 6 |
| III | **Foundations, Walls and Columns:**<br>**Foundations:** Definition and Functions, Structural Requirements, Bearing Capacity of Soils, Materials used and their properties, Types of Shallow and Deep foundations, Conditions for their applications, Plinth and Plinth Beams.<br>**Walls and Columns:** Structural and Functional requirements, Types of Units and Mortars and their properties, Factors affecting strength and stability of walls, Functions of wall in buildings, Brick masonry bonds, Concrete Block masonry, Cavity walls, Function and types of columns. | 7 |

| | | |
|---|---|---|
| IV | **Openings in Buildings:**<br>Physical and Functional roles of Openings, Materials Involved, Criteria for sizes of Openings, Functional types of Doors, Windows, Ventilators. Openings vs. Internal Comfort, Role of Lintel and Chajja.<br>Staircases- Ideal Characteristics, types, Functional Design criteria. | 6 |
| V | **Roofs and Floors:**<br>Definitions, Accessible and Inaccessible roofs, Structural and functional requirements, Load considerations, Types of Sloped roofs, Roof covering materials, Types of Flat roof/floor, Types of RC slabs, Role of concrete and steel reinforcement, Formwork, Joints in construction. | 6 |
| VI | **Building Services and Finishes:**<br>Types and requirements of Building Services, Plumbing for water supply and sanitation, Electrification. Types of Finishes for Wall, Floor, Roof, Ceilings. Types of Paints and their applications, Defects in finishes. | 7 |

| **Text Books** | |
|---|---|
| 1 | R. K. Rajput. Engineering Materials, S. Chand Publications, New Delhi, Edition 2014. |
| 2 | S.K.Duggal Building Materials, New Age International, 3rd Edition, 2008, |
| 3 | B.C.Punmia, Ashok Kumar Jain, Arun Kumar Jain, Building Construction, Laxmi publications, New Delhi, 5th Edition, 2005. |

| **References** | |
|---|---|
| 1 | S.P. Arora and S.P. Bindra, "Building Construction", Dhanpat Rai and Sons, Edition 2014. |
| 2 | Sandeep Mantri, 'The A to Z of Practical Building Construction and its Management' Satya Prakashan, New Delhi, 2014 |
| 3 | IS codes: IS 3495, IS 1077, IS 383, IS 4031 |

| **Useful Links** | |
|---|---|
| 1 | |

**CO-PO Mapping**

| | Programme Outcomes (PO) | | | | | | | | | | | | PSPO | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 |
| **CO1** | 2 | | | | | 2 | | | | | | | 2 | 2 |
| **CO2** | 2 | | | | | 2 | 2 | | | | | | 2 | |
| **CO3** | | 2 | | | | | | | | | | | 2 | |
| **CO4** | | | 2 | | | 2 | | | | | | | 2 | |
| **CO5** | 2 | 2 | | | | | | | | 3 | | | 2 | 2 |

The strength of mapping: - 1: Low, 2: Medium, 3: High

**Assessment**

- The assessment is based on MSE, ISE, and ESE.
- MSE shall be typically on modules 1 to 3.
- ISE shall be taken throughout the semester in the form of a teacher's assessment. The mode of assessment can be field visits, assignments, etc., and is expected to map at least one higher-order PO.
- ESE shall be on all modules with around 25-30% weightage on modules 1 to 3 and 70-75% weightage on modules 4 to 6.
- For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed, and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

| Prepared by Dr. K. S. Gumaste | DAC/BoS Secretary | Head/BoS Chairman |
|---|---|---|

# Walchand College of Engineering, Sangli

*(Government Aided Autonomous Institute)*

**AY 2024-25**

## Course Information

| | |
|---|---|
| **Programme** | B. Tech. (Civil Engineering) |
| **Class, Semester** | Second Year B. Tech., III |
| **Course Code** | 7CV251 |
| **Course Name** | Fluid Mechanics Laboratory |
| **Desired Requisites:** | Engineering Physics, Fluid Mechanics |

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

## Course Objectives

| | |
|---|---|
| **1** | To provide hands-on experience in conducting experiments to measure fundamental properties of fluids such as density, viscosity, and surface tension. |
| **2** | To develop proficiency in using laboratory equipment and instruments for fluid mechanics measurements, such as flow meters, pressure gauges, and manometers. |
| **3** | To provide hands-on practice to conduct experiments for study of pipe flow. |
| **4** | To develop the analytical skills required for interpretation and analysis. |

