Walchand College of Engineering

(Government Aided Autonomous Institute)

Vishrambag, Sangli - 416 415

Credit System for

Second Year B.Tech. (Civil Engineering)

Sem-III and IV

Applicable to AY 2024-25 and onwards

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

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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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Dean Academics

Walchand College of Engineering, Sangli

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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. 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. 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. Types of flow: steady and unsteady, uniform and non-uniform, Laminar and Turbulent, one, two, three-dimensional flow, rotational and irrotaional flow. 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. 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. Turbulent Flow: Velocity distribution and shear stresses in turbulent flow, Nikuradse's experiments, Elementary concepts of turbulent flow in smooth and rough pipes. 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. 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:** Centrifugal pump: type, component parts and working of pump. 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 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** 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** 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 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** 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** 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** 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** 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:** 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:** 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:** **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. **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:** 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. Staircases- Ideal Characteristics, types, Functional Design criteria.	6
V	**Roofs and Floors:** 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:** 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 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 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 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab Performance and documentation	Lab Course faculty	During Week 13 to Week 18 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

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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

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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:** 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)

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

V	**Success and Failure Management** Understanding Success and Failure, Learning from Failure, Growth Mindset, Balancing Success and Failure, Personal Development Plan	5
VI	**The Art of Presentation** 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)

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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 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 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab Performance and documentation	Lab Course faculty	During Week 13 to Week 18 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.				

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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** 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** Methodology for Innovation, Team Building, Problem Statement Presentation	6
III	**The Innovation Process** 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** Business Model Canvas, Technology led Entrepreneurship, Introduction to SINE Incubator, Lean Model Canvas SINE, Start-up Stories:	7
V	**From Corporate to Entrepreneurship** Creativity and Generating Product Ideas, From Idea to Proof of Concept, Network Entrepreneurship	7
VI	**Case Study** 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)

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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 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab Performance and documentation	Lab Course faculty	During Week 13 to Week 18 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.

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Course Information

Programme	B. Tech. (Civil Engineering)
Class, Semester	Second Year B. Tech., Sem. IV
Course Code	7CV221
Course Name	Open Channel Hydraulics
Desired Requisites:	Fluid Mechanics and Hydraulic Machines

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 instil know-how of open channel hydraulics as a prerequisite to the design of hydraulic structures.
2	To enhance problem-solving abilities by applying theoretical knowledge to analyse real-world open channel flow problems
3	To apply various hydraulic models and theories to analyse and predict flow characteristics in open channels, such as uniform flow, gradually varied flow, and rapidly varied flow.
4	To impart the basics of dimensional analysis and principles of physical modelling

Course Outcomes (CO)

CO	Description	Blooms Taxonomy	
		Descriptor	Level
	At the end of the course, the students will be able to,		
CO1	***Explain*** fluid flow through open channels.	Understand	II
CO2	***Analyse*** the open channel flow to determine surface profiles and study energy dissipation	Analyse	III
CO3	***Apply*** hydraulic models and theories of open channel flow, including uniform flow, gradually varied flow, and rapidly varied flow	Apply	III
CO4	***Apply*** principles of dimensional analysis and hydraulic model testing.	Apply	III

Module	Module Contents	Hrs
I	**Introduction to open channel Flow:** Scope and importance, Types of open channel, Types of flows in open channel, Geometric elements, Velocity distribution, Energy and momentum equation applied to open channel flow, Measurement of velocity and discharge.	7
II	**Uniform Flow:** Uniform flow, Uniform flow characteristics, prismatic channel, Chezy's and Manning's Formulae, Manning's roughness coefficient, Uniform flow computations, Normal depth, Conveyance, Section factor, Hydraulic exponent, Hydraulically most efficient sections.	7
III	**Specific Energy and Specific Force:** Energy -Depth relationship in open channel flow, Specific energy - definition and diagram, Critical flow, Sub-critical and supercritical flow, Specific force -definition and diagram, Unit discharge and discharge diagram.	6

IV	**Gradually Varied flow:** Definition and types of non-uniform flow, Gradually Varied Flow (GVF) and Rapidly Varied Flow (RVF), Basic assumptions of GVF; Governing Differential Equation of GVF-Alternative forms; Classification of channel bed-slopes; Zones of GVF profiles; Various GVF profiles, their general characteristics and examples of their occurrence; Control section., Gradually varied flow computations.	8
V	**Rapidly varied flow:** Phenomenon of Hydraulic jump; Location and examples of occurrence of hydraulic jump; Assumptions in the theory of hydraulic jump; Application of momentum equation to hydraulic jump in rectangular channel; Conjugate depths and relation between conjugate depths. Various terms related to hydraulic jump; Classification of hydraulic jump; Practical uses of hydraulic jump. Energy dissipation in hydraulic jump; graphical method of determination of energy dissipation.	6
VI	**Dimensional Analysis and model testing:** Dimensional analysis, Buckingham's theorem, Dimensionless numbers and its significance. Model similitude, Model laws, Theory and applications.	6

