



BMS INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(Autonomous Institute affiliated to VTU)

Scheme of Teaching and Examination: Effective from AY 2021 - 22

Choice Based Credit System (CBCS)

UG PROGRAM: B.E., CIVIL ENGINEERING										Semester: III			
Sl. No.	Course category	Course Code	Course Title	Teaching Dept.	Teaching Hours/Week				Credits	Examination			
					L	T	P	PW		Duration	CIE Marks	SEE Marks	Total Marks
1	BS	21MTA31	Fourier Series, Numerical Methods, Statistics and Probability	MAT	3	1	1	0	4	3	50	50	100
2	HSS	21KSK32	MANDATORY COURSES (Govt. of Karnataka) / Samskrutika Kannada	HS	1	0	0	0	1	1	50	50	100
		21KBK32	MANDATORY COURSES (Govt. of Karnataka) / Balake Kannada										
3	UHV	21UHV33	Universal Human Values- I	HS	1	0	0	0	1	1	50	50	100
4	INT	21INT34	INTERNSHIP - I	CV	0	0	0	4	2	3	100	--	100
5	PC	21CV35	Solid Mechanics	CV	2	2	0	0	3	3	50	50	100
6	PC	21CV36	Fluid Mechanics and Applied Hydraulics	CV	2	2	0	0	3	3	50	50	100
7	PC	21CV37	Building Materials and Construction Techniques	CV	1	2	0	0	2	3	50	50	100
8	PC	21CV38	Engineering Geology	CV	1	2	0	0	2	3	50	50	100
9	PC	21CVL39A	Fluid Mechanics and Hydraulic Machinery Laboratory	CV	0	0	2	0	1	3	50	50	100
10	PC	21CVL39B	Basic Material Testing Laboratory	CV	0	0	2	0	1	3	50	50	100
TOTAL					11	9	9	4	20	-	550	450	1000
					33								

Note: BS: Basic Science; PC: Professional Course; HSS: Humanity and Social Science; AEC: Ability Enhancement Courses, L: Laboratory Course; INT: Internship; UHV: Universal Human Values;

Course Prescribed to Lateral Entry Diploma holders admitted to III Semester B.E.													
1	NCCM	21DIP31A	Diploma Mathematics- I	MAT	3	0	0	0	0	3	100	--	100

- Lateral Entry Students have to undergo Internship- I during the intervening vacation of III and IV Semesters.
- The Assessment Pattern for 1/2/3 credit courses shall be done as per VTU guidelines.
- Additional Mathematics I and II shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA but completion of the courses shall be mandatory for the award of the degree
- Successful completion of the course Additional Mathematics I and II shall be indicated as satisfactory in the grade card. Non completion of the courses diploma mathematics shall be indicated as unsatisfactory

B.E. CIVIL ENGINEERING Choice Based Credit System (CBCS) SEMESTER – III			
Fourier Series, Numerical Methods, Statistics and Probability (3:1:1) 4 (Common to ECE, ETE, EEE, MECH & CIVIL Branches) (Effective from the academic year 2021-22)			
Course Code	21MTA31	CIE Marks	50
Teaching Hours/Week (L: T:P)	3:2:0	SEE Marks	50
Total Number of Contact Hours	50	Exam Hours	3
Course Objectives: This course will enable students to:			
<ol style="list-style-type: none"> 1. Apply the concepts of Fourier series, Fourier transforms, Difference equations and Z-transforms in the field of engineering. 2. Apply the important analytical tools for solving partial differential equations arising in engineering applications. 3. Apply the knowledge of interpolation/extrapolation and Numerical Integration technique whenever analytical methods fail or very complicated, to offer solutions. 			
Module – 1			
Introduction: Understanding of Transform Calculus, Numerical methods & their applications in Engineering, Economics and Statistics.			
Fourier Series: Convergence and divergence of infinite series of positive terms, Periodic function, Dirichlet's conditions, Fourier Series of periodic functions of period 2π and arbitrary period. Fourier series of even and odd functions. Half range Fourier Series, Practical harmonic analysis.			
Self-Learning Component: Complex Fourier Series.			
Lab Session 1:			
<ol style="list-style-type: none"> 1. Obtain the Fourier series of a function. 2. Finding Fourier series by practical Harmonic Analysis <p style="text-align: right;">(10 Hours)</p>			
Module – 2			
Fourier Transforms: Infinite Fourier transforms, Fourier Sine and Cosine transforms. Inverse Fourier transforms - problems.			
Z-transforms: Difference equations, basic definition, Z-transform-definition, Standard Z-transforms, Damping rule, Shifting rule, Initial value and final value theorems (without proof) and problems, Inverse Z-transforms – problems, Solution of Difference equations using Z transforms			
Self-Learning Component: Proofs of Z-transformation of standard functions.			
Lab Session 2:			
<ol style="list-style-type: none"> 1. Obtain the Fourier Transform of a function. 2. Obtain the solution of difference equation using Z Transforms. <p style="text-align: right;">(10 Hours)</p>			
Module – 3			
Partial Differential Equations: Formation of PDEs by elimination of arbitrary constants / functions, Solution of non-homogeneous PDE by direct integration, Homogeneous PDEs involving derivative with respect to one independent variable only, Solution of Lagrange's linear PDE. Solution of One-dimensional heat and wave equations and its solution by method of separation of variables.			
Self-Learning Component: Derivation of One-dimensional heat and wave equations by method of separation of variables.			
Lab Session 3:			
<ol style="list-style-type: none"> 1. Formation of PDE by eliminating arbitrary constant and function. 2. Solution of Heat equation. <p style="text-align: right;">(10 Hours)</p>			
Module – 4			
Numerical solution of Partial Differential Equations: Classification of second order PDE, Numerical solution of one-dimensional heat equation using implicit and explicit finite difference methods. Numerical solution of one-dimensional wave equation and two - dimensional Laplace equation.			
Vector Integration: Line & Surface integrals, Volume integrals-definition and problems, Green's theorem in a plane, Stoke's theorem and Gauss Divergence theorem (without proof) - problems.			

Self-Learning Component: Proof of Green's theorem in a plane.

Lab Session 4:

1. Numerical Solution of Laplace equation.
2. Evaluate Green's Theorem in a plane.

(10 Hours)

Module – 5

Finite Differences: Forward and backward differences, Newton's forward and backward interpolation formulae, Divided differences- Newton's divided difference formula, Lagrange's interpolation formula and inverse interpolation formulae (all formulae without proof) -problems.

