

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

B.E. in Civil Engineering

Scheme of Teaching and Examinations 2022

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2023-24)

III SEMESTER													
Sl. No	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	PCC	BCV301	Strength of Materials	TD: CVPSB: CV	3	0	0		03	50	50	100	3
2	IPCC	BCV302	Engineering Survey	TD: CVPSB: CV	3	0	2		03	50	50	100	4
3	IPCC	BCV303	Engineering Geology	TD- Geology/CV PSB-Geology/CV	3	0	2		03	50	50	100	4
4	PCC	BCV304	Water Supply and Waste water Engineering	TD: CV PSB: CV	3	0	0		03	50	50	100	3
5	PCCL	BCV305	Computer Aided Building Planning and Drawing	TD: CV PSB: CV	0	0	2		03	50	50	100	1
6	ESC	BCV306x	ESC/ETC/PLC	PSB: CV	3	0	0		03	50	50	100	3
7	UHV	BSCK307	Social Connect and Responsibility	Any Department	0	0	2		01	100	---	100	1
8	AEC/ SEC	BCV358x	Ability Enhancement Course/Skill Enhancement Course - III		If the course is a Theory				01	50	50	100	1
				1	0	0							
					If a course is a laboratory				02				
				0	0	2							
9	MC	BNSK359	National Service Scheme (NSS)	NSS coordinator	0	0	2			100	---	100	0
		BPEK359	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		BYOK359	Yoga	Yoga Teacher									
Total									550	350	900	20	

PCC: Professional Core Course, PCCL: Professional Core Course laboratory, UHV: Universal Human Value Course, MC: Mandatory Course (Non-credit), AEC: Ability Enhancement Course, SEC: Skill Enhancement Course, L: Lecture, T: Tutorial, P: Practical S= SDA: Skill Development Activity, CIE: Continuous Internal Evaluation, SEE: Semester End Evaluation. K: This letter in the course code indicates common to all the stream of Engineering. ESC: Engineering Science Course, ETC: Emerging Technology Course, PLC: Programming Language Course

Engineering Science Course (ESC/ETC/PLC)

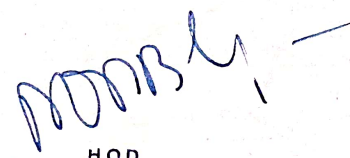
BCV306A	Rural, Urban Planning and Architecture	BCV306C	Sustainable Design Concept for Building Services
BCV306B	Geospatial Techniques in Practice	BCV306D	Fire Safety in Buildings

Ability Enhancement Course – III

BCVL358A	Data analytics with Excel (0:0:1)	BCVL358C	Problem Solving with PYTHON
BCV358B	Smart Urban Infrastructure	BCV358D	Personality Development for Civil Engineers

Professional Core Course (IPCC): Refers to Professional Core Course Theory Integrated with practicals of the same course. Credit for IPCC can be 04 and its Teaching-Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (B.E./B.Tech.) 2022-23 may please be referred.

National Service Scheme /Physical Education/Yoga: All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first Week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score is mandatory for the award of the Degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of Degree.


H.O.D.
Dept. of Civil Engineering
Aiva's Institute of Engg. & Technology
Mijar, Moodbidri - 574 226

STRENGTH OF MATERIALS		Semester	III
Course Code	BCV301	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3+0+0+0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3 Hrs.
Examination type (SEE)	Theory		

Course Learning objectives: This course will enable students to

- Understand the simple stresses, strains, and compound stresses in various structural components.
- Understand the bending moments and shear forces in different types of beams under various loading conditions
- Know the bending stress, shear stress, and torsional stress in beams and shafts with different cross sections
- Understand the deflection in beams and the stability of columns under different loading conditions.
- Understand the behaviour and strength of structural elements subjected to compound stresses and stresses in thin and thick cylinders.

Teaching-Learning Process (General Instructions)

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills.
2. Arrange field visits to give brief information about the water and wastewater treatment plant.
3. Encourage collaborative (Group Learning) Learning in the class.
4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking and enhance the knowledge of treatment processes.
5. Adopt Problem Based Learning (PBL), which fosters students, Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Seminars, surprise tests and Quizzes may be arranged for students in respective subjects to develop skills

Module-1

Simple Stresses and Strains: Introduction, Properties of Materials, Stress, Strain, Hooke's law, Poisson's Ratio, Stress – Strain Diagram for structural steel, Principles of superposition, Total elongation of tapering bars of circular and rectangular cross sections. Composite section, Volumetric strain, expression for volumetric strain, Elastic constants, relationship among elastic constants. Thermal stresses and strains, Compound bars subjected to thermal stresses, state of simple shear. (L1, L2, L3)

Module-2

Bending moment and shear force diagrams in beams: Introduction to types of beams, supports and loadings. Definition of shear force and bending moment, sign convention, Relationship between loading, shear force and bending moment, Shear force and bending moment equations, development of Shear Force Diagram(SFD) and Bending Moment Diagram (BMD) with salient values for cantilever, simply supported and overhanging beams for point loads, UDL (Uniformly Distributed Load), UVL (Uniformly Varying Load), Couple and their combinations (L1,L2,L3)

Module-3

Bending and Shear Stresses in Beams: Introduction, pure bending theory, Assumptions, derivation of bending equation, modulus of rupture, section modulus, flexural rigidity. Expression for transverse shear stress in beams, Bending and shear stress distribution diagrams for circular, rectangular, 'I', and 'T' sections.
Torsion in Circular Shaft: Introduction, pure torsion, Assumptions, derivation of torsion equation for circular shafts, torsional rigidity and polar modulus Power transmitted by a shaft. (L1, L2, L3)

Module-4

Deflection of Beams: Definition of slope, Deflection and curvature, Sign conventions, Derivation of moment- curvature equation. Double integration method and Macaulay's method: Slope and deflection for standard loading cases and for determinate prismatic beams subjected to point loads, UDL, UVL and couple.
Columns and Struts: Introduction, short and long columns. Euler's theory; Assumptions, Derivation for Euler's Buckling load for different end conditions, Limitations of Euler's theory. Rankine-Gordon's formula for columns. (L1,L2,L3)

Module-5

Compound Stresses:

Introduction, state of stress at a point, General two dimensional stress system, Principal stresses and principal planes. Mohr's circle of stresses

Thin and Thick Cylinders:

Introduction, Thin cylinders subjected to internal pressure; Hoop stresses, Longitudinal stress and change in volume. Thick cylinders subjected to both internal and external pressure; Lamé's equation, radial and hoop stress distribution. (L1,L2,L3)

Course outcome (Course Skill Set)

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

1. Evaluate the simple stresses, strains and compound stresses
2. Calculate the Bending moments, shear force and draw BMD, SFD for various types of beams and loadings
3. Analyse the bending stress, shear stress and torsional stress in beams and shafts with different cross sections
4. Evaluate the deflection in beams and determine the stability of the columns.
5. Evaluate the behaviour and strength of structural elements under the action of compound stresses and strains in thin and thick cylinders.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). The student is declared as a pass in the course if he/she secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

- There are 25 marks for the CIE's Assignment component and 25 for the Internal Assessment Test component.
- Each test shall be conducted for 25 marks. The first test will be administered after 40-50% of the coverage of the syllabus, and the second test will be administered after 85-90% of the coverage of the syllabus. The average of the two tests shall be scaled down to 25 marks
- Any two assignment methods mentioned in the 22OB2.4, if an assignment is project-based then only one assignment for the course shall be planned. The schedule for assignments shall be planned properly by the course teacher. The teacher should not conduct two assignments at the end of the semester if two assignments are planned. Each assignment shall be conducted for 25 marks. (If two assignments are conducted then the sum of the two assignments shall be scaled down to 25 marks)
- The final CIE marks of the course out of 50 will be the sum of the scale-down marks of tests and assignment/s marks.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (duration 03 hours).

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored shall be proportionally reduced to 50 marks

Suggested Learning Resources:**Text Books**

- B.C Punmia Ashok Jain, Arun Jain, "Strength of Materials", Laxmi - 2018-22 Publications, 10th Edition-2018
- R K Bansal, "A Textbook of Strength of Materials", 4th Edition, Laxmi Publications, 2010
- S.S. Rattan "Strength of Materials" McGraw Hill Education (India) Pvt. Ltd., 2nd Edition (Sixth reprint 2013).
- Vazirani, V N, Ratwani M M. and S K Duggal "Analysis of Structures Vol. I", 17th Edition, Khanna Publishers, New Delhi.
- R.K. Rajput, "Strength of materials" S. Chand Publishing (6th Edition)
- S S Bhavikatti, "Strength of Materials" Vikas Publishing (5th Edition)
- B.S. Basavarajaiah, P. Mahadevappa "Strength of Materials" in SI Units, University Press (India) Pvt. Ltd., 3rd Edition, 2010

Web links and Video Lectures (e-Resources):

- 1.Strength of Materials web course by IIT Roorkee <https://nptel.ac.in/courses/112107146/>
- 2.Strength of Materials video course by IIT Kharagpur <https://nptel.ac.in/courses/105105108/>
- 3.Strength of Materials video course by IIT Roorkee <https://nptel.ac.in/courses/112107147/18>
- 4.All contents organized <http://www.nptelvideos.in/2012/11/strengthof-materials-prof.html>

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Quiz (To assist in GATE Preparations)
- Demonstrations in Lab
- Virtual Lab Experiments

CO & PSO - PO Mapping (Individual Teacher has to fill)**Mapping of Course Outcomes and Program specific outcomes to Program Outcomes**

Course outcomes	Program outcomes												Program Specific Outcomes			
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4
CO1																
CO2																
CO3																
CO4																
CO5																
Total																
Average																

Level 0: Not Mapped, 1: Low Mapped, 2: Moderately Mapped 3: Highly Mapped

Note: Depending on the Assessment tool used, higher order POs Can be identified by the concerned course instructor.

Handwritten signature

H.O.D.

Dept. of Civil Engineering
Alva's Institute of Engg. & Technology
Mijar, Moodbidri - 574 225

Engineering Survey		Semester	3
Course Code	BCV302	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:2:0	SEE Marks	50
Total Hours of Pedagogy	40 hours Theory + 8-10 Lab slots	Total Marks	100
Credits	04	Exam Hours	3
Examination nature (SEE)	Theory		

Course Learning objectives: This course will enable students to

- Ability to understand principles of both traditional and modern surveying applying knowledge of mathematics.
- Ability to handle surveying equipment's and software tools to carry out field surveying, plot topographical Drawings and construction drawing
- Ability to use Total station for data capture, data storage, data transfer.
- Ability to prepare construction drawing and setting out

Teaching-Learning Process (General Instructions)

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills.
2. Arrange field visits to give brief information about the water and wastewater treatment plant.
3. Encourage collaborative (Group Learning) Learning in the class.
4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking and enhance the knowledge of treatment processes.
5. Adopt Problem Based Learning (PBL), which fosters students, Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Seminars, surprise tests and Quizzes may be arranged for students in respective subjects to develop skills.

MODULE-1

Engineering surveying – Definition & importance of surveying for Civil Engineers. Surveying types- Control survey, Topographical surveying, Construction Survey, Cadastral survey, Hydrographic survey and Underground Survey. Surveying through the ages- Chain surveying, Compass surveying and Plane Table Surveying (concepts and limitations only).
Measurement of Distance- Various types of tapes, Laser distance meter, Distance measuring wheel, Electronic Distance measurement, GPS.

L1,L2,L3

MODULE-2

Vertical Control- Concepts of various types of Datum – Mean Sea level, Bench marks – Temporary and Permanent.

Levelling- Terms used in levelling, Setting up of Dumpy level. Differential levelling by plane of collimation method using Dumpy level.

Theodolite Surveying – Terms used in Theodolite surveying. Setting up a Theodolite. Measurement of horizontal and vertical angles with Theodolite.

Total Station Surveying – Features, parts, accessories and advantages of Total Station. Surveying with total station – Measurement of Horizontal angle, vertical angle, distance, slope, vertical distance, multiple angles with Total station. Using Total station for Area measurement and Volume calculation. L1,L2,L3

MODULE-3

Contours - Definition, terms used, characteristics of contours and applications of contours in civil engineering practice. Contouring using level, theodolite and total station. Plotting of contours in CAD.

Longitudinal and cross sectioning – Definition, importance of L/S & C/S. L/S & C/S using level, theodolite and Total station. Plotting of L/S & C/S in CAD.

Coordinate survey with Total station - Measurement of coordinates using total station. Creating Job files, importance of back sight data, coordinate data recording. Data transferring, data refinement and plotting in CAD. L1,L2,L3

MODULE-4

Curves –Types of Curves- Application of curves in civil engineering. Setting out of Horizontal curve by Theodolite (Rankine's method) and using Total Station. Components of Compound, Reverse curve. Transition Curve and Combined curve. Various types of vertical curves and its applications.

Areas and Volumes- Methods of determining areas by trapezoidal and Simpsons' rule. Measurement of volume by prismoidal and trapezoidal formula. Earthwork volume calculations from spot levels and from contour maps; Earthwork calculation in Embankments.