## Course Outcomes (CO)

| **CO** | Description<br>At the end of the course, the students will be able to, | Blooms Taxonomy | |
|---|---|---|---|
| | | Descriptor | Level |
| **CO1** | ***Interpret*** properties of fluids such as density, viscosity, and surface tension. | Apply | III |
| **CO2** | ***Use*** laboratory equipment and instruments for fluid mechanics measurements, such as flow meters, pressure gauges, and manometers. | Apply | III |
| **CO3** | ***Practice*** experiments for the study of pipe flow. | Apply | III |
| **CO4** | ***Estimate*** performance of Pump and turbine. | Apply | III |

## List of Experiments / Lab Activities

**List of Experiments:**

1. Determination of viscosity of oil by using a Redwood viscometer
2. Determination of metacentric height of ship model
3. Development of Flow net by using the electrical analogy method
4. Verification of Bernoulli's theorem for the energy equation
5. Verification of momentum equation by using the impact of jet on a circular disc
6. Measurement of discharge by using sharp edged circular orifice and Venturimeter
7. Study of different types of flow by using the Reynolds experiment
8. Measurement and calculation of minor losses are due to entrance, exit, expansion of flow,
9. contraction of flow, elbow, bent and valve
10. Measurement of Loss of head for the pipe flow by using differential U-tube Manometer
11. Study of characteristics of Centrifugal Pump and Pelton Wheel Turbine under constant speed.

| Text Books | |
|---|---|
| 1 | Likhi, S.K., "Hydraulics: Laboratory Mannual", New Age International Publishers, 1st Edition, 1995 |
| 2 | Aswa G.L., "Experimental Fluid Mechanics", Vol. I & II, Nem Chand & Bros., Roorkee, 1st Edition, 1983 |
| 3 | Rangaraju K.G., "Flow in Open Channels", Tata McGraw Hill Publication Co. Ltd., New Delhi,1st Edition,1993 |
| **References** | |
| 1 | Modi P.M. and Seth S.M., "Hydraulics and Fluid Mechanics", Standard Book House, 9th Edition, 2013 |
| 2 | Subramanya K., "Theory and Applications of Fluid Mechanics" Tata McGraw Hill Publishing Co., Ltd., 7th Edition 2000 |
| 3 | Ven Te Chow, "Open channel Hydraulics", Tata McGraw Hill Publishing, 1st Edition, 2000 |
| | |
| **Useful Links** | |
| 1 | https://www.youtube.com/watch?v=itBtboWKKYY&list=PLZ5iF05Ly-kgGWarGh0iIdUIu4cz7Hrdw&index=2 |
| 2 | https://www.youtube.com/watch?v=8iZe_UiBtTc&list=PLZ5iF05Ly-kgGWarGh0iIdUIu4cz7Hrdw |
| 3 | https://www.youtube.com/watch?v=bw5wWkjpkuA&list=PLZ5iF05Ly-kgGWarGh0iIdUIu4cz7Hrdw&index=6 |

| CO-PO Mapping | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Programme Outcomes (PO) | | | | | | | | | | | | PSO | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 |
| **CO1** | | | | 3 | | | | | | | | | 1 | 1 |
| **CO2** | | | | 3 | | | | | | | | | 1 | 1 |
| **CO3** | | | | 3 | | | | | | | | | 1 | 1 |
| **CO4** | | | | 3 | | | | | | | | | 1 | 1 |
| The strength of mapping: 1:Low, 2:Medium, 3:High | | | | | | | | | | | | | | |

| Assessment | | | | |
|---|---|---|---|---|
| There are three components of lab assessment, LA1, LA2, and Lab ESE<br>IMP: Lab ESE is a separate head of passing. Lab ESE is treated as End Semester Exam and is based on all experiments/lab activities. | | | | |
| **Assessment** | **Based on** | **Conducted by** | **Typical Schedule** | **Marks** |
| LA1 | Lab activities, attendance, journal | Lab Course Faculty | During Week 1 to Week 6<br>Marks Submission at the end of Week 6 | 30 |
| LA2 | Lab activities, attendance, journal | Lab Course Faculty | During Week 7 to Week 12<br>Marks Submission at the end of Week 12 | 30 |
| Lab ESE | Lab Performance and documentation | Lab Course faculty | During Week 13 to Week 18<br>Marks Submission at the end of Week 18 | 40 |
| Week 1 indicates the starting week of a semester. The actual schedule shall be as per the academic calendar. Lab activities/Lab performance shall include performing experiments, mini-projects, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments. | | | | |

| Prepared by | DAC/BoS Secretary | Head/BoS Chairman |
|---|---|---|

# Walchand College of Engineering, Sangli

*(Government Aided Autonomous Institute)*

**AY 2022-23**

**Course Information**

| | |
|---|---|
| **Programme** | B. Tech. (Civil Engineering) |
| **Class, Semester** | Second Year B. Tech., Sem III |
| **Course Code** | 7CV252 |
| **Course Name** | Engineering Surveying Laboratory |
| **Desired Requisites:** | Engineering Surveying |