Numerical Integration: Simpson's $(1/3)^{\text{rd}}$ and $(3/8)^{\text{th}}$ rules, Weddle's rule (without proof) – problems.

Self-Learning Component: Trapezoidal rule.

Lab Session 5:

1. Numerical solution using Newton's Forward / Backward interpolation formula.
2. Numerical integration using Simpson's One-third rule.

Recap/Summary of the Course

(10 Hours)

Course Outcomes:

The students will be able to:

- CO1: Apply Fourier series to study the behaviour of periodic functions and Fourier transforms and Z-transforms to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
- CO2: Analyse a variety of partial differential equations and solution by exact methods/method of separation of variables.
- CO3: Construct a variety of partial differential equations and solution by exact methods/method of separation of variables.
- CO4: Apply Green's Theorem, Divergence Theorem and Stoke's theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.
- CO5: Apply the knowledge of Numerical Methods in the modelling of various physical and engineering phenomena.

Question paper pattern:

- **SEE** will be conducted for 100 marks. (100 marks reduced to 50 marks)
- **Part A:** First question with 20 MCQs carrying 1 mark each.
- **Part B:** Each full question is for 16 marks. (Answer five full questions out of 10 questions with intra modular choice). In every question, there will be a maximum of three sub-questions.
- **CIE** will be announced prior to the commencement of the course.
- 25 marks for test. Average of three test will be taken.
 - 25 marks for Alternate Assessment Method.

Textbooks:

1. B.S. Grewal, "Higher Engineering Mathematics", 43rd Edition, Khanna Publishers, 2015.
2. E. Kreyszig, "Advanced Engineering Mathematics", 10th Edition, John Wiley & Sons, 2015.
3. B.V. Ramana, "Higher Engineering Mathematics", 6th Edition, Tata McGraw-Hill, 2010.

References:

1. N.P. Bali, Manish Goyal, "A Text Book of Engineering Mathematics", Laxmi Publishers, 2014.
2. H.K. Dass, Er. Rajnish Verma, "Higher Engineering Mathematics", 3rd Edition, S. Chand publishers, 2014
3. P. Kandasamy, K. Thilagavathi, K. Gunavathi, "Engineering Mathematics", Vol. III, 2001.
4. S.S. Sastry, "Introductory Methods of Numerical Analysis", 4th Edition, Prentice Hall of India, 2010.

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

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ Samskrutika Kannada (1:0:0):1
(Effective from the academic year 2021-2022)

ವಿಷಯ ಸಂಕೇತ Course Code	21KSK32/42	ನಿರಂತರ ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನದ ಅಂಕಗಳು CIE Marks	50
ಒಂದು ವಾರಕ್ಕೆ ಬೋಧನಾ ಅವಧಿ Teaching hours/Week (L: T:P)	1-0-0	ಸೆಮಿಸ್ಟರ್ ಅಂತ್ಯದ ಪರೀಕ್ಷೆಯ ಅಂಕಗಳು SEE Marks	50
ಒಟ್ಟು ಬೋಧನಾ ಅವಧಿ Total Number of contact hours	13	ಪರೀಕ್ಷೆಯ ಅವಧಿ Exam Hours	02

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯದ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು

1. ವೃತ್ತಿಪರ ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಪರಿಚಯಿಸಿ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.
3. ತಾಂತ್ರಿಕ ವೃತ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳು ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.

ಘಟಕ-1

ಲೇಖನಗಳು:

ಕರ್ನಾಟಕ ಏಕೀಕರಣ: ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ-ಜಿ.ವೆಂಕಟಸುಬ್ಬಯ್ಯ
ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ-ಡಾ.ಎಲ್.ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ.ವಿ.ಕೇಶವಮೂರ್ತಿ 2 ಗಂಟೆಗಳು

ಘಟಕ-2

ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ:

ವಚನಗಳು-ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ
ಕೀರ್ತನೆಗಳು-ಅದರಂದೇನು ಫಲ ಇದರಂದೇನು ಫಲ-ಪುರಂದರದಾಸರು
ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ-ಕನಕದಾಸರು 3 ಗಂಟೆಗಳು

ಘಟಕ-3

ಆಧುನಿಕ ಕಾವ್ಯ ಭಾಗ:

ಡಿ.ವಿ.ಜಿ.ಯವರ ಮಂಕು ತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದ ಕೆಲವು ಭಾಗಗಳು.
ಹೊಸ ಬಾಳಿನ ಗೀತೆ: ಕುವೆಂಪು 2 ಗಂಟೆಗಳು

ಘಟಕ-4

ತಾಂತ್ರಿಕ ವೃತ್ತಿಗಳ ಪರಿಚಯ, ವಿಜ್ಞಾನ ಮತ್ತು ತಂತ್ರಜ್ಞಾನ:

ಡಾ.ಸರ್.ಎಂ.ವಿಶ್ವೇಶ್ವರಯ್ಯ:ವೃತ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ-ಎ.ಎನ್.ಮೂರ್ತಿರಾವ್
ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ-ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ 4 ಗಂಟೆಗಳು

ಘಟಕ-5

ಫಲಾನ ಕಥನ:

ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ: ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ

2 ಗಂಟೆಗಳು

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು: ಅರಣ್ಯಾಡಿಜ ರಣಾಭಿರಂಜ

1. ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯವಾಗುತ್ತದೆ.
2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳು ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಆಸಕ್ತಿಯು ಮೂಡುತ್ತದೆ.
3. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವಾಗುತ್ತದೆ.
4. ಕನ್ನಡ ಭಾಷಾಭ್ಯಾಸ, ಸಾಮಾನ್ಯ ಕನ್ನಡ ಹಾಗೂ ಆಡಳಿತ ಕನ್ನಡದ ಪದಗಳ ಪರಿಚಯವಾಗುತ್ತದೆ

Question paper pattern:

- SEE will be conducted for 100 marks. The same will be reduced to 50 Marks.
- There shall be 100 MCQs, each carrying 1 mark.
- CIE will be announced prior to the commencement of the course.
- 50 marks for test. Average of three tests will be taken and reduced to 25.
- 25 marks for Alternate Assessment Method.