Construction Surveying - Setting out works using Total Station, Setting out buildings by Centre line method. L1, L2, L3, L4

MODULE-5

GPS Surveying – Introduction. Overview of GPS system- space, control and user segments. Reference co- ordinate systems. Absolute and Differential positioning with GPS. Gagan system in India. Types of GPS Receivers. Engineering survey using Differential GPS.

Surveying with Drone – Introduction, applications and advantages. Features of photogrammetric mapping method. Drone surveying requirements- Drone platform, Flight planning software, Sensor DGPS equipment and Image processing software. Types of drones and sensors. Process of drone surveying – flight planning, DGPS markers, capturing images, post processing of images using photogrammetry software and output maps.

Application and uses of Remote sensing and GIS in engineering surveying. L1, L2, L3, L4

CO & PSO - PO Mapping (Individual Teacher has to fill)

CO & PSO - PO Mapping (Individual Teacher has to fill)																	
Mapping of Course Outcomes and Program specific outcomes to Program Outcomes													Program Specific Outcomes				
Course outcomes	Program outcomes												Program Specific Outcomes				
	PO 1	PO 2	P O3	P O4	P O5	P O6	P O7	P O8	P O9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	
CO1																	
CO2																	
CO3																	
CO4																	
CO5																	
Total																	
Average																	

Level 0: Not Mapped, 1: Low Mapped, 2: Moderately Mapped 3: Highly Mapped

Note: Depending on the Assessment tool used, higher order POs Can be identified by the concerned course instructor.

H.O.D.

Dept. of Civil Engineering
A . . . Institute of Engg. & Technology
Mijar, Moodbidri - 574 225

ENGINEERING GEOLOGY		Semester	3
Course Code	BCV303	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:2:0	SEE Marks	50
Total Hours of Pedagogy	40 hours Theory + 8-10 Lab slots	Total Marks	100
Credits	04	Exam Hours	
Examination nature (SEE)	Theory		
Course objectives: <ol style="list-style-type: none">1. To inculcate the importance of earth's interior and application of Geology in civil engineering in Geo Hazard mitigation and management2. To create awareness among Civil engineers regarding the resources of earth3. To provide knowledge on dynamic Geology and its importance in modifying the physical character of rocks which cause rocks suitable or unsuitable in different civil engineering projects such as Dams, bridges, tunnels and highways.4. To educate the ground water management regarding diversified geological formations, . To highlight the concept of rain water harvesting.5. To understand the application of Remote Sensing and GIS, Natural disaster and management and environmental awareness. To understand the subsurface using geospatial data6. To provide decision support on the nature of the basic raw materials used in construction. To provide decision support on Lithological characters and subsurface conditions7. To describe various geological maps and interpretation of geological data for mining and subsurface investigations.			
Teaching-Learning Process (General Instructions) <p>These are sample Strategies; that teachers can use to accelerate the attainment of the various course outcomes.</p> <ul style="list-style-type: none">• Chalk and Talk method.• Show Video/animation films to explain earth dyanamics and influence of geology in prime civil constructions• Encourage collaborative (Group Learning) Learning in the class• Ask at least three HOTS (Higher order Thinking) questions in the class, which promotes critical thinking.• Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking process such as the ability to evaluate, generalize, and analyse information rather than simply recall it.• Topics will be introduced in a multiple representation.• Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.• Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.			
MODULE-1		7 hrs	
Introduction, the scope of earth science in Engineering. <p>Earth's internal structure and composition, internal dynamics and Plate tectonics, Earthquakes - types, causes, so-seismic lines, seismic zonation, seismic proof structures. Volcanic eruption - types, causes. Landslides-causes types, preventive measures; Tsunami – causes, consequences, mitigation. Cyclones - causes and management.</p>			
MODULE-2		5 hrs	
Earth Materials in Construction <p>Minerals -Industrial, rock-forming and ore minerals. Physical properties, composition. Rocks Types, structure/Texture, mineral composition occurrence, properties. Decorative (facing/polishing), railway ballast, rocks for masonry work, monumental/architecture, Dressing of stones, Requirement of good building stones.</p>			
MODULE-3		7hrs	

- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for **25 marks**).
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

CIE for the practical component of the IPCC

- **15 marks** for the conduction of the experiment and preparation of laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to **15 marks**.
- The laboratory test (**duration 02/03 hours**) after completion of all the experiments shall be conducted for 50 marks and scaled down to **10 marks**.
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **25 marks**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC.

SEE for IPCC

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored by the student shall be proportionally scaled down to 50 Marks

The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper may include questions from the practical component.

Suggested Learning Resources:

Books

1. Punmia BC, & Jain Ashok Kumar. (2016). *Surveying* (17th ed., Vol. 1). Laxmi Publications.
2. Dr. K.R. Arora. (2019). *Surveying* (17th ed., Vol. 1). Standard Book House.
3. Charles D. Ghilani. (2012) (13th ed.). Prentice Hall

Web links and Video Lectures (e-Resources):

1. <https://enterprise.dji.com/surveying/land-surveying>
2. <https://www.gps.gov/applications/survey/>
3. <https://www.constructionplacements.com/total-station-in-surveying-types-uses-and-applications/>
4. <https://www.youtube.com/watch?v=bbs5AEPstl4>
5. https://www.youtube.com/watch?v=KHI4TEeexuM&list=PLLy_2iUCG87DwNVc3Mz1yYIRA42jSQ1tB&index=28
6. https://www.youtube.com/watch?v=lu9vrE48_I4&list=PLLy_2iUCG87DwNVc3Mz1yYIRA42jSQ1tB&index=30
7. <https://www.youtube.com/watch?v=RXUi2cX4CkU>
8. <https://www.youtube.com/watch?v=SVa66vO08So>

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1. Hand on use of various surveying instruments
2. Surveying Civil engineering block and plotting with instruments of student's choice
3. Setting out a single bedroom house plan in field

PRACTICAL COMPONENT OF IPCC

Sl.NO	Experiments
1	Use of Various types of tapes, Laser distance meter, Distance measuring wheel.
2	Differential levelling by Dumpy level by plane of collimation method
3	Measurement of horizontal and vertical angles by Theodolite. Method of repetition
4	Setting out simple curve using Rankine's method using Theodolite
5	Setting out central line of a small residential building.
6	Setting up of Total station. Features and components of Total station
7	Measurement of Distance, slope, vertical distance, horizontal and vertical angles using Total station
8	Coordinate measurement with Total station
9	Longitudinal sectioning and cross sectioning using Total station
10	Contouring and plotting with Total station
11	Demonstration of Equipment's used for chain, compass and plane table surveying
12	Visit to railway station/ large construction site to understand the importance of datum and benchmark.

Course outcomes (Course Skill Set):

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

- Summarize various types of surveying and carry out distance measurement using various equipment's
- Illustrate the use and applications of levelling and theodolite
- Plot contours, longitudinal and cross sections for construction projects.
- Set curves for construction works and carry out estimation of areas and volumes.
- Demonstrate the necessary skills to carry out GPS and DRONE Surveying

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

CIE for the theory component of the IPCC (maximum marks 50)

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are **25 marks** and that for the practical component is **25marks**.
- 25 marks for the theory component are split into **15 marks** for two Internal Assessment Tests (Two Tests, each of 15 Marks with 01-hour duration, are to be conducted) and **10 marks** for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.

Suggested Learning Resources:

Books

1. Engineering Geology, by Parthasarathy et al, Wiley publications
2. A textbook of Engineering Geology by ChennaKesavulu, Mac Millan India Ltd
3. Principle of Engineering Geology, by K.M. Bangar, Standard publishers
4. Physical and Engineering Geology, by S.K. Garg, Khanna publishers
5. Principles of Engineering Geology, by KVGK Gokhale, BS Publications

Reference Books

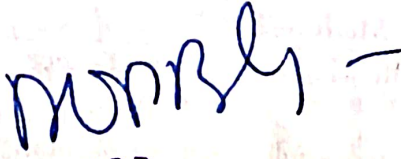
1. Introduction to Environmental Geology by Edward A Keller, Pearson publications.
2. Engineering Geology and Rock Mechanics B. P. Verma, Khanna publishers
3. Principles of Engineering Geology and Geotechnics, Krynine and Judd, CBS Publications

Web links and Video Lectures (e-Resources):

- <https://www.youtube.com/watch?v=aTVDiRtRook&list=PLDF5162B475DD915F>
- <https://www.youtube.com/watch?v=EBiLLjAxBuU&index=2&list=PLDF5162B475DD915F>
- <https://www.youtube.com/watch?v=sTY-ao4RZck&list=PLDF5162B475DD915F&index=3>
- <https://nptel.ac.in/courses>
- <https://youtu.be/fvoYHzAhvVM>
- <https://youtu.be/aTVDiRtRook>
- https://serc.carleton.edu/NAGTWorkshops/hazards/events/12262004.html?serc_source=recommendation
- <https://serc.carleton.edu/NAGTWorkshops/visualization/examples/CBezanson.html?sercsource=recommendation>
- <https://serc.carleton.edu/NAGTWorkshops/coursedesign/goalsdb/14712.html>
- <https://www.earthsciweek.org/classroom-activities>
- NPTEL materials

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Field Visits
- Quiz/Assignments/Open book test to develop skills
- Encourage collaborative learning in the class
- Demonstration of Geological models and animations
- Hands on experiments with Rock and Minerals


H.O.D.
Dept. of Civil Engineering
Institute of Engg. & Technology
Wijar, Moodbidri - 574 225

WATER SUPPLY AND WASTEWATER ENGINEERING		Semester	III
Course Code	BCV304	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3+0+0+0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	
Examination type (SEE)	Theory		

Course Learning objectives: This Course will enable the students to

1. Analyze the variation of water demand and to estimate water requirement for a community.
2. Study drinking water quality standards and to illustrate qualitative analysis of water.
3. Analysis of physical and chemical characteristics of water and wastewater.
4. Understand and design of different unit operations and unit process involved in water and wastewater treatment process
5. Design various oxidation processes.

Teaching-Learning Process (General Instructions)

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills.
2. Arrange field visits to give brief information about the water and wastewater treatment plant.
3. Encourage collaborative (Group Learning) Learning in the class.
4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking and enhance the knowledge of treatment processes.
5. Adopt Problem Based Learning (PBL), which fosters students, Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Seminars, surprise tests and Quizzes may be arranged for students in respective subjects to develop skills

Module-1

Introduction: Water: Need for protected water supply, Demand of Water: Types of water demands - domestic demand, industrial, institutional and commercial demand, public use and fire demand estimation, factors affecting per capita demand, Variations in demand of water, Peak factor.

Design period and factors governing design period. Methods of population forecasting and numerical problems. Physico chemical characteristics of water Sampling. **L1, L2, L3**

Module-2

Water Treatment: Objectives, Unit flow diagrams – Significance of each unit, Aeration process Limitations and types.

Sedimentation - Theory, settling tanks, types and design with numerical, Coagulation and flocculation, types of coagulants.

Filtration: Mechanism, theory of filtration, types of filters: slow sand, rapid sand and pressure filters. Operation and cleaning. Design of slow and rapid sand filter without under drainage system, Numerical. **L1, L2,**

Module-3

the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

CIE for the theory component of the IPCC (maximum marks 50)

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are **25 marks** and that for the practical component is **25 marks**.
- 25 marks for the theory component are split into **15 marks** for two Internal Assessment Tests (Two Tests, each of 15 Marks with 01-hour duration, are to be conducted) and **10 marks** for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.
- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for **25 marks**).
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

CIE for the practical component of the IPCC

- **15 marks** for the conduction of the experiment and preparation of laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to **15 marks**.
- The laboratory test (**duration 02/03 hours**) after completion of all the experiments shall be conducted for 50 marks and scaled down to **10 marks**.
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **25 marks**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC.

SEE for IPCC

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored by the student shall be proportionally scaled down to 50 Marks

The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper may include questions from the practical component.

Note: Subject to be taught by Geologist with qualification M. Sc Geology/MPhil/ Ph. D in Geology

Earth Surface process and Resources

Weathering, type, causes, soil insitu, drifted soil, soil profile, soil mineralogy, structure, types of soil, Black cotton soil v/s Lateritic soil; effects of weathering on monumental rocks. Soil Horizon, Soil Classification by Grain Size.

MODULE-4 7 hrs**Surface and sub Investigation for deep foundation**

Dip and strike, and outcrop problems(numerical problem geometrical/ simple trigonometry based), Borehole data(and problems), Faults, folds, unconformity, joints, types, recognition and their significance in Civil engineering projects like tunnel project, dam project, Reservoir site,.

MODULE-5 5 hrs**Modern Tools and geophysical methods**

Rocks as aquifers, water-bearing properties igneous, sedimentary and metamorphic rocks , coefficient of permeability, factors affecting permeability, Electrical Resistivity meter, depth of water table, (numerical problems), seismic studies.