**Credits: 2**

| **Teaching Scheme** | | **Examination Scheme (Marks)** | | | |
|---|---|---|---|---|---|
| **Practical** | 2 Hrs/ Week | **LA1** | **LA2** | **Lab ESE** | **Total** |
| **Interaction** | 0 Hrs/ Week | 30 | 30 | 40 | 100 |

**Course Objectives**

| | |
|---|---|
| **1** | To make familiar with conventional surveying equipment for their use in preliminary, detailed and check survey |
| **2** | To impart knowledge of land surveying techniques through field performance using appropriate surveying equipment |
| **3** | To conceptualize plan/ map preparation of the survey features based on field data collection, computations, errors, corrections |

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

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

| | | |
|---|---|---|
| **CO1** | To recall use of conventional surveying equipment for land surveying | Apply |
| **CO2** | To recognize appropriate methodology for surveying various land features by establishing horizontal and vertical control in the field | Analyze |
| **CO3** | To evaluate technical suitability of the site based on reduction of field data | Evaluate |

**List of Experiments / Lab Activities/Topics**

**Part I: Field Exercises**

1. Horizontal distance measurement by chain & tape
2. Bearing measurement and determination of included angles in Compass Traversing
3. Use of minor equipment in reconnaissance survey
4. Levelling:
    a. Study of Dumpy, Auto, and Tilting level
    b. Reduction of levels by collimation plane & rise and fall method
    c. Reciprocal levelling
    d. Determination of sensitivity of level tube
    e. Profile levelling & cross-sectioning
    f. Demonstration of permanent adjustments
5. Plane Table Surveying Methods & Orientation
6. Theodolite survey
    a. Horizontal angle measurement
    b. Vertical angle measurement
    c. Line out of Structures
    d. Trigonometric levelling
    e. Demonstration of permanent adjustments

**II: Field Projects**

1. Chain triangulation
2. Chain & Compass Traversing
3. Plane table traversing
4. Traversing by theodolite & computations
5. Road Surveying (Alignment, Earthwork calculations etc.)
6. Block and Radial Contouring

| Textbooks | |
|---|---|
| 1 | Punmia B. C. and Jain, "Surveying", Vol. 1, 2 & 3, Laxmi Publications, New Delhi. 17th edition, 2015. |
| 2 | Basak N. N., "Surveying and Levelling", Tata Mcgraw Hill Education Pvt. Ltd, New Delhi, 2nd Edition, 2017. |
| 3 | Arora K. R. "Surveying", Vol. 1 & 2, Standard Book House, Kota 16th edition, 2018,. |
| **References** | |
| 1 | Duggal S. K, "Surveying", Tata Mcgraw Hill Education Pvt Ltd, 4th edition, Delhi, 2017. |
| 2 | Bannister and Raymond, "Surveying", ELBS, Longman Group Ltd., England. |
| 3 | Davis R. E., F. Foote and J. Kelly, "Surveying; Theory and Practice", McGraw Hill Book Company, New York |

**CO-PO Mapping**

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

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO, and preferably to only one PO.

**Assessment**

There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%

| Assessment | Based on | Conducted by | Typical Schedule | Marks |
|---|---|---|---|---|
| LA1 | Lab activities, attendance, journal | Lab CourseFaculty | During Week 1 to Week 8 Marks Submission at the end of Week 8 | 30 |
| LA2 | Lab activities, attendance, journal | Lab CourseFaculty | During Week 9 to Week 16 Marks Submission at the end of Week16 | 30 |
| Lab ESE | Lab activities,journal/ performance | Lab Course Faculty and External Examiner as applicable | During Week 18 to Week 19 Marks Submission at the end of Week19 | 40 |

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

# Walchand College of Engineering, Sangli

*(Government Aided Autonomous Institute)*

**AY 2024-25**

## Course Information

| | |
|---|---|
| **Programme** | B.Tech. (Civil) |
| **Class, Semester** | Second Year B. Tech., Sem III |
| **Course Code** | 7MA201 |
| **Course Name** | Applied Mathematics for Civil Engineering |
| **Desired Requisites:** | Engineering Mathematics I & II |

| **Teaching Scheme** | | **Examination Scheme (Marks)** | | | |
|---|---|---|---|---|---|
| **Lecture** | 3 Hrs/week | **MSE** | **ISE** | **ESE** | **Total** |
| **Tutorial** | - | 30 | 20 | 50 | 100 |
| | | **Credits: 03** | | | |