Textbook:

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ

ಡಾ.ಹಿ.ಚಿ ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ,

ಪ್ರಸಾರಾಂಗ ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ

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

ಬಳಕೆ ಕನ್ನಡ Balake Kannada (1:0:0):1
(Common to all Branches)
(Effective from the academic year 2021-22)

ವಿಷಯ ಸಂಕೇತ Course Code	21KBK32/42	ನಿರಂತರ ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನದ ಅಂಕಗಳು CIE Marks	50
ಒಂದು ವಾರಕ್ಕೆ ಬೋಧನಾ ಅವಧಿ Teaching hours/Week (L: T:P)	1-0-0	ಸೆಮಿಸ್ಟರ್ ಅಂತ್ಯದ ಪರೀಕ್ಷೆಯ ಅಂಕಗಳು SEE Marks	50
ಒಟ್ಟು ಬೋಧನಾ ಅವಧಿ Total Number of contact hours	13	ಪರೀಕ್ಷೆಯ ಅವಧಿ Exam Hours	02

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು Course Learning Objectives:

1. To Create awareness regarding the necessity of learning local language for comfortable and healthy life.
2. To enable learners to Listen and understand the Kannada language properly.
3. To speak, read and write Kannada language as per requirement.
4. To train the learners for correct and polite conversation.

Module-1

Introduction, Necessity of learning a local language. Methods to learn the Kannada language.
Easy learning of a Kannada Language: A few tips. Hints for correct and polite conversation,
Listening and Speaking Activities Key to Transcription.

ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು
Personal Pronouns, Possessive Forms, Interrogative words

(3 Hours)

Module-2

ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು

Possessive forms of nouns, dubitive question and Relative nouns
ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು

ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು – Qualitative, Quantitative and Color Adjectives, Numerals
ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ (ಅ, ಅದು, ಅವು, ಅಲ್ಲಿ) Predictive Forms, Locative Case

(3 Hours)

Module-3

ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು Dative cases and Numerals

ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು Ordinal numerals and Plural makers

ನ್ಯೂನ/ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು ಮತ್ತು ವರ್ಣ ಗುಣವಾಚಕಗಳು Defective /Negative Verbs and Colour
Adjectives

(3 Hours)

Module-4
<p>ಅಪ್ಪಣೆ/ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತ್ತು ಒತ್ತಾಯ ಅರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು Permission, Commands, encouraging and urging words (Imperative words and sentences)</p> <p>ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು Accusative Cases and Potential Forms used in General Communication (2 Hours)</p>
Module-5
<p>"ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು Helping verbs "iru and iralla" Corresponding Future and Negation Verbs</p> <p>ಹೋಲಿಕೆ(ತರತಮ), ಸಂಬಂಧಸೂಚಕ ಮತ್ತು ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ</p> <p>Comparative, Relationship, Identification and Negation words (2 Hours)</p>
<p>ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು: Course outcomes</p> <p>At the end of the Course, The Students will be able</p> <ol style="list-style-type: none"> 1. To understand the necessity of learning of local language for comfortable life. 2. To Listen and understand the Kannada language properly. 3. To speak, read and write Kannada language as per requirement. 4. To communicate (converse) in Kannada language in their daily life with Kannada speakers. 5. To speak in polite conversation.
<p>Question paper pattern:</p> <ul style="list-style-type: none"> ● SEE will be conducted for 100 marks. The same will be reduced to 50 Marks. ● There shall be 100 MCQs, each carrying 1 mark. ● CIE will be announced prior to the commencement of the course. ● 50 marks for test. Average of three tests will be taken and reduced to 25. ● 25 marks for Alternate Assessment Method.
<p>Textbook:</p> <p>ಬಳಕೆ ಕನ್ನಡ</p> <p>ಲೇಖಕರು: ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ</p> <p>ಪ್ರಸಾರಾಂಗ, ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ</p>

Note: 21KSK32 Samskruthika Kannada (**Kannada for Administration**) is for students who speak, read and write Kannada and 21KBK32 Balake Kannada (**Kannada for Communication**) is for non-Kannada speaking, reading and writing students.

B.E. CIVIL ENGINEERING			
Choice Based Credit System (CBCS)			
SEMESTER – III			
Universal Human Values- I (1:0:0) 1			
(Effective from the academic year 2021-2022)			
Course Code	21UHV33	CIE Marks	50
Teaching Hours/Week (L: T:P)	1-0-0	SEE Marks	50
Total Number of Lecture Hours	13	Exam Hours	1
Course objectives:			
This introductory course is intended to			
1. Develop a holistic perspective based on self-exploration about themselves (human being).			
2. Understand harmony in the human being.			
3. Strengthening of self-reflection.			
4. Develop commitment and courage to act.			
Module – 1			
Preamble: Significance and Scope of the course, Importance of the course in societal, political and economic growth of the nation.			
Introduction to Value Education: Understanding Value Education; Need and Basic guidelines for Value Education; Scope and Process.			
Self-exploration as the Process for Value Education: What is self- exploration; Process of self-exploration.			
Case study and Group Discussion			2 Hours
Module – 2			
Basic Human Aspirations: Continuous happiness and prosperity; Exploring happiness and prosperity; Methods to Fulfill the Basic Human Aspirations; Need for right understanding; Relationship and Physical Facilities.			
Case study and Group Discussion			2 Hours
Module – 3			
Understanding human being as co-existence of the self and the Body: Understanding and distinguishing between the Needs of the Self and the Body- Quantitative, Qualitative, Knowing, Assuming, Recognizing and fulfilling in self and in body.			
Case study and Group Discussion			3 Hours
Module – 4			
Harmony in self: Understanding self; Activities in self; Power of expectation, thought and desire; Conflicts or contradictions in self as a result of pre-conditioned desire; Realisation and Understanding.			
Case study and Group Discussion			3 Hours
Module – 5			
Harmony with Body: Harmony of self with the body-Sanyama and Svasthya; Understanding and living with Sanyama; Nurturing of the body; Protection of the body; Right utilization of the body; Correct appraisal of our physical needs.			
Case study and Group Discussion			3 Hours

Course outcomes: The students will be able to:

1. Understand the role of value education, self-exploration and harmony in self and with body.
2. Distinguish between values and skills, Self and the Body, Intention and Competence of an individual.

Question paper pattern:

- **SEE** will be conducted for 100 marks. The same will be reduced to 50 Marks.
- **There shall be 100 MCQs**, each carrying 1 mark.
- **CIE** will be announced prior to the commencement of the course.
- 50 marks for test. Average of three tests will be taken and reduced to 25.
- 25 marks for Alternate Assessment Method.

