BMS INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(Autonomous Institute affiliated to VTU, Belagavi, Approved by AICTE, New Delhi)

Avalahalli, Yelahanka, Bengaluru 560064

Bachelor of Engineering

Department of Civil Engineering

IV Semester Scheme and Syllabus
2022 Scheme - Autonomous

Approved in the BoS meeting held on 13.10.2023

Program Educational Objectives (PEOs)

- Lead a successful career by analyzing, designing and solving various problems in the field of Civil Engineering.
- Execute projects through team building, communication and professionalism.
- Excel through higher education and research for endured learning.
- Provide effective solution for sustainable environmental development.

Vision and Mission of the Department

Vision

To be an Exemplary Centre, disseminating quality education and developing technically competent civil engineers with professional integrity for the betterment of society.

Mission

- Impart technical proficiency through quality education.
- Motivate entrepreneurship through enhanced industry - interaction and skill based training.
- Inculcate human values through outreach activities.

Program Specific Outcomes (PSOs)

- Identify & address the challenges in transportation, sanitation, waste management, and urban flooding in metropolitan cities.
- Provide solutions related to civil engineering built environment through a multidisciplinary approach.

Scheme of IV Semester

BMS INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(Autonomous Institute affiliated to VTU)

Scheme of Teaching and Examination: Effective from AY 2023 – 24

Choice Based Credit System (CBCS)

UG PROGRAM: CIVIL ENGINEERING (CV) — Semester: IV

Sl. No.	Course category	Course Code	Course Title	Teaching Dept.	Teaching Hours/Week				Credits	Examination			
					L	T	P	PW /S		Duration	CIE Marks	SEE Marks	Total Marks
1	PCC	BCV401	Analysis of Structures	CV	3	2	0	0	4	3	50	50	100
2	IPCC	BCV402	Fluid Mechanics and Hydraulics	CV	3	0	2	0	4	3	50	50	100
3	IPCC	BCV403	Transportation Engineering	CV	3	0	2	0	4	3	50	50	100
4	PCCL	BCVL404	Building Materials Testing Lab	CV	0	0	2	0	1	3	50	50	100
5	ESC	BCV405x	ESC/ETC/PLC		3	0	0	0	3	3	50	50	100
6	AEC/ SEC	BCV456x	Ability Enhancement Course/Skill Enhancement Course- IV	TD and PSB: Concerned department	If the course is Theory: 1	0	0	0	1	1	50	50	100
					If the course is a lab: 0	0	2	0		2			
7	BSC	BBOK407	Biology For Engineers	TD / PSB: BT, CHE,	2	0	0	0	2	3	50	50	100
8	UHV	BUHK408	Universal human values course	Any Department	1	0	0	0	1	1	50	50	100
9	MC	BNSK459	National Service Scheme (NSS)	NSS coordinator	0	0	2	0	0		100	---	100
		BPEK459	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		BYOK459	Yoga	Yoga Teacher									
		BNCK459	NCC	NCC coordinator									
		BMUK459	Music	Music Teacher									
TOTAL					**17**	**0**	**10**	**0**	**20**	**-**	**500**	**400**	**900**
					27								

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			
BCV456A	Building Information Modelling in Civil Engineering	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.

IV Semester Syllabus

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - IV

Analysis of Structures (3:2:0:0) 4

(Effective from the academic year 2023-24)

Course Code	BCV401	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:2:0:0	SEE Marks	50
Total Number of Contact Hours	50	Exam Hours	03

Course Learning objectives: This course will enable students to

1. Understand different types of structures
2. Calculate the forces in truss members
3. Determine and slope & deflection of beams, trusses, and frames using moment area method and principle of strain energy
4. Analyse the arches and cable structures
5. Analyse the indeterminate structural members using slope deflection, moment distribution, and flexibility and stiffness method.

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. Numerical.

(10 Hours) 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. Numerical.

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 calculatedeflection of beams, trusses and frames (No numerical on unit load method). Numerical.

(10 Hours) L1,L2,L3

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. Numerical.

(10 Hours) 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

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.

(10 Hours) L1,L2,L3,L4

Module-5

Matrix Method: Flexibility Method: Introduction, Axes and coordinates, Flexibility matrix, Analysis of continuous beams, Stiffness Method: Introduction, Stiffness matrix, Analysis of continuous beams.

(10 Hours) L1,L2,L3,L4

Course outcome

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

CO1 Explain the different types of structures and determine the member forces by method of joints and sections

CO2 Calculate the slope and deflections structural members using moment area method and principle of strain energy

CO3 Determined the various internal forces at any section of arches and cables

CO4 Analyze the indeterminate structural members using slope deflection and moment distribution method

CO5 Analyze the indeterminate beams using flexibility and stiffness method

Suggested Learning Resources:

Books

1. Reddy, C.S., Basic Structural Analysis, 3 rd. ed., Tata McGraw-Hill Education Pvt. Ltd., New Delhi, 2011.
2. Hibbeler, R.C., Structural Analysis, 9 th edition., Pearson publications., New Delhi, 2012.
3. Thandavamoorthy, T.S., Structural Analysis, 6 th edition., Oxford University press., New Delhi,2015.
4. L S Negi and R S Jangid, "Structural Analysis", Tata McGraw-Hill Publishing Company Ltd.
5. D S Prakash Rao, "Structural Analysis: A Unified Approach", Universities Press 4
6. K.U. Muthu and H. Narendra, "Indeterminate Structural Analysis", IK International Publishing Pvt. Ltd.
7. Gupta S P, G S Pundit and R Gupta, "Theory of Structures", Vol II, Tata McGraw Hill Publications company Ltd.
8. V N Vazirani and M M Ratwani, "Analysis of Structures", Vol. 2, Khanna Publishers
9. Wang C K, "Intermediate Structural Analysis", McGraw Hill, International Students Edition. S. Rajashekhara and G. Sankarasubramanian, "Computational Structural Mechanics", PHI Learning Pvt. Ltd.,
10. S S Bhavikatti, structural analysis, vikas publishing house pvt.ltd., new Delhi
11. S Ramamrutham and R Narayanan,Theory of structures , Dhanpat Rai Publishing Company.

Web links and Video Lectures (e-Resources):

- https://nptel.ac.in/courses/105105166
- https://nptel.ac.in/courses/105105166
- https://nptel.ac.in/courses/105105166
- https://nptel.ac.in/courses/105105109
- https://nptel.ac.in/courses/105105109

https://nptel.ac.in/courses/105105109

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

- Seminars /Quiz (to assist in GATE preparations)
- Demonstrations in using Softwares
- Self-Study on simple topics
- Simple problems solving by Etabs/Staad pro.

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - IV

Fluid Mechanics and Hydraulics (3:0:2:0) 4

(Effective from the academic year 2023-24)

Course Code	BCV402	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:2:0	SEE Marks	50
Total Number of Contact Hours	40 + 8-10 Lab slots	Exam Hours	3

Course Learning objectives: This course will enable students to

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

MODULE-1

Fluids and their properties – specific properties, surface tension, capillarity, Pascal's law, hydrostatic law, fluid pressure measurement using simple and differential manometers & digital meters, Total pressure, and center of pressure on vertical and inclined plane surfaces. Numerical.