Text Books	
1	Modi P.M. and Seth S.M., "Hydraulics and Fluid Mechanics", Standard Book House, 9th Edition, 2013
2	Ven Te Chow, "Open channel Hydraulics", Tata McGraw Hill Publishing, 1st Edition, 2000.
3	Rangaraju K.G., "Flow in Open Channels", Tata McGraw Hill, New Delhi, 1st Edition, 1993.

References	
1	Jain A. K., "Fluid Mechanics", Khanna Publishers, 11th Edition, 2013.
2	Subramanya K., "Flow in Open Channels" Tata McGraw-Hill, 7th Edition, 2009.
3	Chanson, "The Hydraulics of Open Channel Flow an Introduction", Wiley, 1st Edition, 2004.

Useful Links	
1	https://www.youtube.com/watch?v=vLfsrd7td14&list=PL485F1F6C7083FBE1&index=3
2	https://www.youtube.com/watch?v=8zM_mzXbOck&list=PL485F1F6C7083FBE1&index=13
3	https://www.youtube.com/watch?v=ra5LTEwSumU&list=PL485F1F6C7083FBE1&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	3												2	1
CO2		3											2	1
CO3			2										2	1
CO4			2										2	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, IV Semester
Course Code	7CV222
Course Name	Building Planning and Design
Desired Requisites:	Building Materials and Construction

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	2 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	-	30	20	50	100
Practical	-				
Interaction	-	**Credits: 3**			

Course Objectives

1	Impart Concepts in Building Planning and Functional Design.
2	Articulate integration of aesthetical concepts and influence of climate in building design
3	Establish the art of expressing buildings in terms of drawings.

Course Outcomes (CO)

CO	At the end of the course, the students will be able to,	Descriptor	Level
CO1	Perceive the requirements of residential/public buildings in terms of structural and functional aspects and apply the principles of planning, bye-laws/regulations during the planning process of buildings.	Understand and Apply	II & III
CO2	Practice the planning ideologies in buildings, in relevance to building services, climatology, acoustics and fire resistance.	Apply	III
CO3	Design buildings by composing functional and aesthetical aspects and illustrate building graphically in terms of engineering drawings.	Create	IV

Module	Module Contents	Hrs
I	**Site, Building and Building Drawings** Categories of buildings as per NBC, Types of Residential buildings, Site selection, Factors influencing selection of site, guidelines for planning and drawing of buildings, Positions of various building components, types of drawings and relevant scales.	6
II	**Principles of Building Planning** Conceptual understanding of Aspect, Prospect, Privacy, Furniture, Roominess, Grouping, Circulation, Sanitation, Lighting, Ventilation, Flexibility, Elegance, Sanitation, Economy and their interrelationship in the integrated planning of buildings.	7
III	**Building Bye laws** Objectives, Minimum plot size, Building frontage, open spaces, exemption to open spaces, standard dimensions in buildings, Provision for light & ventilation, Means for access, Drainage & sanitation, FSI, Fungible FSI, Saleable areas, Transfer of development rights, RERA.	7
IV	**Climatology and Building design** Elements of climate, Climatic zones, Comfort indices, Direction and its characteristics, orientation of buildings, Design of windows, Orientation criteria in various zones, Natural and Artificial means of achieving comfort.	6
V	**Aesthetics in Buildings** Conceptual understanding of Aesthetics, Subjective and Objective Aesthetics, Aesthetic theory, Influence of Indian Architecture, Aesthetics in Engineering Design, Formal elements of functional design, Composition in Building Architecture	6

VI	**Acoustics and Fire resistance in buildings** Applications, Sound ratings, conditions of good acoustics, Sound behavior in enclosures, Common acoustical defects, Echo & reverberation, acoustical design of auditoriums. Fire safety & role of designer, causes, fire loads & occupancies, Fire resistance of common building materials, general fire safety recommendations, Fire escapes, Alarms & extinguishing equipment.	7

Text Books	
1	Kumarswamy and Kameshwar Rao., "Building Planning and Design," Charotar Publications, 8th Edition, 2010
2	Civil Engineering Drawing - V. B. Sikka, S. K. Kataria and Sons, 7th Edition, 2015
References	
1	Planning: The Architect's Handbook "E. & OE" by Pierce S Rowland, Iliffe Books Ltd. London
2	"Time Saver Standards for Building Types", John Hancock Callender, Joseph De Chiara, McGraw-Hill, New York, 1983.
3	National Building Code of India 2016 (Vol I and II) SP- 7, Bureau of Indian Standards, New Delhi.