PRACTICAL COMPONENT OF IPCC (May cover all / major modules)

Sl.NO	Experiments 8 hrs
1	Identification of common minerals based on Physical Properties
2	Identification of rocks used in building construction based on Physical properties
3	Solving Geological maps for suitability for aqua duct
4	Geological maps with inclined beds, suitability for tunnels/ Dams
5	Geological maps with folds, in tunnels/ Dams
6	Geological maps with unconformity , in tunnel/dam project
7	Geological maps with faults in Dams/tunnels project
8	One Day Nearest Field Visit Investigation.

Course outcomes (Course Skill Set):

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

- Apply geological knowledge in different civil engineering practice.
- Acquire knowledge on durability and competence of foundation rocks, and will be able to use the best building materials.
- Students will become competent enough for the safety, stability, economy and life of the structures that they construct
- Able to solve various issues related to ground water exploration, build up dams, bridges, tunnels which are often confronted with ground water problems
- Students will become Intelligent enough to apply GIS, GPS and remote sensing as a latest tool in different civil engineering for safe and solid construction.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for

Lecture 25 : Water Treatment Units Screening and Aeration

https://youtu.be/QsWp_HIZqPs

Lecture 26 : Water Treatment Units Sedimentation <https://youtu.be/T1M4Eciwq7Q>

Lecture 27 : Practice Problems On Sedimentation <https://youtu.be/Zlh2mpOjIMU>

Lecture 28: Coagulation and Flocculation: Theory <https://youtu.be/aAo2bBaF0yU>

Lecture 29: Coagulation and Flocculation: Selection and Application <https://youtu.be/44p0IN31ogo>

Lecture 30: Coagulation and Flocculation: Design Operation and Process Control https://youtu.be/v0TDfCz_iLU

Lecture 31: Filtration Theory and Slow Sand Filters https://youtu.be/nuJQe9F_2zI

Lecture 32: Rapid Sand Filter: Filter Media and Components <https://youtu.be/3qw3sKcuQIY>

Lecture 33: Rapid Sand Filters and Pressure Filters https://youtu.be/PEX_0DebrSQ

Lecture 34: Practice Problems Coagulation Flocculation and Filtration <https://youtu.be/73jxsBCDuq4>

Lecture 35: Disinfection Basic <https://youtu.be/d4UG9Xivulk>

Lecture 36: Chlorination <https://youtu.be/L3eSkeOU3iY>

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

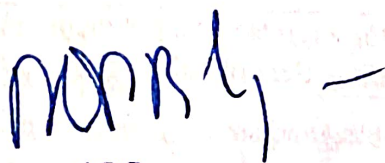
- Activity Based Learning (Suggested Activities in Class)/ Practical Based learning <http://nptel.ac.in>
- <https://swayam.gov.in>
- <https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham>

CO & PSO - PO Mapping (Individual Teacher has to fill)

Mapping of Course Outcomes and Program specific outcomes to Program Outcomes																
Course outcomes	Program outcomes												Program Specific Outcomes			
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4
CO1																
CO2																
CO3																
CO4																
CO5																
Total																
Average																

Level 0: Not Mapped, 1: Low Mapped, 2: Moderately Mapped 3: Highly Mapped

Note: Depending on the Assessment tool used, higher order POs Can be identified by the concerned course instructor.



H.O.D.

Dept. of Civil Engineering
Alva's Institute of Engg. & Technology
Mijar, Moodbidri - 574 225

COMPUTER AIDED BUILDING PLANNING AND DRAWING		Semester	3
Course Code	BCV305	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:2:0	SEE Marks	50
Credits	01	Exam Hours	100
Examination type (SEE)	practical		
Course objectives: <ul style="list-style-type: none">• Gain skill set to prepare Computer Aided Engineering Drawings using a software• Understanding the details of construction of different building elements• Visualize the completed form of the building and the intricacies of construction based on the engineering drawings• Get familiarization of practices used in Industry.			
Sl.NO	Experiments		
1	Drawing Basics: Selection of scales for various drawings, thickness of lines, dimensioning, abbreviations and conventional representations as per IS:962.		
2	Drawing Tools: Lines Circle, Arc, Poly line, Multiline, Polygon, Rectangle, Spline, Ellipse, Modify tools: Erase, Copy, Mirror, Offset, Array, Move, Rotate, Scale, Stretch, Lengthen, Trim, Extend, Break, Chamfer and Fillet,		
3	Using Text: Single line text, Multiline text, Spelling, Edit text		
4	Special Features: View tools, Layers concept, Dimension tools, Hatching, Customizing Toolbars, Working with multiple drawings.		
5	Drawings of Different Building Elements: Refer NBC before practice <ul style="list-style-type: none">a> Footing/ Foundation – Foundation dimension for Isolated, combined footing, Standard dimension and cross section of footingb> Size stone Masonry – Size of single and double bond stone, Sections at wall foundationc> Brick Masonry – Size of standard Burnt Brick, Solid Cement Block, Hollow Cement block, Other bricks used in current practice		
6	Principles of planning, Planning regulations and building bye-laws, factors affecting site selection, Functional planning of residential and public buildings, design aspects for different public buildings. Recommendations of NBC.		
7	Draw a building plan for single and double bed room accommodation for a given site dimension. Students have to go through Building Bye Laws and regulations		
8	Prepare the centre line drawing for marking the single and double bedroom house as in exercise 6		
9	Prepare a complete sanction plan for the exercise 6 as per the bye law. Also study the requirements to plan Residential Building, School building, Hospital Building, Offices		
10	Drawing of plan with electrical, plumbing and sanitary services using CAD software		
11	Drawing standard sections for Lintel and chajja, RCC Slabs, Columns and beams.		
12	Drawing different types of staircases – Dog legged, Open well – plan and section		

Disinfection: Methods of disinfection with merits and demerits. Breakpoint chlorination, Softening: Lime soda and Zeolite process.
Wastewater: Introduction: Need for sanitation, methods of sewage disposal, types of sewerage systems, Treatment of municipal waste water: Waste water characteristics sampling, significance and techniques, physical, chemical and biological characteristics, Numerical on BOD.

L1, L2

Module-4

Treatment Process: flow diagram for municipal waste water Treatment unit operations and process Screens: types, disposal. Grit chamber, oil and grease removal. Primary and secondary settling tanks, **Suspended growth system** - conventional activated sludge process and its modifications, numerical.

L1, L2, L3

Module-5

Attached growth system – Trickling filter, numerical on Trickling filters, bio-towers and rotating biological contactors. Principle of stabilization ponds, oxidation ditch. Sludge digesters (aerobic and anaerobic), Equalization. Thickeners and drying beds.

L1, L2, L3

Course outcome (Course Skill Set)

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

1. Estimate the average and peak water demand for a community.
2. Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
3. Design the different units of water treatment plant.
4. Design the various units of wastewater treatment plant.
5. Design of various AOPs and low cost treatment units.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). The student is declared as a pass in the course if he/she secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

- There are 25 marks for the CIE's Assignment component and 25 for the Internal Assessment Test component.
- Each test shall be conducted for 25 marks. The first test will be administered after 40-50% of the coverage of the syllabus, and the second test will be administered after 85-90% of the coverage of the syllabus. The average of the two tests shall be scaled down to 25 marks
- Any two assignment methods mentioned in the 22OB2.4, if an assignment is project-based then only one assignment for the course shall be planned. The schedule for assignments shall be planned properly by the course teacher. The teacher should not conduct two assignments at the end of the semester if two assignments are planned. Each assignment

shall be conducted for 25 marks. (If two assignments are conducted then the sum of the two assignments shall be scaled down to 25 marks)

- The final CIE marks of the course out of 50 will be the sum of the scale-down marks of tests and assignment/s marks.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (duration 03 hours).

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.

Marks scored shall be proportionally reduced to 50 marks

Suggested Learning Resources:

Text books

- Howard S. Peavy, Donald R. Rowe, George T, "Environmental Engineering" - Tata McGraw Hill, New York, Indian Edition, 2013
- S. K. Garg, Environmental Engineering Volume-I, Water supply Engineering – M/s Khanna Publishers, New Delhi 2010
- B.C. Punmia and Ashok Jain, Environmental Engineering I-Water Supply Engineering, Laxmi Publications (P) Ltd., New Delhi 2010.
- B C Punmia, "Environmental Engineering volume-II", Laxmi Publications 2nd, 2016
- Karia G.L., and Christian R.A, "Wastewater Treatment Concepts and Design Approach", Prentice Hall of India Pvt. Ltd., New Delhi. 3rd, Edition, 2017
- S.K.Garg, "Environmental Engineering vol-II, Water supply Engineering", Khanna Publishers, – New Delhi, 28th edition and 2017
- CPHEEO Manual on water supply and treatment engineering, Ministry of Urban Development, Government of India, New Delhi.
- Mark.J Hammer, Water & Waste Water Technology, John Wiley & Sons Inc., New York, 2008

Web links and Video Lectures (e-Resources):

Lecture 01: Background and Course Introduction <https://youtu.be/yDnrv-oGSBc>

Lecture 02: Water Sources and Availability <https://youtu.be/K4Vty0cmvbl>

Lecture 03: Water Uses <https://youtu.be/9H7dPkW0sJA>

Lecture 04: Water Supply Key Issues and Concerns <https://youtu.be/JueYGPbsflw>

Lecture 05: Urban water services and water supply systems <https://youtu.be/bCKm9KkcQtw>

Lecture 06: Urban water services and water supply systems <https://youtu.be/s0hy0ZIM1bA>

Lecture 07: Components of Water Demand <https://youtu.be/mVmErXpIp64>

Lecture 08: Fluctuations in Water Demand <https://youtu.be/qXUwy5OnX9Q>

Lecture 09: "Concept of Design Period and Design Population Need to Forecast Population Population Forecasting Methods https://youtu.be/QvLdA_qhUog Lecture 10: Demand Forecasting and Design Capacities <https://youtu.be/rKTWjvx7E8A>

Lecture 11: Water Sources and Collection of Water <https://youtu.be/TvEGgZw1El4>

Lecture 12: Surface Water Intakes <https://youtu.be/GcQOyAdG5OM>

Lecture 13: Surface Water Intakes Systems https://youtu.be/r1oJtm_SXz4

Lecture 14: Groundwater Intake <https://youtu.be/Zo1p7uRDEmM>

Lecture 15: Well Interferences, Well losses and Efficiency https://youtu.be/dRU5M_WICU0 Lecture 16: Raw water Conveyance and Pumping <https://youtu.be/iQwEoEhujTc>

Lecture 17: Practice Problems <https://youtu.be/e5bduQiz5NY> Lecture 18 : Raw Water Storage <https://youtu.be/WZII7kWoUjE>

Lecture 19 : Treated Water Storage <https://youtu.be/BuZ48afjd04>

Lecture 20 : Placement, Design and Construction of Storage Reservoirs <https://youtu.be/nOCZbXaBb1o>

Course outcomes (Course Skill Set):

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

- Prepare, read and interpret the drawings in a professional set up.
- Know the procedures of submission of drawings and Develop working and submission drawings for building.
- Plan of residential or public building as per the given requirements..

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

Continuous Internal Evaluation (CIE):

CIE marks for the practical course are 50 Marks.

The split-up of CIE marks for record/ journal and test are in the ratio 60:40.

- Each experiment is to be evaluated for conduction with an observation sheet and record write-up. Rubrics for the evaluation of the journal/write-up for hardware/software experiments are designed by the faculty who is handling the laboratory session and are made known to students at the beginning of the practical session.
- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled down to 30 marks (60% of maximum marks).
- Weightage to be given for neatness and submission of record/write-up on time.
- Department shall conduct a test of 100 marks after the completion of all the experiments listed in the syllabus.
- In a test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability.
- The marks scored shall be scaled down to 20 marks (40% of the maximum marks).

The Sum of scaled-down marks scored in the report write-up/journal and marks of a test is the total CIE marks scored by the student.

Semester End Evaluation (SEE):

- SEE marks for the practical course are 50 Marks.
- SEE shall be conducted jointly by the two examiners of the same institute, examiners are appointed by the Head of the Institute.
- The examination schedule and names of examiners are informed to the university before the conduction of the examination. These practical examinations are to be conducted

between the schedule mentioned in the academic calendar of the University.

- All laboratory experiments are to be included for practical examination.
- (Rubrics) Breakup of marks and the instructions printed on the cover page of the answer script to be strictly adhered to by the examiners. **OR** based on the course requirement evaluation rubrics shall be decided jointly by examiners.
- Students can pick one question (experiment) from the questions lot prepared by the examiners jointly.
- Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners.

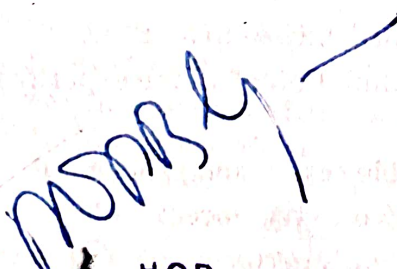
General rubrics suggested for SEE are mentioned here, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on course type, rubrics shall be decided by the examiners)

Change of experiment is allowed only once and 15% of Marks allotted to the procedure part are to be made zero.