## Course Objectives

| | |
|---|---|
| **1** | To impart mathematical skills and enhance the thinking power of students. |
| **2** | To introduce fundamental concepts of mathematics and their applications in engineering fields. |

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

| **CO** | **Description** | Blooms Taxonomy | |
|---|---|---|---|
| | At the end of the course, the students will be able to, | Descriptor | Level |
| **CO1** | **Use** Laplace Transform and Inverse Laplace Transform to solve linear differential equations. | Understanding | II |
| **CO2** | **Understand the** Fourier series of periodic functions. | Understanding | II |
| **CO3** | **Apply** PDEs for solving Engineering problems. | Applying | III |
| **CO4** | **Apply** various discrete & continuous distributions to solve real-life problems. | Applying | III |
| **CO5** | **Apply** basic concepts of Vector calculus to solve problems with conditions arising in the engineering field. | Applying | III |

| **Module** | **Module Contents** | **Hrs** |
|---|---|---|
| I | **Laplace Transform and Its Applications:** Definition, Transform of Standard functions, Properties, Transform of derivative and Integral, Inverse Laplace Transform, Convolution Theorem, Applications to solve linear differential equations. | **8** |
| II | **Fourier Series:** Periodic functions, Dirichlet's conditions, Definition, determination of Fourier coefficients (Euler Formulae), Expansion of functions, Even and odd functions, change of interval and functions having arbitrary period, Half range Fourier sine and cosine series. | **7** |
| III | **Partial Differential Equations:** Four Standard forms of partial differential equations, application to one dimensional heat equation. | **6** |
| IV | **Probability Distribution:** Random Variable, Discrete random variable, Continuous random variable, Probability mass function, Probability density function, Poisson distribution, Normal distribution, Examples. | **5** |
| V | **Vector Differentiation:** Concept of vector field, directional derivatives, gradient of vector field, tangent line to the curve, velocity, acceleration, divergent and curl of vector field. | **6** |

| | | |
|---|---|---|
| VI | **Vector Integral:**<br>Line integrals, surface integral, Green's theorem in plane, Stoke's Theorem. | **7** |

| | |
|---|---|
| | |
| **Textbooks** | |
| 1 | P. N. and J. N. Wartikar, "A Text Book of Applied Mathematics", Vol I and II", Vidyarthi Griha Prakashan, Pune, 2006. |
| 2 | B .S. Grewal, "Higher Engineering Mathematics", Khanna Publication, 44th Edition , 2017. |
| 3 | Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley Eastern Limited Publication, 10th Edition, 2015. |
| | |
| **References** | |
| 1 | V.K. Rohatgi, "An Introduction to Probability and Statistics", Wiley Publication, 2nd Edition, 2008. |
| 2 | Wylie C.R, "Advanced Engineering Mathematics", Tata McGraw Hill Publication, 8th Edition, 1999. |
| 3 | H. K. Dass, "Higher Engineering Mathematics", S. Chand & Company Ltd., 1st Edition 2014. |
| 4 | B. V. Ramana, "Higher Engineering Mathematics", McGraw Hill Publication, 2018. |
| | |
| **Useful Links** | |
| 1 | https://www.youtube.com/watch?v=Na6N2DwdL_k&list=PLp6ek2hDcoNB3jiva0_CRJ1wmTOo98E0 |
| 2 | https://www.youtube.com/watch?v=W3HXK1Xe4nc |

**CO-PO Mapping**

| | Programme Outcomes (PO) | | | | | | | | | | | | PSO | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 |
| **CO1** | 1 | | | | | | | | | | | | | |
| **CO2** | 2 | 1 | | | | | | | | | | | | |
| **CO3** | 2 | 1 | | | | | | | | | | | | |
| **CO4** | 1 | 1 | | | | | | | | | | | | |
| **CO5** | 2 | 1 | | | | | | | | | | | | |

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO.

**Assessment**

- The assessment is based on MSE, ISE, and ESE.
- MSE shall be typically on modules 1 to 3.
- ISE shall be taken throughout the semester in the form of a teacher's assessment. The mode of assessment can be field visits, assignments, etc., and is expected to map at least one higher-order PO.
- ESE shall be on all modules with around 25-30% weightage on modules 1 to 3 and 70-75% weightage on modules 4 to 6.
- For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed, and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

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

**AY 2024-25**

**Course Information**

| | |
|---|---|
| **Programme** | All WCE Programme |
| **Class, Semester** | SY BTech 1st & 2nd Sem |
| **Course Code** | 7VE201 |
| **Course Name** | Value Education |
| **Desired Requisites:** | Open mind and a willingness to learn |

| **Teaching Scheme** | | **Examination Scheme (Marks)** | | | |
|---|---|---|---|---|---|
| Lecture | 01Hrs/week | LA1 | LA2 | ESE | Total |
| Tutorial | 01 Hrs/week | 30 | 30 | 40 | 100 |
| | | **Credits: -** | | | |