(08 Hours) L1, L2,L3

MODULE-2

Kinematics- Types of flow, continuity equation in Cartesian coordinates, velocity potential, stream function, orthogonality, flow nets. Numerical.

Dynamics-Euler's equation of motion, Bernoulli's equation, Application-Venturimeter & Orifice ---meter. Numerical.

(08 Hours) L1, L2, L3, L4

MODULE-3

Flow measurement: Classification of orifice, hydraulic coefficients of orifice, discharge over rectangular, triangular and Cipoletti notch. Numerical

Flow through pipes- major loss (Darcy- Weisbach equation) and minor losses (no derivations), pipes in series and parallel, equivalent pipe, typical pipe connections in buildings. Numerical

(08 Hours) L1, L2, L3,L4

MODULE-4

Open channel hydraulics- classification of flow, Chezy's equation with empirical equations, Most economical channel sections-rectangular, trapezoidal, circular. Uniform flow: specific energy curve and critical parameters. Non-uniform flow: hydraulic jump-equation & energy loss equation. Numerical

(08 Hours) L1, L2, L3,L4

MODULE-5

Hydropower plants – heads & efficiencies, Impulse-Momentum equation, Velocity triangles.

Turbines-types, Pelton wheel-working, work done and hydraulic efficiency & design. Kaplan turbine-working & working proportions. Numerical

Centrifugal pumps-working, heads & efficiency, work done (no derivation), specifications of centrifugal pumps.

(08 Hours) L1, L2,L3, L4

PRACTICAL COMPONENT OF IPCC

Sl.NO	Experiments (08 Hours) (L1, L2, L3, L4}
1	Verification of Bernoulli's equation
2	Calibration of Venturimeter
3	Determination of hydraulic coefficients of small vertical orifice
4	Calibration of triangular notch & Cipolletti notch
5	Determination of major losses in pipes of varying diameter
6	Determination of major losses in pipe network bench
7	Determination of Cd for broad crested weir
8	Determination of efficiency of jet on flat and curved vanes
9	Determination of Cd of Venturiflume
10	Demo of determination of efficiency of centrifugal pump
11	Demo of determination of efficiency of Kaplan turbine
12	Demo of determination of efficiency of Pelton wheel

Course outcomes (Course Skill Set):

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

CO1. Explain the fundamental properties of fluids and solve problems on fluid pressure and hydrostatics

CO2. Apply the principles of kinematics and dynamics of fluid flow to solve problems on velocity and pressure

CO3. Compute the discharge through pipes, notches, and weirs

CO4. Design open channels of different sections and estimate the energy loss in hydraulic jump

CO5. Derive working proportions of hydro turbines and centrifugal pumps

CO6. Able to interpret the experimental results of discharge, efficiency based on the test conducted in the laboratory

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.**

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - IV

Transportation Engineering (3:0:2:0) 4

(Effective from the academic year 2023-24)

Course Code	BCV403	CIE Marks	50
Teaching Hours/Week (L:T:P:S)	3:0:2:0	SEE Marks	50
Total Number of Contact Hours	40 hours Theory + 8-10 Lab slots	Total Marks	100

Course Learning objectives: This course will enable students to

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

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, Extra widening, 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.

(08 Hours) (L1, L2, L3)

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.

Highway Drainage: Significance and requirements, Surface drainage system and design-Examples, sub surface drainage system, Types of cross drainage structures their choice and location.

(08 Hours) (L1, 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**.**

(08 Hours) (L1, 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.

(08 Hours) (L1, L2, L3)

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.

(08 Hours) (L1, L2, L3)

PRACTICAL COMPONENT OF IPCC

Sl.NO	Experiments (8-10 Lab slots) (08 Hours)	
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

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

CO1: Apply the basic principles of geometric design in the context of transportation engineering and planning.

CO2: Select the appropriate pavement materials for the construction and design of pavements as per standard practices.

CO3: Conduct traffic studies and analyse traffic data for practical applications.

CO4: Elucidate the functions, requirements and components of Railway Track.

CO5: Identify the different component parts of airport and design the suitable runway.

CO6: Interpret the experimental results of highway materials based on laboratory tests and design the pavements as per IRC guidelines.

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 Harbor Dock Engineering by B L Gupta, Amit Gupta.
7. S K Khanna, C E G Justo and A Veeraragavan, “Highway Materials Testing Laboratory

Web links and Video Lectures (e-Resources):

1. https://nptel.ac.in/courses/105101087
2. https://onlinemanuals.txdot.gov/txdotmanuals/rdw/horizontal_alignment.htm#BGBHGEGC
3. www.civil.iitb.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**

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - IV

Building Materials Laboratory (0:0:2:0) 1

(Effective from the academic year 2023-24)

Course Code	BCVL404	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:2:0	SEE Marks	50
Total Number of Contact Hours	15	Exam Hours	3

Course objectives:

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

Sl.NO	Experiments
1	Tests on Bricks and Tiles (Weight & Dimensionality, Water Absorption, Strength) **(L1, L2, L3, L4)**
2	Tests Cement Concrete blocks (Weight & Dimensionality, Water Absorption, Strength) **(L1, L2, L3, L4)**
3	Test on Cement, Initial and Final Setting Time, Consistency and Specific Gravity **(L1, L2, L3, L4)**
4	**Tests on Fine aggregates -** Sieve Analysis, Moisture content, Specific gravity, Bulk density, Bulking and Silt Content **(L1, L2, L3, L4)**
5	**Tests on Coarse aggregates-** Sieve Analysis, Water absorption, Moisture content, specific gravity and Bulk density. **(L1, L2, L3, L4)**
6	Compression test on mild steel and wood. **(L1, L2, L3, L4)**
7	Compression Test on mortar/Concrete cubes specimens **(L2,L3,L4)**
8	Splitting Tensile strength on mortar/concrete cylinder specimens **(L2,L3,L4)**
9	Tensile Test on Steel Bars **(L1, L2, L3, L4)**
10	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

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

CO1 Apply the acquired engineering knowledge to determine the physical characteristics and strength of building materials by working as an individual and team.

CO2 Conduct the experiments as per the code specifications and prepare the report comprehensively to communicate efficiently.

CO3 Record the observations and infer the results by analysing and verifying against the standards.

Suggested Learning Resources:

- Davis, Troxell and Hawk, “Testing of Engineering Materials”, International StudentEdition – McGraw Hill Book Co. New Delhi.
- M L Gambhir and Neha Jamwal, “Building and construction materials-Testing andquality 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. NewDelhi.
- Kukreja C B, Kishore K. and Ravi Chawla “Material Testing Laboratory Manual”,Standard Publishers & Distributors1996.
- Relevant latest IS Codes.

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - IV

Finance for Professionals (3:0:0:0) 3

(Effective from the academic year 2023-24)

Course Code	BCV405A	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Exam Hours	3

Course objectives:

1. To give learners an overview of finance and develop their finance sense

Module-1

Economics: Introduction to economics, Economic policies, Role of monetary policy inmanaging the economy

(08 Hours) L1, L2, L3.