CO-PO Mapping

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

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

Assessment

The assessment is based on examinations in the form of MSE for 30 marks and ISE of 20 marks. Also there shall be an End-Semester examination (ESE) of 50 marks. MSE shall be typically on modules 1, 2 and 3, ISE based on peer assessment on planning ideologies and ESE shall be on all modules with nearly 50% weightage on modules 1 to 3 and 50% weightage on modules 4 to 6.

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.
Course Code	7CV223
Course Name	Structural Analysis
Desired Requisites:	Engineering Mechanics, Strength of Materials

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	-	30	30	40	100
Practical	-				
Interaction	-	**Credits: 3**			

Course Objectives

1	To explain the fundamental concepts of determinacy, stability of 2D structures etc.
2	To provide the knowledge of methods of analysis of indeterminate structures.
3	To introduce students to the matrix methods of analysis of structures.

Course Outcomes (CO)

CO	At the end of the course, the students will be able to,	Blooms Taxonomy	
		Descriptor	Level
CO1	Explain the concepts of determinacy, stability, principle of superposition.	Understand	2
CO2	Analyze the determinate and indeterminate structures determinate beams using suitable method.	Analyse	3
CO3	Analyse the indeterminate beams and frames using the Slope deflection and Moment distribution method.	Analyse	3
CO4	Explain and apply the basic concepts of matrix methods of structural analysis to beams.	Understand and Apply	2/3

Module	Module Contents	Hrs
I	**Slope and Deflection of Beams:** Types of structures, Equilibrium and compatibility conditions, Determinacy and Stability of structures, Static and kinematic degree of indeterminacy for beams, trusses and frames. Principle of superposition. Computation of Slope and Deflections in Determinate beams: Double Integration Method, Macaulay's method, Moment area method and Conjugate beam method.	7
II	**Energy principles in structural analysis:** Strain energy due to axial force, shear force, bending moment and torque. Castigliano's Strain Energy theorems. Computation of deflections in determinate structures such as beams, arches, trusses. Betti's Law and Maxwell's reciprocal theorems. Method of virtual work for slope and deflection of determinates structures	7
III	**Analysis of Indeterminate trusses and Arches** Three hinged Arch, Two hinged arch, SFD and BMD for arches, Indeterminate truss analysis, Lack of fit of truss members, temperature stresses in Truss members.	7
IV	**Influence Line Diagrams:** Muller-Breslau's principle and its application to statically determinate simple and compound beams. Influence line diagrams for support reaction, shear force and bending moment, ILD for member forces in statically determinate trusses	7
V	**Slope Deflection Method:** Slope deflection equations, Case of sinking of supports, Analysis of indeterminate beams and portal frames with and without sway.	8

VI	**Moment Distribution Method:** Carry over theorem, Distribution theorem, Relative and absolute stiffness, Distribution factors, Case of sinking of supports, Analysis of beams, frames with and without sway. **Introduction to matrix methods for structural analysis** Flexibility and stiffness coefficients, development of flexibility and stiffness coefficient matrix	6

Text Books	
1	Reddy C. S., "Basic Structural Analysis", Tata McGraw Hill, 3rd Edition, 2011.
2	Devdas Menon, "Structural Analysis", Alpha Science Intl, Ltd., 2nd Edition, 2008
3	Pandit & Gupta, "Structural Analysis - Matrix Approach", Tata McGraw-Hill Publishing Company Ltd., New Delhi, 4th Edition, 2004.
References	
1	Hibbeler R. C., "Mechanics of Materials", Pearson Education, 10th Edition, 2016.
2	Weaver and Gere J. M., "Matrix Analysis of Framed Structures", CBS Publications and Distributors, 2nd Edition, 2004.
3	Wang C. K., "Indeterminate Structural Analysis", Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1st Edition, 1983.
Useful Links	
1	Mod-01 Lec-01 Review of Basic Structural Analysis I - YouTube
2	Lecture -1 Structural Analysis - YouTube
3	NPTEL: Civil Engineering - Structural Analysis II
4	https://www.youtube.com/channel/UCeZaQte8MpBtv_0i1MspYUQ/