**Course Objectives**

| | |
|---|---|
| 1 | Develop holistic personal and professional skills by enhancing communication, emotional intelligence, and resilience to foster positive relationships and sustainable living practices. |
| 2 | Promote ethical and sustainable leadership through the application of integrity, teamwork, and a growth mindset to navigate success and failure while mastering effective presentation and communication skills. |
| 3 | Empower lifelong learning and contribution by reflecting on personal values, engaging in critical thinking, and committing to continuous self-assessment and professional development for addressing global challenges. |

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

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

| **CO** | **Course Outcome Statement/s** | **Bloom's TaxonomyLevel** | **Bloom's Taxonomy Descriptor** |
|---|---|---|---|
| **CO1** | Learn effective communication, empathy, and relationship-building skills to foster positive interactions in personal andprofessional settings. | I | Remembering |
| **CO2** | Incorporate sustainable habits into daily life and build resilience through mindfulness and stress management to handle challenges and support environmental stewardship. | II | Understanding |
| **CO3** | Develop goal-setting and achievement strategies, manage success and failure, and deliver impactful presentations for overall personal and professional development. | III | Applying |
| **CO4** | Strengthen analytical skills and creative problem-solving techniques to make informed decisions and tackle complexissues in various contexts. | IV | Analyzing |

| **Module** | **Module Contents** | **Hours** |
|---|---|---|
| I | **Interpersonal skills**<br>Introduction to Relationships, Communication Skills, Emotional Intelligence, Conflict Resolution, Maintaining Healthy Relationships | 5 |
| II | **Sustainable Living**<br>Introduction to Sustainability, Environmental Impact, Sustainable Practices, Community Involvement, Personal Action Plan | 5 |
| III | **Inner Peace and Resilience**<br>Understanding Inner Peace, Mindfulness and Meditation, Stress Management, Building Resilience, Positive Mindset | 5 |
| IV | **The Art of Winning**<br>Winning Mindset, Goal Setting, Perseverance and Adaptability, Teamwork and Leadership, Case Studies and Real-life Examples | 5 |

| | | |
|---|---|---|
| V | **Success and Failure Management**<br>Understanding Success and Failure, Learning from Failure, Growth Mindset, Balancing Success and Failure, Personal Development Plan | 5 |
| VI | **The Art of Presentation**<br>Introduction to Presentations, Content Organization, Verbal and Non-Verbal Communication, Practice and Delivery, Feedback and Improvement | 5 |

**Textbooks**

| | |
|---|---|
| 1 | Stephen R. Covey, *The 7 Habits of Highly Effective People*, Free Press, 25thAnniversary Edition, 2013. |
| 2 | Daniel Goleman, *Emotional Intelligence: Why It Can Matter More Than IQ*, Bantam Books,10th Anniversary Edition, 2005. |
| 3 | Carol S. Dweck, *Mindset: The New Psychology of Success*, Ballantine Books, UpdatedEdition, 2016. |
| 4 | William McDonough and Michael Braungart, *Cradle to Cradle: Remaking the WayWe Make Things*, North Point Press, 1st Edition, 2002. |
| 5 | Garr Reynolds, *Presentation Zen: Simple Ideas on Presentation Design and Delivery*, NewRiders, 2nd Edition, 2011. |

**References**


| | |
|---|---|
| 1 | Covey, S. R. (1989). *The 7 Habits of Highly Effective People*. Simon & Schuster. |
| 2 | Rosenberg, M. B. (2015). *Nonviolent Communication: A Language of Life*. PuddleDancer Press. |
| 3 | Carnegie, D. (1998). *How to Win Friends and Influence People*. Simon & Schuster. |
| 4 | Covey, S. R. (1989). *The 7 Habits of Highly Effective People*. Simon & Schuster. |
| 5 | Rosenberg, M. B. (2015). *Nonviolent Communication: A Language of Life*. PuddleDancer Press. |


**Useful Links**

| | |
|---|---|
| 1 | https://ideas.ted.com/how-to-build-closer-relationships/ |
| 2 | https://www.nationalgeographic.com/environment/article/sustainable-living |
| 3 | https://www.lexisnexis.in/blogs/family-law-in-india/ |
| 4 | https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8937019/ |
| 5 | https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8710473/ |

**CO-PO Mapping**

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

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO.