Module-2

Finance Vocabulary and Financial Statements: Unique role of finance, Unique role of finance example, Accounting, finance & auditing, Capital vs. revenue, Capital vs. revenue example, Sources & uses of funds, Sources & uses of funds example, Revenue recognition principles, Double entry bookkeeping, Illustration of double entry book keeping, Understanding profit & loss, Understanding profit & loss example, Profit and profitability, Profit and profitability example 1, Profit and profitability example 2

(08 Hours) L1, L2, L3.

Module-3

Financial Statement and Risk Analysis: Finance metrics & financial statement analysis, Financemetrics & financial statement analysis example, understanding liquidity, understanding liquidity example, Funds flow analysis, Example of funds flow analysis, Cash flow analysis, Example of cash flow analysis, Introduction to risk management, understanding risk management example, Management of risk, understanding risk management measurement example, Understanding risk management products example, Holistic look at risk management.

(08 Hours) L1, L2, L3.

Module-4

Time Value of Money: Time value of money, understanding time value of money, understanding financial functions, Applications of time value of money, Capital structure, Capital structure example, cost of capital, Cost of capital example, Capital budgeting, Understanding capital budgeting - example

(08 Hours) L1, L2, L3.

Module-5

Personal Finance: Financial Instrument, Approaches to investing, Ratios for investment, Portfolio management principles, Example of portfolio, forming a portfolio, Forming a portfolio example, Bill book entry as Schedule of rates (example).

(08 Hours) L1, L2, L3.

Course outcome

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

1. Understand how their work and effort contribute to organizational financial performance
2. Comprehend financial acumen and tools to optimize outcomes

Suggested Learning Resources:

Books

1. Financial Management: Theory & Practice | 11th Edition by Prasanna Chandra
2. International Financial Reporting Standards (Bangalore University)

Web links and Video Lectures (e-Resources):

E-learning content on L&T EduTech Platform.

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

Case study to understand the project finance concept

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - IV

Construction Equipment, Plants and Machinery (3:0:0:0) 3

(Effective from the academic year 2023-24)

Course Code	**BCV405B**	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course objectives:

1. To provide insight on the functions and operations of various equipment and techniques during construction
2. To acquire knowledge on the equipment life cycle management
3. To understand the significance of mechanization and digitalization in the construction industry
4. To impart knowledge on the safety measures during construction activities

Module-1

Introduction to Construction Equipment- Classification of Construction Equipment, Factors behind the selection of equipment's.

Earth Moving Equipment: Classification and Types, Functions, Attachments of Excavators, Operations of Earth Moving Equipment.

Hoisting Equipment: Classification and Types, Functions, Operations of Hoisting Equipment.

(08 Hours) L1, L2

Module-2

Road Making and Quarry/Mining Equipment: Introduction, Classification and Types, Functions, Operations of Equipment.

Classification to Hot mix Plant Process of Asphalt Paver-PQC Paver-. Classification & Components- Motor Grader and Horizontal Movement Vehicles. **(08 Hours)L1, L2**

Module-3

Concreting Equipment: Classification and Types, Functions and Operations.

Operations of a Batching Plant - Introduction - Components of Concrete Pump & Placer - Concrete Pipeline Laying and Cleaning.

Equipment Life Cycle Management: Life Cycle of an Equipment- Equipment Performance Parameters - Introduction to Maintenance- Types of Maintenance- Maintenance Practices.

Equipment Acquisition, Depreciation and method of calculation of depreciation.

(08 Hours) L1, L2,L3

Module-4

Tunnelling Equipment / Piling Equipment: Introduction to Tunnel Boring Machines- Details and Operation of a Hard-Rock TBM Details of Earth Pressure Balance (EPB) TBM- Details and operation of Slurry TBM & Components- Hydraulic Grabs- Piling Rig

(08 Hours) L1, L2

Module-5

Mechanization and Digitalization in Construction and Safety in Construction Equipment:Importance of Digital Analytics- Digital Solution in Construction Projects- Importance of Mechanization - Railway Track Construction- Rebar Processing Machine- Operation of Mechanized Equipment- Introduction to 3D Concrete Printer- Importance of Safety- VariousPPE & Purpose- Safety of Men & Machines at Work- Safety During Construction Activities Safety with Tools & Tackles

(08 Hours) L1, L2

Course outcome

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

CO1 Identify and select the equipment required for various construction activities
CO2 Outline the types and operation of equipment used for road making/ quarry/ and mining
CO3 Explain the equipment required for concreting and analyze the life cycle of an equipment
CO4 Discuss the necessary equipment for tunneling and piling
CO5 Describe the significance of mechanization /digitalization and safety in construction activities

Suggested Learning Resources:

Books

1. Velumani. P, "Construction Techniques and Practices", SIA Publishers & Distributers PvtLtd, 2020.
2. Dr. Manoranjan Samal, "Advanced Construction Techniques and Equipment" S.K. Kataria& Sons
3. S.C.Sharma, "Construction Equipment and management" E-Book .2019.

References

1. Kumar Neeraj Jha, "Construction Project Management" PEARSON publications

Web links and Video Lectures (e-Resources):

- E-learning content on L&T EduTech Platform.

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

- Visit to construction site to understand construction equipments

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - IV

Concreting Techniques and Practices (3:0:0:0) 3

(Effective from the academic year 2023-24)

Course Code	BCV405C	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course objectives:

1. To impart knowledge on materials used in concrete, relevant Indian standard codes, and practical aspects on concreting activities at projects.
2. To explain the importance of concrete mix design to build durable structures.
3. To introduce the various stages of production of concrete mixes.
4. To get overview of pre-cast elements and their application.
5. To learn the best practices of special concrete from decades of experiences.

Module-1

Introduction to concrete, overview of materials- cement, low carbon cement, coarse aggregate and fine aggregate, and mineral admixture:- fly ash, GGBS, micro silica / silica fume, metakaolin / rice husk ash, composite cement and ultrafine materials, lab test - fineness of fly ash, recycled aggregate- Physical & chemical Properties of admixtures.

Water and chemical admixture: source, requirements, limits and testing Blending of fine and coarse aggregate, gradation for optimization and practical aspects.

(08 Hours) L1, L2, L3.

Module-2

Mix design - Volumetric mix design, mix design by absolute volume method, worked out practical examples based on industries experience at project sites over several decades, higher grades of concrete, high performance concrete, test on concrete: workability of concrete, flexural and compressive strength tests, Overview on mix design using IS 10262:2019. **(08 Hours) L1, L2, L3.**

Module-3

Production of concrete-: batching plant, calibration, mixing and transportation of concrete handling of concrete at construction, ready-mix concrete, pumping, placing of concrete with boom placers, levelling, vibration and compaction, cold joints, finishing and curing and protection of concrete.

(08 Hours) L1, L2, L3.

Module-4

Pre-cast concrete elements-: Difference between Precast and Other forms of Concrete construction, Advantages of this form of construction. Need for Prefabrication: Principles of prefabrication, Comparison with cast-in-situ construction, types of prefabrication, automation in manufacturing of precast elements, Erection. Structural Concepts of Precast concrete Systems: Loads, Load path, Limit states, Precast Concrete building systems.