Textbooks

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. ISBN978-93-87034-47-1
2. The Teacher's Manual for *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 978-93-87034-53-2

References

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantik, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. Slow is Beautiful - Cecile Andrews
4. Vivekananda - Romain Rolland (English)

Relevant websites, documentaries

1. Value Education websites, <http://uhv.ac.in>,
2. Story of Stuff, <http://www.storyofstuff.com>

B.E. CIVIL ENGINEERING			
Choice Based Credit System (CBCS)			
SEMESTER – III			
Solid Mechanics (2:1:0) 3			
(Effective from the academic year 2021-22)			
Course Code	21CV35	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:2:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3
Course Objectives:			
This course will enable students to:			
<ol style="list-style-type: none"> 1. Understand the basic concepts of the stresses and strains. 2. Analyze & understand the determinate structures & distribution of various stresses. 3. Determine the stresses on thin and thick cylinder, buckling load of columns and understand the theory of failures. 4. Inculcate the ability to understand and provide the solution to the real times problems. 5. Recognize the application and advancements of solid mechanics 			
Module – 1			
<p>Simple Stresses: Axial Members - Deformation, strain, simple stress, Principle of superposition- Hook’s Law- Poisson’s ratio- Elastic constants and their relationship-Compound Bars – Thermal Stresses – Stresses due to pure Shear.</p> <p>Compound Stresses: Introduction, Stress components on inclined planes, General two-dimensional stress system, Principal planes and stresses, maximum shear stresses and their planes (shear planes). Compound stress using Mohr’s circle method.</p>			
(8 Hours)			
Module – 2			
<p>Shear Force and Bending Moment: Concept of shear force and Bending Moment-shear force and bending moment diagrams for determinate beams – Point of Contra Flexure-Relationship between shear force, bending moment and rate of loading at a section.</p> <p>Analysis of Simple Trusses: Types of trusses, Analysis of statically determinate trusses using method of joints and method of sections.</p>			
(8 Hours)			
Module – 3			
<p>Bending and shear stresses: Theory of simple bending-Section Modulus-Numerical in rectangular, circular, I and T Sections. Shear stresses– Derivation of Shear stress intensity equations - Shear stress distribution across various beams like Rectangular, Circular, I and T section.</p> <p>Torsion: Torsion of Circular and Hollow Shafts –Elastic Theory of Torsion - Stresses and Deformation in Circular Solid and Hollow Shafts</p>			
(8 Hours)			
Module – 4			
<p>Thin Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – changes in diameter, and volume of thin cylinders – Thin spherical shells.</p> <p>Thick cylinders: Introduction Lamé’s theory for thick cylinders – Derivation of Lamé’s formulae – distribution of hoop and radial stresses across thickness – compound cylinders – Necessary difference of radii for shrinkage – Thick spherical shells.</p>			
(8 Hours)			
Module – 5			
<p>Columns: Introduction – Short and long columns, Euler’s theory on columns, Effective length, slenderness ratio, radii of gyration, buckling load, Assumptions, derivations of Euler’s Buckling load for different boundary conditions, Limitations of Euler’s theory, Rankine’s formula and problems.</p> <p>Theories of Failure: Introduction – various theories of failures (Theory only).</p>			
(8 Hours)			

Course outcomes:

The students will be able to:

CO1: Explain the stresses & strains and determines its components on inclined plane.

CO2: Analyse the determinate beams and trusses and find the stresses subjected to bending, shear and torsion.

CO3: Determine various stresses on thin and thick cylinders, buckling load of columns and explain the various theory of failures

CO4: Identify and analyze the real times problems and arriving substantial conclusions

CO5: Recognize the applications and advancements of solid mechanics in the field of Civil Engineering.

Question paper pattern:

- **SEE** will be conducted for 100 marks. (100 marks reduced to 50 marks)
- **Part A:** First question with 20 MCQs carrying 1 mark each.
- **Part B:** Each full question is for 16 marks. (Answer five full questions out of 10 questions with intra modular choice). In every question, there will be a maximum of three sub-questions.
- **CIE** will be announced prior to the commencement of the course.
- 25 marks for test. Average of three test will be taken.
- 25 marks for Alternate Assessment Method.

Text Books:

1. Sadhu Singh, "Strength of Materials", Khanna publishers, New Delhi, 2013
2. Rajput.R.K, "Strength of Materials", S. Chand & Co., New Delhi, 2015.
3. Bansal, R. K. A textbook of strength of materials. Laxmi Publications, 2010.
4. Bhavikatti, S.S. "Strength of Materials" Vikas Publishing House Pvt. Ltd, 2013.
5. Basavarajaiah B S and Mahadevappa P, "Strength of Materials in SI Units" University Press (India) Pvt. Ltd, 3rd edition 2010.

References:

1. L. S. Negi, "Strength of Materials", Tata Mc Graw Hill Education Pvt. Ltd, 2010.
2. Vaidyanathan.R, Perumal.P and Lingeswari.S, "Mechanics of Solids and Structures, Volume I", Laxmi Publications Pvt Ltd, Chennai, 2017.
3. L.S. Srinath, "Strength of Materials", Macmillan Publishers India,2000
4. Bansal R K "Strength of Materials", Laxmi Publications, New Delhi, 2010.
5. Ferdinand Beer, E.Russell Johnston and John Dewolf, "Mechanics of Materials", Mc Graw Hill Education, 2015.