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
CO2		3												2
CO3		3												2
CO4	3	3												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. IV
Course Code	7CV224
Course Name	Water Resources Engineering
Desired Requisites:	

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	02 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	01 Hr/week	30	20	50	100
Practical	-				
Interaction	-	**Credits: 03**			

Course Objectives

1	To impart knowledge about concepts of hydrology, precipitation and its data analysis.
2	To impart knowledge about runoff, stream flow measurement and groundwater hydrology.
3	To impart knowledge about fundamental concepts in irrigation.
4	To provide necessary knowledge about canal irrigation and watershed management practices.

Course Outcomes (CO)

CO	Description	Blooms Taxonomy	
	At the end of the course, the students will be able to,	Descriptor	Level
CO1	***Explain*** concepts of hydrology and methods of precipitation data analysis.	Understand	II
CO2	***Describe*** runoff, stream flow measurement and groundwater hydrology.	Understand	II
CO3	***Use*** Soil water plant Relationship, for different methods of Field water application with basics of irrigation engineering.	Apply	III
CO4	***Demonstrate*** components related to canal engineering and ***Apply*** different principles of watershed development for sustainable water and soil conservation solutions	Apply	III

Module	Module Contents	Hrs
I	**Introduction to hydrology** Hydrological cycle and application of hydrology. Precipitation: Types of Precipitation, measurement, analysis of Precipitation data, mass rainfall curves, intensity-duration curves, and concept of depth area duration analysis, frequency analysis. Evaporation, transpiration, evapotranspiration and infiltration.	5
II	**Runoff** Rainfall-runoff relationships, Flow Duration Curve, Flow-mass Curve Applications Hydrograph analysis: Factors affecting runoff, Unit hydrograph theory and applications. Stream flow measurement. Floods Estimation and control, flood frequency analysis, Introduction to flood routing.	5
III	**Groundwater hydraulics** Occurrence, Aquifers, hydraulic conductivity, transmissivity, Aquifer yield. Well irrigation: Well hydraulics, Tube wells- Types, Methods for drilling, Well Development. Open wells - Classification, Yield, Advantages and Disadvantages of well irrigation, Ground water recharge methods and its efficiency.	5

IV	**Introduction to Irrigation Engineering** Water requirement of crops, Soil Water-Plant Relationship, Methods of Field Water Application, Effects of excess water for irrigation, cropping pattern. Irrigation: Necessity, Survey and data collection for irrigation project, Reservoir planning and sediment control Types of Irrigation Schemes, performance assessment of irrigation scheme	5
V	**Canal Irrigation** Canal and Canal structures, Canal lining, Diversion head works- Weir and Barrages, Cross-Drainage works- Aqueduct, Siphon aqueduct, Super passage, Canal siphon, Canal Maintenance, Canal revenue assessment methods, canal water losses and its preventive measures	4
VI	**Water Shed Development** Check dam, Nala bund, Bandhara Irrigation- Construction and Working, Advantages and Disadvantages, Percolation tank- Need, Selection of site, Construction, Watershed management, the importance of stakeholder involvement, Soil conservation measures, Methods and design of Rainwater harvesting systems.	4

Text Books	
1	Garg S. K., "Water resources Engg. Vol. II, Irrigation Engineering & Hydraulic Structures", Khanna publisher, Delhi, 24th edition, 2011.
2	Garg S. K., "Water resources Engg. Vol. I, Hydrology & water resources Engg.", Khanna publisher, Delhi, 15th edition, 2010.
3	Deodhar M. J., "Elementary Engineering Hydrology", Pearson Education, 1st Edition, 2009.

References	
1	Raghunath H. M., "Hydrology: principles, analysis, design", New Ace International (P) Limited, Publishers, 4th edition.
2	Punmia B. C., Pande Brij Basi Lal, Arun Kumar Jain, Ashok Kumar Jain, "Irrigation and Water Power Engineering", Laxmi Publications, 16th edition, 2009.
3	Asawa G. L., "Irrigation and Water Resources Engineering", New Age International Publishers, 1st edition, 2005.

