

DEPARTMENT OF CIVIL ENGINEERING

(Courses for Multiple Entry-Multiple Exits, Multidisciplinary and Specialized Minors, Honors and Research)

According to this curricular framework of the B. Tech Curriculum Structure in accordance with NEP2020, a complete set of courses for different learners to opt for : 1-Year UG Certificate, 2-Year UG Diploma in respective Major Programme and 3-Year B.Sc degree.

A. Courses for Minors

Totally 170 credits are required to earn an undergraduate engineering degree which includes a **Multidisciplinary Minor in Civil of 14 Credits from one of the stream.**

Course	Course Name	L	T	P	Credits
Stream 1-Surveying and its application					
2CVSA21	Satellite Geodesy	2			2
2CVSA30	Global Navigation Satellite Systems	3			3
2CVSA32	Remote Sensing and GIS	3			3
2CVSA40	DGPS Survey	3			3
2CVSA41	Project				3
Stream 2-Environment Engineering					
2CVEN21	Air Pollution Control	2			2
2CVEN31	Water and Waste Water Engineering	3			3
2CVEN32	Solid Waste Management	3			3
2CVEN41	Environmental Impact Assessment	3			3
2CVEN42	Project				3

B. Courses for Double Minor (Specialization Minor)

An additional 14 credits are required to earn under **Honors in Structural Engineering or Sustainability Engineering** to get eligible for **Under Graduate engineering degree with Honors – Double Minor (Specialization Minor).**

Course Name	Platform	Credits
Stream 1- Structural Engineering		
Foundation Engineering	Coursera / NPTEL/ MOOC	2
Bridge Engineering		3
Finite Element Analysis		3
Structural Dynamics		3
Project		3
Stream 2- Sustainability Engineering		
Basics of Sustainable Development		2
Life Cycle Analysis		3
Waste management for Smart Cities		3
Green product development		3
Project		3

C. Courses for Honours

An additional 18 credits are required to earn under **Honors in Construction Technology** to get eligible for **Under Graduate Engineering degree with Honors**.

Course Name	Platform	Credits
Mechanics Of Materials	Coursera / NPTEL/ MOOC	3
Admixtures And Special Concretes		
Introduction to Multimodal Urban Transportation Systems (MUTS)		
Safety in Construction		3
Availability and Management Of Groundwater Resources		
Introduction to Accounting and Finance for Civil Engineers		
Integrated Waste Management For A Smart City		3
Water Economics And Governance		
Rock Mechanics And Tunneling		
Advanced Foundation Engineering		3
Energy Efficiency, Acoustics and Daylighting in Building		
Introduction to Lean Construction		
Report Writing based on all the previously completed courses		6

D. Courses for Honors with Research

An additional 18 credits are required to earn under **Honors with Research** to get eligible for **Under Graduate Engineering degree with Honors with Research**

Course Name	Credits
Research Methodology	4
Dissertation in Sem VII and Sem VIII	14

E. Compulsory Courses for Multiple Entry-Multiple Exits

- Certified Draftmans Engineer – CAD Competency Course (1-Year UG Certificate)

Course Name	L	T	P	Credit
Measurement and Planning	3			2
CAD Competency			6	3
Project using CAD			6	3

- Certified Valuator Engineer – Estimation and Valuation Certification (2-Year UG Diploma)

Course Name	L	T	P	Credit
Estimation and Valuation	3			2
Softwares competency for Estimation.			6	3
Project			6	3

- Certified Civil/Site Supervisor Engineer - Three Month Internship into MNC Company Certifications (3 Year B.Sc degree)


Head of Department


Dean Academics


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Executive Director

Annasaheb Dange College of Engineering and Technology Ashta
Department of Civil Engineering
 Teaching and Evaluation Scheme



F. Y. B. Tech Semester I

Course Code	Course Name	Teaching Scheme					THEORY					PRACTICAL					GRAND TOTAL		
		L	T	P	Credits	ISE		MSE+ ESE			Total	Min	ISE		ESE			Total	Min
						Max	Min	MSE	ESE	Min			Max	Min	Max				
2CVBS101	Applied Mathematics - I	3	1		4	40	16	30	30	24	100	40	-	-	-	-	-	100	
2CVBS102	Applied Physics	3	-	-	3	40	16	30	30	24	100	40	-	-	-	-	-	100	
2CVPC103	Applied Mechanics	3	-	-	3	40	16	30	30	24	100	40	-	-	-	-	-	100	
2CVES104	Engineering Graphics	2	-	-	2	40	16	30	30	24	100	40	-	-	-	-	-	100	
2CVHS105	Professional Communication Skills	-	-	4	2	-	-	-	-	-	-	-	50	20	-	-	50	20	50
2CVBS106	Applied Physics Laboratory	-	-	2	1	-	-	-	-	-	-	-	50	20	-	-	50	20	50
2CVPC107	Applied Mechanics Laboratory	-	-	2	1	-	-	-	-	-	-	-	50	20	-	-	50	20	50
2CVES108	Engineering Graphics and CAD Laboratory	-	-	4	2	-	-	-	-	-	-	-	50	20	-	-	50	20	50
2CVES109	Design Thinking Laboratory	1	-	2	2	-	-	-	-	-	-	-	50	20	-	-	50	20	50
2CCHS110	Value Added Course-I	-	-	2	1	-	-	-	-	-	-	-	50	20	-	-	50	20	50
	Total Contact Hours	12	1	16	21														700

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 Teaching and Evaluation Scheme



Course Code	Course Name	Teaching Scheme										THEORY						PRACTICAL						GRAND TOTAL						
		L		T		P		Credits		ISE		MSE+ ESE		Total		Min		Max		Min		Max			Min		Max			
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max		Min	Max	Min	Max		
2CVBS111	Applied Mathematics - II	3	1	-	-	4	4	16	30	30	24	100	40	-	-	-	-	-	-	-	-	-	-	-	-	-	100			
2CVBS112	Applied Chemistry	3	-	-	-	3	3	16	30	30	24	100	40	-	-	-	-	-	-	-	-	-	-	-	-	-	100			
2CVPC113	Fundamentals of Civil Engineering	4	-	-	-	4	4	16	30	30	24	100	40	-	-	-	-	-	-	-	-	-	-	-	-	-	100			
2CVES114	Basic Electrical Engineering	2	-	-	-	2	2	16	30	30	24	100	40	-	-	-	-	-	-	-	-	-	-	-	-	-	100			
2CVBS115	Applied Chemistry Laboratory	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	50	20	-	-	50	20	-	-	50			
2CVPC116	Fundamentals of Civil Engineering Laboratory	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	50	20	-	-	50	20	-	-	50			
2CVES117	Basic Electrical Engineering Laboratory	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	50	20	-	-	50	20	-	-	50			
2CVES118	Programming for Problem Solving Laboratory	1	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	50	20	50	20	100	40	-	-	100			
2CVHS119	Value added course- II	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	50	20	-	-	50	20	-	-	50			
Total Contact Hours		13	1	10	19																					700				

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Course Code	Course Name	Teaching Scheme					THEORY						PRACTICAL						GRAND TOTAL
		L		P		Credits	ISE		MSE+ ESE		Total	Min	ISE		ESE		Total	Min	
							Max	Min	MSE	ESE			Min	Max	Min	Max			
2CVPC201	Differential Equation and Calculus	2	1	-	3	3	40	16	30	30	24	100	40	-	-	-	-	-	100
2CVPC202	Structural Mechanics	3	-	2	4	4	40	16	30	30	24	100	40	50	20	-	-	50	150
2CVPC203	Building Design and Drawing	3	-	2	4	4	40	16	30	30	24	100	40	50	20	50	20	50	200
2CVPC204	Surveying	3	-	2	4	4	40	16	30	30	24	100	40	50	20	50	20	50	200
2CVPC205	Hydrology & Irrigation Engineering	3	-	-	3	3	40	16	30	30	24	100	40	-	-	-	-	-	100
2CVHS206	Environment Studies	2	-	-	2	2	50	20	-	-	-	50	20	-	-	-	-	-	50
2CVHS207	Universal Human Values	2	-	-	2	2	50	20	-	-	-	50	20	-	-	-	-	-	50
2CVCC208	Aptitude And Reasoning Part - I	-	-	2	1	1	-	-	-	-	-	-	-	50	-	-	-	50	50
	Total Contact Hours	18	1	8	23														900

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S. Y. B. Tech Semester IV

Course Code	Course Name	Teaching Scheme						THEORY						PRACTICAL						GRAND TOTAL
		L	T	P	Credits	ISE		MSE+ESE			Total	Min	ISE		ESE		Total	Min		
						Max	Min	Max	MSE	ESE			Min	Max	Min					
						Max	Min	Max	Min	Max			Min							
2CVPC209	Fluid Mechanics	3	-	2	4	40	16	30	30	24	100	40	50	20	50	20	100	40	200	
2CVPC210	Concrete Technology	3	-	2	4	40	16	30	30	24	100	40	50	20	-	-	50	20	150	
2CVPC211	Structural Analysis	3	-	-	3	40	16	30	30	24	100	40	-	-	-	-	-	-	100	
2CVPC212	Construction Management & Economics	2	-	-	2	40	16	30	30	24	100	40	-	-	-	-	-	-	100	
2CV**2**	Minor Course - I	2	-	-	2	40	16	30	30	24	100	40	-	-	-	-	-	-	100	
2CVHS215	Psychology	2	-	-	2	50	20	-	-	-	50	20	-	-	-	-	-	-	50	
2CVHS216	Constitution of India	1	-	-	1	50	20	-	-	-	50	20	-	-	-	-	-	-	50	
2CVPC217	Building Planning and Drawing Laboratory	-	-	2	1	-	-	-	-	-	-	-	50	20	50	20	100	40	100	
2CVCC218	Aptitude And Reasoning Part - II	-	-	2	1	-	-	-	-	-	-	-	50	20	-	-	50	20	50	
2CVEL219	Product Development Laboratory	-	-	2	1	-	-	-	-	-	-	-	50	20	-	-	50	20	50	
2CVES220	General Proficiency	-	-	2	1	-	-	-	-	-	-	-	50	20	-	-	50	20	50	
Total Contact Hours		16	0	12	22													1000		

Minor Course - I (Semester IV)		
Sr. No.	Course Code	Domain
1	2CVSA213	Surveying and Its Applications
2	2CVEN214	Environment Engineering

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 Teaching and Evaluation Scheme