B.E. CIVIL ENGINEERING			
Choice Based Credit System (CBCS)			
SEMESTER – III			
Fluid Mechanics and Applied Hydraulics (2:1:0) 3			
(Effective from the academic year 2021-22)			
Course Code	21CV36	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:2:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3
Course Objectives:			
This course will enable students to:			
<ol style="list-style-type: none"> 1. Understand the basic concepts of fluid properties and hydraulic applications. 2. Apply the basic laws of fluid mechanics and their applications in Civil Engineering 3. Estimate losses in pipes and analyze pipe networks 4. Classify open channel flows and design economical sections 5. Differentiate turbines & pumps and estimate their performance and efficiencies. 			
Module – 1			
Introduction to Course: Relevance in the Global scenario. Financial bearing on the World Economy. Role in Environmental and Societal concerns. Internship and Job opportunities. Significance and application of the course in Civil Engineering.			
Fluid Properties: Definition of fluid, Concept of Fluid Continuum, Mass Density, Specific Volume, Specific Weight, Specific Gravity-Definitions, Units and Dimensions, Viscosity, Newton’s Law of Viscosity, Newtonian & Non-Newtonian Fluids, Ideal & Real Fluids, Surface Tension, and Capillarity. Research aspects of non-Newtonian fluids			
Fluid Pressure & Its Measurement: Pascal’s Law, definition of Pressure, Hydrostatic pressure law, Types of Pressures, Measurement of Pressure- Simple & Differential Manometers (no inclined manometers) and Mechanical & Digital pressure gauge.			
Practical Session: Preparation and demonstration of Non-Newtonian fluid (Oobleck)			
(8 Hours)			
Module – 2			
Fluid Statics: Introduction - Total Pressure and Centre of Pressure – Definitions, Total pressure, and Centre of pressure on vertical, inclined plane- numerical, introduction to curved plane (no numerical). Practical applications of Total pressure and center of pressure			
Fluid Kinematics: Introduction, Continuum, Control volume. Hydro-Kinematics – Lagrangian and Eulerian approach, Types of fluid flow. Description of fluid flow - Stream line, Path line and Streak line, Continuity equation in Cartesian coordinates, velocity, and acceleration of fluid particle-numerical, Stream function, velocity potential function, Laplace equation (no problems), Flow net (equipotential lines and streamlines) applications			
Practical Session: Demonstration of fluid flow visualization in lab.			
(8 Hours)			
Module – 3			
Fluid Dynamics: Concept of Inertia force and other forces causing Motion, Derivation of Euler’s & Bernoulli’s Equation, Applications of Bernoulli’s Equation for flow measurement – Venturi -Meter, orifice & orifice meter, Notches- Rectangular, Triangular, Trapezoidal and weirs- Broad Crested and Ogee weir- numerical. Velocity measurement- Pitot tube and current meter			
Introduction to pipe flow: Difference between pipe flow and open channel flow, energy losses in pipe flow- major and minor losses, Darcy-Weisbach equation, Hazen-William’s equation, Pipes in series and parallel, equivalent pipes systems and pipe joints, Introduction to pipe network analysis by Hardy-cross method (no numerical), Typical pipe connections for a residence.			
Practical Session: Modelling of Pipe joints, pipe networks and standard pipes for residences			
(8 Hours)			

Module – 4

Introduction, Classification of channels, Types of open channel flows

Uniform Flow: Uniform flow in open channels, Chezy's & Manning's formula, Most economical open sections- rectangular, trapezoidal, circular sections- derivations. Specific Energy, definitions, Specific Energy curve, condition for Maximum discharge & Minimum specific energy, critical flow in rectangular sections.

Non-Uniform Flow: Gradually Varied flow- derivation & Problems, Classification of channel bottom slopes, hydraulic jump, derivation of hydraulic jump in a rectangular channel, types & applications.

Practical Session: Demonstration of hydraulic jump in lab.

(8 Hours)

Module – 5

Introduction to need for renewable energy: Hydropower plants in India and their contribution to Indian Economy, importance to sustainable environment, components and layout. Classification of turbines- Pelton wheel, Francis and Kaplan turbines –theory. Concept of velocity triangle and impulse-momentum equation. Case of impact of jet on radial curved vanes.

Hydraulic machines: Equation for work done and efficiency for Pelton wheel, Francis Turbine and Kaplan turbine, design & working proportions, Specific speed and unit quantities. New innovations in wind turbines and tidal turbines

Pumps: Classification, general principle of working, work done, minimum starting speed, multi-pumping systems

Practical Session: Industrial visit to a hydropower plant. Recap/Summary of the Course

(8 Hours)

Course outcomes:

The students will be able to:

CO1: Apply engineering fundamentals and properties of fluids in dynamics.

CO2: Solve components of flow systems applying basic fluid laws and pipe laws.

CO3: Design the economical open channel sections and hydraulic machines for hydropower plants

CO4: Analyze flow components and flow measurement through pipe networks and open channels

CO5: Evaluate case studies on real time applications of fluid mechanics and hydraulics

Question paper pattern:

- **SEE** will be conducted for 100 marks.
- **Part A:** First question with 20 MCQs carrying 1 mark each.
- **Part B:** Each full question is for 16 marks. (Answer five full questions out of 10 questions with intra modular choice). In every question, there will be a maximum of three sub-questions.
- **CIE** will be announced prior to the commencement of the course.
- 25 marks for test. Average of three tests will be taken.
- 25 marks for Alternate Assessment Method.

Text Books

1. Bansal, R. K., "Fluid mechanics and hydraulic machines", revised 9th Edition, (2010.)
2. AK, Jain, P. N. Modi, and S. M. Seth., "Fluid Mechanics", Khanna Publishers, Delhi, (2015.)
3. Rajput, R. K., "Fluid mechanics and hydraulic machines". S Chand & Company Limited, (2016.)

References:

1. Streeter, Victor L., "Fluid mechanics", McGraw Hill Publication, 7th edition, (2015)
2. Subramanya, K., "Flow in open channels", Tata McGraw-Hill Education, (2009.)
3. Chow, Ven Te., "Open Channel Hydraulics", McGraw-Hill, New York (1959), Reprint (2009)

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – III

Building Materials and Construction Techniques (1:1:0) 2

(Effective from the academic year 2021-22)

Course Code	21CV37	CIE Marks	50
Teaching Hours/Week (L:T:P)	1:2:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course Objectives:

This course will enable students to:

1. Comprehend knowledge on various materials used in construction and concrete technology.
2. Perceive the knowledge on the applications and testing procedures in construction.
3. Understand the quality of materials and methods of construction.
4. Assess the quality of materials and methods of construction following the code provisions.
5. Recognize the recent advancements in building materials and their impact on the environment.

Module – 1**Building Materials**

Building stones, classification of rocks, common building stones and their properties, qualities of good building stones, criterion of selection. Composition and manufacturing of bricks, classification, special types of bricks, ceramic clay tiles, manufacturing process and types. Portland cement: Types and properties, Tests on Portland cements, Aggregates: classification function, and types. Properties and Tests on aggregates. Water: its quality and recommendations.

(8 Hours)**Module – 2****Timber, Glass, Metals and Allied Products**

Timber –characteristics of good timber, defects in timber, properties of timber products and their uses. Glass- types, classification and uses. Metals- ferrous, non-ferrous and alloys. allied products such as plaster of Paris, paints, distempers and varnishes, rubber, adhesives and sealants, and miscellaneous materials, recent advances in building materials

(8 Hours)**Module – 3****Concrete Manufacturing**

Production of concrete: mixing, casting, compacting and curing of concrete, workability concept, tests, workability factors and fresh concrete properties. Various types of admixtures and construction chemicals-applications.

(8 Hours)**Module – 4****Tests on Hardened Concrete and Mix Design**

Tests on concrete, properties and factors affecting properties of hardened concrete- Non-destructive tests on concrete- Concrete mix design and methods of mix design illustration for M40 as per the guidelines in IS-10262-2019. Concepts of durability- Types of special concrete.