Useful Links	
1	https://www.youtube.com/watch?v=pxXsyE-_TXg&list=PLwdnzlV3ogoU-zxx2wMFG_FSDsGKVQ93g&index=19

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
COs	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2				1	1						1	1
CO2	3	2				1	1						1	1
CO3	3	2				1	2						1	1
CO4	3	2				1	2						1	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., IV
Course Code	7CV271
Course Name	Open Channel Hydraulics Laboratory
Desired Requisites:	Fluid Mechanics and Open Channel Hydraulics

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 demonstrate behaviour of fluid flow through open channel using lab scale models
2	To provide hands on experience to measure open channel flow by using different lab scale Arrangements.
3	To provide hands-on practice to specific energy and energy dissipation in open channel flow.
4	To develop the analytical skills required for interpretation and analysis.

Course Outcomes (CO)

CO	Description	Blooms Taxonomy	
	At the end of the course, the students will be able to,	Descriptor	Level
CO1	**Interpret** behaviour of fluid flow through open channel.	Apply	III
CO2	**Calculate** open channel flow by using different lab scale arrangements.	Apply	III
CO3	**Calculate** specific energy and energy dissipation in open channel flow.	Apply	III
CO4	**Interpret** and analyze data obtained through lab-scale experiments performed on uniform and non-uniform flows	Apply	III

List of Experiments / Lab Activities

List of Experiments:

1. Measurement of velocity for open channel flow by using pitot tube and current meter.
2. Determination of Manning's and Chezy's constant for open channel flow by using uniform flow Formulae.
3. Study of nappe profile over a sharp crested weir by providing with and without ventilation below the lower nappe.
4. Measurement of open channel flow by using
   i. Rectangular Notch
   ii. Triangular Notch
   iii. Broad Crested Weir.
   iv. Round Crested Weir.
   v. Venturi flume.
5. Develop specific energy and specific force diagrams of hydraulic jump in the open channel flow.
6. Develop the different type of hydraulic jumps in open channel flow and estimation of loss of energy.

Text Books	
1	Likhi, S.K., “Hydraulics: Laboratory Mannual”, New Age International Publishers, 1 st Edition, 1995
2	Aswa G.L., “Experimental Fluid Mechanics”, Vol. I & II, Nem Chand & Bros., Roorkee, 1 st Edition, 1983
3	Rangaraju K.G., “Flow in Open Channels”, Tata McGraw Hill Publication Co. Ltd., New Delhi,1 st 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., 7 th Edition 2000
3	Ven Te Chow, “Open channel Hydraulics”, Tata McGraw Hill Publishing, 1 st Edition, 2000
Useful Links	
1	https://www.youtube.com/watch?v=bY0PJgnITTI
2	https://www.youtube.com/watch?v=XpGZmYMa3rA
3	https://www.youtube.com/watch?v=28MIrjhhcug

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 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 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab Performance and documentation	Lab Course faculty	During Week 13 to Week 18 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

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AY 2024-25

Course Information	
Programme	B.Tech. (All branches)
Class, Semester	Second Year B.Tech., Sem - II
Course Code	
Course Name	Employability Skills Development (ESD)
Desired Requisites:	--

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	4Hrs/week	**ISE**	**MSE**	**ESE**	**Total**
Tutorial	-	20	30	50	100
Practical	-				
Interaction	-	**Credits: 2**			

Course Objectives	
1	To improve the problem-solving skills of students
2	To understand the approach towards problem solving
3	Understanding the sectional cut-offs for different companies

Course Outcomes		
CO1	Ability to improve the accuracy percentage	
CO2	Understand the current changing recruitment trends	
CO3	Understanding the differential marking scheme in papers	
CO4	Performance improvement in competitive exams like CAT, GATE	

Module	**Module Contents**	**Hours**
I	**Arithmetic I** Ratio, Proportion, Mark Up & Discount, Averages, Mixtures & Alligations, Simple & Compound Interest	6

II	**Arithmetic II** Percentages, Profit & Loss, Time & Work, Time, Speed & Distance, Boat & Streams, Linear Races s	8
II	**Numbers** Cyclicity, Remainders, Cyclicity of Remainders, Indices, Factors, LCM, HCF	4
III	**Permutation, Combination, Probability** Fundamental principal of counting, Arrangements, Selection, Grouping, Distribution, Independent Events, Conditional Probability, Binomial Distribution	6
IV	**Logical Reasoning** Clocks, Calendars, Games & Tournaments, Analytical Puzzles, Binary Logic, Blood relations, Directions, Coding, Decoding, Seating Arrangement (Linear, Circular & Rectangular)	6
V	**Verbal Ability I** Vocabulary - Synonyms, Antonyms, Analogies Reading Comprehension, Para Jumbles	6
VI	**Verbal Ability II** Parts of Speech, Tenses, Subject Verb Agreement	4
Text Books		
1	Quantitative Aptitude - Abhijit Guha	
2	Quantitative Aptitude - Sarvesh Agarwal	
References		
1	Quicker Maths - M. Tyra	
2	Quantitative Aptitude - Chandresh Agarwal	
3	Puzzles to puzzle you - Shakuntala Devi	
Useful Links		
1	www.campusgate.co.in	
2	www. Lofoya.com	
3	www.brainbashers.com	