The minimum duration of SEE is 02 hours

Suggested Learning Resources:

- MG Shah, CM Kale, SY Patki, "Building drawing with an integrated approach to Built Environment Drawing", Tata McGraw Hill Publishing co. Ltd, New Delhi.
- Gurucharan Singh, "Building Construction", Standard Publishers, & distributors, New Delhi.
- Malik RS and a Meo GS, "Civil Engineering Drawing", Asian Publishers/Computech Publication Pvt Ltd


H.O.D.
Dept. of Civil Engineering
A's Institute of Engg. & Technology
Wijar, Moodbidri - 574 225

Fire Safety in Buildings		Semester	3
Course Code	BCV306D	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	Theory		

Course objectives:

- To understand the importance fire safety
- To learn various techniques involved in fire safety
- To design fire resistant buildings using proper materials and methods

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. The online courses available should be shared with students
2. YouTube videos
3. Power point presentations
4. Visit to fire stations and understand various fire accidents.

Module-1

Fire: Introduction, Basic concepts of fire protection, Fire as a process of combustion, planning for fire protection, fire resistance Ventilation and fuel controlled fire, process of combustion: flashover condition, effect of fire on construction material, design of fire resistance steel structure, concrete structure

Module-2

Fire safety: urban planning, escape and refuge, internal planning, detection and suppression Introduction to lift design, design of lift system, expected stop and floor of reversal, different cases, simulation, arrangements and escalators

Module-3

Introduction to flow system: water supply, constant demand, variable demand and diversity factor, control systems Flow in pipe networks and fixture units, design of water supply distribution system, flow in waste water pipes

Module-4

Introduction to HVAC: governing equations to HVAC process, numerical problem on HVAC system, psychometric chart, equation based approach Electrical systems: design of electrical systems, intelligent building, life cycle cost and basics of building maintenance, stages of maintenance management, planning for building maintenance, periodicity of maintenance management, estimation of repair cycle, cost profile of maintenance, lamp replacement, building inspection, planned and Ad-hoc maintenance

Module-5

Condition survey and health evaluation of buildings, diagnosis of building by visual survey, case studies of visual survey, effect of corrosion and alkali aggregate reaction, sampling and choice of test location Non-destructive testing, core strength test, carbonation and chloride measurement, electrical method of progress measurement Repair, rehabilitation, retrofit, periodicity and economics of condition survey, interpretation of test results

11. Concept of building fire safety - D. EGAN.
12. Design of fire resisting structures - H.L. MALHOTRA.

List of reference materials/books/

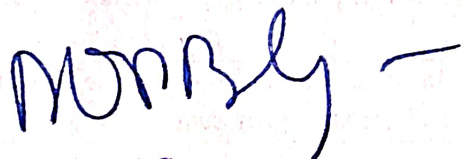
1. An introduction to fire dynamics - D. DRYSDALE
2. Structural fire protection Edt by T.T. LIE
3. Elevator technology - G.C. BARNEY
4. HEATING VENTILATING AND AIR CONDITIONING Analysis and Design - Faye C. McQuiston and Jerald D. Parker.
5. Building Maintenance Management - R. LEE
6. Developments In Building Maintenance - I.EJ. GIBSON
7. Concrete Structures: materials, Maintenance And Repair D.CAMPBELL, ALLEN & H. ROPER

Web links and Video Lectures (e-Resources):

- <https://archive.nptel.ac.in/courses/105/102/105102176/>

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Assignment students: A case study of fire hazard in building and restoration procedure adopted


H.O.D.
Dept. of Civil Engineering
Alva's Institute of Engg. & Technology
Mijar, Moodbidri - 574 225

BSCK307 – Social Connect & Responsibility 2022 Scheme & syllabus for 3rd sem		Semester	3 rd
Course Code	BSCK307	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:3:1	SEE Marks	-----
Total Hours of Pedagogy	40 hour Practical Session +15 hour Planning	Total Marks	100
Examination nature (No SEE – Only CIE)	For CIE Assessment - Activities Report Evaluation by College NSS Officer / HOD / Sports Dept / Any Dept.		
Credits	01 - Credit		

Course objectives: The course will enable the students to:

1. Provide a formal platform for students to communicate and connect to the surrounding.
2. create a responsible connection with the society.
3. Understand the community in general in which they work.
4. Identify the needs and problems of the community and involve them in problem –solving.
5. Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems.
6. Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.

General Instructions - Pedagogy :

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the activities will develop students' theoretical and applied social and cultural skills.
2. State the need for activities and its present relevance in the society and Provide real-life examples.
3. Support and guide the students for self-planned activities.
4. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress in real activities in the field.
5. Encourage the students for group work to improve their creative and analytical skills.

Contents :

The course is mainly activity-based that will offer a set of activities for the student that enables them to connect with fellow human beings, nature, society, and the world at large.

The course will engage students for interactive sessions, open mic, reading group, storytelling sessions, and semester-long activities conducted by faculty mentors.

In the following a set of activities planned for the course have been listed:

Social Connect & Responsibility - Contents

Part I:

Plantation and adoption of a tree:

Plantation of a tree that will be adopted for four years by a group of BE / B.Tech students. (ONE STUDENT ONE TREE)

They will also make an excerpt either as a documentary or a photo blog describing the plant's origin, its usage in daily life, its appearance in folklore and literature. -- Objectives, Visit, case study, report, outcomes.

Part II :

Heritage walk and crafts corner:

Heritage tour, knowing the history and culture of the city, connecting to people around through their history, knowing the city and its craftsman, photo blog and documentary on evolution and practice of various craft forms -- Objectives, Visit, case study, report, outcomes.

Part III :

Organic farming and waste management:

Usefulness of organic farming, wet waste management in neighboring villages, and implementation in the campus --

Objectives, Visit, case study, report, outcomes.

Part IV:

Water conservation:

Knowing the present practices in the surrounding villages and implementation in the campus, documentary or photoblog presenting the current practices – Objectives, Visit, case study, report, outcomes.

Part V :

Food walk:

City's culinary practices, food lore, and indigenous materials of the region used in cooking – Objectives, Visit, case study, report, outcomes.

Course outcomes (Course Skill Set):

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

CO1: Communicate and connect to the surrounding.

CO2: Create a responsible connection with the society.

CO3: Involve in the community in general in which they work.

CO4: Notice the needs and problems of the community and involve them in problem –solving.

CO5: Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems.

CO6: Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.

Activities:

Jamming session, open mic, and poetry: Platform to connect to others. Share the stories with others. Share the experience of Social Connect. Exhibit the talent like playing instruments, singing, one-act play, art-painting, and fine art.

PEDAGOGY:

The pedagogy will include interactive lectures, inspiring guest talks, field visits, social immersion, and a course project. Applying and synthesizing information from these sources to define the social problem to address and take up the solution as the course project, with your group. Social immersion with NGOs/social sections will be a key part of the course. Will all lead to the course project that will address the needs of the social sector?

COURSE TOPICS:

The course will introduce social context and various players in the social space, and present approaches to discovering and understanding social needs. Social immersion and inspiring conversational will culminate in developing an actual, idea for problem-based intervention, based on an in-depth understanding of a key social problem.

Duration :

A total of 40 - 50 hrs engagement per semester is required for the 3rd semester of the B.E. /B.Tech. program. The students will be divided into groups. Each group will be handled by faculty mentor. Faculty mentor will design the activities (particularly Jamming sessions open mic, and poetry) Faculty mentors has to design the evaluation system as per VTU guidelines of scheme & syllabus.

Guideline for Assessment Process:

Continuous Internal Evaluation (CIE):

After completion of the course, the student shall prepare, with daily diary as reference, a comprehensive report in consultation with the mentor/s to indicate what he has observed and learned in the social connect period. The report should be signed by the mentor. The report shall

be evaluated on the basis of the following criteria and/or other relevant criteria pertaining to the activity completed. Marks allotted for the diary are out of 50. Planning and scheduling the social connect Information/Data collected during the social connect Analysis of the information/data and report writing Considering all above points allotting the marks as mentioned below

Excellent : 80 to 100

Good : 60 to 79

Satisfactory : 40 to 59

Unsatisfactory and fail : <39

Special Note :

NO SEE – Semester End Exam – Completely Practical and activities based evaluation

Pedagogy – Guidelines :

It may differ depending on local resources available for the study as well as environment and climatic differences, location and time of execution.

Sl No	Topic	Group size	Location	Activity execution	Reporting	Evaluation Of the Topic
1.	Plantation and adoption of a tree:	May be individual or team	Farmers land/ parks / Villages / roadside/ community area / College campus etc.....	Site selection /proper consultation/Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty
2.	Heritage walk and crafts corner:	May be individual or team	Temples / monumental places / Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc.....	Site selection /proper consultation/Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty
3.	Organic farming and waste management:	May be individual or team	Farmers land / parks / Villages visits / roadside/ community area / College campus etc.....	Group selection / proper consultation / Continuous monitoring / Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty
4.	Water conservation: & conservation techniques	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers / campus etc.....	site selection / proper consultation/Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty
5.	Food walk: Practices in society	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc.....	Group selection / proper consultation / Continuous monitoring / Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty

Plan of Action (Execution of Activities)

Sl.NO	Practice Session Description
1	Lecture session in field to start activities
2	Students Presentation on Ideas
3	Commencement of activity and its progress
4	Execution of Activity
5	Execution of Activity
6	Execution of Activity
7	Execution of Activity
8	Case study based Assessment, Individual performance
9	Sector/ Team wise study and its consolidation
10	Video based seminar for 10 minutes by each student At the end of semester with Report.

- Each student should do activities according to the scheme and syllabus.
- At the end of semester student performance has to be evaluated by the faculty for the assigned activity progress and its completion.
- At last consolidated report of all activities from 1st to 5th, compiled report should be submitted as per the instructions and scheme.

Assessment Details for CIE (both CIE and SEE)

Assessment Details for CIE (both CIE and SEE)		<ul style="list-style-type: none">• Implementation strategies of the project (NSS work).• The last report should be signed by NSS Officer, the HOD and principal.• At last report should be evaluated by the NSS officer of the institute.• Finally the consolidated marks sheet should be sent to the university and also to be made available at LIC visit.
Weightage	CIE – 100%	
Field Visit, Plan, Discussion	10 Marks	
Commencement of activities and its progress	20 Marks	
Case study based Assessment Individual performance with report	20 Marks	
Sector wise study & its consolidation 5*5 = 25	25 Marks	
Video based seminar for 10 minutes by each student At the end of semester with Report. Activities 1 to 5, 5*5 = 25	25 Marks	
Total marks for the course in each semester	100 Marks	
For each activity, 20 marks CIE will be evaluated for IA marks at the end of semester, Report and assessment copy should be made available in the department.		
Students should present the progress of the activities as per the schedule in the prescribed practical session in the field. There should be positive progress in the vertical order for the benefit of society in general through activities.		

H.O.D.

Dept. of Civil Engineering

Institute of Engg. & Technology

Mijar, Moodbidri - 574 225

Data analytics with Excel		Semester	3
Course Code	BCV358A	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:2:0	SEE Marks	50
Credits	01	Exam Hours	100
Examination type (SEE)	practical		
Course objectives: <ul style="list-style-type: none">Understand the use of Spreadsheet for data collection and analysis.Evaluate the equations using Excel functionsLearn the data quality and consistency of data			
Sl.NO	Experiments		
1	Introduction to Data Analysis Using Spreadsheets: Fundamentals of spreadsheet applications, Excel interface, and learn how to navigate around a worksheet and workbook.		
2	Using Excel Spreadsheets: Perform basic spreadsheet tasks, such as viewing, entering and editing data, and moving, copying and filling data. Learn about the fundamentals of formulas, and learn about the most common functions used by a data analyst. Finally, you will learn how to reference data in formulas.		
3	Cleaning & Wrangling Data Using Spreadsheets: Importance of data quality, how to import file data in to Excel, fundamentals of data privacy, remove duplicate and inaccurate data, and how to remove empty rows in your data..		
4	How to deal with inconsistencies in your data and how to use the Flash Fill and Text to Columns features to help you manipulate and standardize your data		
5	Analyzing Data Using Spreadsheets: Fundamentals of analyzing data using a spreadsheet, and learn how to filter and sort data. Learn how to use some of the most useful functions for a data analyst		
6	How to use the VLOOKUP and HLOOKUP reference functions. In addition, learn how to create pivot tables in Excel, and use several pivot table features		
7	Final Project: In this final module, you will be introduced to a hands-on lab where you will complete a graded assignment for cleaning and preparing data, and then analyzing data using an Excel spreadsheet.		
8	Submission of report for final assessment		
Course outcomes (Course Skill Set): At the end of the course the student will be able to: <ul style="list-style-type: none">Prepare the data sets and perform the analysis.Analyse and perform repetitive calculations using several functionsDesign and apply solutions to verify the data sets			

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

Continuous Internal Evaluation (CIE):

CIE marks for the practical course are **50 Marks**.

The split-up of CIE marks for record/ journal and test are in the ratio **60:40**.