**Assessment**

The assessment is based on LA1, LA2 and ESE.
LA1 shall be typically on modules 1 to 3.
LA2 shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be Tests, assignments, oral, seminar etc. and is expected to map at least one higher order PO.
ESE shall be on all modules with around 30 - 40% weightage on modules 1 to 3 and 60 - 70% weightage on modules 4 to 6.
For passing a theory course, Min. 40% marks in (LA1+LA2+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

# Walchand College of Engineering, Sangli

*(Government Aided Autonomous Institute)*

**AY 2024-25**

## Course Information

| | |
|---|---|
| **Programme** | B.Tech. (Civil Engineering) |
| **Class, Semester** | Second Year, III Semester |
| **Course Code** | 7CECV251 |
| **Course Name** | Building Materials and Construction Lab |
| **Desired Requisites:** | |

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

## Course Objectives

| | |
|---|---|
| **1** | Demonstrate tests on certain civil engineering materials as per IS standards |
| **2** | Relate the theoretical learnings by conducting visits to Construction Sites |
| **3** | Illustrate graphically the components of buildings in terms of engineering drawings. |

## Course Outcomes (CO)

| **CO** | Description | Blooms Taxonomy | |
|---|---|---|---|
| | | Descriptor | Level |
| **CO1** | Demonstrate the testing of construction materials and calculate the necessary engineering parameters as per Indian standards. | Apply | III |
| **CO2** | Investigate the suitability (acceptance/rejection) of the material quality based on testing reports and IS specifications. | Analyse | IV |
| **CO3** | Perceive the adequacy/flaws of materials and techniques used on construction sites and market survey. | Understand | II |
| **CO4** | Demonstrate the various building components in terms of scaled drawings | Apply | III |

## List of Experiments / Lab Activities

**List of Experiments:**

1. Compressive strength and Water Absorption of Brick/Block as per IS 3495 Part I and II. (CO1&2)
2. Sieve analysis and Fineness Modulus of Fine Aggregate (IS 2386 Part I). (CO1&2)
3. Determination of Bulking of Sand: Lab method and IS method (IS 2386 Part III). (CO1&2)

   ***ISE1- based on continuous evaluation of the above 3 activities.***
4. Site Visit to a Local Building under Construction to observe Foundation Details. (CO3)
5. Site Visit to a Local Building under Construction to observe Masonry Construction. (CO3)
6. Market Survey of Building Materials – A Self Study. (CO3)

   ***ISE2 - based on continuous evaluation of the above 3 activities.***
7. Construction Details and Drawings of Door and Windows and Staircase.
8. Site Visit to a Local Building to observe Plumbing Details.

   ***ESE - End semester Evaluation based on all activities.***

## Text Books

| | |
|---|---|
| 1 | IS 3495 (Parts 1 to 4): 1992 Indian Standard Methods of Tests of Burnt Clay Building Bricks, Bureau of Indian Standards, Manak Bhavan. 9 Bahadur Shah Zafar Marg, New Delhi |

| | |
|---|---|
| 2 | IS: 2386 (Part III) - 1963 (Reaffirmed 2002) Indian Standard Methods of Test for Aggregates for Concrete, Bureau of Indian Standards, Manak Bhavan. 9 Bahadur Shah Zafar Marg, New Delhi |
| 3 | Mantri Institute's 'The A to Z of Practical Building Construction and its Management' Mantri Institute of Devp. and Research. Pune, Published by Satya Prakashan, 2011 |
| **References** | |
| 1 | M L Gambhir, Neha Jamwal, Building and Construction Materials: Testing and Quality Control, Tata McGraw-Hill Education, 2014 |
| | |
| **Useful Links** | |
| 1 | Material Testing-lab-manual: http://site.iugaza.edu.ps/mymousa/files/Material_-Testing-lab-manual.pdf |

| **CO-PO Mapping** | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Programme Outcomes (PO)** | | | | | | | | | | | | **PSO** | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 |
| **CO1** | 3 | | | | 2 | | 1 | | | | | | | |
| **CO2** | | 3 | | | | | | 2 | | | | | 2 | |
| **CO3** | | | | | | | 2 | | | | | 2 | | |
| **CO4** | 2 | | | | 2 | | | | | 3 | | | | |
| The strength of mapping: 1:Low, 2:Medium, 3:High | | | | | | | | | | | | | | |

| **Assessment** | | | | |
|---|---|---|---|---|
| There are three components of lab assessment, LA1, LA2, and Lab ESE<br>IMP: Lab ESE is a separate head of passing. Lab ESE is treated as End Semester Exam and is based on all experiments/lab activities. | | | | |
| **Assessment** | **Based on** | **Conducted by** | **Typical Schedule** | **Marks** |
| LA1 | Lab activities, attendance, journal | Lab Course Faculty | During Week 1 to Week 6<br>Marks Submission at the end of Week 6 | 30 |
| LA2 | Lab activities, attendance, journal | Lab Course Faculty | During Week 7 to Week 12<br>Marks Submission at the end of Week 12 | 30 |
| Lab ESE | Lab Performance and documentation | Lab Course faculty | During Week 13 to Week 18<br>Marks Submission at the end of Week 18 | 40 |
| Week 1 indicates the starting week of a semester. The actual schedule shall be as per the academic calendar. Lab activities/Lab performance shall include performing experiments, mini-projects, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments. | | | | |