(8 Hours)**Module – 5****Construction Techniques and Practices**

Structural systems - Load Bearing Structure - Framed Structure - Load transfer mechanism – floor system-Development of construction techniques - High rise Building Technology. Specifications, details and sequence of activities and construction co-ordination – Site Clearance – Marking – Earthwork- Centering and shuttering– Formwork– Scaffolding–Plumbing Services. Structural steel and High Tensile Steel Properties – Types – Market forms of steel–Fabrication and erection of steel trusses – Frames– Launching girders.

(8 Hours)

Course outcomes:

The students will be able to:

CO1: Perceive knowledge on various materials used in construction and concrete technology.

CO2: Analyze the applications and testing procedures in construction.

CO3: Check for the standard quality of materials and methods of construction.

CO4: Appraise quality of materials and methods of construction following the code provisions.

CO5: Impart the recent advancements in building materials and their effect on environment.

Question paper pattern:

- **SEE** will be conducted for 100 marks. (100 marks reduced to 50 marks)
- **Part A:** First question with 20 MCQs carrying 1 mark each.
- **Part B:** Each full question is for 16 marks. (Answer five full questions out of 10 questions with intra modular choice). In every question, there will be a maximum of three sub-questions.
- **CIE** will be announced prior to the commencement of the course.
- 25 marks for test. Average of three test will be taken.
- 25 marks for Alternate Assessment Method.

Text Books

1. Varghese P.C, "Building Construction", Prentice Hall of India, 2012.
2. Engineering materials by R. K. Rajput, S. Chand & Company Ltd. (2000 Edn.).
3. Bindra.S.P and Arora.S.P, "Building construction", Dhanpat Rai Publication Pvt. Ltd., 2010.
4. Gupta.B.L., Amit Gupta, "Concrete Technology", Jain Book Agency, 2010.
5. Shetty,M.S, "Concrete Technology", S.Chand and Company Ltd, New Delhi, 2013

References:

1. Edward Allen, Joseph Iano, "Fundamentals of Building Construction: Materials and Methods", Wiley Publishers, 2014.
2. Maden Mehta, "Building Construction", Pearson Education Publishers, 2016.
3. Rangwala, "Building construction", Charotar Publishing House Pvt. Ltd., 2016.
4. Punmia.B.C, Ashok Kumar Jain and Arun Kumar Jain, "Building construction", Laxmi Publications Pvt. Ltd., 2016.
5. IS: 10262:2019, Guidelines for Design and Development of Different Types of Concrete Mixes, Indian Standards, New Delhi, 2019

B.E. CIVIL ENGINEERING			
Choice Based Credit System (CBCS)			
SEMESTER - III			
Engineering Geology (1:1:0) 2			
(Effective from the academic year 2021-22)			
Course Code	21CV38	CIE Marks	50
Teaching Hours/Week (L: T:P)	1:2:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3
Course Objectives:			
This course will enable students to:			
<ol style="list-style-type: none"> 1. Inculcate the importance of earth's interior and application of Geology in civil engineering. Attempts are made to highlight the industrial applications of minerals. 2. Create awareness among Civil engineers regarding the use of rocks as building materials. 3. 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. 4. Educate the ground water management regarding diversified geological formations, climatologically dissimilarity which are prevailed in the country. 5. Understand the application of Remote Sensing and GIS, Natural disaster and management and environmental awareness. 			
Module – 1			
Introduction: Relevance in the Global scenario. Financial bearing on the World Economy. Role in Environmental and Societal concerns. Internship and Job opportunities. Significance and application of the course in Civil Engineering.			
Mineralogy: Applications of Engineering Geology in Civil Engineering Practices and understanding the internal structure of the earth and its composition. Mineral properties, composition and their use in the manufacture of construction materials – Quartz Group (Glass); Feldspar Group (Ceramic wares and Flooring tiles); Kaolin (Paper, paint and textile); Asbestos (AC sheets); Carbonate Group (Cement); Gypsum (POP, gypsum sheets, cement); Mica Group (Electrical industries); Ore minerals - Iron ores (Steel); Chromite (Alloy); Bauxite (aluminum); Chalcopyrite (copper).			
Mining: Ore deposits, Extraction of ore, Principal of Economic Geology, Mineral resources of India.			
Application: The above topic is essential for different civil engineering projects. (8 Hours)			
Module – 2			
Petrology: Formation, Classification and Engineering Properties of different rocks:			
Igneous rocks- Types of Granite, Dolerite, Basalt, Pumice, Granite Porphyry as building materials.			
Sedimentary Rocks: Sandstone, Limestone, Shale, Late rite, Conglomerate as building materials.			
Metamorphic Rocks: Gneiss, Slate, Muscovite & Biotite schist, Marble, Quartzite. Rock weathering types and their effects on Civil Engineering Projects. Selection of rocks as materials for construction, as a foundation, Decorative, Flooring, and Roofing, Concrete Aggregate, Road Metal, Railway Ballast with examples.			
Application: The above topic is essential for different civil engineering projects. (8 Hours)			
Module – 3			
Structural Geology & Rock Mechanics: Structural aspects of rocks like Outcrop, Dip and strike, Folds, Faults, Joints, Unconformities and their influence on Engineering Projects/structures like dam, tunnels, slope treatment; ground improvement, recognition of the structures in field and their types/classification. Dip and strike problems their uses in dam, tunnels and reservoir site.			
Rock Quality Determination (RQD) & Rock Structure Rating (RSR). Geological site characterization: Dam foundations and rock Foundation treatment for dams and Reservoirs heavy structures by grouting and rock reinforcement. Tunnels: Basic terminology and application, site investigations, Coastlines and their engineering considerations.			
Application: The above topic is required for projects especially dam, tunnel and reservoir. (8 Hours)			