- Each experiment is to be evaluated for conduction with an observation sheet and record write-up. Rubrics for the evaluation of the journal/write-up for hardware/software experiments are designed by the faculty who is handling the laboratory session and are made known to students at the beginning of the practical session.
- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled down to **30 marks** (60% of maximum marks).
- Weightage to be given for neatness and submission of record/write-up on time.
- Department shall conduct a test of 100 marks after the completion of all the experiments listed in the syllabus.
- In a test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability.
- The marks scored shall be scaled down to **20 marks** (40% of the maximum marks).

The Sum of scaled-down marks scored in the report write-up/journal and marks of a test is the total CIE marks scored by the student.

Semester End Evaluation (SEE):

- SEE marks for the practical course are 50 Marks.
- SEE shall be conducted jointly by the two examiners of the same institute, examiners are appointed by the Head of the Institute.
- The examination schedule and names of examiners are informed to the university before the conduction of the examination. These practical examinations are to be conducted between the schedule mentioned in the academic calendar of the University.
- All laboratory experiments are to be included for practical examination.
- (Rubrics) Breakup of marks and the instructions printed on the cover page of the answer script to be strictly adhered to by the examiners. **OR** based on the course requirement evaluation rubrics shall be decided jointly by examiners.

- Students can pick one question (experiment) from the questions lot prepared by the examiners jointly.
- Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners.

General rubrics suggested for SEE are mentioned here, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on course type, rubrics shall be decided by the examiners)

Change of experiment is allowed only once and 15% of Marks allotted to the procedure part are to be made zero.

The minimum duration of SEE is 02 hours

Suggested Learning Resources:

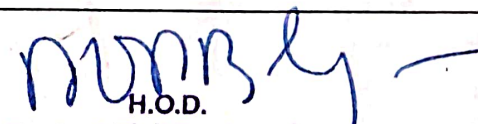
- <https://www.coursera.org/learn/excel-basics-data-analysis-ibm>
- Any online platform with the above course content like YouTube videos and NPTEL courses

Physical Education (Sports and Athletics) syllabus

Semester: III						
PHYSICAL EDUCATION (SPORTS & ATHLETICS) – I						
Course Code	:	BPEK359		CIE	:	100 Marks
Credits: L:T:P	:	0:0:1				
Total Hours	:	24 P				
Course Outcomes: At the end of the course, the student will be able to						
<ol style="list-style-type: none">1. Understand the fundamental concepts and skills of Physical Education, Health, Nutrition and Fitness2. Familiarization of health-related Exercises, Sports for overall growth and development3. Create a foundation for the professionals in Physical Education and Sports4. Participate in the competition at regional/state / national / international levels.5. Create consciousness among the students on Health, Fitness and Wellness in developing and maintaining a healthy lifestyle.6. Understand and practice of Traditional Games						
Module I : Orientation					4 Hours	
<ol style="list-style-type: none">A. LifestyleB. Health & WellnessC. Pre-Fitness test.						
Module II: General Fitness & Components of Fitness					4 Hours	
<ol style="list-style-type: none">A. Warming up (Free Hand exercises)B. Strength – Push-up / Pull-upsC. Speed – 30 Mtr Dash						
Module III : Specific games (Any one to be selected by the student)					16 Hours	
<ol style="list-style-type: none">1. Kabaddi – Hand touch, Toe Touch, Thigh Hold, Ankle hold and Bonus.2. Kho-Kho – Giving Kho, Single Chain, Pole dive, Pole turning, 3-6 Up.						

Scheme and Assessment for auditing the course and Grades:

Sl. No.	Activity	Marks
1.	Participation of student in all the modules	20
2.	Quizzes – 2, each of 15 marks	30
3.	Final presentation / exhibition / Participation in competitions/ practical on specific tasks assigned to the students	50
Total		100


 H.O.D.
 Dept. of Civil Engineering
 Alva's Institute of Engg. & Tech.
 Mijar, Moodbidri - 574 904
 @## 16092024

VARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

B.E. in Civil Engineering

Scheme of Teaching and Examinations 2022

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2023-24)

IV SEMESTER

Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	PCC	BCV401	Analysis of Structures	TD: CV PSB: CV	3	0	0		03	50	50	100	3
2	IPCC	BCV402	Fluid Mechanics and Hydraulics	TD: CV PSB: CV	3	0	2		03	50	50	100	4
3	IPCC	BCV403	Transportation Engineering	TD: CV PSB: CV	3	0	2		03	50	50	100	4
4	PCCL	BCVL404	Building Materials Testing Lab	TD: CV PSB: CV	0	0	2		03	50	50	100	1
5	ESC	BCV405x	ESC/ETC/PLC		3	0	0		03	50	50	100	3
6	AEC/ SEC	BCV456x	Ability Enhancement Course/Skill Enhancement Course- IV	TD and PSB: Concerned department	If the course is Theory				01	50	50	100	1
					1	0	0						
					If the course is a lab				02				
					0	0	2						
7	BSC	BBOK407	Biology For Engineers	TD / PSB: BT, CHE,	3	0	0		03	50	50	100	3
8	UHV	BUHK408	Universal human values course	Any Department	1	0	0		01	50	50	100	1
9	MC	BNSK459	National Service Scheme (NSS)	NSS coordinator	0	0	2			100	---	100	0
		BPEK459	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		BYOK459	Yoga	Yoga Teacher									
Total									500	400	900	20	

PCC: Professional Core Course, PCCL: Professional Core Course laboratory, UHV: Universal Human Value Course, MC: Mandatory Course (Non-credit), AEC: Ability Enhancement Course, SEC: Skill Enhancement Course, L: Lecture, T: Tutorial, P: Practical S= SDA: Skill Development Activity, CIE: Continuous Internal Evaluation, SEE: Semester End Evaluation. K: This letter in the course code indicates common to all the stream of engineering.

Ability Enhancement Course / Skill Enhancement Course - IV

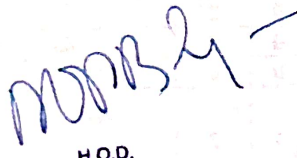
BCVL456A	Building Information Modelling in Civil Engineering – Basics (0:0:2)	BCV456C	Electronic Waste Management - Issues and Challenges
BCV456B	GIS with Quantum GIS	BCV456D	Technical Writing Skills

Engineering Science Course (ESC/ETC/PLC)

BCV405A	Finance for Professionals	BCV405C	Concreting Techniques & Practices
BCV405B	Construction Equipment, Plants and Machinery	BCV405D	Watershed Management

Professional Core Course (IPCC): Refers to Professional Core Course Theory Integrated with practical of the same course. Credit for IPCC can be 04 and its Teaching-Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (B.E./B.Tech.) 2022-23

National Service Scheme /Physical Education/Yoga: All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first Week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score is mandatory for the award of the Degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses is mandatory for the award of Degree.


H.O.D.
Dept. of Civil Engineering
Aiva's Institute of Engg. & Technology
Mijar, Moodbidri - 574 225

Analysis of Structures		Semester	IV
Course Code	SCV401	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	03	SEE Marks	50
Total Hours of Pedagogy	3:0:0:0	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	Theory/practical/Viva-Voce /Term-work/Others		

Course Learning objectives: This course will enable students to

- Understand the Different Forms of Structural Systems.
- Determine the Strain Energy and Slope and Deflection of Beams, Trusses and Frames.
- Analyse arches and cable structures.
- Analyse different types of beams and frames using slope deflection method.
- Analyse different types of beams and frames using moment distribution method.

Teaching-Learning Process (General Instructions)

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills.
2. Arrange field visits to give brief information about the water and wastewater treatment plant.
3. Encourage collaborative (Group Learning) Learning in the class.
4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking and enhance the knowledge of treatment processes.
5. Adopt Problem Based Learning (PBL), which fosters students, Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Seminars, surprise tests and Quizzes may be arranged for students in respective subjects to develop skills

Module-1

Introduction and Analysis of Plane Trusses: Structural forms, Conditions of equilibrium, Compatibility conditions, Degree of freedom, Linear and nonlinear analysis, Static and kinematic indeterminacies of structural systems, Types of trusses, Assumptions in analysis, Analysis of determinate trusses by method of joints and method of sections.
L1,L2,L3

Module-2

DEFLECTION OF BEAMS: Moment area method: Derivation, Mohr's theorems, sign convention; Application of moment area method to determinate prismatic beams, beams of varying cross section; Use of moment diagram by parts.

Strain Energy: Principle of virtual displacements, Principle of virtual forces, Strain energy and complimentary energy, Strain energy due to axial force, bending, shear and torsion (No numerical). Castigliano's theorems, application of Castigliano's theorems to calculate deflection of beams, trusses and frames (No numerical on unit load method).

Module-3

Arches and Cable Structures: Three hinged parabolic arches with supports at the same and different levels. Determination of normal thrust, radial shear and bending moment. Analysis of cables under point loads and UDL. Length of cables for supports at same and at different levels- Stiffening trusses for suspension cables.
L1,L2,L3

Module-4

Slope Deflection Method: Introduction, sign convention, development of slope deflection equation; Analysis of continuous beams including settlement of supports; Analysis of orthogonal rigid plane frames including sway frames with kinematic indeterminacy up to 3
L1,L2,L3,L4

Module-5

Moment Distribution Method: Introduction, Definition of terms, Development of method, Analysis of continuous beams with support yielding, Analysis of orthogonal rigid plane frames including sway frames with kinematic indeterminacy up to 3
L1,L2,L3,L4

Course outcome (Course Skill Set)

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

1. identify the different forms of structural systems and analyse the trusses.
2. Evaluate the slope and deflections in beams, frames and trusses by using moment area method and energy principle.
3. Analyse and determine the stress resultants in arches and cables.
4. Analyse the indeterminate structures and construct BMD AND SFD using slope deflection methods.
5. Analyse the indeterminate structures and construct BMD AND SFD using Moment Distribution Method.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

Continuous Internal Evaluation (CIE):

CIE marks for the practical course are **50 Marks**.

The split-up of CIE marks for record/ journal and test are in the ratio **60:40**.

- Each experiment is to be evaluated for conduction with an observation sheet and record write-up. Rubrics for the evaluation of the journal/write-up for hardware/software experiments are designed by the faculty who is handling the laboratory session and are made known to students at the beginning of the practical session.
- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled down to **30 marks** (60% of maximum marks).
- Weightage to be given for neatness and submission of record/write-up on time.
- Department shall conduct a test of 100 marks after the completion of all the experiments listed in the syllabus.
- In a test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability.
- The marks scored shall be scaled down to **20 marks** (40% of the maximum marks).

The Sum of scaled-down marks scored in the report write-up/journal and marks of a test is the total CIE marks scored by the student.

Semester End Evaluation (SEE):

- SEE marks for the practical course are 50 Marks.
- SEE shall be conducted jointly by the two examiners of the same institute, examiners are appointed by the Head of the Institute.
- The examination schedule and names of examiners are informed to the university before the conduction of the examination. These practical examinations are to be conducted between the schedule mentioned in the academic calendar of the University.
- All laboratory experiments are to be included for practical examination.
- (Rubrics) Breakup of marks and the instructions printed on the cover page of the answer script to be strictly adhered to by the examiners. **OR** based on the course requirement evaluation rubrics shall be decided jointly by examiners.

- Students can pick one question (experiment) from the questions lot prepared by the examiners jointly.
- Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners.

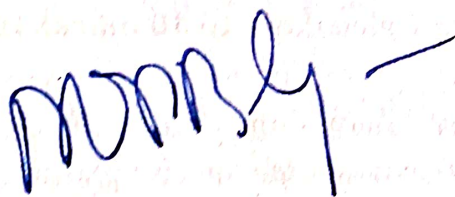
General rubrics suggested for SEE are mentioned here, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on course type, rubrics shall be decided by the examiners)

Change of experiment is allowed only once and 15% of Marks allotted to the procedure part are to be made zero.

The minimum duration of SEE is 02 hours

Suggested Learning Resources:

- <https://www.coursera.org/learn/excel-basics-data-analysis-ibm>
- Any online platform with the above course content like YouTube videos and NPTEL courses



H.O.D.
Dept. of Civil Engineering
Alva's Institute of Engg. & Technology
Mijar, Moodbidri - 574 225

FLUID MECHANICS AND HYDRAULICS			
Course Code	BCV402	Semester	IV
Teaching Hours/Week (L:T:P: S)	3:0:2:0	CIE Marks	50
Total Hours of Pedagogy	40 + 8-10 Lab slots	SEE Marks	50
Credits	04	Total Marks	100
Examination nature (SEE)	Theory/Practical	Exam Hours	3

Course Learning objectives: This course will enable students to

- Understand the Fundamentals of properties of fluids, fluid pressure measurement and hydrostatic law
- Learn the Principles of kinematics, hydrodynamics and its applications
- Study the Flow measurements and design of pipes
- Understand the design of open channels and energy concepts
- Understand the Working principles of hydraulic turbines and pumps

Teaching-Learning Process (General Instructions)

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills.
2. Arrange field visits to give brief information about the water and wastewater treatment plant.
3. Encourage collaborative (Group Learning) Learning in the class.
4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking and enhance the knowledge of treatment processes.
5. Adopt Problem Based Learning (PBL), which fosters students, Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Seminars, surprise tests and Quizzes may be arranged for students in respective subjects to develop skills.