CO-PO Mapping															
	Programme Outcomes (PO)												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1											3				
CO2							2								
CO3									3						
CO4										3					
The strength of mapping is to be written as 1,2,3; Where, 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.															

Assessment
The assessment is based on the MCQ test which will be conducted online through the platform and it will be a proctored test. No negative marking will be there in the test. Test will be of 60 minutes with 20 questions each on Quantitative Aptitude, Logical Reasoning & Verbal Ability

Walchand College of Engineering, Sangli

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AY 2024-25

Course Information

Programme	B. Tech. (Civil Engineering)
Class, Semester	Second Year B.Tech.
Course Code	7IK201
Course Name	IKS: Introduction to Ancient Indian Technology
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 understand development of architecture solutions within the restraints imposed by prevalent social and cultural setup, available building materials, climate and geography of particular region.
2	Insight of the evolution of architecture in Indian subcontinent.

Course Outcomes (CO)

CO	Description	Blooms Taxonomy	
		Descriptor	Level
CO1	***Understand*** evolution of architectural styles in Indian subcontinent	Understand	II
CO2	***Understand*** the development of construction technology in Indian subcontinent	Understand	II
CO3	***Understand*** impact of previous architectural styles on successive architectural styles	Understand	II
CO4	***Differentiate*** various Indian architectural styles	Understand	II

Module	**Module Contents**	**Hours**
I	**Harappan and Vedic Architecture** Architecture and town planning of Harappan civilization such as towns of Lothal, Mohenjo Daro, Dholavira, Kalibanga etc. Understanding of Vedic architecture and settlements.	4
II	**Buddhist and Jain Architecture** Architectural examples of Mahayana and Hinayana Buddhism; Rock-cut and free standing. Study of caves, stupas, and viharas of places like Sanchi, Amravati, Karle, Ajanta etc. Medieval Jain temple architecture of western India.	4
III	**Hindu Architecture** Study of chronological development of religious and secular Hindu architecture and settlement planning; Early examples of monolithic and rock-cut architecture of South India. Development of Nagara and Dravidian temple architecture under different dynasties; such as like Cholas, Vijaynagar, Chandels, Hampi, Tanjavur, Khajuraho. Characteristic features of East, South, Central, West, and North Indian temple architecture for plan, shikhara, pillars, decoration, sculpture, etc. Theoretical base of Indian Architecture; examples from treatises like Mayamatam, Manasara, Samarangana Sutradhara etc.	6
IV	**Islamic Architecture** Introduction early Islamic architecture in India. Characteristic features of Islamic architecture; minarets, domes, gardens, geometrical and calligraphic decorations. The buildings of different dynasties of Delhi, Agra, Deccan, Gujarat etc.	4

V	**Colonial Architecture** English, French, Dutch and Portuguese Colonial architecture in Indian subcontinent. Architectural literary research work of scholars like Ram Raz, P.K. Acharya etc.	4
VI	**Contemporary Architecture** Post Independence architecture and planning; New city planning: Chandigarh, Gandhinagar etc. Modern foreign and Indian architects and their works in India.	4

Text Books	
1	Brown Percy, "Indian Architecture (Buddhist and Hindu period)," Read Books Ltd., 2013 Edition.
2	Brown Percy, "Indian Architecture (Islamic Period)," Read Books Ltd., 2013 Edition.
3	Sir Fletcher B., "History of Architecture," Architectural Press, 20th Edition.

References	
1	Grover Satish, "The Architecture of India: Buddhist and Hindu period," Vikas Publications, Illustrated Edition 2007.
2	Grover Satish, "The Architecture of India: Islamic," Vikas Publications, Illustrated Edition 2007.