08 Hours) L1, L2, L3.

Module-5

Special types of concrete: self-compacting concrete, mass concrete, dry lean concrete, geo-polymer concrete, pavement quality concrete, fiber reinforced concrete, composite concrete, lightweight concrete, ferro-cement, shotcreteing, guniting, grouting, challenges faced at sites: plastic shrinkage cracks, plastic settlement, honey comb, bug holes, cover to concrete, do's and don'ts in concrete construction, site shoot, introduction on 3D printing. Mix ratio proportion of special concrete. **(08 Hours) L1, L2, L3.**

Course outcome

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

CO1. Evaluate the properties of cement, coarse aggregate and fine aggregate by conducting test.

CO2. Design a concrete mix in line with the specifications of IS 10262:2019.

CO3. Recognize the steps involved in various stages of production of concrete.

CO4. Identify pre-cast concrete elements and their application.

CO5. Elaborate the special types of concrete and their use.

Suggested Learning Resources:

Books

1. Concrete Technology by M. S. Shetty, S Chand, New Delhi-110055.
2. Concrete Technology by M. L. Gambhir, Tata McGraw-Hill.
3. Structural design manual", Precast concrete connection details, Society for the studies in the use of precast concrete, Netherland Betor Verlag, 2009
4. IS 456, IS 269, IS 516, IS 1786, IS 1893, IS 12269, IS 9103, IS 8112, IS 10262

Web links and Video Lectures (e-Resources):

- E-learning content on L&T EduTech Platform.

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

- Visit to construction site to understand concreting process

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - IV

Watershed Management (3:0:0:0) 3

(Effective from the academic year 2023-24)

Course Code	BCV405D	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course objectives:

1. To understand Watershed Hydrology
2. To estimate water demand and learn, water conservation methods
3. To understand application of Remote Sensing and GIS in watershed management
4. Sustainable measures for watershed management

Module-1

Principles of Watershed Management: Basics concepts, hydrology and wateravailability, surface water, ground water, water budget equation conjunctive use, human influences and effects of climate change in the water resources system- urban and rural area. **(08 Hours) L1, L2, L3.**

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, **(08 Hours) L1, L2, L3.**

Module-3

Conservation of Water: Perspective on recycle and reuse, wastewater reclamation, lake rejuvenation, 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 for rural and urban area, roof catchments system, check dams, aquifer storage, urban flood management. **(08 Hours) L1, L2, L3.**

Module-4

Sustainable Watershed Approach: Sustainable integrated watershed management, natural resources management, agricultural practices, integrated farming, soil erosion and conservation. National water policy in India and International water law. **(08 Hours) L1, L2, L3.**

Module-5

Applications of RS and GIS in Watershed management: Role of decision support systemin watershed management, watershed characteristics of coastal regions, coastal aquifer management, uniqueness of coastal water resources. **(08 Hours) L1, L2, L3.**

Course outcome

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

CO1 Discuss surface and ground water resources system and, human influences.

CO2 Integrate water resources system in arid and semi-arid regions and explain watershed aquifer for management.

CO3 Analyze water resources related issues for conservation and synthesize augmentation of water resources.

CO4 Design integrated watershed management system.

CO5 Apply modern tools in watershed management.

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", Colorad 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

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - IV

Building Information Modelling in Civil Engineering (0:0:2:0) 1

(Effective from the academic year 2023-24)

Course Code	BCV456A	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	0:0:2:0	SEE Marks	50
Total Number of Contact Hours	15	Exam Hours	3

Course objectives:

1. Understand the concept of Building Information Modelling
2. Create the workflow followed in industry during creation of BIM 3D model which includes
3. Building the discipline-based model and create the federated models

Exercise

1. Introduction Building Information Modelling
2. Revit Projects: Project Templates, Revit File Types Working with Revit Elements and Families Exploring the User Interface Starting a Project
3. Setting Up Levels and Grids (Datum Planes) Setting up Levels & Modifying Creating Grids
4. Modelling Walls Creating Walls Modify wall types
5. Working with Doors and Windows Loading Door and Window Types from the Library Creating Additional Door and Window Sizes
6. Using Editing Tools & Working with Views: Using Editing Commands Setting the view display Visibility Graphics, Duplicate Views Elevations & Sections, Adding Callout Views
7. Modelling Floors Creating and Modifying Floors
8. Modelling Stairs, Railings, and Ramps Creating & Modifying Stairs Working with Railings Sketching Custom Stairs Creating Ramps
9. Modelling Roofs Creating Roofs by Footprint Using Join & unjoin roof

Course outcome

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

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

Suggested Learning Resources:

Books

1. ISO 19650 - Building Information Modelling (BIM)

BIM Handbook – Chuck Eastman, Paul Teicholz, Rafael Sacks, Kathleen Liston

Web links and Video Lectures (e-Resources):

E-learning content on L&T EduTech Platform.

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

Create a plan of residential building and practice BIM tools

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - IV

GIS with Quantum GIS (1:0:0:0) 1

(Effective from the academic year 2023-24)

Course Code	BCV456B	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	1:0:0:0	SEE Marks	50
Total Number of Contact Hours	15	Exam Hours	1

Course objectives:

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

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 **(03 Hours) L1, L2, L3.**

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 images. **(03 Hours) L1, L2, L3.**

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. **(03 Hours) L1, L2, L3.**

Module-4

CREATE MAPS AND RELATED PRODUCTS: Creation tools, Graphic elements, Atlasesgeneration, and Graphic output creations. Practical exercises: Map creation with QGIS. **(03 Hours) L1, L2, L3.**

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

(03 Hours) L1, L2, L3.

Course outcome

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

CO1: Use open source software for civil engineering applications

CO2: Various tools in QGIS software

CO3: Create thematic layers with attribute data

CO4: Generate maps for decision making

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, 6thEdition, 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

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - IV

Electronic Waste Management - Issues and Challenges (1:0:0:0) 1

(Effective from the academic year 2023-24)

Course Code	BCV456C	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	1:0:0:0	SEE Marks	50
Total Number of Contact Hours	15	Exam Hours	1

Course objectives:

1. To provide students with a comprehensive understanding of e-waste and its impact on the environment.
2. To familiarize students with the generation, composition, and hazardous components of e-waste.
3. To highlight the health and environmental risks associated with improper e-waste management.
4. To introduce students to various methods of e-waste collection, recycling, and disposal.
5. To develop an understanding of the relevant policies and regulations governing e-waste management in India.

Module-1

Introduction to E-waste: Definition, Examples with Sources, Composition **(03 Hours) L1, L2, L3.**

Module-2

E-Waste Hazards & Toxicity: Environmental Risks & Risk to Human Health, **(03 Hours) L1, L2, L3**

Module-3

Brief preview for Global E-waste Generation Rates, Overview of India's E-waste Generation Rates **(02 Hours) L1, L2, L3**

Module-4

Methods of E-waste Collection - Methods of E-waste Recycling, Reuse & Repair - Methods of E-waste Disposal, OSH aspects, Business opportunities **(04 Hours) L1, L2, L3**

Module-5

E-Waste Management Policies - E-waste Regulations in India **(03 Hours) L1, L2, L3**

- Self-Study: MOOC - UNITAR's e-course "How to Prevent E-Waste?"
- Site-visit - To locate e-waste collection and recycling facilities in respective locality and understand how value can be created from household e-wastes.
- Awareness Exercise - To enable a change in consumer behavior, by raising the awareness with regard to the role of other stakeholders, including local governments, retailers and manufacturers.
- Awareness Exercise - Highlight individual and community actions to tackle and manage E-waste Management.