Course Code	Course Name	Teaching Scheme					THEORY						PRACTICAL						GRAND TOTAL	
		L		T		P	Credits	ISE		MSE+ ESE		Total Min	ISE		ESE		Total Min			
				Max	Min			Max	Min	Max	Min		Max	Min	Max	Min				
2CVOE3##	Open Elective-I	3	-	-	3	-	3	50	20	-	-	-	50	20	-	-	-	-	-	50
2CVVS301	Design of Steel Structures	3	-	-	3	-	3	40	16	30	24	100	40	-	-	-	-	-	-	100
2CVPC302	Geotechnical Engineering	3	-	2	4	-	4	40	16	30	24	100	40	50	20	50	20	100	40	200
2CVPC303	Infrastructure Engineering	3	-	2	4	-	4	40	16	30	24	100	40	50	20	50	20	100	40	200
2CVPE3**	Program Elective-I	2	-	-	2	-	2	40	16	30	24	100	40	-	-	-	-	-	-	100
2CV**3**	Minor Course - II	3	-	-	3	-	3	40	16	30	24	100	40	-	-	-	-	-	-	100
2CVEL311	In Plant Training	-	1	-	1	-	1	-	-	-	-	-	-	50	20	-	-	50	20	50
2CVHS312	Entrepreneurship	-	-	2	1	-	1	-	-	-	-	-	-	50	20	-	-	50	20	50
2CVCC313	Reasoning and Soft Skill Part - III	-	-	2	1	-	1	-	-	-	-	-	-	50	20	-	-	50	20	50
	Total Contact Hours	17	1	8	22		26													900

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Program Elective - I (Semester V)		
	Course	Domain
2CVPE304	Composite Materials	Structural Engineering
2CVPE305	Investment Planning and Management	Construction Management
2CVPE306	Public Health Engineering	Environment Engineering
2CVPE307	Site Investigation Methods & Practices	Geotechnical and Transportation Engineering
2CVPE308	Remote sensing	Geoinformatics & Geology

Minor Course - II (Semester V)		
	Minor Course- II	Domain
2CVSA309	Global Navigation Satellite Systems	Surveying and Its Applications
2CVEN310	Water and Waste Water Engineering	Environment Engineering

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Department of Civil Engineering
 Teaching and Evaluation Scheme



T. Y. B. Tech Semester VI

Course Code	Course Name	Teaching Scheme					THEORY						PRACTICAL						GRAND TOTAL
		L	T	P	Credits	ISE		MSE+ ESE			Total	Min	ISE		ESE		Total	Min	
						Max	Min	MSE	ESE	Min			Max	Min	Max	Min			
2CVOE3##	Open Elective-II	3	-	-	3	50	20	-	-	-	50	20	-	-	-	-	-	-	50
2CVPC314	Theory of Structures	3	-	-	3	40	16	30	30	24	100	40	-	-	-	-	-	-	100
2CVPC315	Environmental Engineering	3	-	2	4	40	16	30	30	24	100	40	50	20	50	20	100	40	200
2CVPC316	Design of RCC Structures	3	-	-	3	40	16	30	30	24	100	40	-	-	-	-	-	-	100
2CVPE3**	Program Elective-II	3	-	2	4	40	16	30	30	24	100	40	50	20	-	-	50	20	150
2CV**3**	Minor Course - III	3	-	-	3	40	16	30	30	24	100	40	-	-	-	-	-	-	100
2CVVS324	Structural Design and Drawing I (Mini Project)	-	-	2	1	-	-	-	-	-	-	-	50	20	50	20	100	40	100
2CVEL325	Software Training I	-	-	2	1	-	-	-	-	-	-	-	50	20	-	-	50	20	50
2CVCC326	Reasoning and Soft Skill Part - IV	-	-	2	1	-	-	-	-	-	-	-	50	20	-	-	50	20	50
	Total Contact Hours	18	0	10	23														900
					28														

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Program Elective - II (Semester VI)		
Course	Laboratory	Domain
2CVPE317	Structural Audit Laboratory	Structural Engineering
2CVPE318	Safety Aspects in Civil Engineering Laboratory	Construction Management
2CVPE319	Sustainable Management of Solid Waste	Environment Engineering
2CVPE320	Ground Improvement Techniques	Geotechnical and Transportation Engineering
2CVPE321	Engineering Geology	Geoinformatics & Geology

Minor Course - III (Semester VI)		
Sr. No.	Course Code	Domain
1	2CVSA322	Remote Sensing and GIS
2	2CVEN323	Surveying and Its Applications
		Environment Engineering

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Annasaheb Dange College of Engineering and Technology Ashta
Department of Civil Engineering
 Teaching and Evaluation Scheme



Course Code	Course Name	Teaching Scheme						THEORY						PRACTICAL						GRAND TOTAL
		L		P		Credits		ISE		MSE+ ESE		Total Min		ISE		ESE		Total Min		
								Max	Min	MSE	ESE	Min		Max	Min	Max	Min			
2CVOE4##	Open Elective-III	2	-	-	2	2	50	20	-	-	-	50	20	-	-	-	-	-	-	50
2CVPC401	Earthquake Resistant Structures	3	-	-	3	3	40	16	30	30	24	100	40	-	-	-	-	-	100	
2CVVS402	Quantity Surveying and Valuation	3	-	2	4	4	40	16	30	30	24	100	40	50	20	50	20	100	200	
2CVHS403	Project management and Finance	2	-	-	2	2	40	16	30	30	24	100	40	-	-	-	-	-	100	
2CVPE4**	Program Elective-III	3	-	2	4	4	40	16	30	30	24	100	40	50	20	-	-	50	150	
2CV**4**	Minor Course - IV	3	-	-	3	3	40	16	30	30	24	100	40	-	-	-	-	-	100	
2CVVS411	Structural Design and Drawing II Lab	-	-	4	2	-	-	-	-	-	-	-	-	50	20	50	20	100	40	100
2CVEL412	Software Training II	-	-	2	1	-	-	-	-	-	-	-	-	50	20	-	-	50	20	50
2CVEL413	Project Phase I	-	-	4	2	-	-	-	-	-	-	-	-	100	40	-	-	100	40	100
	Total Contact Hours	16	0	14	23	28														950

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Program Elective - III (Semester VII)		
Course	Laboratory	Domain
2CVPE404	Repair & Rehabilitation of Structures	Structural Engineering
2CVPE405	Advanced Construction Techniques	Construction Management
2CVPE406	Air Pollution & Control	Environment Engineering
2CVPE407	Pavement Design & Analysis	Geotechnical and Transportation Engineering
2CVPE408	GIS & its Applications in Civil Engineering	Geoinformatics & Geology

Minor Course - IV (Semester VII)		
Sr. No.	Course Code	Domain
1	2CVSA409	Surveying and Its Applications
2	2CVEN410	Environment Engineering

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Final Year B. Tech Semester VIII

Course Code	Course Name	Teaching Scheme					THEORY						PRACTICAL						GRAND TOTAL
		L		P		Credits	ISE		MSE+ ESE		Total Min	ESE		ESE		Total Min			
		T	T	Max	Min		MSE	ESE	Min	Max		Min	Max	Min	Max				
2CVPC4**	Program Elective-IV (MOOC)	2	-	2	40	16	30	30	24	100	40	-	-	-	-	-	-	100	
2CV**4**	Minor Project	-	-	3	-	-	-	-	-	-	-	100	40	-	-	100	40	100	
2CVEL421	Project Phase II	-	-	4	-	-	-	-	-	-	-	100	40	100	40	200	80	200	
2CVEL422	Internship	-	-	10	-	-	-	-	-	-	-	100	40	100	40	200	80	200	
Total Contact Hours		2	0	4	4	17												600	

Program Elective - IV (MOOC)	
Course Code	Domain
2CVPC414	Structural Engineering
2CVPC415	Construction Management
2CVPC416	Environment Engineering
2CVPC417	Geotechnical and Transportation Engineering
2CVPC418	Geoinformatics & Geology

Minor Course - V (Semester VIII)		
Sr. No.	Course Code	Domain
1	2CVSA419	PROJECT Surveying and Its Applications
2	2CVEN420	PROJECT Environment Engineering

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Annasaheb Dange College of Engineering and Technology Ashta
Department of Civil Engineering



B. Tech Program with One Major and One Minor (170 Credits)

Course Category	I	II	III	IV	V	VI	VII	VIII	Total
Basic Sciences	8	8							16
Engineering Science	6	5		1					12
Program Core	4	5	18	14	7	10	5	0	63
Program Elective					3	4	4	2	13
Minor				2	3	3	3	3	14
Open Elective					3	3	2		8
Vocational and Skill Enhancement Courses					3	1	4		8
Humanities and Social Sciences	3	1	4	3	1		2		14
Experiential Learning Courses				1	1	1	3	12	18
Co-curricular Courses			1	1	1	1			4
Total	21	19	23	22	22	23	23	17	170

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Annasaheb Dange College of Engineering and Technology Ashta
Department of Civil Engineering
Details of Minor, Specialization Minor and Honors Program

Certification Course after F.Y. Sem II

Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Measurements and Planning	3			2
	VOC	CAD Competency			6	3
	VOC	Project using CAD			6	3
Total						8


Vocational Course after S.Y. Sem IV

Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Estimation and Valuation	3			2
	VOC	Softwares competency for Estimation.			6	3
	VOC	Project			6	3
Total						8

Internship after T.Y. Sem VI

Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Three Month Internship into MNC Company				8
Total						16


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Annasaheb Dange College of Engineering and Technology Ashta
Department of Civil Engineering
Honors by Discipline

Honors in Construction Technology

Honors Course after S.Y. Sem IV						
Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Mechanics Of Materials				
		Admixtures And Special Concretes				3
		Introduction to Multimodal Urban Transportation Systems (MUTS)				
Total						3

Honors Course after T.Y. Sem V						
Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Safety in Construction				
		Availability and Management Of Groundwater Resources				3
		Introduction to Accounting and Finance for Civil Engineers				
Total						3

Honors Course after T.Y. Sem VI						
Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Integrated Waste Management For A Smart City				
		Water Economics And Governance				3
		Rock Mechanics And Tunneling				
Total						3

Honors Course after B.Tech. Sem VII						
Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Advanced Foundation Engineering				
		Energy Efficiency, Acoustics and Daylighting in Building				3
		Introduction to Lean Construction				
Total						3

Honors Course after B.Tech. Sem VIII						
Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Report Writing based on all the previously completed courses				3
Total						3

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Annasaheb Dange College of Engineering and Technology Ashta
Department of Civil Engineering
Honors by Research

Course Code	NEP	Course Name	L	T	P	Credits
		Research Methodology	4			4
		Dissertation in Sem VII and Sem VIII			28	14
Total						18

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Sayantika

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Annasaheb Dange College of Engineering and Technology Ashta
Department of Civil Engineering
Double Minors