MODULE-1

Fluids and their properties – compressibility, surface tension, capillarity, Pascal's law, hydrostatic law, fluid pressure measurement using simple and differential manometers, Total pressure and center of pressure on vertical and inclined plane surfaces. L2,L3

MODULE-2

Kinematics- Types of flow, continuity equation in Cartesian coordinates, velocity potential, stream function, flow nets, Dynamics-Euler's equation of motion, Bernoulli's equation, Application- Venturimeter, Orifice meter, Pitot tube. L2,L4

MODULE-3

Classification of orifice and mouthpiece, hydraulic coefficients, discharge over rectangular, triangular and Cipoletti notch, Flow through pipes- major and minor losses, pipes in series and parallel, equivalent pipe, concept of water hammer and surge tanks. L2,L4

MODULE-4

Open channel hydraulics- classification of flow, Most economical channel sections-rectangular, triangular, trapezoidal, circular, Uniform flow, specific energy-rectangular channels, on-uniform flow, hydraulic jump-equation and applications, GVF equation-types. **L2,L4**

MODULE-5

Momentum equation, impact of jet on stationary and moving curved vanes Turbines-types, Pelton wheel-working proportions, velocity triangles Francis turbine- working proportions, velocity triangles Centrifugal pumps-work done, efficiency, multi-stage pumps. **L2,L4**

PRACTICAL COMPONENT OF IPCC (May cover all / major modules)

Sl.NO	Experiments	
1	Verification of Bernoulli's equation	L1,L2
2	Calibration of Venturimeter/Orifice meter	L1,L2
3	Determination of hydraulic coefficients of small vertical orifice	L1,L2
4	Calibration of triangular notch	L1,L2
5	Determination of Cd for Cipoletti notch	L1,L2
6	Determination of major losses in pipes	L1,L2
7	Determination of Cd for ogee/broad crested weir	L1,L2
8	Determination of efficiency of jet on flat and curved vanes	L1,L2
9	Determination of Cd of Venturiflume	L1,L2
10	Demo of determination of efficiency of centrifugal pump	L1,L2
11	Demo of determination of efficiency of Francis/Kaplan turbine	L1,L2
12	Demo of determination of efficiency of Pelton wheel	L1,L2

Course outcomes (Course Skill Set):

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

- Explain the fundamental properties of fluids and solve problems on fluid pressure and hydrostatics.
- Apply the principles of kinematics and dynamics of fluid flow to solve problems on velocity and pressure.
- Compute the discharge through pipes, notches and weirs.
- Design the turbines and open channels of different sections and to estimate the energy loss in hydraulic jump.
- Able to interpret the experimental results of discharge, efficiency based on the test conducted in the laboratory.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

CIE for the theory component of the IPCC (maximum marks 50)

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are 25 marks and that for the practical component is 25 marks.
- 25 marks for the theory component are split into 15 marks for two Internal Assessment Tests (Two Tests, each of 15 Marks with 01-hour duration, are to be conducted) and 10 marks for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.

- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for 25 marks).
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

CIE for the practical component of the IPCC

- 15 marks for the conduction of the experiment and preparation of laboratory record, and 10 marks for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to 15 marks.
- The laboratory test (duration 02/03 hours) after completion of all the experiments shall be conducted for 50 marks and scaled down to 10 marks.
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for 25 marks.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC.

SEE for IPCC

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (duration 03 hours)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored by the student shall be proportionally scaled down to 50 Marks

The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper may include questions from the practical component.

Suggested Learning Resources:**Books:****Text Books:**

1. P.N. Modi and S.M. Seth-Hydraulics and Fluid Mechanics, including Hydraulic machines, standard Book House, New Delhi
2. K Subramanya- Fluid Mechanics and Hydraulic Machines, Tata McGraw-Hill, New Delhi
3. R.K. Bansal- A text book of Fluid Mechanics and Hydraulic Machines- Laxmi Publications, New Delhi
4. Victor L. Streeter, Benjamin Wyile E and Keith W. Bedford- Fluid Mechanics, Tata McGraw Hill publishing Co Ltd, New Delhi
5. J.F. Douglas. M. Gastric, John Warfield, Lynne Jack – Fluid Mechanics, Pearson, Fifth edition.
6. K. Subramanya- Fluid Mechanics and Hydraulic Machines, Problems and Solutions, Tata McGrawhill, New Delhi.
7. S K SOM and G.Bis was – “ introduction to Fluid Mechanics and Fluid Machines, Tata Mcg raw Hill, New Delhi.

Web links and Video Lectures (e-Resources):

- YouTube Videos

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning:

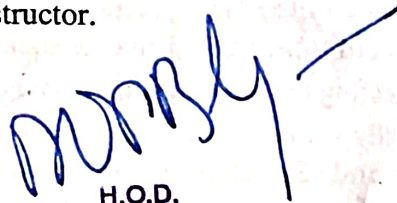
- Visit to hydro- electric power plant
- Visit to sites to visualise the flow measuring devices, viz., weirs, spillways, etc.

CO & PSO - PO Mapping (Individual Teacher has to fill)

Mapping of Course Outcomes and Program specific outcomes to Program Outcomes																
Course outcomes	Program outcomes												Program Specific Outcomes			
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4
CO1																
CO2																
CO3																
CO4																
CO5																
Total																
Average																

Level 0: Not Mapped, 1: Low Mapped, 2: Moderately Mapped 3: Highly Mapped

Note: Depending on the Assessment tool used, higher order POs Can be identified by the concerned course instructor.


H.O.D.
Dept. of Civil Engineering
Alva's Institute of Engg. & Technology
Mijar, Moodbidri - 574 225

TRANSPORTATION ENGINEERING		Semester	
Course Code	BCV403	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:2:0	SEE Marks	50
Total Hours of Pedagogy	40 hours Theory + 8-10 Lab slots	Total Marks	100
Credits	04	Exam Hours	
Examination nature (SEE)	Theory		

Course Learning objectives: This course will enable students to

- Gain knowledge of different modes of transportation systems and to learn the introductory concepts on Highway Engineering.
- Get insight to different highway materials and pavement design elements of a highway network.
- Realize the significance of road safety by incorporating the concepts of Traffic Engineering.
- Understand to different aspects of geometric elements of railway system and evaluate the material quantity required for track laying
- Gain knowledge about various components of an Airport and its runway design.

Teaching-Learning Process (General Instructions)

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills.
2. Arrange field visits to give brief information about the water and wastewater treatment plant.
3. Encourage collaborative (Group Learning) Learning in the class.
4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking and enhance the knowledge of treatment processes.
5. Adopt Problem Based Learning (PBL), which fosters students, Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Seminars, surprise tests and Quizzes may be arranged for students in respective subjects to develop skills

MODULE-1

TRANSPORTATION ENGINEERING: Introduction, Different Modes of Transportation, M R Jayakar Committee recommendations, Road Classifications and Road Patterns.

Highway Alignment: Factors affecting highway alignment, Engineering surveys for alignment-conventional and modern methods.

Highway Geometric Design: Factors affecting geometric design of roads, Cross Sectional Elements, Sight distances, Horizontal alignment- Transition curve, superelevation, Extrapwidening, Vertical alignment-gradients, summit and valley curves. (*No derivations*)

Problems on Sight distance, Super elevation, extra widening of curves, Length of transition curve, Length of summit and valley curve. (L1, L2)

MODULE-2

HIGHWAY MATERIALS AND PAVEMENTS: Desirable properties of aggregates, soil subgrade & Bitumen, Application of bituminous emulsion, Desirable properties of Bituminous Mixes
Pavement Design: Factors Controlling design of highway pavements, Pavement types, component parts of pavements and their functions; types of joints used in rigid pavement. Critical stresses in flexible and rigid pavement.
Highway Drainage: Significance and requirements, Surface drainage system and design-Examples, sub surface drainage system, Types of cross drainage structures their choice and location.
Problems on design of Longitudinal drain. (L2, L3)

MODULE-3

TRAFFIC ENGINEERING: Objectives and scope of Traffic Engineering. Traffic Characteristics: Road user characteristics, vehicular characteristics – static and dynamic characteristics, Reaction time of driver and PIEV theory, Types of traffic engineering studies-volume, spot speed, speed and delay, parking, accident, origin & destination, objectives of studies and data collection, method of study, analysis. PCU concept, factors affecting and PCU at different locations and applications. Traffic signs, Signal design by IRC method; Types of intersections.
Problems on Spot speed studies, Speed and delay studies, accident studies, Signal design by IRC method. (L2, L3)

MODULE-4

RAILWAY ENGINEERING: Permanent way and its requirements, Gauges and types, Typical cross sections single and double-line BG track, Coning of wheels and tilting of rails, Rails-Functions-requirements, types and defects of rails. Sleepers and Ballast: Functions, requirements, Track fitting and fasteners, Calculation of quantity of materials required for laying a track, Points & crossings, Railway Station and Yards. Metro train & high speed train- Design factors considered.
Problem on Quantity calculation for laying railway track. Super-elevation (L1, L2)

MODULE-5

AIRPORT ENGINEERING: Layout of an airport with component parts and functions, Site selection for airport, Aircraft characteristics affecting the design and planning of airport, Airport classification, Runway orientation using wind rose with examples.
RUNWAY-Basic runway length-Corrections and examples, Runway geometrics, Taxiway-Factors affecting the layout - geometrics of taxiway-Comparison between Runway and Highway, Design of exit taxiway with examples.
Problems on Runway orientation, Basic Runway length, Exit taxiway design. (L2, L3)

PRACTICAL COMPONENT OF IPCC (May cover all / major modules)**Experiments (8-10 Lab slots)**

Sl. NO		
1	Tests on Aggregates a. Crushing Strength Test b. Los Angeles abrasion test c. Impact test d. Shape tests (combined index and angularity number)	(L1, L2)
2	Tests on Bituminous Materials a. Penetration test b. Ductility test c. Softening point test d. Specific gravity test e. Viscosity test by tar viscometer f. Flash and fire point test	(L1, L2)
3	Tests on Soil a. Wet sieve analysis b. CBR Test on soil	(L1, L2)
4	Design of flexible pavement as per IRC 37-2018	(L2, L4)
5	Design of Rigid pavement as per IRC 58-2015	(L3, L4)
6	Bituminous Mix Design by Marshall Method (Demonstration only)	(L1, L2)
7	Traffic Engineering studies	(L3, L4)

Course outcomes (Course Skill Set):

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

1. Explain the basic principles of geometric design in the context of transportation engineering and planning.
2. Select the appropriate pavement materials for construction and design the pavement as per standard practices.
3. Conduct traffic studies and analyse traffic data for practical applications.
4. Identify the Components parts of Railway Track and design the suitable runway for an Airport.
5. Able to interpret the experimental results of highway materials based on laboratory tests and design the pavement as per IRC guidelines.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

CIE for the theory component of the IPCC (maximum marks 50)

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are **25 marks** and that for the practical component is **25 marks**.
- 25 marks for the theory component are split into **15 marks** for two Internal Assessment Tests (Two Tests, each of 15 Marks with 01-hour duration, are to be conducted) and **10 marks** for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.

- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for **25 marks**).
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

CIE for the practical component of the IPCC

- **15 marks** for the conduction of the experiment and preparation of laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to **15 marks**.
- The laboratory test (**duration 02/03 hours**) after completion of all the experiments shall be conducted for 50 marks and scaled down to **10 marks**.
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **25 marks**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC.

SEE for IPCC

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored by the student shall be proportionally scaled down to 50 Marks

The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper may include questions from the practical component.

Suggested Learning Resources:

Books

1. S K Khanna and C E G Justo, "Highway Engineering", Nem Chand Bros, Roorkee.
2. L R Kadiyali, "Highway Engineering", Khanna Publishers, New Delhi.
3. "A Text Book of Railway Engineering" by S C Saxena and S P Arora
4. "Airport Engineering" by S C Rangwala
5. "Airport Planning and Design" by Khanna Arora and Jain, Nem Chand Bros, Roorkee.
6. "Roads, Railways, Bridges, Tunnels and Harbour Dock Engineering by B L Gupta, Amit Gupta.
7. S K Khanna, C E G Justo and A Veeraragavan, "Highway Materials Testing Laboratory Manual", Nem Chand Bros, Roorkee.

Web links and Video Lectures (e-Resources):

1. <https://nptel.ac.in/courses/105101087>
2. https://onlinemanuals.txdot.gov/txdotmanuals/rdw/horizontal_alignment.htm#BGBHGECC
3. www.civil.itb.ac.in/tvm/1111_nptel/567_Grade/plain/plain.html
4. <https://www.pavementinteractive.org/>
5. <https://www.eng.auburn.edu/research/centers/ncat/research/other-publications.html>
6. <https://nptel.ac.in/courses/105/106/105106203/>
7. <https://nptel.ac.in/courses/105/101/105101008>
8. <https://nptel.ac.in/courses/105/104/105104098>
9. <https://www.classcentral.com/course/edx-intro-to-traffic-flow-modeling-and-intelligenttransport-systems-12728>
10. <https://www.aai.aero/>
11. <https://www.faa.gov/>
12. <https://www.icao.int>

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Visit to a road construction project

CO & PSO - PO Mapping (Individual Teacher has to fill)

Mapping of Course Outcomes and Program specific outcomes to Program Outcomes																
Course outcomes	Program outcomes												Program Specific Outcomes			
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4
CO1																
CO2																
CO3																
CO4																
CO5																
Total																
Average																

Level 0: Not Mapped, 1: Low Mapped, 2: Moderately Mapped 3: Highly Mapped

Note: Depending on the Assessment tool used, higher order POs Can be identified by the concerned course instructor.

mrb

H.O.D.