Course Outcome

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

CO1. Identify the different types of E-wastes, based on their components.
CO2. Identify the hazards upon Environmental and Public Health, due to inappropriate E-waste Management.
CO3. Demonstrate knowledge upon the world-wide generation aspects of E-waste.
CO4. Identify the suitable methods for the organized collection, recycling and disposal of E-wastes.
CO5. Demonstrate knowledge of the existing policies, regulations, and frameworks for E-waste management In India.

Reference Materials

1. "E-Waste Management: From Waste to Resource" by R. K. Rathore and H. N. Chanakya, TERI Press, 2019
2. "E-Waste in India: An Emerging Crisis" by Sangeeta Sharma, Cambridge Scholars Publishing, 2019
3. "E-Waste Management: Research, Technology, and Applications", Majeti Narasimha Vara Prasad, CRC Press, 2016
4. "Electronic Waste Management and Treatment Technology" by Rezaul Begg, R. M. Sarcar, and R. V. R. Singh, Springer, 2018
5. "E-Waste Management: From Waste to Resource" by Florin-Constantin Mihai, Academic Press, 2018.
6. Rajesh Gopinath and N. Balasubramanya, "Environmental science and Engineering", 1st Edition, City of Publisher, Cengage Learning India Private Limited, 2018.
7. Rajesh Gopinath, E-Waste and the uprising technological Era in Environmental Inequality, BEL (Quarterly Bulletin), March 2019.

Web links and Video Lectures (e-Resources):
NPTEL video Lectures.
Activity Based Learning (Suggested Activities in Class) / Practical Based learning. Visit to an E-waste management industry

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - IV

Technical Writing Skills (1:0:0:0) 1

(Effective from the academic year 2023-24)

Course Code	BCV456D	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	1:0:0:0	SEE Marks	50
Total Hours of Pedagogy	15	Exam Hours	1

Course objectives:

1. Achieve better Technical writing and Presentation skills for employment.
2. Develop adequate knowledge of paragraph writing and precise writing techniques
3. Write business proposals and reports.
4. Write conference papers and prepare gist of published papers.
5. Develop efficiency in drafting social media posts and blogs.

Module-1

Technical Report Writing: Introduction to Technical writing process, Understanding ofwriting process, Introduction to various Technical Report writing. **(03 Hours) L1, L2, L3**

Module-2

Art of condensation and Paragraph Writing: Introduction and importance, Types and principles of condensation. Importance of paragraph writing, Features and its construction styles.

(03 Hours) L1, L2, L3

Module-3

Business Report Writing: Introduction, Definition and Salient features of Business reports. Significance and types of report writing. (Formal and Informal). Resume building and Types ofresumes. (samples of resumes) **(03 Hours) L1, L2, L3**

Module-4

Technical Articles and Proposals: Nature and significance, Types of technical Articles Journal articles and conference papers. Elements of technical articles. Introduction to technical proposalwriting, Purpose, importance, structure and types of technical proposals. Plagiarism Checking and Proof reading.

(03 Hours) L1, L2, L3

Module-5

Social media posts and Blog Writing: Ethics and practices of social media posts, Principles andfundamentals, Guiding principles for composition of articles, some common pitfalls. Maintaining common etiquette. Blogs and Blog writings strategies. **(03 Hours) L1, L2, L3**

Course outcome

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

CO1 Effectively communicate in technical matters.

CO2 Practice preparation of gist, abstract and notes from a technical article.

CO3 Prepare a business proposals and reports.

CO4 Write and respond in social media and write blogs.

Suggested Learning Resources:

Books

1. Sanjay Kumar and Pushpalata, 'Communication Skills', Oxford University Press. 2018.
2. M. Ashraf Rizvi, 'Effective Technical Communication', McGraw Hill, 2018.
3. Gajendra Singh Chauhan and et.al. 'Technical Communication', Cengage Publication, 2018.
4. Meenakshi Raman and Sangeeta Sharma, Technical Communication Principles and Practice, Oxford University Press, 2018.

Web links and Video Lectures (e-Resources):

- https://developers.google.com/tech-writing/announcements
- https://www.classcentral.com/course/technical-writing-7117.

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

- Demonstrations of Videos
- Group Discussion
- Practice sessions
- Presentation on any social issues
- Quizzes

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - IV

BIOLOGY FOR ENGINEERS (2:0:0:0)2

(Effective from the academic year 2023-24)

Course Code	**BBOK407**	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:0:0:0	SEE Marks	50
Total Number of Contact Hours	25	Exam Hours	3 Hour

Course Objectives:

This course will enable students to:

1. To familiarize the students with the basic biological concepts and their engineering applications.
2. To enable the students with an understanding of bio-sensor principles.

Module – 1

Introduction to Biology

The cell: The basic unit of life, Structure and functions of a cell. Plant Cell and animal cell, Prokaryotic and Eukaryotic cell, Stem cells and their application. (Text 1 and 2)**.** **(05 Hours**) **(L1,L2,L3)**

Module – 2

Biomolecules and Biosensors:

Biomolecules: Properties and functions of carbohydrates, proteins, lipids. Short Biosensor History, Biosensor Classification. (Text 3: 1.1 and 1.2). **(05 Hours) (L1,L2,L3)**

Module – 3

Biochemical Components Used in Biosensor Assemblies

Enzymes, Antibodies, Protein/Peptide Receptors, Nucleic Acids, Whole Cells as Biosensing Elements, Immobilization of Biochemical Elements of Biosensors. (Text 3: 2.1, 2.2, 2.3, 2.4, 2.5, 2.6).

(05 Hours) (L1,L2,L3)

Module – 4

Adaptation of Anatomical Principles

Brain as a CPU system. Eye as a Camera system. Heart as a pump system. Lungs as purification system. Kidney as a filtration system. (Text 4) **(05 Hours) (L1,L2,L3)**

Module – 5

Biomimetics

Introduction, Echolocation (ultrasonography / ultrasound Imaging), Photosynthesis (photovoltaic cells, bionic leaf). Birds and insects (flight aerodynamics), Lotus leaf effect (Super hydrophobic and self-cleaning surfaces), Shark skin (Friction reducing swimsuits), Kingfisher beak (Bullet train). (Text 5 and 6)).

(**05 Hours) (L1,L2,L3)**

Course Outcomes:

The students will be able to:

CO1: Interpret the components of a basic biological cell and their functions

CO2: Understand the principles of bioengineering sensors.

CO3: Compare the adaptation of anatomical principles in day-to-day engineering applications.

CO4: Relate the solution offered by nature to analogous engineering problems.