Useful Links	
1	https://www.youtube.com/watch?v=m8fcpZxrkwI&list=PLyqSpQzTE6M_5jEwMql2g6TwH XilMDDiF
2	https://www.youtube.com/watch?v=uZVfgosyQiI&pp=ygUeSGlzdG9yeSBvZiBJbmRpYW4gQXJjaG l0ZWN0dXJl

CO-PO Mapping

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

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 2023-24

Course Information

Programme	B. Tech. (Civil Engineering)
Class, Semester	Second Year B. Tech., Sem IV
Course Code	7VSCV272
Course Name	Advanced Surveying Lab
Desired Requisites:	Engineering Surveying and Engineering Surveying Laboratory

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

Course Objectives

1	To demonstrate advanced surveying techniques through field exercises.
2	To develop and retain a basic understanding of employing special functions of advanced survey Instruments for land Surveys.

Course Outcomes (CO) with Bloom's Taxonomy Level

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

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy**	
		Description	**Level**
CO1	Study digital level, digital theodolite, auto reduction tachometer and total station and use appropriate surveying instruments for field exercises.	Applying	III
CO2	Demonstrate the use of advanced instruments for topographic survey.	Understand	II

List of Experiments / Lab Activities/Topics

List of Experiments:

Part I: Field Exercises

1. Levelling

a. Study of Digital level

b. Levelling exercises

c. Digital data processing

2. Digital Theodolite

a. Study of micro optic theodolite

b. Angle measurement and traversing

c. Trigonometric levelling

3. Tacheometry

a. Determination of constants of Tacheometer

b. Stadia tacheometry for length, gradient, and area determination

c. Study of subtense bar

d. Auto reduction tacheometry for length, gradient, and area determination

4. Study of Total Station

a. Exercises based on various functions

b. Digital data processing

Part II: Field Projects Project Survey for setting out, alignment, contouring, earthwork computations, drawing preparation etc.

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

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.
4	

CO-PO Mapping

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

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

Assessment

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

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

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

Prepared by – Dr. P. G. Sonavane 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., IV
Course Code	7VSCV271
Course Name	Mini Project: Building Planning and CAD
Desired Requisites:	Building Materials and Construction

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	Impart the approach to functionally plan and design a typical building by applying concepts of principal of planning and implementation of byelaws.
2	Contribute necessary knowledge to apply the various building services viz. plumbing, electrification and furniture within the buildings.
3	Create awareness of aesthetics and architectural ornamentation in buildings through engineering drawings

Course Outcomes (CO)

CO	Description	Descriptor	Level
CO1	**Illustrate** the requirements of residential/public building in terms of structural, functional, architectural aspects and **apply** the principles of planning, bye laws during planning process and designing building for chosen project.	Apply	III
CO2	**Study and Integrate** different building services, namely, water supply, drainage facilities and electrification services for the selected project.	Integrate	
CO3	Communicate and interact as a team to **apply** the drawing techniques and **compose** buildings using conventional and modern tools.	Create	VI

List of Experiments / Lab Activities

List of Activities:

1. Forming groups of 4-5 students in each batch and allocating a type of building as a project work. An overall ideation of the various planning phases will be explained to the students.
2. For the type of building chosen, each group will visit 2-3 existing buildings and will present the development in planning for the given problem: Size & nature of plot, Soil conditions and gradient, Structural system, Requirements of the building, Drawings to be submitted, during the second week.
3. For the selected type of building, presentation on the following: Bubble diagram, grouping of various rooms, a tentative plan of the building based on principles of planning privacy, ventilation, lighting, sizes for functional comfort, openings.
4. The group will present scaled drawings on graph sheets about the Building Plan based on principles of planning and bye laws. Drawing sheets based on orientation of buildings, climate, Minimizing internal heat gain, Design of staircase. The group will present the revised scaled drawings on Drawing sheets based on, Plumbing for water supply and drainage, Design of the plumbing system, Electrification, Location of Switchboards, min. no. of points, safety devices.
5. The various phases and improvements in of planning process will be a continuous activity and should lead to a final ideal plan for which detailed drawings using Auto CAD are to be submitted as under:
   I. Municipal drawings- Plan, section and front elevation, site plan, area calculations statement.
   II. Plans showing furniture and electrification details
   III. Plan showing water supply and plumbing layout, terrace slope and drainage, table of materials used.
6. Students will have to draw all the finalized building plans using AutoCAD and attach its print along with the previous sheets as submission work

Text Books	
1	N. Kumarswamy and A. Kameshwar Rao., "Building Planning and Design," Chraotar Publishing House Pvy. Ltd., 8th edition, 2010.
2	A Course in Civil Engineering Drawing - V. B. Sikka, S. K. Kataria and Sons, 7th Edition, 2015.
3	National Building Code of India 2016, SP- 7, Bureau of Indian Stds. New Delhi, 2nd Edition.
References	
1	Planning: The Architect's Handbook "E. & OE" by Pierce S Rowland, Iliffe Books Ltd. London
2	Time saver's standards of Architectural design data, Callender, Tata Mc Graw Hill Pub.
3	Architecture and Town Planning – S.C Agarwal. Dhanpat Rai and Sons, 2013
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		2	3										2	
CO2			2				3						2	
CO3	2				2				3	1			2	
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	Project activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Drawing Sheets, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Mini-Project PoE Performance and documentation	Lab Course faculty	Marks Submission during External PoE	40
Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. 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.				