Dept. of Civil Engineering

Anna University of Engg. & Technology

Chennai, Meenambidri - 574 226

BUILDING MATERIALS TESTING LABORATORY		Semester	4
Course Code	BCVL404	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:2:0	SEE Marks	50
Credits	01	Total Marks	100
		Exam Hours	02
Examination type (SEE)	Practical		

Course objectives:

- Ability to apply knowledge of mathematics and engineering in calculating the mechanical properties of structural materials.
- Ability to function on multi-disciplinary teams in the area of material testing.
- Ability to use the techniques, skills and modern engineering tools necessary for engineering.
- Understanding of professional and ethical responsibility in the areas of material testing.
- Ability to communicate effectively the mechanical properties of materials..

Sl.NO	Experiments
1	Tests on Bricks, Tiles, Cement Concrete blocks (Weight & Dimensionality, Water Absorption, Strength)(L1, L2, L3, L4)
2	Tests on Fine aggregates - Sieve Analysis, Moisture content, Specific gravity, Bulk density, Bulking and Silt Content (L1, L2, L3, L4)
3	Tests on Coarse aggregates- Sieve Analysis, Water absorption, Moisture content, specific gravity and Bulk density(L1, L2, L3, L4)
4	Compression test on mild steel, cast iron and wood.(L1, L2, L3, L4)
5	Tension test on mild steel and HYSD bars (L2, L3, L4)
6	Torsion test on mild steel circular sections. (L1, L2, L3, L4)
7	Bending Test on Wood Under two-point loading. (L1, L2, L3, L4)
8	Shear Test on Mild steel- single and double shear. (L1, L2, L3, L4)
9	Impact test on Mild Steel (Charpy&Izod). (L1, L2, L3, L4)
10	Hardness tests on ferrous and non-ferrous metals- Brinell's, Rockwell and Vicker's. (L1, L2, L3, L4)
11	Demonstration of Strain gauges and Strain indicators. (L1, L2, L3, L4)

NOTE: All tests to be carried out as per relevant latest BIS Codes

Course outcomes (Course Skill Set):

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

- Analyze the physical characteristics, and behavior of common building materials.
- Reproduce the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion for steel .
- Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials.
- Recognize the importance of ethical conduct, integrity, and accuracy in materials testing and

reporting..

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation (CIE):

CIE marks for the practical course are **50 Marks**.

The split-up of CIE marks for record/ journal and test are in the ratio **60:40**.

- Each experiment is to be evaluated for conduction with an observation sheet and record write-up. Rubrics for the evaluation of the journal/write-up for hardware/software experiments are designed by the faculty who is handling the laboratory session and are made known to students at the beginning of the practical session.
- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled down to **30 marks** (60% of maximum marks).
- Weightage to be given for neatness and submission of record/write-up on time.
- Department shall conduct a test of 100 marks after the completion of all the experiments listed in the syllabus.
- In a test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability.
- The marks scored shall be scaled down to **20 marks** (40% of the maximum marks).

The Sum of scaled-down marks scored in the report write-up/journal and marks of a test is the total CIE marks scored by the student.

Semester End Evaluation (SEE):

- SEE marks for the practical course are 50 Marks.
- SEE shall be conducted jointly by the two examiners of the same institute, examiners are appointed by the Head of the Institute.
- The examination schedule and names of examiners are informed to the university before the conduction of the examination. These practical examinations are to be conducted between the schedule mentioned in the academic calendar of the University.
- All laboratory experiments are to be included for practical examination.
- (Rubrics) Breakup of marks and the instructions printed on the cover page of the answer script to be strictly adhered to by the examiners. **OR** based on the course requirement

evaluation rubrics shall be decided jointly by examiners.

- Students can pick one question (experiment) from the questions lot prepared by the examiners jointly.
- Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners.

General rubrics suggested for SEE are mentioned here, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on course type, rubrics shall be decided by the examiners)

Change of experiment is allowed only once and 15% of Marks allotted to the procedure part are to be made zero.

The minimum duration of SEE is 02 hours

Suggested Learning Resources:

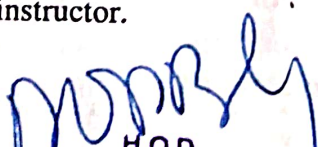
- Davis, Troxell and Hawk, "Testing of Engineering Materials", International Student Edition – McGraw Hill Book Co. New Delhi.
- M L Gambhir and Neha Jamwal, "Building and construction materials-Testing and quality control", McGraw Hill education (India) Pvt. Ltd., 2014.
- Fenner, "Mechanical Testing of Materials", George Newnes Ltd. London.
- Holes K A, "Experimental Strength of Materials", English Universities Press Ltd. London.
- Suryanarayana A K, "Testing of Metallic Materials", Prentice Hall of India Pvt. Ltd. New Delhi.
- Kukreja C B, Kishore K. and Ravi Chawla "Material Testing Laboratory Manual", Standard Publishers & Distributors 1996.
- Relevant latest IS Codes.

CO & PSO - PO Mapping (Individual Teacher has to fill)

Mapping of Course Outcomes and Program specific outcomes to Program Outcomes																
Course outcomes	Program outcomes												Program Specific Outcomes			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1																
CO2																
CO3																
CO4																
CO5																
Total																
Average																

Level 0: Not Mapped, 1: Low Mapped, 2: Moderately Mapped 3: Highly Mapped

Note: Depending on the Assessment tool used, higher order POs Can be identified by the concerned course instructor.


H.O.D.
Dept. of Civil Engineering
Alva's Institute of Engg. & Technology
Mijar, Moodbidri - 574 226

Watershed Management		Semester	4
Course Code	BCV405D	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:2:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3
Examination type (SEE)	Theory/practical/Viva-Voce /Term-work/Others		
Course objectives: <ul style="list-style-type: none">• To understand Watershed Hydrology• To estimate water demand and learn, water conservation methods• To understand application of Remote Sensing and GIS in watershed management• Sustainable measures for watershed management			
Teaching-Learning Process (General Instructions) These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes. <ul style="list-style-type: none">• Power point Presentation, video• Video tube, NPTEL materials• Quiz/Assignments/Open book test to develop skills• Encourage collaborative learning in the class with site visits related to subject and impart practical knowledge			
Module-1			
Principles of Watershed Management: Basics concepts, hydrology and water availability, surface water, ground water, conjunctive use, human influences in the water resources system.			
Module-2			
Water resources systems: Integrated water resources system, river basins-morphometric analysis of watersheds for watershed management, watershed management practices in arid and semi-arid regions, watershed management through wells, management of water supply, short term and long-term strategic planning.			
Module-3			
Conservation of Water: Perspective on recycle and reuse, wastewater reclamation, social aspects of watershed management and community participation, private sector participation, institutional issues, socio-economy, integrated development, water legislation and implementations, case studies. Water Harvesting: Rainwater management, conservation, storage and effective utilization of rainwater, structures for rainwater harvesting, roof catchments system, check dams, aquifer storage.			
Module-4			
Sustainable Watershed Approach: Sustainable integrated watershed management, natural resources management, agricultural practices, integrated farming, soil erosion and conservation.			
Module-5			
Applications of RS and GIS in Watershed management: Role of decision support system in watershed management, watershed characteristics, of coastal regions, coastal aquifer for management, uniqueness of coastal water resources.			

Course outcome (Course Skill Set)

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

- Discuss surface and ground water resources system and, human influences.
- Integrate water resources system in arid and semi-arid regions and explain watershed aquifer for management.
- Analyse water resources related issues for conservation and synthesize augmentation of water resources.
- Design integrated watershed management system.
- Apply modern tools in watershed management.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered.
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (duration 03 hours).

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored shall be proportionally reduced to 50 marks

Note: Subject to be taught by Geologist with qualification M. Sc Geology/MPhil/ Ph. D in Geology or Faculty of Civil Engineering

Suggested Learning Resources:

Books

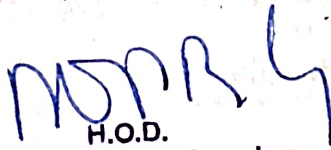
1. Singh Vir, Raj., "Watershed Planning and Management", Yash Publishing House, Bikaner. 3rd Revised Edition, 2016.
2. Murthy, J. V. S., "Watershed Management in India", New Age Publishers, New Delhi. 2nd Edition, 2017.
3. "Decision Support System for Integrated Watershed Management", Colorado State University. 2012.
4. Tideman, E. M. "Watershed Management" Omega Scientific Publishers, New Delhi. 2002.

Web links and Video Lectures (e-Resources):

- <https://www.youtube.com/watch?v=wkPu4LwRKro>
- <https://youtu.be/wkPu4LwRKro>
- <https://youtu.be/wkPu4LwRKro>
- <https://youtu.be/wkPu4LwRKro>

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Seminars/Quiz (To assist in GATE Preparations)
- Self-Study on simple topics
- Discussion of case studies
- Field visits to construction sites



H.O.D.

Dept. of Civil Engineering
Alva's Institute of Engg. & Technology
Mijar, Moodbidri - 574 225

GIS with Quantum GIS		Semester	4
Course Code	BCV456B	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:2:0:0	SEE Marks	50
Total Hours of Pedagogy	15	Total Marks	100
Credits	01	Exam Hours	1
Examination type (SEE)	Theory (MCQ)		

Course objectives:

- Learning the open source QGIS software for Civil Engineering applications
- Understand raster and vector data
- Creation of base map and thematic maps for specific application

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. Demonstration of open source software for GIS
2. YouTube videos to learn GIS software
3. Power Point presentations.

Module-1

QGIS Introduction: Definition of GIS and its use. Introduction to a free and open source desktop geographic information system software. Types of data (vector and raster formats), web services, useful commands and utilities for geo-processing, extending its capabilities to digital satellite image processing and analysis

Module-2

INTRODUCTION IN QGIS About QGIS Characteristics of QGIS Start using QGIS. QGIS TOOLS QGIS Configuration, General tools, Working with projections QGIS Browser. WORKING WITH RASTER DATA Introduction, Display raster data, Raster calculator, Working with images, Practical exercises: Working with raster data and operations with

Module-3

QGIS PLUGINS Additional modules of QGIS or “plugins” Description of Plugins incorporated in QGIS Operations through “plugins” Practical exercises: Different QGIS “plugins” and their applications: GDAL library tool, georeferencing, coordinate capture, format converter.

Module-4

CREATE MAPS AND RELATED PRODUCTS: Creation tools, Graphic elements, Atlases generation, and Graphic output creations. Practical exercises: Map creation with QGIS.

Module-5

RELATIONAL DATABASE MANAGEMENT SYSTEMS AND SPATIAL DATA. Database design, Database connections, Table joins Spatial joins, generate new statistics and new data using table and spatial data information. Practical exercises: Creation of thematic maps like population data of taluk, Watershed map with drainage and water bodies, Highway with other 2 road intersection details

Course outcome (Course Skill Set)

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

1. Use open source software for civil engineering applications
2. Various tools in QGIS software
3. Create thematic layers with attribute data
4. Generate maps for decision making

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Examination (CIE)

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examinations (SEE)

SEE paper shall be set for 50 questions, each of the 01 marks. The pattern of the question paper is MCQ (multiple choice questions). The time allotted for SEE is **01 hour**. The student has to secure a minimum of 35% of the maximum marks meant for SEE.

Suggested Learning Resources:**Books**

1. Geographic Information System-An Introduction, Tor Bernharadsen, 2009, 3rd Edition, Wiley India Pvt. Ltd. New Delhi, ISBN - 9788126511389.
2. Principles of Remote sensing and Image Interpretation, Lillesand and Kiefer, 2011, 6th Edition, John Wiley Publishers, New Delhi, ISBN – 8126532238.

Web links and Video Lectures (e-Resources):

- YouTube videos
- <https://docs.qgis.org/3.16/pdf/en/QGIS-3.16-DesktopUserGuide-en.pdf> for QGIS manual
- NPTEL Lectures.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Prepare the thematic maps using google earth images for various applications

Universal Human Values (UHV)		Semester	3 rd
Course Code	BUHK408	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	1:0:0:1	SEE Marks	50
Total Hours of Pedagogy	15 hour Theory Session +15 hour Self study	Total Marks	100
Credits	01	Exam Hours	01 Hour
Examination type (SEE)	SEE paper shall be set for 50 questions, each of the 01 mark. The pattern of the question paper is MCQ (multiple choice questions) .		