Stream 1 - Structural Engineering						
Course Code	NEP	Course Name	L	T	P	Credits
	Coursera / NPTEL/ MOOC	Foundation Engineering				2
		Bridge Engineering				3
		Finite Element Analysis				3
		Structural Dynamics				3
		Project				3
Total						14

Stream 2 - Sustainability Engineering						
Course Code	NEP	Course Name	L	T	P	Credits
	Coursera / NPTEL/ MOOC	Basics of Sustainable Development				2
		Life Cycle Analysis				3
		Waste management for Smart Cities				3
		Green product development				3
		Project				3
Total						14

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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVBS101, Applied Mathematics I
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	3/1
Credits	4
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVBS101_1	Solve the system of linear equations by using matrix method and numerical techniques.
2CVBS101_2	Calculate Eigen values and Eigen vectors and power of matrix by using Cayley-Hamilton theorem
2CVBS101_3	Fit the curves for bivariate data by applying least square techniques.
2CVBS101_4	Apply Taylor series to find the expansion of functions.
2CVBS101_5	Compute the n^{th} power and roots of the complex number by using De-Moivre's Theorem.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Matrices and Solution of Linear System Equations: Rank of a matrix, Normal form of a matrix, echelon form, Consistency of linear system of equations (system of homogeneous and non-homogeneous linear equation).	07
Unit 2	Eigen Values and Eigen Vectors: Vectors, Linear dependence and linear independence of vectors, Eigen values, Properties of Eigen values, Eigen vectors, Properties of Eigen vectors, Cayley-Hamilton Theorem (Inverse and Higher powers of matrix).	08
Unit 3	Numerical Solution of System of Simultaneous Linear Equations: Gauss Elimination Method, Gauss-Jordan Method, Iterative Method – Gauss Jacobi method and Gauss Seidel method, Eigen value using Power method.	06
Unit 4	Statistics and Curve fitting: Method of Least Squares, Fitting of Straight Line, Fitting of Parabola, Fitting of exponential curves, Lines of Regression.	06
Unit 5	Expansion of Functions and Indeterminate Forms: Taylor's series, Maclaurin's series, Standard expansions, Expansion of function using Standard series, Indeterminate forms.	07
Unit 6	Complex Numbers: De Moivre's theorem, Roots of a complex number, Expansion of $\sin(nx)$ and $\cos(nx)$ in powers of $\sin x$ and/or $\cos x$, Circular functions of a complex variable, Hyperbolic functions, relation between circular and hyperbolic functions, Inverse Hyperbolic functions.	08



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Sr. No.	Title of Tutorials
1	Matrices and Solution of Linear System Equations: Normal form, system of homogeneous linear equation.
2	System of non- homogeneous linear equation.
3	Eigen Values and Eigen Vectors.
4	Cayley-Hamilton Theorem.
5	Numerical Solution of System of Simultaneous Linear Equations:
6	Curve Fitting I: Fitting of Straight Line and Fitting of Parabola.
7	Curve Fitting II: Fitting of exponential curves and Lines of Regression.
8	Expansion of function.

Text Books					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Numerical Methods in Engineering & Science	Dr. B. S Grewal	Khanna Publishers	9 th	2010
02	Advanced Engineering Mathematics	H. K. Das	S. Chand	22 nd	2018
03	A textbook of Applied Mathematics	P.N. Wartikar & J. N. Wartikar	Pune Vidyarthi Griha Prakashan	1 st	2008
04	Higher Engineering Mathematics	B. V. Ramana	Tata McGraw Hill Publ.	6 th	2010

Reference Books / Handbooks					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Higher Engineering Mathematics	Dr. B. S. Grewal	Khanna Publishers	44 th	2018
02	Advanced Engineering Mathematics	N. P. Bali, Manish Goyal	Infinity science press	7 th	2010
03	Advanced Engineering Mathematics	Erwin Kreyszig	Wiley Publishers	10 th	2017
04	Numerical Methods	Dr. P. Kandasamy, Dr. K. Thilagavathy, Dr. K. Gunavathi	S. Chand	1 st	2010


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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVBS102, Applied Physics
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	3/0
Credits	3
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVBS102_1	Apply suitable optical theory to determine wavelength and divergence of monochromatic and polychromatic sources of light using relevant optical methods of testing.
2CVBS102_2	Calculate the interplaner spacing, lattice constant and properties of unit cell for a given crystal system based on the crystallographic study using laws of material science.
2CVBS102_3	Use concept of Nanotechnology to express Production technique and tools of nano material using different synthesis methods and microscopes.
2CVBS102_4	Solve engineering problems based on Architectural acoustics and Ultrasonic's using appropriate theories and formulae.
2CVBS102_5	Apply principles of Quantum mechanics to calculate observables on known wave functions using fundamental quantum mechanical processes in nature.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Wave Optics : Diffraction:- Introduction, construction of plane diffraction grating, Diffraction at multiple slits, Determination of wavelength of particular colour using plane diffraction grating, Resolving power of grating, Numericals. Polarization:- Polarization of light, Polarization by double refraction, Positive and Negative crystals, Optical activity, Laurent's half shade Polarimeter, Numericals.	06
Unit 2	Laser and Fibre Optics : Laser: Introduction to laser, Laser and ordinary light, Interaction of radiation with matter- Absorption, Spontaneous emission, Stimulated emission, Pumping (Three level and four level), Population inversion, Metastable state, Laser beam Characteristics, Solid State laser (Ruby Laser), Industrial and medical applications of laser, Holography- Difference between ordinary photography and Holography, Construction and reconstruction of Hologram. Optical fibre: Introduction, Basic principle (total internal reflection), Structure of optical fibre, Propagation of light through optical fibre, Acceptance angle and acceptance cone (no derivation), Fractional refractive index change, Numerical aperture (no derivation), Classification of optical fibre, Advantages and disadvantages of optical fibre, Applications of optical fibres, Numericals.	08


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<p>Unit 3</p>	<p>Structure of Solids and its Characterization: Crystalline state, Lattice, Space lattice, Basis and crystal structure, Unit cell, lattice parameters, Crystal system in brief, (Cubic, Monoclinic...Triclinic), Fourteen Bravais lattices, Properties of unit cell (number of atoms per unit cell, coordination number, atomic radius, packing fraction), Calculation of lattice constant (Relation between lattice constant and density), Symmetry elements in cubic crystal, Miller indices:- Procedure, Features and Sketches for different planes. X-ray diffraction (Laue method), Bragg's law, Bragg's X-ray diffractometer, Numericals.</p>	<p>08</p>
<p>Unit 4</p>	<p>Nano Physics: Introduction, Concept of nanotechnology, Production techniques:- Top-down (eg. Ball milling) and Bottom-up (eg. Sol-gel process), Tools – Scanning Electron Microscope (SEM) and Atomic Force Microscope (AFM), Applications of nano- materials, Carbon Nano Tube (CNT):- Structure, two types, properties and applications.</p>	<p>06</p>
<p>Unit 5</p>	<p>Architectural acoustics and Ultrasonic : Architectural Acoustics: Introduction, Basic requirements for acoustically good hall, Reverberation, Time of Reverberation, Sabine's formula (no derivation), Absorption coefficient, Factors affecting the architectural acoustics and their remedy, Numericals. Ultrasonic waves: Introduction, Properties of ultrasonic waves, Production of ultrasonic waves by magnetostriction method, Determination of wavelength and velocity of ultrasonic waves by using acoustic diffraction method, Detection of ultrasonic waves, Applications of ultrasonic waves, Numericals. Microwaves- Properties, Advantages, Disadvantages and its applications.</p>	<p>07</p>
<p>Unit 6</p>	<p>Quantum Physics: Introduction to Quantum mechanics, Plank's Quantum Theory, Photoelectric Effect, Compton Effect with theory, Wave Particles Duality, Matter waves, Properties of Matter wave, Heisenberg Uncertainty principle for position and momentum of particle, Problems.</p>	<p>07</p>



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Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Physics	G Vijayakumari	Vikas Pub. House (P) Ltd	3 rd	2009
02	A Text Book of Engineering Physics	M.N.Avadhanulu & P. G. Kshirsagar	S. Chand Publication.	12 th	2006
03	Engineering Physics	P. K. Palanisamy	Sci Tech pub. (P) Ltd.	2 nd	2009
04	Introduction to Nano science and Nanotechnology:	K.K. Chattopadhyay and A.N. Banerjee,	PHI Learning	3 rd	2009

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Physics	Resnick Halliday, Krane,	John Wiley & Sons Pub.	8 th	2008
02	Engineering Physics	R. K. Gaur & Gupta S. L	Dhanapat Rai Publication	8 th	2008
03	Solid State Physics:	S. O. Pillai	New Age International Ltd.	6 th	2007
04	Introduction to Solid State Physics	Charles Kittle,	Wiley India Pvt. Ltd	7 th	2008
05	Materials Science and Engineering –	V. Raghvan,	PHI Learning.	5 th	2006
06	Engineering Physics:	D. K. Bhattacharya and A.Bhaskaran,	Oxford University Press	6 th	2010



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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVPC103, Applied Mechanics
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	3/0
Credits	3
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPC103_1	Interpret the resultant force and reactions at support for a force system based on concepts of resolution and composition.
2CVPC103_2	Calculate forces in members of truss under point load with their nature.
2CVPC103_3	Compute moment of inertia for a composite plane lamina by using parallel and perpendicular axis theorem.
2CVPC103_4	Apply the concept of dynamic equilibrium for rigid bodies in motion using principle of kinetics.
2CVPC103_5	Illustrate the motion of rigid bodies after impact using principle of conservation of momentum.