Textbooks:	
[1]	Biology for Engineers, Rajendra Singh C and Rathnakar Rao N, Rajendra Singh C and Rathnakar Rao N Publishing, Bengaluru, 2023.
[2]	Human Physiology, Stuart Fox, Krista Rompolski, McGraw-Hill eBook. 16th Edition, 2022
[3]	Biosensors: essentials. Evtugyn, Gennady. Vol. 84. Springer Berlin Heidelberg, 2014.
[4]	Biomedical Instrumentation, Leslie Cromwell, Prentice Hall 2011
[5]	Biomimetics: Nature-Based Innovation, Yoseph Bar-Cohen, 1st edition, 2012, CRC Press.
[6]	Bio-Inspired Artificial Intelligence: Theories, Methods and Technologies, D. Floreano and C. Mattiussi, MIT Press, 2008
References:	
[1]	Biology for Engineers, Arthur T. Johnson, CRC Press, Taylor and Francis, 2011
[2]	Wilson and Walker- Principles and Techniques of Biochemistry and Molecular Biology, by Andreas Hofmann, Samuel Clokie. 2018 Edition.
[3]	Biology for Engineers, Sohini Singh and Tanu Allen, Vayu Education of India, New Delhi, 2014.
[4]	3D Bioprinting: Fundamentals, Principles and Applications by Ibrahim Ozbolat, 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

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – IV

Universal Human Values (UHV) (1:0:0:0)1

(Common to all branches)

(Effective from the academic year 2023-24)

Course Code	**BUHK408**	CIE Marks	50
Teaching Hours/Week (L: T:P:S)	1:0:0:0	SEE Marks	50
Total Number of Contact Hours	15-hour Theory Session +15 hour Self study	Exam Hours	01

Course Objectives:

This course is intended to:

1. 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.
2. 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.
3. 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.
4. This course is intended to provide a much-needed orientation input in value education to the young enquiring minds

Module – 1

Introduction to Value Education:

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 **(03 Hours) L1,L2,L3**

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.

(03Hours) L1,L2,L3

Module – 3

Harmony in the Family and Society:

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.

(03hours) L1,L2,L3

Module – 4

Harmony in the Nature/Existence:

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 **(03 hours) L1,L2,L3**

Module – 5

Implications of the Holistic Understanding – a Look at Professional Ethics:

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 **(03 hours) L1,L2,L3**

Course outcome

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

CO1: 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.

CO2: They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).

CO3. 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

Textbooks and Teachers Manual	
1.	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 97893-87034- 47-1
2.	The Teacher‟s Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G
References	
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.	SThe 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	Sussan 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) KrishiTantraShodh, 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=8ovkLRYXIjE
- https://www.youtube.com/watch?v=OgdNx0X923I
- https://www.youtube.com/watch?v=nGRcbRpvGoU
- https://www.youtube.com/watch?v=sDxGXOgYEKM

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – IV

NSS (0:0:2)

(Common to all branches)

(Effective from the academic year 2023-24)

Course Code	**BNSK459**	CIE Marks	100
Teaching Hours/Week (L:T:P)	0:0:2	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Mandatory Course (Non-Credit)

(Completion of the course shall be mandatory for the award of degree)

Course Objectives: National Service Scheme (NSS) will enable the students to:

1. Understand the community in general in which they work.
2. Identify the needs and problems of the community and involve them in problem solving.
3. Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems.
4. Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.
5. Develop capacity to meet emergencies and natural disasters & practice national integration and social harmony in general.

Module – 1

Introduction to NSS

History and growth of NSS, Philosophy of NSS, Objectives of NSS, Meaning of NSS Logo, NSS Programs and activities, administrative structure of NSS, Planning of programs / activities, implementation of NSS programs / activities, National & State Awards for NSS College / Program Officer / Volunteers.

(04 Hours) L1,L2,L3

Module – 2

Overview of NSS Programs

Objectives, special camping – Environment enrichment and conservation, Health, Family, Welfare and Nutrition program. Awareness for improvement of the status of women, Social Service program, production-oriented programs, Relief & Rehabilitation work during natural calamities, education and recreations, Selection of the problem to be addressed.

(**04 Hours) L1,L2,L3**

Module – 3

NSS Activities - Group Contributions to Society / community (Activity based Learning)

Organic Farming, Indian agriculture (Past, Present, Future) Connectivity for marketing, Waste management– Public, Private and Govt. organization, 5 R's. Water conservation techniques – role of different stakeholders – implementation, preparing an actionable business proposal for enhancing the village income and approach for implementation. Helping local schools to achieve good results and enhance their enrolment in Higher/ technical/ vocational education.

(06 Hours) L1,L2,L3

Module – 4

NSS National Level Activities for Society / Community at large (Activity based Learning)

Developing Sustainable Water management system for rural areas and implementation approaches. Contribution to any national level initiative of Government of India. Foreg. Digital India, Skill India, Swachh Bharat, Atmanirbhar Bharath, Make in India, Mudra scheme, Skill development programs etc.

(06 Hours) L1,L2,L3

Module – 5

NSS Individual Activities for Local Voice (Activity based learning)

Govt. school Rejuvenation and helping them to achieve good infrastructure, Plantation and adoption of plants. Know your plants. Spreading public awareness under rural outreach programs, National integration and social harmony events.

(06 Hours) L1,L2,L3

Course outcomes :

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

CO1: Understand the importance of his / her responsibilities towards society.

CO2: Analyse the environmental and societal problems/issues and will be able to design solutions for the same.

CO3: Evaluate the existing system and to propose practical solutions for the same for sustainable development.

CO4: Implement government or self-driven projects effectively in the field.

CO5: Develop capacity to meet emergencies and natural disasters & practice national integration and social harmony in general.

Teaching Practice:

- Classroom teaching (Chalk and Talk)
- ICT – Power Point Presentation
- Audio & Video Visualization Tools

Assessment Details

Weightage	**CIE – 100%**
Presentation -1 Selection of topic, PHASE-1	20 Marks
Commencement of activity and its progress – PHASE – 2	20 Marks
Case Study based Assessment – Individual performance	20 Marks
Sector wise study and its consolidation	20 Marks
Video based seminar for 10 minutes by each student at the end of the course with Report	20 Marks

Suggested Learning Resources:

Books:

1. NSS Course Manual**,** Published by NSS Cell, VTU Belagavi.
2. Government of Karnataka, NSS cell, activities reports and its manual.
3. Government of India, NSS cell, Activities reports and its manual.

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – IV

Sports (0:0:2)

(Common to all Branches)

(Effective from the academic year 2023-24)

Course Code	**BPEK459**	CIE Marks	100
Teaching Hours/Week (L: T:P)	0:0:2	SEE Marks	--
Total Number of Contact Hours	26	Exam Hours	--

Mandatory Course (Non-Credit)

(Completion of the course shall be mandatory for the award of degree)

Course Objectives: The course will enable students to

1. Develop a healthy life style.
2. Acquire Knowledge about various stages of sports and games.
3. Focus on modern technology in sports.

Module – 1

Introduction of the game: Aim of sports and games, Brief history of the game, Nature of the game, Terminology & Modern trends of the game, Fitness & Skill tests along with Game Performance.