Course objectives:

This course is intended to:

- To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.
- This course is intended to provide a much-needed orientation input in value education to the young enquiring minds.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. The methodology of this course is explorational and thus universally adaptable. It involves a systematic and rational study of the human being vis-à-vis the rest of existence.
2. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the activities will develop students' theoretical and applied skills.
3. State the need for UHV activities and its present relevance in the society and Provide real-life examples.
4. Support and guide the students for self-study activities.
5. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress in real activities in the field.
6. This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and then to continue within the student in every activity, leading to continuous self-evolution.
7. Encourage the students for group work to improve their creative and analytical skills.

Module-1**Introduction to Value Education****(3 hours)**

Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education) Understanding Value Education, Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity – the Basic Human Aspirations, Happiness and Prosperity – Current Scenario, Method to Fulfil the Basic Human Aspirations

Module-2

Harmony in the Human Being :

Understanding Human being as the Co-existence of the Self and the Body, Distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health

Module-3**Harmony in the Family and Society :**

(3 hours)

Harmony in the Family – the Basic Unit of Human Interaction, 'Trust' – the Foundational Value in Relationship, 'Respect' – as the Right Evaluation, Other Feelings, Justice in Human-to-Human Relationship, Understanding Harmony in the Society, Vision for the Universal Human Order

Module-4**Harmony in the Nature/Existence :**

(3 hours)

Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature, Realizing Existence as Co-existence at All Levels, The Holistic Perception of Harmony in Existence

Module-5**Implications of the Holistic Understanding – a Look at Professional Ethics :**

(3 hours)

Natural Acceptance of Human Values, Definitiveness of (Ethical) Human Conduct, A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Competence in Professional Ethics Holistic Technologies, Production Systems and Management Models-Typical Case Studies, Strategies for Transition towards Value-based Life and Profession

Course outcome (Course Skill Set)

At the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature);

- They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
- They would have better critical ability.
- They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
- It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

Expected to positively impact common graduate attributes like:

1. Ethical human conduct
2. Socially responsible behaviour
3. Holistic vision of life
4. Environmentally responsible work
5. Having Competence and Capabilities for Maintaining Health and Hygiene
6. Appreciation and aspiration for excellence (merit) and gratitude for all

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). The student is declared as a pass in the course if he/she secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

Continuous Internal Examination (CIE)

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 22OB2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

The sum of two tests, two assignments, will be out of 100 marks and will be scaled down to 50 marks

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examinations (SEE)

SEE paper shall be set for **50 questions**, each of the 01 marks. **The pattern of the question paper is MCQ (multiple choice questions).** **The time allotted for SEE is 01 hour.** The student has to secure a minimum of 35% of the maximum marks meant for SEE.

Suggested Learning Resources:

Books for READING:

Text Book and Teachers Manual

- a. The Textbook A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
- b. The Teacher's Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G

Reference Books

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews

7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj – Pandit Sunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)
14. Susan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
15. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
16. A Nagraj, 1998, Jeevan Vidya Ek Parichay, Divya Path Sansthan, Amarkantak.
17. P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
18. A N Tripathy, 2003, Human Values, New Age International Publishers.
19. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
20. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers , Oxford University Press
21. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
22. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
23. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.

Web links and Video Lectures (e-Resources):

- Value Education websites,
- <https://www.uhv.org.in/uhv-ii>,
- <http://uhv.ac.in>,
- <http://www.uptu.ac.in>
- Story of Stuff,
- <http://www.storyofstuff.com>
- Al Gore, An Inconvenient Truth, Paramount Classics, USA
- Charlie Chaplin, Modern Times, United Artists, USA
- IIT Delhi, Modern Technology – the Untold Story
- Gandhi A., Right Here Right Now, Cyclewala Productions
- https://www.youtube.com/channel/UCQxWr5QB_eZUnwxSwxXEkQw
- https://fdp-si.aicte-india.org/8dayUHV_download.php
- <https://www.youtube.com/watch?v=8ovkLRYXlJE>
- <https://www.youtube.com/watch?v=OgdNx0X923I>
- <https://www.youtube.com/watch?v=nGRcbRpvGoU>
- <https://www.youtube.com/watch?v=sDxGXOgYEKM>

BIOLOGY FOR ENGINEERS		Semester	IV
Course Code	BBOK407	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3
Examination type (SEE)	Theory		

Course objectives:

- To familiarize the students with the basic biological concepts and their engineering applications.
- To enable the students with an understanding of biodesign principles to create novel devices and structures.
- To provide the students an appreciation of how biological systems can be re-designed as substitute products for natural systems.
- To motivate the students to develop interdisciplinary vision of biological engineering.

Teaching-Learning Process (General Instructions)
These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

- Explanation via real life problem, situation modelling, and deliberation of solutions, hands-on sessions, reflective and questioning /inquiry-based teaching.
- Instructions with interactions in classroom lectures (physical/hybrid).
- Use of ICT tools, including YouTube videos, related MOOCs, AR/VR/MR tools.
- Flipped classroom sessions (~10% of the classes).
- Industrial visits, Guests talks and competitions for learning beyond the syllabus.
- Students' participation through audio-video based content creation for the syllabus (as assignments).
- Use of gamification tools (in both physical/hybrid classes) for creative learning outcomes.
- Students' seminars (in solo or group) /oral presentations.

Module-1 (8 Hours)

INTRODUCTION TO BIOLOGY:
The cell: the basic unit of life, Structure and functions of a cell. The Plant Cell and animal cell, Prokaryotic and Eukaryotic cell, Stem cells and their application. Biomolecules: Properties and functions of Carbohydrates, Nucleic acids, proteins, lipids. Importance of special biomolecules; Enzymes (Classification (with one example each), Properties and functions), vitamins and hormones.

Module-2(8 Hours)

BIOMOLECULES AND THEIR APPLICATIONS (QUALITATIVE):
Carbohydrates (cellulose-based water filters, PHA and PLA as bioplastics), Nucleic acids (DNA Vaccine for Rabies and RNA vaccines for Covid19, Forensics – DNA fingerprinting), Proteins (Proteins as food – whey protein and meat analogs, Plant based proteins), lipids (biodiesel, cleaning agents/detergents), Enzymes (glucose-oxidase in biosensors, lignolytic enzyme in bio-bleaching).

Module-3(8 Hours)

HUMAN ORGAN SYSTEMS AND BIO DESIGNS (QUALITATIVE):
Brain as a CPU system (architecture, CNS and Peripheral Nervous System, signal transmission, EEG, Robotic arms for prosthetics. Engineering solutions for Parkinson's disease). Eye as a Camera system (architecture of rod and cone cells, optical corrections, cataract, lens materials, bionic eye). Heart as a pump system (architecture, electrical signalling - ECG monitoring and heart related issues, reasons for blockages of blood vessels, design of stents, pace makers, defibrillators). Lungs as purification system (architecture, gas exchange mechanisms, spirometry, abnormal lung physiology - COPD, Ventilators, Heart-lung machine). Kidney as a filtration system (architecture, mechanism of filtration, CKD, dialysis systems).

Module-4 (8 Hours)

NATURE-BIOINSPIRED MATERIALS AND MECHANISMS (QUALITATIVE):

Echolocation (ultrasonography, sonars), Photosynthesis (photovoltaic cells, bionic leaf), Bird flying (GPS and aircrafts), Lotus leaf effect (Super hydrophobic and self-cleaning surfaces), Plant burrs (Velcro), Shark skin (Friction reducing swim suits), Kingfisher beak (Bullet train), Human Blood substitutes - hemoglobin-based oxygen carriers (HBOCs) and perfluorocarbons (PFCs).

Module-5 (8 Hours)

TRENDS IN BIOENGINEERING (QUALITATIVE):

Muscular and Skeletal Systems as scaffolds (architecture, mechanisms, bioengineering solutions for muscular dystrophy and osteoporosis), scaffolds and tissue engineering, Bioprinting techniques and materials, 3D printing of ear, bone and skin. 3D printed foods. Electrical tongue and electrical nose in food science, DNA origami and Biocomputing, Bioimaging and Artificial Intelligence for disease diagnosis. Self-healing Bioconcrete (based on bacillus spores, calcium lactate nutrients and biomineralization processes) and Bioremediation and Biomining via microbial surface adsorption (removal of heavy metals like Lead, Cadmium, Mercury, Arsenic).

Course outcome (Course Skill Set)

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

1. Elucidate the basic biological concepts via relevant industrial applications and case studies.
2. Evaluate the principles of design and development, for exploring novel bioengineering projects.
3. Corroborate the concepts of biomimetics for specific requirements.
4. Think critically towards exploring innovative biobased solutions for socially relevant problems.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 22OB2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (duration 03 hours).

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 2 sub-questions), should have a mix of topics under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored shall be proportionally reduced to 50 marks

Suggested Learning Resources:

Books

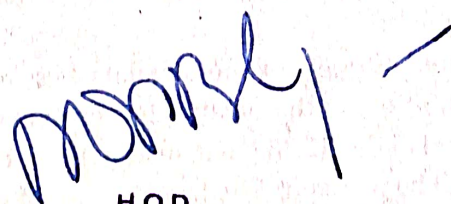
- Biology for Engineers, Rajendra Singh C and Rathnakar Rao N, Rajendra Singh C and Rathnakar Rao N Publishing, Bengaluru, 2023.
- Human Physiology, Stuart Fox, Krista Rompolski, McGraw-Hill eBook. 16th Edition, 2022
- Biology for Engineers, Thyagarajan S., Selvamurugan N., Rajesh M.P., Nazeer R.A., Thilagaraj W., Barathi S., and Jaganthan M.K., Tata McGraw-Hill, New Delhi, 2012.
- Biology for Engineers, Arthur T. Johnson, CRC Press, Taylor and Francis, 2011
- Biomedical Instrumentation, Leslie Cromwell, Prentice Hall 2011.
- Biology for Engineers, Sohini Singh and Tanu Allen, Vayu Education of India, New Delhi, 2014.
- Biomimetics: Nature-Based Innovation, Yoseph Bar-Cohen, 1st edition, 2012, CRC Press.
- Bio-Inspired Artificial Intelligence: Theories, Methods and Technologies, D. Floreano and C. Mattiussi, MIT Press, 2008.
- Bioremediation of heavy metals: bacterial participation, by C R Sunilkumar, N Geetha A C Udayashankar Lambert Academic Publishing, 2019.
- 3D Bioprinting: Fundamentals, Principles and Applications by Ibrahim Ozbolat, Academic Press, 2016.
- Electronic Noses and Tongues in Food Science, Maria Rodriguez Mende, Academic Press, 2016

Web links and Video Lectures (e-Resources):

- <https://nptel.ac.in/courses/121106008>
- <https://freevideolectures.com/course/4877/nptel-biology-engineers-other-non-biologists>
- <https://ocw.mit.edu/courses/20-020-introduction-to-biological-engineering-design-spring-2009>
- <https://ocw.mit.edu/courses/20-010j-introduction-to-bioengineering-be-010j-spring-2006>
- <https://www.coursera.org/courses?query=biology>
- https://onlinecourses.nptel.ac.in/noc19_ge31/preview
- <https://www.classcentral.com/subject/biology>
- <https://www.futurelearn.com/courses/biology-basic-concepts>

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Group Discussion of Case studies
- Model Making and seminar/poster presentations
- Design of novel device/equipment like Cellulose-based water filters, Filtration system



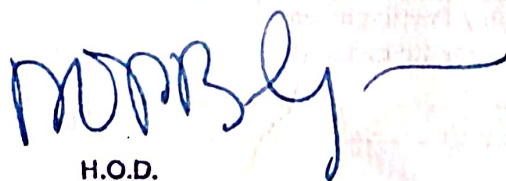
H.O.D.
Dept. of Civil Engineering
Alva's Institute of Engg. & Technology
Mijar, Moodbidri - 574 225

Physical Education (Sports and Athletics) syllabus

Semester: IV						
PHIYSICAL EDUCATION (SPORTS & ATHLETICS) – II						
Course Code	:	BPEK459		CIE	:	100 Marks
Credits: L:T:P	:	0:0:1				
Total Hours	:	24 P				
Course Outcomes: At the end of the course, the student will be able to						
1. Understand the ethics and moral values in sports and athletics						
2. Perform in the selected sports or athletics of student's choice.						
3. Understand the roles and responsibilities of organisation and administration of sports and games.						
Module I : Ethics and Moral Values						4 Hours
A. Ethics in Sports						
B. Moral Values in Sports and Games						
Module II : Specific Games (Any one to be selected by the student)						16 Hours
A. Volleyball – Attack, Block, Service, Upper Hand Pass and Lower hand Pass.						
B. Athletics (Track Events) – Any event as per availability of Ground.						
Module III: Role of Organisation and administration						4 Hours

Scheme and Assessment for auditing the course and Grades:

Sl. No.	Activity	Marks
1.	Participation of student in all the modules	20
2.	Quizzes – 2, each of 15 marks	30
3.	Final presentation / exhibition / Participation in competitions/ practical on specific tasks assigned to the students	50
Total		100



H.O.D.

Dept. of Civil Engineering
 Bha's Institute of Engg. & Technology
 Mijar, Moodbidri - 574 225

@# 16092024