Module – 4
<p>Hydrogeology and Geomorphology: Water Bearing Formations, Aquifer and its types – Aquitard, Aquifuge, and Aquiclude. Artificial recharge structure, Rain water harvesting and groundwater exploration, Geophysical exploration, Hydrological cycle. Vertical distribution of groundwater, artesian groundwater in soil and rock. Porosity, Specific yield and retention, Permeability, Transmissibility and Storage coefficient. Groundwater and Surface water effects with respect to the Agriculture and Irrigation sector. Quality of water. Seawater intrusion in coastal areas and remedies. Groundwater Pollution. Floods and its control, Cyclone and its effects. Landforms, different drainage pattern and types. Soil formation and soil profile.</p> <p>Application: The above topic is required for water resource management.</p> <p style="text-align: right;">(8 Hours)</p>
Module – 5
<p>Seismology, GIS, GPS and Remote Sensing: Earthquake - Causes and Effects, Seismic waves, engineering problems related to Earthquakes, Earthquake intensity, Richter scale, Seismograph, Seismic zones- World and India. Tsunami- causes and effects, Volcanic Eruptions. Landslides (Mass movements) causes, types and remedial measures. Remote Sensing – Concept, Application and its Limitations; Natural Disasters and their mitigation. Geographic Information System (GIS) and Global Positioning System (GPS) concept and applications. Concept and their use resource mapping. Aerial Photography, LISS 4 data uses, PAN data uses, LANDSAT Imagery.</p> <p>Application: The above topic is essential for interpretation of satellite imagery through GIS Technology especially for Data Analysis and Disaster Management</p> <p style="text-align: right;">(8 Hours)</p>
<p>Course outcomes:</p> <p>The students will be able to:</p> <p>CO1: Perceive the geological problems with respect to rocks and minerals.</p> <p>CO2: Apply the knowledge of Geological structures and methodologies.</p> <p>CO3: Analyze the various borehole and thickness problems in civil engineering projects.</p> <p>CO4: Propose alternative best building materials with respect to strength of the rocks.</p> <p>CO5: Identify latest techniques in GPS, GIS to Interpret Satellite imageries</p>
<p>Question paper pattern:</p> <ul style="list-style-type: none"> • SEE will be conducted for 100 marks. (100 marks reduced to 50 marks) • Part A: First question with 20 MCQs carrying 1 mark each. • Part B: Each full question is for 16 marks. (Answer five full questions out of 10 questions with intra modular choice). In every question, there will be a maximum of three sub-questions. • CIE will be announced prior to the commencement of the course. • 25 marks for test. Average of three test will be taken. 25 marks for Alternate Assessment Method.
<p>Textbooks:</p> <ol style="list-style-type: none"> 1. P.K. Mukerjee, A Text Book of Geology , World Press Pvt., Ltd. Kolkata, 2004 2. Parbin Singh, Text Book of Engineering and General Geology, Published by S.K.Kataria and Sons, New Dehli, 2008. 3. P.C. Varghese, Text Book of Engineering Geology for Civil Engineers, Published by S PHI Learning Pvt. Ltd., 2011. <p>Reference:</p> <ol style="list-style-type: none"> 1. D. Venkata Reddy, Engineering Geology, New Age International Publications, NewDelhi, 2006. 2. M.P Billings, Structural Geology, CBS Publishers and Distributors, New Delhi, 2000. 3. K V G K Gokhale,, Principles of Engineering Geology, B S Publications, Hyderabad, 2001.

B.E. CIVIL ENGINEERING			
Choice Based Credit System (CBCS)			
SEMESTER – III			
Fluid Mechanics and Hydraulic machinery Laboratory (0:0:1) 1			
(Effective from the academic year 2021-22)			
Course Code	21CVL39A	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:0:2	SEE Marks	50
Total Number of Contact Hours	26	Exam Hours	3
Course Objectives:			
This course will enable students to:			
<ol style="list-style-type: none"> 1. Apply and verify basic fluid laws 2. Calibrate notches and weirs 3. Determine co-efficient of discharge for venturi-meter and orifice-meter 4. Estimate major and minor losses in pipes, efficiency of turbines and pumps 			
List of Experiments			
PART A			
Introduction and revision. Significance of fluid mechanics and hydraulics experiments in Civil Engineering, research on turbines and open-ended experiments			
<ol style="list-style-type: none"> 1. Calibration of V notch and rectangular notch 2. Determination of co-efficient of discharge for venturimeter and Orifice meter 3. Verification of Bernoulli's equation 4. Determination of hydraulic coefficients of small vertical orifice 5. Calibration of Ogee weir, Broad crested weir and venturiflume 6. Experimental determination of force exerted by a jet on flat and curved plates (Hemispherical Vane). 7. Determination of Major and Minor Losses in Pipes 			
PART B			
<ol style="list-style-type: none"> 8. Experimental determination of operating characteristics of Pelton turbine (group) 9. Determination of efficiency of Kaplan turbine (Group) 10. Pipe network bench 11. Pipe fittings for buildings (taps, wash basin and pumps) 12. Hydrology bench and rainfall experiment 13. Open ended experiment on flow visualization and Reynold's number to understand laminar and turbulent flow 14. Open ended experiment on hydraulic jump 15. Open ended experiment on digital water meter and current meter 			
Course outcomes:			
The students will be able to:			
CO1: Work as an individual or as a team and accomplish the experimental and analytical tasks			
CO2: Analyse and interpret the results obtained from the experiments and complete report.			
CO3: Communicate the significance of the experiments with respect to the ethical and feasibility components.			
Examination pattern:			
<ul style="list-style-type: none"> • SEE will be conducted for 3 hours. • Two experiments, one from Part A and one from Part B has to be completed. • Questions for Part A and Part B is given on a lotto basis and oral viva-voce is conducted. • In Record and in CIE, for each experiment the weightage of marks is as follows, <ol style="list-style-type: none"> (i) Aim, Procedure and writeup- 15% marks (ii) Conducting the practical including calculation, graphs and results – 70% marks (iii) Viva- Voce- 15% marks 			
Note:			
<ul style="list-style-type: none"> • In CIE and SEE, if there is change of experiment then subsequently 15% marks with respect to aim, write up and procedure shall be deducted. • CIE can have the similar QP pattern as SEE and shall be accordingly evaluated. 			

Text Books

1. G L Asawa, "Laboratory work in hydraulic engineering", New Age International (2006) .
2. G. Padmanabhan, "Fluid Mechanics Laboratory Manual for Civil Engineering Students" (11th Edition), Kendall Hunt Publishing Company(2007)

References

1. Robabeh Jazaei, "Fluid Mechanics Experiments", Morgan & Claypool Publishers, 1st edition (2020.)
2. Bansal, R. K., "Fluid mechanics and hydraulic machines", revised 9th Edition, (2010)
3. AK, Jain, P. N. Modi, and S. M. Seth., "Fluid Mechanics", Khanna Publishers, Delhi, (2015)