(06 Hours) L1,L2,L3

Module – 2

Offensive and Defensive Techno Tactical Abilities: Fitness, Fundamentals & Techniques of the game with the implementation of Biomechanics, Tactics- Drills for the Techno Tactical abilities, Individual and Group, Miner games- to implement the Techniques, Tactics and Motor abilities.

(05 Hours) L1,L2,L3

Module – 3

Team tactics and Rules of the Game: Rules and Regulations of the Game: Game rules as well as sequence of officiating, Team tactics: Offensive and Defensive team strategies and scrimmages, Practice Matches: among the group, Analysis of Techno Tactical abilities: Correction and implementation of skills and Sports Injuries and rehabilitation: First aid, PRICE treatment,

(05 Hours) L1,L2,L3

Module – 4

Sports Training: Introduction of Sports Training, Principles of Sports performance, how to increase and sustain the sports performance, Training Load & Recovery- How to increase the training load (volume/Intensity) and means and methods for Recovery, Periodization: Shorts, Medium and Long term, Physiological changes: Changes in Lung capacity, heart beats etc…

(05 Hours) L1,L2,L3

Module – 5

Organization of Sports Event: Tournament system, Planning and preparation for the competition, Ground preparation and Equipment's, Organizing an event among the group.

(05 Hours) L1,L2,L3

The above 5 modules are common to all the sports events / games, we are offering the following games**: 1. Baseball, 2. Kabaddi, 3. Table Tennis, and 4. Volleyball.**

Course outcomes:

The students will be able to:

6 Understand the importance of sports and games, inculcate healthy habits of daily exercise & fitness, Self-hygiene, good food habits, Create awareness of Self-assessment of fitness.

7 Develops individual and group techno tactical abilities of the game.

8 Increases the team combination and plan the strategies to play against opponents.

9 Outline the concept of sports training and how to adopt technology to attain high level performance.

10	Summarize the basic principles of organising sports events and concept of technology implemented to organise competitions in an unbiased manner.

Teaching Practice:

- Classroom teaching (Chalk and Talk)
- ICT – Power Point Presentation and video analysing.
- Practical classes in outdoor and indoor as per requirement.

CIE: 100 Marks

- CIE 1 for 40 marks – A theory paper which is MCQ / Descriptive conducted during the semester.
- CIE 2 for 60 marks – A practical test conducted at the end of the semester in which the student has to give fitness and skill tests and his performance in game will be assessed.

Textbooks

1. Barbara Bushman, "ACSM's complete guide to Fitness & Health", 2011, Human Kinetics USA
2. Pankaj Vinayak Pathak, "*Sports and Games - Rules and Regulation*", 2019, Khel Sahitya Kendra.
3. Hardayal Singh, *"Sports Training, General Theory & Methods"***,** 1984 "Netaji Subhas, National Institute of Sports".
4. Keith A. Brown, "International Handbook of Physical Education and Sports Science", 2018, (5 Volumes) Hardcover.

References

1. Tudor O Bompa,*" Periodization Training for Sports*", 1999, Human Kinetics, USA
2. Michael Boyle, "New Functional Training for Sports" 2016, Human Kinetics USA
3. Michael Kjaer, Michael Rogsgaard, Peter Magnusson, Lars Engebretsen & 3 more, "Text book of Sports Medicine: Basic Science and Clinical Aspects of Sports Injury and Physical Activity", 2002, Wiley Blackwell.
4. Scott L. Delp and Thomas K. Uchida, "Biomechanics of Movement: The Science of Sports, Robotics, and Rehabilitation", 2021, The MIT Press
5. MCARDLE W.D. "Exercise Physiology Nutrition Energy And Human Performance" 2015, LWW IE (50)

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – IV

Yoga (0:0:2)

(Common to all Branches)

(Effective from the academic year 2023-24)

Course Code	**BYOK459**	CIE Marks	100
Teaching Hours/Week (L:T:P)	0:0:2	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Course Objectives:

This course will enable students to:

5. Understand the importance of practicing yoga in day-to-day life.
6. Be aware of therapeutic and preventive value of Yoga.
7. Have a focussed, joyful and peaceful life.
8. Maintain physical, mental and spiritual fitness.
9. Develop self-confidence to take up initiatives in their lives.

Module – 1

Introduction to Yoga: Introduction, classical and scientific aspects of yoga, Importance, Types, Healthy Lifestyle, Food Habits, Brief Rules, Sithalikarana Practical classes. **(04 Hours) L1,L2,L3**

Module – 2

Physical Health: Introduction, Pre-requisites, Asana-Standing, Sitting, Supine and Prone, Practical classes. **(06 Hours) L1,L2,L3**

Module – 3

Psychological Health: Introduction Thought Forms, Kriya (Kapalabhati), Preparation to Meditation, Practical classes. **(06 Hours) L1,L2,L3**

Module – 4

Therapeutic Yoga: Mudra Forms, Acupressure therapy, Relaxation techniques Practical classes. **(06 Hours) L1,L2,L3**

Module – 5

Spirituality & Universal Mantra: Introduction, Being Human, Universal Mantra, Universal LOVE, Benefits of practice of Spirituality in day-to-day life, practical classes. **(04 Hours) L1,L2,L3**

Course Outcomes:

Students will be able to:

6. Understand the requirement of practicing yoga in their day-to-day life.
7. Apply the yogic postures in therapy of psychosomatic diseases
8. Train themselves to have a focussed, joyful and peaceful life.
9. Demonstrate the fitness of Physical, Mental and Spiritual practices.
10. Develops self-confidence to take up initiatives in their lives.

Teaching Practice:

- Classroom teaching (Chalk and Talk)
- ICT – Power Point Presentation
- Audio & Video Visualization Tools

CIE: 100 Marks

- CIE 1 for 40 marks – A theory paper which is MCQ / Descriptive conducted during the semester.
- CIE 2 for 60 marks – A practical test conducted at the end of the semester in which the student have to perform asanas.

Textbooks

1. George Feuerstein: The yoga Tradition (Its history, literature, philosophy and practice.)
2. Sri Ananda: The complete Book of yoga Harmony of Body and Mind. (Orient paper Backs: vision Books Pvt.Ltd., 1982.
3. B.K.S Iyenkar: Light on the Yoga sutras of patanjali (Haper Collins Publications India Pvt.,Ltd., New Delhi.)
4. Science of Divinity and Realization of Self – Vethathiri Publication, (6-11) WCSC, Erode

References

1. Principles and Practice of Yoga in Health Care, Publisher: Handspring Publishing Limited, ISBN: 9781909141209, 9781909141209
2. Basavaraddi I V: Yoga in School Health, MDNIY New Delhi, 2009
3. Dr. HR. Nagendra: Yoga Research and applications (Vivekanda Kendra Yoga Prakashana Bangalore)
4. Dr. Shirley Telles: Glimpses of Human Body (Vivekanda Kendra Yoga Prakashana Bangalore)

Web resources

Web links and Video Lectures (e-Resources): Refer links

1. https://youtu.be/KB-TYlgd1wE
2. https://youtu.be/aa-TG0Wg1Ls

B.E. CIVIL ENGINEERING
Choice Based Credit System (CBCS)
SEMESTER – IV

NCC (0:0:2)
(Common to all Branches)
(Effective from the academic year 2023-24)

Course Code	BNCK459	CIE Marks	100
Teaching Hours/Week (L: T:P)	0:0:2	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Mandatory Course (Non-Credit)
(Completion of the course shall be mandatory for the award of degree)

Course Objectives:
This course will enable students to:
- Understand the vision of NCC and its functioning.
- Understand the security set up and management of Border/Coastal areas.
- Acquire knowledge about the Armed forces and general awareness.