Course Contents:

Unit No.	Title	Hrs
Unit 1	Introduction to Engineering mechanics: Basic concepts - Particle, Body, Rigid body, Force, Types of force systems, Law of transmissibility of force, Resolution of a force, Resultant force, Moment of a force, couple, Varignon's theorem.	06
Unit 2	Equilibrium of forces Concept of equilibrium, Conditions of equilibrium, Free Body Diagram, Law of moment, Introduction to surface friction, Types of Loads, Types of supports, Types of Beams, Analysis of Simple and Compound beams using conditions of equilibrium.	08
Unit 3	Analysis of Truss Introduction of roof truss, Types of Trusses, Determinacy of a Truss, Assumptions for analysis of truss, Analysis of truss using method of Joint and method of Section.	07
Unit 4	Centroid and Moment of Inertia Introduction to Centroid and Center of Gravity, Centroid of plain laminae, Moment of Inertia, Moment of Inertia of Standard shapes from first principle, Parallel and perpendicular axis theorem, Moment of Inertia of plain and composite figures, Radius of Gyration.	07
Unit 5	Kinetics of Linear and Circular motion Equation of linear motion and motion under gravity, Introduction to surface friction, Kinetics of linear motion, D' Alembert's Principle, Work- Energy Principle, Impulse Momentum Principle, Kinetics of Circular Motion, Torque.	08


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Unit 6	Collision Introduction to Phenomenon of Collision, Law of Conservation of Momentum, Newton's law of Collision of Elastic Bodies, Coefficient of Restitution, Types of Collisions, Direct Collision of Two Bodies, Loss of Kinetic Energy During Collision.	06
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Mechanics	S. Ramamrutham	Dhanpat Rai Publishing Company (P). Ltd	9 th	2010
02	Engineering Mechanics	R. S. Khurmi	S. Chan	Revised	2006
03	Engineering Mechanics	R. K. Bansal Sanjay Bansal	Laxmi Publications Pvt. Ltd.	6 th	2013
04	Engineering Mechanics	K. L. Kumar	Tata McGraw Hill Education	4 th	2012
05	Engineering Mechanics	S. B. Junnarkar	Charotar Publications	16 th	2011
06	Engineering Mechanics	S.S. Bhavikatti	New Age International Pvt. Ltd.	4 th	2012

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Mechanics	Timoshenko and Young	McGraw Hill Publishers	3rd	2006
02	Engineering Mechanics	Irving H. Shames	Prentice Hall of India, New Delhi	5 th	2011
03	Vector Mechanics for Engineers Vol.-I and II	F. P. Beer and E. R. Johnson	Tata McGraw Hill Education	6 th	2011
04	Engineering Mechanics: Statics & Dynamics	Ferdinand Singer	Harper and Row Publications	9 th	2009
05	Fundamentals of Engineering Mechanics	S. Rajasekaran	Vikas Publishing House Pvt. Ltd.	3 rd	2005



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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVES104, Engineering Graphics
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	2/0
Credits	2
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVES104_1	Sketch projection of simple geometries (curves & Planes).
2CVES104_2	Sketch projection of solids & its sectional views.
2CVES104_3	Produce the orthographic projection.
2CVES104_4	Produce the isometric projection.
2CVES104_5	Prepare Perspective drawing of simple objects.

Course Contents:

Unit No.	Title	Hrs
Unit 1	Fundamental of engineering graphics : Introduction to drawing instrument and their uses. Different types of lines used in drawing practice, the dimensioning system as per BSI. Engineering Curves: Introduction to First angle and third angle methods of projection. Construction of curves used in drawing only Ellipse, Hyperbola and Parabola.	04
Unit 2	Projections of Solids Projections of Prisms, Pyramids, Cylinder and Cones inclined to both reference planes. (Excluding Frustum and Sphere)	06
Unit 3	Sections of Solids : Prisms, Pyramids, Cylinders and Cones in simple positions and inclined to one reference plane and parallel to other.	04
Unit 4	Orthographic projection- Lines used, selection of views, the spacing of views, dimensioning and sections. Drawing required views from given pictorial views (conversion of pictorial views into orthographic views). Including sectional orthographic views	06
Unit 5	Isometric Projections Introduction to isometric. Isometric scale, Isometric projections and Isometric views /drawings. Circles in isometric view. Isometric views of simple solids and objects.	04
Unit 6	Perspective Views Introduction, Simple Objects for Perspective Drawing.	04



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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Drawing	N D Batt & V M Panchal	Charotor Publication House, Bombay	50 th	2010
02	Engineering Drawing	Dhananjay A Jhole	Tata Mc-Graw Hill	5 th	2011
03	Fundamentals of Engineering Drawing	Warren. J. Luzadder	Prentice-Hall of India.	11 th	1999
04	Engineering Drawing	P. S. Gill	Katson books	9 th	2012

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Drawing	N D Batt & V M Panchal	Charotor Publication House, Bombay	50 th	2010
02	Engineering Drawing	Dhananjay A Jhole	Tata Mc-Graw Hill	5 th	2011
03	Fundamentals of Engineering Drawing	Warren. J. Luzadder	Prentice-Hall of India.	11 th	1999
04	Engineering Drawing	P S Gill	Katson books	9 th	2012
05	Fundamentals of Engineering Mechanics	S. Rajasekaran	Vikas Publishing House Pvt. Ltd.	3 rd	2005


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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS105, Professional Communication Skills
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/4
Credits	2
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS105_1	Exhibit the skill of sentence construction considering the frame of English language rules accurately for effective and sound communication.
2CVHS105_2	Present their portfolio confidently considering SWOT analysis by using digital tools convincingly as per the corporate expectations.
2CVHS105_3	Write formal letters proficiently by following required techniques that helps in maintaining professional affairs at workplace.
2CVHS105_4	Produce professional presentations proficiently on assigned topics in convincing manner using necessary tools and techniques.
2CVHS105_5	Justify own role in communicative events with balanced zeal, in well-organized manner.

List of Experiments

Exp. No.	Title of Experiments
1	Checking My English Communication
2	Self - Introduction
3	Presenting my Career Choices
4	Preparing my Portfolio
5	Enriching Vocabulary
6	Avoiding Common Errors
7	Presenting My Portfolio
8	Note Making
9	Getting Smart with Technical Description of charts/ Images/ Processes
10	Delivering Professional Presentation
11	Application and Resume Writing
12	Email Writing
13	GD (General)
14	Introducing Guest/ Friend
15	Extempore
16	GD (Technical)
17	Mock Interview
18	Organizing an Event



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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	The Professional: Defining the New Standard of Excellence at Work	Subroto Bagchi	Penguin Books India Pvt. Ltd.	Revised Edition	2011
02	Cambridge Guide to IELTS	Pauline Cullen, Amanda French	Cambridge University Press	Reprint	2017
03	A Practical Course in Effective English Speaking Skills	J. K. Gangal	PHI Learning Private Limited, New Delhi	Print	2012
04	Personality Development and Soft Skills	Barun K. Mitra	Oxford University Press, New Delhi , India	Seventh Impression	2012

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	High-school English Grammar and Composition	Wren and Martin	S. Chand and Co., New Delhi	1 st	2015
02	The Ace of Soft Skills	Ajai Chowdry, Bala Balchandran	Pearson Publication, Delhi	8 th	2013
03	Effective Technical Communication	M. Ashraf Rizvi	Mc Graw Hill Education, Chennai	Second Edition	2017
04	Business Communication	Hory Sankar Mukerjee	Oxford University Press, New Delhi , India	Second Edition	2013


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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVBS106, Applied Physics Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs): Project

Upon successful completion of the project, the student will be able to:

2CVBS106_1	Apply suitable optical theory to calculate wavelength and divergence of monochromatic and polychromatic sources of light using plane diffraction grating.
2CVBS106_2	Calculate band gap energy and Specific rotation for a given semiconductor and sugar solution using appropriate theories and formulae.
2CVBS106_3	Demonstrate symmetries, planes and properties of unit cell for a given crystal system based on the crystallographic study using laws of material science.
2CVBS106_4	Communicate effectively about laboratory work both orally and writing.
2CVBS106_5	Practice professional and ethical behavior to carry forward in their life.

List of Experiments

Exp. No.	Title of Experiments
1	Plane Diffraction Grating
2	Resolving power of Grating
3	Resolving power of telescope
4	Laurent's Half Shade Polarimeter
5	Kund's tube for determination of velocity of sound
6	Divergence of The LASER Beam
7	Wavelength of LASER
8	Inverse Square Law
9	Band Gap energy
10	Seven Crystal System
11	Symmetry Element of Cube
12	Numerical aperture of optical fibre
13	Double Refraction
14	Material Characterization using ultrasound.

Minimum **EIGHT** experiments should be perform from the above list.



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Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Physics	G Vijayakumari	Vikas Pub. House (P) Ltd	3 rd	2009
02	A Text Book of Engineering Physics	M.N.Avadhanulu & P. G. Kshirsagar	S. Chand Publication.	12 th	2006
03	Engineering Physics	P. K. Palanisamy	Sci Tech pub. (P) Ltd.	2 nd	2009
04	Introduction to Nano science and Nanotechnology:	K.K. Chattopadhyay and A.N. Banerjee,	PHI Learning	3 rd	2009

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Physics	Resnick Halliday, Krane,	John Wiley & Sons Pub.	8 th	2008
02	Engineering Physics	R. K. Gaur & Gupta S. L	Dhanapat Rai Publication	8 th	2008
03	Solid State Physics:	S. O. Pillai	New Age International Ltd.	6 th	2007
04	Introduction to Solid State Physics	Charles Kittle,	Wiley India Pvt. Ltd	7 th	2008
05	Materials Science and Engineering –	V. Raghvan,	PHI Learning.	5 th	2006
06	Engineering Physics:	D.K. Bhattacharya and A.Bhaskaran,	Oxford University Press	6 th	2010



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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVPC107, Applied Mechanics Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs): Project

Upon successful completion of the project, the student will be able to:

2CVES107_1	Compute resultant and moments of a force system to verify the laws for forces for static state of body.
2CVES107_2	Relate the magnitude of support reactions of a simply supported beam using experimental and analytical method.
2CVES107_3	Choose the position of centroid for a plane lamina by using experimental method.
2CVES107_4	Interpret forces in the members of truss using experimental and analytical method.
2CVES107_5	Calculate the coefficient of friction of different material surfaces.

List of Experiments

Exp. No.	Title of Experiments
1	To verify law of polygon of forces using force table.
2	To verify lami's theorem using force table.
3	To verify law of moments by Bell crank lever.
4	To calculate support reactions of beam.
5	To compute centroid of plain lamina.
6	To calculate coefficient of friction of different material surfaces.
7	To find out support reactions of a beam by graphical method.
8	To calculate forces in member of truss with their nature.


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Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Mechanics	S. Ramamrutham	Dhanpat Rai Publishing Company (P). Ltd	9 th	2010
02	Engineering Mechanics	R.S. Khurmi	S. Chand	Revised	2006
03	Engineering Mechanics	R. K. Bansal and Sanjay Bansal	Laxmi Publications Pvt. Ltd.	6 th	2013
04	Engineering Mechanics	K. L. Kumar	Tata McGraw Hill Education	4 th	2012
05	Engineering Mechanics	S. B. Junnarkar	Charotar Publications	16 th	2011
06	Engineering Mechanics	S.S. Bhavikatti	New Age International Pvt. Ltd.	4 th	2012

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Mechanics	Irving H. Shames	Prentice Hall of India, New Delhi	5 th	2011
02	Vector Mechanics for Engineers Vol.-I and II	F. P. Beer and E. R. Johnson	Tata McGraw Hill Education	6 th	2011
03	Engineering Mechanics: Statics & Dynamics	Ferdinand Singer	Harper and Row Publications	9 th	2009
04	Fundamentals of Engineering Mechanics	S. Rajasekaran	Vikas Publishing House Pvt. Ltd.	3 rd	2005
05	Mechanics of Materials	Dr. B. C. Punmia	Laxmi Publications Pvt. Ltd.	Reprint	2010



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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVES108, Engineering Graphics and CAD Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/4
Credits	2
Evaluation Scheme: ISE	50

Course Outcomes (COs): Project

Upon successful completion of the project, the student will be able to:

2CVES108_1	Prepare drawing of Points, lines, Planes using Auto Cad.
2CVES108_2	Plot projection of solids.
2CVES108_3	Produce the orthographic projection.
2CVES108_4	Plot the isometric projection.
2CVES108_5	Prepare sectional view of solids.