# Walchand College of Engineering, Sangli

*(Government Aided Autonomous Institute)*

**AY 2024-25**

**Course Information**

| | |
|---|---|
| **Programme** | B.Tech. (Civil /Mech) |
| **Class, Semester** | SY B. Tech. |
| **Course Code** | 7EE201 |
| **Course Name** | Understanding Incubation and Entrepreneurship |
| **Desired Requisites:** | |

| **Teaching Scheme** | | **Examination Scheme (Marks)** | | | |
|---|---|---|---|---|---|
| Lecture | 03Hrs/week | LA1 | LA2 | ESE | Total |
| Tutorial | - | 30 | 30 | 40 | 100 |

**Credits: 3 ( Select any one evaluation pattern )**

| **Teaching Scheme** | | **Examination Scheme (Marks)** | | | |
|---|---|---|---|---|---|
| **Lecture** | - | **LA1** | **LA2** | **Lab ESE** | **Total** |
| **Tutorial** | - | 30 | 30 | 40 | 100 |
| **Practical** | 3 Hrs/week | | | | |

**Course Objectives**

| | |
|---|---|
| 1 | To familiarize the entrepreneurial framework and the start-up projects which help students to navigate through their own entrepreneurial journey. |
| 2 | To develop an entrepreneurial mind-set thereby encouraging the journey of transformation to convert an idea or a solution into a business |
| 3 | |

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

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

| **CO** | **Course Outcome Statement/s** | **Bloom's Taxonomy Level** | **Bloom's Taxonomy Descriptor** |
|---|---|---|---|
| **CO1** | Translate creative ideas into a sustainable business opportunity | II | Understand |
| **CO2** | Apply principles and practice of new entrepreneurial venture planning to assess a business idea | III | Apply |
| **CO3** | Differentiate among types of Business Models | IV | Analyze |
| **CO4** | Evaluate decision making towards establishing enterprises in real life situations | V | Evaluate |

| **Module** | **Module Contents** | **Hours** |
|---|---|---|
| I | **Introduction to Entrepreneurship**<br>Hand holding for Entrepreneurship GDC start-up stories, The Entrepreneurial Mind-Set , Corporate Entrepreneurship , Generating and Exploiting New Entries | 7 |
| II | **Innovation and Entrepreneurship Types**<br>Methodology for Innovation, Team Building, Problem Statement Presentation | 6 |
| III | **The Innovation Process**<br>Innovation and Entrepreneurship, Solar Oven case-study Paradigm shift from Design to Entrepreneurship, Bio- Med Innovation and Entrepreneurship, Healthcare and Innovation, Human Centered Innovation, Success Stories | 7 |

| | | |
|---|---|---|
| IV | **Introduction to Incubators**<br>Business Model Canvas, Technology led Entrepreneurship, Introduction to SINE Incubator, Lean Model Canvas SINE, Start-up Stories: | 7 |
| V | **From Corporate to Entrepreneurship**<br>Creativity and Generating Product Ideas, From Idea to Proof of Concept, Network Entrepreneurship | 7 |
| VI | **Case Study**<br>Learning from examples Start-up PITCHES - Using Lean Canvas Model | 6 |

| **Textbooks** | |
|---|---|
| 1 | Disciplined Entrepreneurship: 24 Steps to a Successful Startup by Bill Aulet |
| 2 | The Essence of Medical Device Innovation by B Ravi |
| 3 | THE FORTUNE AT BOTTOM OF PYRAMID: Eradicating Poverty Through Profits by C.K.Prahalad Stay Hungry |

| **References** | |
|---|---|
| 1 | Stay Foolish by Rashmi Bansal |
| 2 | The Entrepreneurial Connection: East Meets West in the Silicon Valley by Gurmeet Naroola |
| 3 | Innovation By Design: Lessons from Post Box Design & Development by B. K. Chakravarthy , Janaki Krishnamoorthi |

| **Useful Links** | |
|---|---|
| 1 | |

**CO-PO Mapping**

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

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO.