B.E. CIVIL ENGINEERING			
Choice Based Credit System (CBCS)			
SEMESTER - III			
Basic Material Testing Laboratory (0:0:1) 1			
(Effective from the academic year 2020-21)			
Course Code	21CVL39B	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:0:2	SEE Marks	50
Total Number of Contact Hours	26	Exam Hours	3
Course Objectives:			
This course will enable students to:			
<ol style="list-style-type: none"> 1. Learn the procedure related to testing of basic building materials as per IS codal provisions 2. Learn the procedure related to testing of metallic materials subjected to various loadings as per IS code provisions 			
Part A- Tests on Bricks and Cement			
<ol style="list-style-type: none"> 1. Shape and size test of brick 2. Determination of water absorption of brick 3. Determination of compressive strength of brick 4. Determination of fineness of cement by dry sieving/ by air permeability method 5. Determination of normal consistency of cement 6. Determination of initial and final setting time of cement 7. Determination of specific gravity of cement by using specific gravity bottle. / by using Le-Chatelier Flask. 8. Determination of soundness of cement 			
Part B- Tests on Mortar, Aggregates and Steel			
<ol style="list-style-type: none"> 1. Determination of compressive strength of cement mortar 2. Determination of specific gravity of fine aggregate 3. Determination of fineness modulus and grain size distribution of fine aggregate 4. Determination of fineness modulus and grain size distribution of coarse aggregate 5. Determination of crushing value of coarse aggregate 6. Tensile strength on steel rod 7. Compression test on wood 8. Bending test on wood 			
Course outcomes:			
The students will be able to:			
CO1: Work as an individual or as a team and accomplish the experimental and analytical tasks			
CO2: Analyse and interpret the results obtained from the experiments and draft the report.			
CO3: Communicate the significance of the experiments with respect to the ethical and feasibility components.			
Examination pattern:			
<ul style="list-style-type: none"> • SEE will be conducted for 3 hours. • Two experiments, one from Part A and one from Part B has to be completed. • Questions for Part A and Part B is given on a lotto basis and oral viva-voce is conducted. • In Record and in CIE, for each experiment the weightage of marks is as follows, <ol style="list-style-type: none"> (i) Aim, Procedure and writeup- 15% marks (ii) Conducting the practical including calculation, graphs and results – 70% marks (iii) Viva- Voce- 15% marks 			
Note:			
<ul style="list-style-type: none"> • In CIE and SEE, if there is change of experiment then subsequently 15% marks with respect to aim, write up and procedure shall be deducted. • CIE can have the similar QP pattern as SEE and shall be accordingly evaluated. 			

Textbooks:

1. Kukreja, Material testing lab manual, Standard Publishers, 4th edition, 2010.
2. Hemant Sood, Lab manual on Testing of engineering materials, New age international, 2nd edition, 2015.
3. Abdul Mubeen, Experimental Strength of materials, Khanna publisher's 3rd edition, 1993.
4. N Subramanian, Building Materials Testing and sustainability, Oxford Publications, 1st Edition 2019.

References:

1. Chinmaya Mohapatra, Mechanical Testing of Metallic Materials Create space Independent Publishing 2nd edition, 2016.
2. Kazimi S.M.A, Solid Mechanics, Tata McGraw-Hill Publishing Co., New Delhi. 3rd edition 2019.
3. Srinath, L.S Advanced mechanics and solids Tata McGraw Hill Education Pvt. Ltd., New Delhi 4th edition 2010.
4. Punmia B.C. Theory of Structures (SMTS) Vol 1 & II Laxmi Publishing Pvt Ltd, New Delhi 5th edition, 2016.
5. Rattan. S.S, Strength of Materials Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2nd edition, 2013.

B.E. CIVIL ENGINEERING			
Choice Based Credit System (CBCS)			
SEMESTER – III			
Diploma Mathematics- I (0:0:0) NIL			
COMMON TO ALL BRANCHES			
(Effective from the academic year 2021-22)			
Course Code	21DIP31A	CIE Marks	100
Teaching Hours/Week (L:T:P)	3:0:0	SEE Marks	-
Total Number of Contact Hours	30	Exam Hours	3
Course Objectives:			
This course will enable students to:			
<ol style="list-style-type: none"> To enable students to apply knowledge of mathematics in various engineering fields by making them to learn the basic tools of vector differentiation, calculus and elementary Linear Algebra. To familiarize the important tools of Differential and Integral Calculus required to analyze the engineering problems. 			
Module – I			
Introduction: Understanding the importance of the study of Complex Trigonometry, Calculus, Linear algebra and its applications in the field of Science, Engineering and Economics.			
Differential Calculus-I: Differentiation: Polar curves: angle between the radius vector and tangent, angle between two curves, pedal equation-problems; Maclaurin's series of single variable. (6 Hours)			
Module – II			
Differential Calculus-II: Partial differentiation, Total derivatives-differentiation of composite functions, Jacobians-simple problems. (6 Hours)			
Module – III			
Vector Differentiation: Velocity and acceleration of a particle moving on a space curve. Scalar and vector point functions. Gradient, Divergence, Curl-simple problems. Solenoidal and irrotational vector fields-Problems. (6 hours)			
Module – IV			
Linear Algebra: Introduction - Rank of matrix by elementary row operations - Echelon form. Gauss elimination method and approximate solution by Gauss-Seidel method. Eigen values and Eigen vectors of a square matrix of 2×2 & Rayleigh's power method -problems. (6 hours)			
Module – V			
Integral Calculus: Reduction formulae for $\int \sin^n x dx$, $\int \cos^n x dx$ (proofs with limits between 0 and $\pi/2$), $\int \sin^m x \cos^n x dx$ (m & n are positive integers) (proof without limits) and problems on these Reduction formulae with limits. Double and triple integration-Simple examples. Recap/Summary of the Course. (6 hours)			

Course outcomes:

The students will be able to:

C01: Use derivatives to calculate rate of change of functions of a single and multivariate variable.

C02: Analyze position, velocity and acceleration in two and three dimensions of vector Valued functions.

C03: Learn techniques of integration including the evaluation of double and triple integrals.

C04: Solve system of Linear equations by using Matrix Algebra.

Question paper pattern:

CIE will be announced prior to the commencement of the course.

- 75 marks for test. Average of three tests will be taken.
- 25 marks for Alternate Assessment Method.

Textbooks:

1. B.S. Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers, 2015.
2. B.V. Ramana, Higher Engineering Mathematics, Tata McGraw-Hill, 2010.
3. C. Pandurangappa, Advanced Mathematics II (Lateral entry bridge course textbook), 3rd Edition, Sanguine Publishers, 2015.

References:

1. N.P. Bali, Manish Goyal, A Text Book of Engineering Mathematics, Laxmi Publishers, 2014.
2. E. Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2015.
3. H.K. Dass, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand Private Ltd. , 2014.
4. S. Pal and S.C. Bhunia, Engineering Mathematics, 3rd edition, Oxford University Press, 2016.