Course Contents:

Unit No.	Title	Hrs
Unit 1	Introduction to AutoCAD Introduction & Review of Previous knowledge Capability of AutoCAD Starting AutoCAD Various Visualization commands Documentation Quick tour Creating and Accessing documentation Layout and plotting Concept of hardware & software	06
Unit 2	Getting started (Principle & Concept) Starting AutoCAD. AutoCAD & interface Setting new drawing. Accessing command Opening & saving existing file & function keys etc.	04
Unit 3	Creating objects (coordinate system) Co-ordinates system and their type. Drawing line objects. Drawing curve objects and solid filled areas.	04
Unit 4	Editing methods and controlling drawing display Working with named objects Editing objects using the object property tool bar and various method. Zooming & Panning drawing, redrawing screen, regenerating the drawing.	06



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Unit 5	Basic dimensioning geometric dimensioning & tolerancing. Adding text to drawing Need for Dimensioning. Detailed discussion on Dimensioning and tolerance method in AutoCAD Editing method. Adding text with various engineering symbols.	04
Unit 6	Perspective drawing	04

List of Experiments	
Exp. No.	Title of Experiments
1	Computer aided drafting of Curves.
2	Computer aided drafting of solids upto hexagonal base shape and cylindrical/ Conical shape inclined to the reference planes.
3	Computer aided drafting of orthographic vies of simple 3d objects. (04)
4	Computer aided drafting of Isometric view.
5	Plotting of perspective views of given solids or small 3D objects.

Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Drawing	N D Batt& V M Panchal	Charotor Publication House, Bombay	50 th	2010
02	Engineering Drawing	Dhananjay A Jhole	Tata Mc-Graw Hill	5 th	2011
03	Fundamentals of Engineering Drawing	Warren. J. Luzadder	Prentice-Hall of India.	11 th	1999
04	Engineering Drawing	P S Gill	Katson books	9 th	2012

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Drawing & Graphics	K. Venugopal	New Age Publication	5 th	2012
02	Engineering Drawing	M. B. Shaha and B. C. Rana	Pearson Education	2 nd	2012
03	ABC's of Auto CAD	George Omura	BPB Publication.	-	-
04	Engineering graphic with Auto CAD 2002,	Bethune	Pearson Publication	-	-


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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVES109, Design Thinking Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	1/0/2
Credits	2
Evaluation Scheme: ISE	50

Course Outcomes (COs): Project

Upon successful completion of the project, the student will be able to:

2CVES109_1	Apply the design thinking techniques to empathize the customer through arranging survey and/or interview.
2CVES109_2	Identify and Formulate the solution for real world problem using design thinking technique.
2CVES109_3	Create and Exhibit Prototype, for defined problem using design thinking approach.
2CVES109_4	Test developed prototype for defined problem to meet user's requirements.
2CVES109_5	Adapt ethical practices and professional skills to provide a reliable solution for defined real world problem through participating in team activities.


Unit No.	Content	Hrs.
Unit 1	Introduction to Design Thinking, Design Thinking Process	02
Unit 2	Empathize Phase: Empathy and Ethics, User Perspective, Activities – Empathy Map, Planning, Persona building.	02
Unit 3	Customer Journey Mapping, Observation of stakeholders, Defining and Conceptualization of problem	02
Unit 4	Ideation, Activities – 5 Whys & 1 How, Story boarding, Brainstorming.	02
Unit 5	Prototype – Types, Mindsets, Tools.	02
Unit 6	Testing – Scenario, Methods, Refinements & Recommendations.	02

Expt. No	Title of the Experiment
1	Identification and Selection of Problems
2	Designing of Empathy Map
3	Customer Survey and Analysis
4	Persona Building
5	Customer Journey Map
6	Defining the problem
7	Poster Presentation
8	Ideation
9	Prototype Building
10	Testing


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Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Understanding Design Thinking, Lean, and Agile	Jonny Schneider	O'Reilly	---	2017
02	Introduction to Design Thinking	S. Salivahanan, S. Suresh Kumar, D. Praveen Sam,	Tata Mc Graw Hill,	---	2019
03	Karmic Design Thinking - A Buddhism-Inspired Method to Help Create Human-Centered Products & Services	Prof. Bala Ramadurai,	Self-Published	--	2020
04	Design: Creation of Artifacts in Society	Prof. Karl Ulrich, U. Penn	University of Pennsylvania	--	2011

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Design for How People Think	John Whalen	O'Reilly	---	2019
02	Change by Design	Tim Brown	HarperCollins	---	2009
03	Creative Confidence: Unleashing the Creative Potential Within Us All	Kelley, D. & Kelley, T	New York: William Collins	---	2014
04	Sprint: How to Solve Big Problems and Test New Ideas in Just Five Days	Jack Knapp and others	Simon & Schuster	---	2009

Other Books/E-material			
Sr. No	Title	Instructor	Publisher
01	NPTEL Course- Design Thinking A Primer	Prof. Ashwin Mahalingam & Prof. Bala Ramadurai	www.nptel.ac.in
02	NPTEL Course- Innovation by Design	Dr. B.K. Chakravarthy	www.nptel.ac.in


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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS110A, Badminton
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110A_1	Improve physical fitness.
2CVHS110A_2	Understand the basic rules and how they can play the game of badminton.
2CVHS110A_3	Provide opportunities for playing modified games to promote student learning
2CVHS110A_4	Develop students' critical thinking skills, problem solving skills, self-management skills, collaboration skills, risk assessment etc.
2CVHS110A_5	Learn various technical motor skills in badminton and how you can move better in the court.
2CVHS110A_6	Acquiring a satisfactory level of knowledge and experience of the sport, to enable students to play by themselves for recreation.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to badminton – Aim – Objectives – Short reference in Badminton history Understand the basic rules and how they should play normal game.	04
Unit 2	Skills - Service, Net shot, Clear, Drop, Smash. Skills - Service Forehand & Backhand, Net shot, Drive (Presentation and practice to the court)	06
Unit 3	Skills – Clear, Drop, Smash Implementation of singles rules	05
Unit 4	Footwork 1 Footwork 2	05
Unit 5	Implementation of doubles rules. Forehand strokes. Motor skills practice 1	06
Unit 6	Motor skills practice 2 Motor skills practice 3 Motor skills practice 4	04


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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS110B, Volley Ball
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110B_1	To send the ball over the net, according to the regulations, to the ground on the opponents ground
2CVHS110B_2	The ball is put into play through the service right back player within the service zone
2CVHS110B_3	The Ball must hit with one hand or one arm and directly send over the net opponent's court.
2CVHS110B_4	To valley the ball over the net before it touches on the ground
2CVHS110B_5	The players use their hands to volley the ball.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction & Understand basic volleyball rules, terminology, and scoring procedures.	04
Unit 2	Demonstrate basic skills associated with volleyball, including passing, setting, serving, attacking (spiking), and blocking.	06
Unit 3	Demonstrate the ability to perform individual offensive and defensive skills and strategies.	05
Unit 4	Demonstrate an understanding of the typical game sequencing: serve, pass, attack, defense, transition, and defense.	05
Unit 5	Understand and apply the knowledge of basic rules of volleyball. Skill Practice	06
Unit 6	Demonstrate proper etiquette and good sportsmanship. And Skill related Practice. Skill Practice	04



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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS110C, Kabaddi
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110C_1	Acquire , analyze and interpret basic skills
2CVHS110C_2	Appraise the rules and regulation.
2CVHS110C_3	Demonstrate and assess various basic skills/techniques and game strategies.
2CVHS110C_4	Develops confidence, concentration and tolerance in players.
2CVHS110C_5	This game also Provides an opportunity for healthy competitions among equal players and help them make friends.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Kabaddi – Aim – Objectives – Short reference in Kabaddi history Understand the basic rules and how they should play normal game.	04
Unit 2	Demonstrate basic skills associated with Kabaddi, including pushing, Bonus, Tackling, attacking, and blocking	06
Unit 3	Demonstrate an understanding of the typical game sequencing: service, Bonus, attack, defense, Raiding and defense.	05
Unit 4	Demonstrate the ability to perform individual offensive and defensive skills and strategies. Stepping Practice.	05
Unit 5	Skill Demo – Stepping, Bonus, Foot touch, Toe touch, Thrust, Squat leg, Kicks & Practice.	06
Unit 6	Skill Practice And Shadow Practice	04


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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS110D, Foot Ball
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110D_1	By applying these principles through active participation, students develop the necessary Skills and knowledge to play football.
2CVHS110D_2	Provides students with opportunities to improve physical fitness acquire knowledge of fitness concepts and practice positive personal and social skills.
2CVHS110D_3	Students will gain an understanding of how a wellness lifestyle affects one's health, fitness and physical performance

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Football – Aim – Objectives – Short reference in Football history Understand the basic rules and how they should play normal game.	04
Unit 2	Introduce students to the basic skills and knowledge associated with football. Understand basic football rules, terminology, and safety concerns.	06
Unit 3	Demonstrate the basic football skills of passing, three point stance, catching, blocking, hand-offs, punting, the carry and kicking & Practice.	05
Unit 4	Demonstrate the ability to perform individual offensive and defensive skills and strategies.	05
Unit 5	Improve personal fitness through participation in yoga, muscular strength, muscular endurance, and flexibility activities & Practice.	06
Unit 6	Successfully participates in skill improvement and offensive game strategies & Practice	04


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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS110E, Bharatnatyam Classical Dance
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110E_1	Interpolation of Indian classical dance forms & basic types of Bharatnatyam.
2CVHS110E_2	Subdivide bharatnatyam in terms of Nrutt, Nrutya & Nattya.
2CVHS110E_3	Show the perform base on signal & combine hand posture in terms of Ganesh Vandana & Mahalaxmi Ashtak

Course Contents:

Unit No.	Title	Hrs.
Unit 1	History of Bharatnatyam Dance style & information about all Indian classical dance forms.	01
Unit 2	Basic types of Bharatnatyam :- Tatty Advu, Natty advu, Vishru advu, Kuddit Mett advu, Mett advu, tatti kuddit mett advu & Tirmanam (small). Study of Navras Abhinay. Singal Hand posture , Footwork , Shirobhed(head movement),	10
Unit 3	Combine Hand posture. Meaning of Guruvandna, Ganesh, mahalaxmi shlok. Definition of Nrutt, Nrutya & Nattya.	06
Unit 4	Practical session of Ganesh vandna Shlok in classical music.	06
Unit 5	Practice Sessions. & Presentation Of Ganesh vandna	07
Unit 6	History of Bharatnatyam Dance style & information about all Indian classical dance forms.	01



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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS110F, Harmonium Classical Music
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110F_1	Outline in History Harmonium & different Raags.
2CVHS110F_2	Perform on different songs
2CVHS110F_3	Role play the different music by means of harmonium.