Module– 1

Introduction to National Cadet Corp: What is NCC, who can join NCC, benefits, Establishment, history, 3 wings, motto, core values, Aims, flag, song, pledge, cardinals, Organization, Director General NCC, Directorates, Uniform and Cadet ranks, Camps, Certificate exams, Basic aspects of drill.
National Integration: Importance of national integration**,** Factors affecting national integration, Unity in diversity**,** Role of NCC in nation building.
Disaster Management: What is a Disaster**,** Natural and Man-made disasters**,** Earthquake, Floods.
(04 Hours) L1,L2,L3

Module– 2

Indian Army: Introduction to Indian Army, Command and control, Fighting & supporting arms**,** Rank structure, Major Regiments of the Army**,** Major Wars and Battles**,** Entry to the Indian Army, Renowned leaders and Gallantry Awardees**.** **(02 Hours) L1,L2,L3**

Module– 3

Indian Air Force: Introduction to Indian Air Force, Command and control**,** Rank structure**,** Major Aircrafts, Entry to the Indian Air Force, Renowned leaders.

Indian Navy: Introduction to Indian Navy, Command and control, Rank structure, Major Ships and Submarines**,** Entry to the Indian Navy, Renowned leaders**.** **(02 Hours) L1,L2,L3**

Module– 4

Health and Hygiene: First Aid Protocols - CPR, Understanding Types of Bandages, Fire Fighting
Field & Battle Crafts: Field Signals using hands, Judging distance -Types of Judging Distance, Section formations-types of Section Formation **(10 Hours) L1,L2,L3**

Module– 5

Drill Practicals: Savdhan, Vishram, Salute, Turning, Marching**.** **(08 Hours) L1,L2,L3**

Course outcomes:

The students will be able to:

CO1: Develop qualities like character, comradeship, discipline, leadership, secular outlook, spirit of adventure, ethics and ideals of selfless service.

CO2: Get motivated and trained to exhibit leadership qualities in all walks of life and be always available for the service of the nation.

CO3: Familiarize on the issues related to social & community development and disaster management and equip themselves to provide solutions.

CO4: Get an insight of the defense forces and further motivate them to join the defense forces.

Teaching Practice:

- Blackboard/Multimedia Assisted Teaching.
- Class Room Discussions, Brainstorming Sessions, Debates.
- Activity: Organizing/Participation in Social Service Programs.
- On Ground: Drill training.

CIE: 100 Marks

- CIE 1 for 40 marks – A theory paper which is MCQ / Descriptive conducted during the semester.
- CIE 2 for 60 marks – A practical test conducted at the end of the semester.

Textbooks:

3. NCC Cadets Handbook –Common Directorate General of NCC, New Delhi.
4. NCC Cadets Handbook –Special(A), Directorate General of NCC, New Delhi.

References:

- Chandra B. Khanduri, "Field Marshal KM Cariappa: a biographical sketch", Dev Publications,2000.
- Gautam Sharma, "Valour and Sacrifice: Famous Regiments of the Indian Army", Allied Publishers,1990.

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – IV

Music (0:0:2)

(Common to all Branches)

(Effective from the academic year 2023-24)

Course Code	BMUK459	CIE Marks	100
Teaching Hours/Week (L: T:P)	0:0:2	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Mandatory Course (Non-Credit)

(Completion of the course shall be mandatory for the award of the Degree)

Course Objectives:

The course will enable the students to:

1. Identify the major traditions of Indian music, both through notations and aurally.
2. Analyze the compositions with respect to musical and lyrical content.
3. Demonstrate an ability to use music technology appropriately in a variety of settings.

Module – 1

Preamble: Contents of the curriculum intend to promote music as a language to develop an analytical, creative, and intuitive understanding. For this the student must experience music through study and direct participation in improvisation and composition.

Origin of the Indian Music: Evolution of the Indian music system, Understanding of Shruthi, Nada, Swara, Laya, Raga, Tala, Mela. **(03 Hours) L1,L2,L3**

Module – 2

Compositions: Introduction to the types of compositions in Carnatic Music - Geethe, Jathi Swara, Swarajathi, Varna, Krithi, and Thillana, Notation system.

(03 Hours) L1,L2,L3

Module – 3

Composers: Biography and contributions of Purandaradasa, Thyagaraja, Mysore Vasudevacharya.

(03 Hours) L1,L2,L3

Module – 4

Music Instruments: Classification and construction of string instruments, wind instruments, percussion instruments, Idiophones (Ghana Vaadya), Examples of each class of Instruments

(03 Hours) L1,L2,L3

Module – 5

Abhyasa Gana: Singing the swara exercises (Sarale Varase Only), Notation writing for Sarale Varase and Suladi Saptha Tala (Only in Mayamalavagowla Raga), Singing 4 Geethe in Malahari, and one Jathi Swara, One Nottu Swara OR One krithi in a Mela raga, a patriotic song

(14 Hours) L1,L2,L3

Course Outcomes (COs):

The students will be able to:

CO1: Discuss the Indian system of music and relate it to other genres (Cognitive Domain)

CO2: Experience the emotions of the composer and develop empathy (Affective Domain)

CO3: Respond to queries on various patterns in a composition (Psycho-Motor Domain)

Teaching Practice:

- Classroom teaching
- ICT – PowerPoint Presentation
- Audio & Video Visualization Tools

CIE: 100 Marks

- **CIE 1** for 40 marks – A theory paper which is MCQ / Descriptive conducted during the semester
- **CIE 2** for 60 marks – A practical test conducted at the end of the semester in which the student has to recite one Sarale Varase mentioned by the examiner in three speeds. Sing / Play the Geethe in Malahari. Singing / Playing Jathi Swara / Krithi.

Textbooks

3. Vidushi Vasantha Madhavi, "Theory of Music", Prism Publication, 2007.
4. T Sachidevi and T Sharadha (Thirumalai Sisters), Karnataka Sangeetha Dharpana - Vol. 1 (English), Shreenivaasa Prakaashana, 2018.

References

5. Lakshminarayana Subramaniam, Viji Subramaniam, "Classical Music of India: A Practical Guide", Tranquebar 2018.
6. R. Rangaramanuja Ayyangar, "History of South Indian (Carnatic) Music", Vipanci Charitable Trust; Third edition, 2019.
7. Ethel Rosenthal, "The Story of Indian Music and Its Instruments: A Study of the Present and a Record of the Past", Pilgrims Publishing, 2007.
8. Carnatic Music, National Institute of Open Schooling, 2019.