**Assessment**

The assessment is based on LA1, LA2 and ESE.LA1 shall be typically on modules 1 to 3.
LA2 shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can beTests, assignments, oral, seminar etc. and is expected to map at least one higher order PO.
ESE shall be on all modules with around 30 - 40% weightage on modules 1 to 3 and 60 - 70% weightage on modules 4 to 6.
For passing a theory course, Min. 40% marks in (LA1+LA2+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

# Walchand College of Engineering, Sangli

*(Government Aided Autonomous Institute)*

**AY 2024-25**

## Course Information

| | |
|---|---|
| **Programme** | B.Tech. (Civil Engineering) |
| **Class, Semester** | Second Year, Semester III |
| **Course Code** | 7VSCV251 |
| **Course Name** | Spreadsheet Applications in Civil Engineering |
| **Desired Requisites:** | |

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

## Course Objectives

| | |
|---|---|
| **1** | Utilize spreadsheet tools for data analysis and visualization |
| **2** | Apply spreadsheet functions to solve basic civil engineering problems. |

## Course Outcomes (CO)

| **CO** | Description | Blooms Taxonomy | |
|---|---|---|---|
| | | Descriptor | Level |
| **CO1** | Demonstrate the use of different functions in MS Excel for Civil Engineering data analysis | Understand and apply | 2/3 |
| **CO2** | Create the graphs, charts and Pivot tables for the data using MS Excel | Create | 6 |
| **CO3** | Analyze the Civil Engineering data using the MS excel capabilities. | Analyze | 4 |
| **CO4** | Create the spreadsheet for demonstrating the use of MS Excel in Civil Engineering data analysis | Create | 6 |

## List of Experiments / Lab Activities

**List of Exercises:**

**Exercise 1:** Introduction to MS Excel Basics and its user interface**:** Understanding the Excel interface, cells, rows, columns, basic formatting: font, cell colour, borders, Simple arithmetic, operations and formulas.

**Exercise 2:** Use of basic functions of MS Excel (SUM, AVERAGE, MIN, MAX functions, COUNT and COUNTA functions, Basic IF statements)

**Exercise 3:** Data entry and formatting of given data in MS Excel

**Exercise 4:** Column and Line charts in MS Excel for Civil Engineering data.

E**xercise 5:** Bar chart and Box-whisker charts in MS Excel for Civil Engineering data.

**Exercise 6:** Pivot table for Civil Engineering Data analysis and visualisation.

**Exercise 7:** Exploratory Data Analysis (EDA) of given data in MS Excel **(**Sorting and Filtering, Conditional Formatting)

**Exercise 8**: Statistical Data Analysis (SDA) of given data in MS Excel

**(**Sorting and Filtering, Conditional Formatting)

**Exercise 9:** Creating a spreadsheet for the application in solving a problem in Civil Engineering

**Exercise 10:** Formatting and printing of the Excel data/ report

## Text Books

| | |
|---|---|
| 1 | "Excel for Engineers and Scientists" by Sylvan Charles Bloch |

| References | |
|---|---|
| 1 | "Engineering Computations: An Introduction Using MATLAB and Excel" by Joseph Musto, William Howard, Richard Williams |
| 2 | Microsoft Excel Data Analysis and Business Modeling" by Wayne L. Winston |
| 3 | |
| | |
| **Useful Links** | |
| 1 | |
| 2 | |

| CO-PO Mapping | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Programme Outcomes (PO) | | | | | | | | | | | | PSO | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 |
| **CO1** | | | | | 3 | | | | | | | 3 | | |
| **CO2** | | | | | 3 | | | | | 3 | | 3 | | |
| **CO3** | 1 | 1 | | | 3 | | | | | | | 3 | | |
| **CO4** | 2 | 2 | | | 3 | | | | | 3 | | 3 | | |
| The strength of mapping: 1:Low, 2:Medium, 3:High | | | | | | | | | | | | | | |

**Assessment**

There are three components of lab assessment, LA1, LA2, and Lab ESE
IMP: Lab ESE is a separate head of passing. Lab ESE is treated as End Semester Exam and is based on all experiments/lab activities.

| Assessment | Based on | Conducted by | Typical Schedule | Marks |
|---|---|---|---|---|
| LA1 | Lab activities, attendance, journal | Lab Course Faculty | During Week 1 to Week 6<br>Marks Submission at the end of Week 6 | 30 |
| LA2 | Lab activities, attendance, journal | Lab Course Faculty | During Week 7 to Week 12<br>Marks Submission at the end of Week 12 | 30 |
| Lab ESE | Lab Performance and documentation | Lab Course faculty | During Week 13 to Week 18<br>Marks Submission at the end of Week 18 | 40 |

Week 1 indicates the starting week of a semester. The actual schedule shall be as per the academic calendar. Lab activities/Lab performance shall include performing experiments, mini-projects, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.