Course Contents:

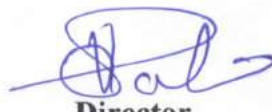
Unit No.	Title	Hrs.
Unit 1	History & Introduction of Harmonium.	02
Unit 2	Harmonium presentation of Raag :- Bhoop raag / Bhimpalash raag.	12
Unit 3	Practice sessions.	03
Unit 4	Practice song notations & Harmonium Dhoon (percussion)	08
Unit 5	Practice sessions & students presentations	05
Unit 6	History & Introduction of Harmonium.	02



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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS110G, Indian Folk Dance
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110G_1	Discuss different types in Indian Folk dance.
2CVHS110G_2	Demonstrate Navras Abhinay, Tribal dance, Dhangari & Lavni dance.
2CVHS110G_3	Compose dance on different folk dance style.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Indian Folk dance & its forms.	02
Unit 2	Basic steps of folk dance styles.	03
Unit 3	Importance of expressions (Acting) in dance, Navras Abhinay & its types. (9 type of navras)	03
Unit 4	Tribal dance, & its different styles.	06
Unit 5	Practice sessions.	04
Unit 6	History of Dhangari & Lavni dance. Types of dhangari & lavni dance.	01
Unit 7	Steps (dance composition) of Dhangari & Lavni dance.	07
Unit 8	Practice sessions & Students performance	04



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Course Details:

Class	F.Y. B. Tech, Sem.- I
Course Code and Course Title	2CVHS110H, Karaoke Singing.
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110H_1	Understand notation of the songs.
2CVHS110H_2	Perform happy, sad, love devotional, patriotic songs.
2CVHS110H_3	Compose songs in many variations.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Song Notation	04
Unit 2	Happy song / Sad song (classical & semi classical)	08
Unit 3	Love song / Devotional song / Patriotic songs	08
Unit 4	Song composition	05
Unit 5	Practice session & students presentation	05


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Course Details:

Class	F. Y. B. Tech, Sem.- II
Course Code and Course Title	2CVBS111, Applied Mathematics II
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	3/1
Credits	4
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVBS111_1	Solve problems on partial derivatives by using fundamental concepts of derivative and apply it to find Jacobian, Maxima and Minima of functions of several variables.
2CVBS111_2	Solve Ordinary Differential Equation by using analytical method and numerical techniques.
2CVBS111_3	Use technique of finite difference and interpolation to compute the value of function for given data.
2CVBS111_4	Apply the concept of Special Functions to evaluate improper integrals.
2CVBS111_5	Evaluate proper and improper type of multiple integrals by using fundamental concepts of integration and apply it to find Area and Mass of a given region.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Partial Differentiation and Its Applications: Function of two or more variables, Partial derivatives, Euler's theorem, Change of variables, Jacobin, Maxima and minima of functions of two variables.	08
Unit 2	Ordinary Differential Equation (First order and First degree): Linear differential equation, Equation reducible to linear differential equation, Exact differential equation, Equation reducible to exact equation.	07
Unit 3	Numerical Solution of Ordinary Differential Equation (First order and First degree): Picard's method, Taylor's series method, Euler's method, modified Euler's method, Runge-kutta method.	06
Unit 4	Finite Differences and Interpolation: Finite differences, Newton's Interpolation formulae, central difference interpolation formulae (stirling formula), interpolation with unequal interval (Lagrange's formula)	06
Unit 5	Special Functions: Gamma function, Properties of Gamma function, Beta function, Properties of Beta function, Relation between Beta and Gamma functions.	07
Unit 6	Multiple Integral and It's Applications: Double Integrals, Triple integral, Change of Order of Integration, Change to polar, Applications to Area and Mass of plane lamina.	08



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Sr. No.	Title of Tutorials
1	Partial Differentiation and homogeneous function
2	Applications of Partial Differentiation
3	Linear and non-differential equation.
4	Exact and non-differential equation
5	Numerical Solution of Ordinary Differential Equation
6	Newton's Interpolation formulae: forward and backward difference formulae
7	Central difference interpolation formulae (stirling formula) and Lagrange's interpolation formula.
8	Special functions

Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Higher Engineering Mathematics	Dr. B. S. Grewal	Khanna Publishers	44 th	2018
02	Advanced Engineering Mathematics	N. P. Bali, Manish Goyal	Infinity science press	7 th	2010
03	Advanced Engineering Mathematics	H. K. Das	S. Chand	22 nd	2018
04	Numerical Methods in Engineering & Science	Dr. B. S Grewal	Khanna Publishers	9 th	2010

Reference Books / Handbooks

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	A textbook of Applied Mathematics	P. N. Wartikar & J. N. Wartikar	Pune Vidyarthi Griha Prakashan	1 st	2008
02	Higher Engineering Mathematics	B. V. Ramana	Tata McGraw Hill Publ.	6 th	2010
03	Advanced Engineering Mathematics	Erwin Kreyszig	Wiley Publishers	10 th	2017
04	Numerical Methods	Dr. P. Kandasamy, Dr.K.Thilagavathy, Dr. K. Gunavathi	S. Chand	1 st	2010



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Course Details:

Class	F. Y. B. Tech, Sem.- II
Course Code and Course Title	2CVBS112, Applied Chemistry
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	3/0
Credits	3
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVBS112_1	Apply principles of water testing to identify water quality parameters and methods of water softening using fundamental laws.
2CVBS112_2	Classify fuels and analytical methods to identify their characteristics using basic principles of chemistry.
2CVBS112_3	Select engineering, ceramic materials on the basis of its properties and applications using their chemical composition.
2CVBS112_4	Apply the methods of prevention of corrosion to a given metal considering it's types and factors affecting corrosion.
2CVBS112_5	Compute the values of hardness of water and calorific values of fuels using fundamental equations.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Water Technology: Introduction, impurities in natural water, Water Testing: acidity, alkalinity and chlorides, hardness of water (definition, causes and significance), Calculations of total hardness, disadvantages of hard water in domestic and industrial applications. Scales and sludges: Formation in boilers and removal, Treatment of hard water by ion- exchange process, Zeolite process, Desalination of brackish water by Reverse Osmosis.	07
Unit 2	Chemical and Instrumental Techniques: Chemical analysis, its types, Different ways to express concentration of solution. Numerical problems. Standards and its types. p^H-metry: Introduction, pH measurement using glass electrode and applications. Spectrometry: Introduction, Laws of spectrometry (Lamberts and Beer-Lambert's law). Instrumentation and applications of UV-Visible spectrophotometer, Chromatography: Introduction, Principle, instrumentation and applications of gas-liquid chromatography (GLC).	07
Unit 3	Engineering Materials: A) Polymers: Introduction, plastics, thermo-softening and thermosetting plastics, industrially important plastics like phenol-formaldehyde, urea formaldehyde. Conducting polymers, biodegradable polymers (properties and applications), composites, fibre-reinforced plastics (FRP) and glass reinforced plastics (GRP). B) Lubricants: Introduction, classification of lubricants (solid, semisolid and liquid), lubrication and it's types, characteristics of lubricants: viscosity, viscosity	07

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	index, flash point, fire point, cloud point and pour point.	
Unit 4	<p>Fuels and Non-conventional Energy Sources: Fuels: Introduction, classification, characteristics of good fuels, comparison between solid, liquid and gaseous fuels, types of calorific value (higher and lower), Bomb calorimeter and Boy's calorimeter. Numericals on Bomb and Boy's calorimeter. Batteries: Introduction, Characteristics of a battery, Rechargeable Li- ion batteries (Diagram, charging-discharging reactions, advantages and applications). Fuel Cells: Introduction, H₂-O₂ Fuel cell (Construction, working and applications), applications of fuel cells.</p>	07
Unit 5	<p>Corrosion & Green Chemistry: Corrosion: Introduction, causes, types, Atmospheric corrosion (oxidation corrosion), Electrochemical corrosion (hydrogen evolution and oxygen absorption mechanism), factors affecting rate of corrosion. Prevention of corrosion by proper design and material selection, hot dipping (galvanizing and tinning), cathodic protection method, electroplating, metal cladding. Green Chemistry: Definition, Twelve principles of green chemistry, Research and industrial applications.</p>	07
Unit 6	<p>Metallic & Ceramic Materials: Alloys: Introduction, alloy definition and classification, purposes of making alloys. Ferrous alloys: Plain carbon steels (mild, medium and high). Nonferrous alloys: Copper alloy (Brass), Nickel alloy (Nichrome), Aluminum alloy (Duralumin and Alnico). Ceramic Materials: Introduction, types of ceramics, types of cement & their applications, Manufacture of Portland Cement by wet process, Composition of Portland Cement & their functions- a) Chemical composition, b) Compound composition, Setting & hardening of Portland Cement.</p>	07

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	A Text Book of Engineering Chemistry	S. S. Dara	S. Chand & Co. Ltd., New Delhi.	11 th	2008
02	A Text book of Engineering Chemistry	Shashi Chawala	Dhanpat Rai Publishing Co. New Delhi.	3 rd	2007
03	A Test Book of Applied Chemistry	Ziyauddin D. Sande, Vijayalaxmi M. Vairat, Pratapsingh V. Gaikwad	Wiley Publications	1 st	2018



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Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Chemistry	Jain & Jain	Dhanpat Rai Publishing Co., New Delhi.	16 th	2015
02	Industrial Chemistry	B. K. Sharma	Goel publication (P) Ltd.	10 th	1999
03	Fundamentals of Engineering Chemistry	S. K. Singh	New Age International (P) Ltd, New Delhi.	1 st	2009
04	Instrumental Methods of Chemical Analysis	Chatwal and Anand	Himalaya Publishing House, Mumbai.	5 th	2005
05	Engineering Chemistry	Wiley India	Wiley India Pvt. Ltd., New Delhi.	1 st	2012



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Course Details:

Class	F. Y. B. Tech, Sem.- II
Course Code and Course Title	2CVPC113, Fundamentals of Civil Engineering
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	4/0
Credits	4
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPC113_1	Develop the components of residential building for a given site condition with the help of building planning rules and regulations
2CVPC113_2	Apply the knowledge of surveying techniques considering the IS code
2CVPC113_3	Discuss the principles of planning with building bye laws and property transaction
2CVPC113_4	Describe aspects of civil engineering field & masonry construction for residential building considering client's requirements
2CVPC113_5	Make use of Transportation, Environmental and Irrigation Engineering in civil engineering sector considering national building code


Course Contents:

Unit No.	Title	Hrs
Unit 1	Introduction to Civil Engineering: Branches & applications of civil engineering, Role of civil engineer, Types of structure, types of loads, Elements & functions of sub structure, types of soil and rocks, concept of bearing capacity, types of foundations, Elements of super-structures and their functions, Concept of Green Building	10
Unit 2	Surveying Principles & Classification of surveys, Dumpy level, Auto Level, Theodolite, Terms used in levelling, levelling instruments, methods of reduction of levels, types of levelling. Contours: Characteristics of contours, use of contour maps. Introduction to EDM and Total station.	06
Unit 3	Building Materials & formwork: Applications and properties of the following building materials: Bricks, Steel, Cement, Aggregate, Plastic, Aluminium, Water, M.S., S.S., FRP sheets, Gypsum, wood, glass, stone, tiles, bitumen, ceramic Formwork: Requirement, economy and material	12
Unit 4	Masonry: Stone masonry - Random Rubble, Uncoursed Rubble, Coursed Rubble and Ashlar Masonry. Brickwork and Brick Bonds - English, Flemish, and Rat trap bond (one- brick thick). Composite masonry, various types of composite masonry walls Arches: Technical terms in arches, types of arches. Lintel: Necessity, types of lintels Basic requirements of a building as a whole:	11

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Unit 5	Introduction to Transportation, Environmental and Irrigation Engineering Components of rigid & flexible pavement, Cross section of road in cutting & filling. Components of railway track(Broad Guage) Green Building – Introduction & rating system, Smart cities, Sustainability, Carbon footprint. Components of water supply scheme (flow diagram). Introduction to Gravity and Earthen Dam.	08
Unit 6	Building Planning: Procedure of Building Permission, significance of commencement, plinth completion or occupancy certificate, orientation of building, National Building code, types of building, Principles of planning, building bye laws, Line plan of residential building	09

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Surveying	N. Basak	Tata Mac Graw Hill Publications	1 st	2016
02	Engineering Hydrology	K Subramanya	Mac Graw Hill Publications	4 th	2013
03	Basic Civil Engineering	G. K. Hiraskar	Dhanpatrai Publications	1 st	2008
04	Basic Civil Engineering	S. S. Bhavikatti	New Age International Publications	2 nd	2003
05	Surveying Vol. I, II, II	B. C. Punmia	Laxmi Publications	2 nd	2001

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Introduction to Environmental Engineering	Mackenzie Davis and David Cornwell	McGraw Hill Education;	6 th	2020
02	The A To Z of Practical Building Construction and its Management	Sandeep Mantri	Satya Prakashan	1 st	2010
03	Engineering Surveying	Schofield W.	Taylor and francies	6 th	2007
04	Advanced Surveying: Total Station, GIS and Remote Sensing	Satheesh Gopi, R. Sathikumar, N. Madhu	Pearson Education India	1 st	2006
05	Surveying	A.Bannister, S. Raymond, R.Baker	Pearson	7 th	2002


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Course Details:

Class	F. Y. B. Tech, Sem.- II
Course Code and Course Title	2CVES114, Basic Electrical Engineering
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	2/0
Credits	2
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVES114_1	Explain basic terminologies related to DC, AC and magnetic circuits to relate the operations of electrical devices using electrical laws.
2CVES114_2	Relate the concepts of AC fundamentals to single-phase and three-phase AC circuits to describe the generation of AC with phasor representation.
2CVES114_3	Demonstrate wiring circuits and earthing systems using circuit diagrams on the basis of different applications & workspaces.
2CVES114_4	Describe the working principle of AC and DC Machines using electromagnetic laws with constructional features & types for various applications.
2CVES114_5	Apply conceptual understanding of AC& DC parameters to solve electrical circuits and provide a solution

Course Contents:

Unit No.	Title	Hrs
Unit 1	DC Circuits Definitions: EMF, Current, Electrical Work, Power, Energy, Ohm's Law, Kirchhoff's Laws, Factors affecting resistance, Analysis of DC Circuits using KCL & KVL [Numerical treatment].	05
Unit 2	Magnetic Circuits Magnetic circuits & definitions, Comparison between Electric and Magnetic circuit, Magnetic Leakage and Fringing, Magnetization (B-H) curve.	04
Unit 3	Fundamentals of AC Circuits Generation of alternating voltage and current, concept of RMS value, Average value, phasor representation, AC circuits- pure R, L, C, and series R-L-C circuits [Numerical Treatment]. Generation of three-phase AC voltage, Advantages of the three-phase system over single-phase system	05
Unit 4	Earthing and Wiring Circuits Concept of earthing, necessity of earthing, plate and pipe earthing, HRC fuse, Simple wiring, Staircase wiring, Godown wiring. [Theoretical treatment only].	04
Unit 5	Single Phase Transformer Working principle of a Transformer, Construction, Core type, and Shell type transformer, EMF Equation, Transformation ratio & applications.	05
Unit 6	Electrical Machines D.C.Motor: Working principle of a DC motor, Construction, Type, and applications.	05

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<p>Single phase AC motor: Double Field Revolving Theory, Working principle of Split phase I.M, applications.</p> <p>Universal Motor: Construction, working principle, applications. [Theoretical treatment only].</p>

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Basic Electrical Engineering	V. K. Mehta Rohit Mehta	S. Chand Publications, New Delhi	5 th	2016
02	A Textbook of Electrical Technology	B L Theraja & A K Theraja	S. Chand Publications, New Delhi	1 st (Reprint)	2016
03	Basic Electrical Engineering	J. M. Kharade, M. D. Patil, D. B. Kanase	Wiley India	1 st	2018
04	Basic Electrical Engineering	I.J. Nagrath D. P. Kothari	Tata McGraw Hill	3 rd	2013

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Electrical Engineering Concepts and Applications	PV Prasad & S. Shivanaraju	CENGAGE Learning	1 st	2012
02	Fundamentals of Electrical Engineering	Bharati Dwivedi, Anurag Tripathi	Wiley	2 nd	2014
03	Electrical Engineering Fundamental	Vincent Del Toro	Pearson Publication	2 nd	2003
04	Fundamentals of Electrical Engineering	Ashfaq Husain	DhanpatRai & co.	3 rd	2008
05	Basic Electrical & Electronics Engineering	S. K. Bhattacharya	Pearson Publication	1 st	2012



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Course Details:

Class	F. Y. B. Tech, Sem.- II
Course Code and Course Title	2CVBS115, Applied Chemistry Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVBS115_1	Determine the hardness acidity, alkalinity, chloride content using appropriate methods of titration for given sample of water.
2CVBS115_2	Estimate rate of corrosion in acidic and alkaline medium by depreciation of weight.
2CVBS115_3	Use pH meter to determine pH value of given solution and validate the findings with suitable optical method (photo-colorimeter) and graphical methods.
2CVBS115_4	Analyze coal sample, lubricants and aqueous solutions to get the percentage compositions using appropriate methods.
2CVBS115_5	Communicate effectively about laboratory work both orally and writing.

List of Experiments

Exp.No.	Title of Experiments
1	Determination of acidity of water sample. (Neutralization Titration)
2	Determination of alkalinity of water sample. (Acid- Base Titration).
3	Determination of chloride content of water by Mohr's method. (Precipitation Titration).
4	Determination of total hardness of water sample by EDTA method.
5	Determination of moisture, volatile and ash content in a given coal sample. (Proximate analysis)
6	Preparation of Urea-formaldehyde resin.
7	Determination of viscosity of lubricating oil.
8	Estimation of zinc in brass solution (Displacement Titration)
9	Estimation of copper in brass solution (Displacement Titration)
10	Determination of rate of corrosion of aluminium in acidic and basic medium
11	Determination of pH of sample solution by pH meter
12	Determination of calorific value of fuel using Bomb calorimeter.
13	Demonstration of Photo-colorimeter.

Minimum 8 experiments should be performed from the list out of which two experiments should be on instrumental methods.


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	A Text Book of Engineering Chemistry	S. S. Dara	S. Chand & Co. Ltd., New Delhi.	11 th	2008
02	A Text Book of Engineering Chemistry	Shashi Chawala	Dhanpat Rai Publishing Co. New Delhi.	3 rd	2007

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Materials Science and Engineering –	V. Raghvan	PHI Learning.	5 th	2006
02	Engineering Chemistry	Jain & Jain	Dhanpat Rai Publishing Co., New Delhi.	15 th	2010
03	Industrial Chemistry	B. K. Sharma	Goel publication (P) Ltd.	10 th	1999


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Course Details:

Class	F. Y. B. Tech, Sem.- II
Course Code and Course Title	2CVPC116, Fundamental of Civil Engineering Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs): Project

Upon successful completion of the project, the student will be able to:

2CVPC116_1	Draw building components of residential by using AutoCAD considering requirement of owner
2CVPC116_2	Calculate reduced levels of different points by levelling.
2CVPC116_3	Calculate linear angular and area measurement by Total Station.
2CVPC116_4	Understand the documents required for municipal submission drawing

List of Experiments

Exp. No.	Title of Experiments
1	Determination of reduced levels for different points by HI & Rise and fall method.
2	Angular measurement by using theodolite.
3	Visit to construction site and visit report.
4	Collection of the various documents required for municipal sanctioning of plan
5	Draw various building components- Staircase & openings
6	Draw a line plan of residential building by applying principles of planning.
7	Study of total station and Linear & Angular measurement.
8	Area measurement by using total station.
9	Traversing by total station.