Walchand College of Engineering, Sangli

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AY 2024-25

Course Information	
Programme	B. Tech. (Other than Civil Engg.)
Class, Semester	Second Year, Semester IV
Course Code	7MDCV221
Course Name	Building Planning and Construction
Desired Requisites:	Nil

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

Course Objectives	
1	To impart Necessary knowledge and concepts in Building Planning and functional design.
2	To impart Necessary knowledge and concepts in the utilization of building materials, their properties and their applications in construction of building.

Course Outcomes (CO) with Bloom's Taxonomy Level

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

CO1	Grasp the principles of planning, building bye laws to apply in the planning of residential/public buildings in relation to functional planning.	Understand	II
CO2	Classify the various components and their relationships in buildings and identify the materials and building services to be adopted for different buildings.	Apply	III

Module	**Module Contents**	**Hours**
I	**Site, Building and Building Drawings** Categories of buildings, Types of Residential buildings, Site selection, Factors influencing selection of site, guidelines for planning and drawing of buildings, Positions of various building components, types of drawings and relevant scales.	6
II	**Principles of Building Planning and Building Bye laws** Principles of planning: Aspects, prospect, Privacy, Furniture, Roominess, Grouping, Circulation, Sanitation, Lighting, Ventilation, Flexibility, Elegance, Sanitation, Economy. Bye laws: Minimum plot size, building frontage, open spaces, standard dimensions in buildings, Provision for light & ventilation, FSI, Height of Building.	7
III	**Planning concepts in Buildings** Requirements in different types of buildings, Integrated approach to planning in various aspects like aesthetics, landscape, interior, etc. Guidelines for planning & drawing residential and public buildings.	6
IV	**Components of building** Sub structure, Foundations, Bearing Capacity of Soils, Types of Shallow and Deep foundations, Conditions for their applications, masonry, Bonds, Doors, Windows, Staircases, Roofs and Floors, Flooring and their Applications	7
V	**Construction Materials** Types, Engineering properties and Uses of Bricks, Stones, Aggregate, Lime, Cement, Steel, Aluminium, PVC, Glass. Concrete: Ingredients, Preparation, Properties of concrete, Types of concrete and their applications	7

VI	**Building Services and Finishes** Plumbing services for water supply, plumbing services for drainage, symbols, Electrification, symbols of electrical fixtures, Types of Plastering and Pointing, Defects, Paints and Varnishes Types, Application, Methodology on various surfaces, Defects.	7
Textbooks		
1	R.K.Rajput S. 'Building Materials' S. Chand Publications.	
2	Bindra and Arora, "Building Construction", Dhanpat Rai and Sons	
3	Kumarswamy and Kameshwar Rao., "Building Planning and Design," Tata McGraw Hill Pvt. ltd, 1995.	
4	Civil Engineering Drawing - V. B. Sikka, S. K. Kataria and Sons.	
References		
1	Punmia, Jain, Jain, "Building Construction", Laxmi Publications ltd. 2005	
2	Mantri Institute's 'The A to Z of Practical Building Construction and its Management' Mantri Institute of Devp. and Research. Pune, 1994.	
3	Building drawing with Integrated approach – Shah, Kale & Patki, Tata Mc Graw Hill Pub.	
4	National Building Code of India and SP- 7.	
Useful Links		
1	https://www.youtube.com/watch?v=pYLKA4YQMyI&list=PL46yD-wnVQqxZ8f-_g1PZaFjJIxnJWyFE	
2	https://www.youtube.com/watch?v=4kLXfCGB_RI&list=PL46yD-wnVQqxZ8f-_g1PZaFjJIxnJWyFE&index=5	
3	https://www.youtube.com/watch?v=2tb1heySCx0	
4	https://www.youtube.com/watch?v=Y0Y8zuETHOQ	

CO-PO Mapping

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

Assessment

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