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Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Building Drawing: With An Integrated Approach To Built Environment	S. Y. Patki, M G Shah, C M Kale	McGraw Hill India	6 th	2021
02	Basic Civil Engineering	G. K. Hiraskar	Dhanpatrai Publications	1 st	2008
03	Surveying	N. Basak	Tata Mac Graw Hill, Publications	1 st	2008
04	Basic Civil Engineering	S. S. Bhavikatti	New Age International Publications	2 nd	2003
05	Surveying Vol. I, II, II	B. C. Punmia	Laxmi Publications	2 nd	2001

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Introduction to Environmental Engineering	Mackenzie Davis and David Cornwell	McGraw Hill Education;	6 th	2020
02	The A To Z of Practical Building Construction and its Management	Sandeep Mantri	Satya Prakashan	1 st	2010
03	Engineering Surveying	Schofield W.	Taylor and francies	6 th	2007
04	Advanced Surveying: Total Station, GIS and Remote Sensing	Satheesh Gopi, R. Sathikumar, N. Madhu	Pearson Education India	1 st	2006
05	Surveying	A.Bannister, S.Raymond, R.Baker	Pearson	7 th	2002
06	Civil Engineering Handbook	P.N.Khanna	Engineer's Publishers	17 th	1999



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Course Details:

Class	F. Y. B. Tech, Sem.- II
Course Code and Course Title	2CVES117, Basic Electrical Engineering Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs): Project

Upon successful completion of the project, the student will be able to:

2CVES117_1	Identify electrical components, equipment, Lamps and different illumination schemes using electrical apparatus & symbols to handle it properly for experimentation.
2CVES117_2	Measure electrical parameters with appropriate measuring instruments on the basis of ratings and type of connections.
2CVES117_3	Demonstrate the circuit laws, perform testing on electric machine to find the solutions with the help of various instruments for domestic and industrial applications.
2CVES117_4	Correlate and comment the observations and results of experiment with different laws to provide solution for given system.
2CVES117_5	Practice safety precautions in day to day life & communicate effectively with ethics about laboratory work both orally and in writing.

List of Experiments

Exp. No.	Title of Experiments
1	Study of electrical components, equipment's, & measuring instruments.
2	Safety Precautions and earthing Test
3	Kirchhoff's Voltage and Kirchhoff's current Law
4	B-H curve for magnetic material
5	RLC Series Circuit
6	Demonstration of different Wiring Circuits
7	Lamps and Illumination Schemes
8	Effect of Temperature on Resistance
9	Load Test on Single Phase Transformer
10	Load Test on DC Shunt Motor.



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Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Basic Electrical Engineering	V. K. Mehta Rohit Mehta	S. Chand Publications, New Delhi	5 th	2016
02	A Textbook of Electrical Technology	B L Theraja & A K Theraja	S. Chand Publications, New Delhi	1 st (Reprint)	2016
03	Basic Electrical Engineering	J. M. Kharade, M. D. Patil, D. B. Kanase	Wiley India	1 st	2018
04	Basic Electrical Engineering	I.J. Nagrath D. P. Kothari	Tata McGraw Hill	3 rd	2013

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Electrical Engineering Concepts and Applications	PV Prasad & S. Shivanaraju	CENGAGE Learning	1 st	2012
02	Fundamentals of Electrical Engineering	Bharati Dwivedi, Anurag Tripathi	Wiley	2 nd	2014
03	Electrical Engineering Fundamental	Vincent Del Toro	Pearson Publication	2 nd	2003
04	Fundamentals of Electrical Engineering	Ashfaq Husain	DhanpatRai& co.	3 rd	2008
05	Basic Electrical & Electronics Engineering	S. K. Bhattacharya	Pearson Publication	1 st	2012



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Course Details:

Class	F. Y. B. Tech, Sem.- II
Course Code and Course Title	2CVES118, Programming for Problem Solving Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	1/0/2
Credits	2
Evaluation Scheme: ISE/ESE (POE)	50 / 50

Course Outcomes (COs): Project

Upon successful completion of the project, the student will be able to:

2CVES118_1	Prepare an algorithm and draw a flowchart to accurately solve various mathematical problems by using structured approach.
2CVES118_2	Apply the fundamental concepts like data types, operators, looping constructs to solve mathematical problems by using the decision and looping controls.
2CVES118_3	Develop a C program to demonstrate the modular approach by using the concept of function, structure and pointer.
2CVES118_4	Demonstrate a solution for various mathematical problems by using the fundamental concepts of C.
2CVES118_5	Write, Compile and debug C program for various problem statements by using structured approach.

Course Contents:

Unit No.	Title	Hrs
Unit 1	Introduction to Information Technology Computer, hardware, software, computer generation, I/O devices-CPU-Memory devices-processors-keyboard-printers. Operating systems- introduction, types of OS, Functions of OS.	02
Unit 2	Problem Solving The meaning of algorithms, Flowcharts, Pseudo codes, Writing algorithms and drawing flowcharts for simple exercises, C Program development environment. Importance of 'C' Language, History, Structure of 'C' Program, Sample 'C' Program.	02
Unit 3	C Fundamentals Constants, variables and data types. Operators and expressions, Managing input / output operations, Control statements-Decision making, Case control & Looping Constructs.	03
Unit 4	Array The meaning of an array, one dimensional and two dimensional arrays, declaration and initialization of arrays, reading , writing and manipulation of above types of arrays, multidimensional arrays.	02
Unit 5	Functions Need of user defined functions, elements of User defined functions, defining functions, return values and their types, function calls, function declaration, methods of parameter passing, Scope rule of functions	02

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Unit 6	Structure & Pointers Need of Structure, Defining a structure, declaring and accessing structure variables, structure initialization, copying and comparing structure variables, structures and functions, Unions. Understanding pointers, accessing the address space of a variable, declaring and initialization pointer variables, accessing a variable through its pointer	03
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List of Experiments	
Exp. No.	Title of Experiments
1	Write an algorithm and draw flowchart for given problem statement.
2	Program using different data types and operators in C.
3	Program using if, if else and if else if construct
4	program to demonstrate looping constructs(while, for loop, do while)
5	Program using nested loop (for loop, while loop).
6	program to demonstrate one dimensional array
7	program to demonstrate two dimensional array
8	Implement a program to demonstrate user defined functions.
9	program to demonstrate concept of structures in c.
10	program to demonstrate pointers and pointer arithmetic in c.

Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Computer Practice	Sheela Kumar	Anuradha Publishers	-	2003
02	Programming And Problem Solving Using C Language	ISR D Group	McGraw-Hill Publications	-	2012
03	Let Us C	Yashwant Kanetkar	BPB	3 rd	2011

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	The 'C' Programming Language	D. M. Ritchie	Pearson	2 nd	1998
02	The Complete Reference C	Herbert Schildt	McGraw-Hill Publications	4 th	2000
03	Test your C Skills	Yashwant Kanetkar	BPB Publications	5 th	2013


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Course Details:

Class	F.Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119A, Table –Tennis
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119A_1	The students define table tennis game.
2CVHS119A_2	Willingly participates in Table Tennis as a component of an active lifestyle.
2CVHS119A_3	The students explain foot- work in forehand and backhand spin.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction & Understand basic Table Tennis rules, terminology, safety concerns, and scoring procedures.	04
Unit 2	Demonstrate proper court etiquette and good sportsmanship.	06
Unit 3	Demonstrate basic skills associated with table tennis including forehand, backhand, spins, grips & serves.	05
Unit 4	Demonstrate Exposition and Applying forehand and backhand straight strike.	05
Unit 5	Assess current personal fitness levels & Practice.	06
Unit 6	Use a variety of stroke placements to keep opponent moving during a table tennis match. Practice.	04


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Course Details:

Class	F. Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119B, Kho-Kho
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119B_1	Helps In Motor Development.
2CVHS119B_2	It helps in social and mental development of the student
2CVHS119B_3	Kho-Kho helps the student to off depression, anxiety, stress and, increase self-esteem.
2CVHS119B_4	It develops team spirit and leadership skill.
2CVHS119B_5	It improves physical fitness.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Kho-Kho – Aim – Objectives – Short reference in Kho-Kho history Understand the basic rules and how they should play normal game.	04
Unit 2	Demonstrate basic skills associated with Kho-Kho, including Fundamental Skills. Chasing Skills- a) Giving Kho b) Taking Direction c) Sudden Change d) Tapping	06
Unit 3	Demonstrate basic skills associated with Kho-Kho, including Fundamental Skills. Chasing Skills-e) Turning Round the Post f) Trapping g) Diving h) Fake Kho i) Late kho & Practice.	05
Unit 4	Demonstrate basic skills associated with Kho-Kho, including Running Skills a) Position on the court b) Avoiding Trapping c) Positioning near post d) Dodging	05
Unit 5	Demonstrate basic skills associated with Kho-Kho, including Running Skills e) Front Dodge f) Back Dodge c) Round the post dodge & Practice	06
Unit 6	Kho-Kho Skills Practice & Matches.	04

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Course Details:

Class	F. Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119C, Basket Ball
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119C_1	Introduce students to the basic skills and knowledge associated with basketball.
2CVHS119C_2	By applying these principles through active participation, students develop the necessary skills and knowledge to play basketball
2CVHS119C_3	Provides students with opportunities to improve physical fitness, acquire knowledge of fitness concepts and practice positive personal and social skills
2CVHS119C_4	Students will gain an understanding of how a wellness lifestyle affects one's health, fitness and physical performance.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction & Understand basic basketball rules, terminology, and safety concerns.	04
Unit 2	Demonstrate the six basic basketball skills of a) Running b) Jumping c) Passing d) catching e) Dribbling and f) Shooting.	06
Unit 3	Demonstrate the ability to perform individual offensive and defensive skills and strategies.	05
Unit 4	Understand and apply the knowledge of basic rules of basketball. Skills Practice.	05
Unit 5	Demonstrate proper etiquette and good sportsmanship. Successfully participates in skill improvement and offensive game strategies.	06
Unit 6	Identify and apply injury prevention principles related to aerobic activities. Practice & Matches.	04

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Course Details:

Class	F. Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119D, Hand Ball
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119D_1	The student has a basic knowledge of the team values of sports games
2CVHS119D_2	Acquainting with the characteristics and trends in the development of the discipline.


Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction & Understand basic Handball rules, terminology, and safety concerns.	04
Unit 2	Health and safety rules. Rules for obtaining credit for the course, Reminder of the history, methodology and basic rules of the game, Exercises to improve passing, grips and throws. The game. Reminder of the refereeing rules.	06
Unit 3	Improving the technique of passing and grips in a team setting. Individual ways of freeing oneself from the opponent and the organization of positional attacks with their use	05
Unit 4	Exercises improving feints and individual defense technique. Everyone's defense system. Principles of individual defense & Practice.	05
Unit 5	Improving the technique of passing and grips in a team setting. Individual ways of freeing oneself from the opponent and the organization of positional attacks with their use. The game & Practice.	06
Unit 6	Identify and apply injury prevention principles related to aerobic activities. Practice & Matches	04


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Course Details:

Class	F. Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119E, Katthak Classical Dance
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119E_1	Explain Importance of katthak with respect to Indian culture.
2CVHS119E_2	Demonstrate Guruvandana, Tatkar.
2CVHS119E_3	Compose Katthak dance with consideration of classical & semi classical music.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Classical dance katthak & its importance.	01
Unit 2	Guruvandana & Tatkaar. (teen taal)	03
Unit 3	Chakri & Hast-sanchalan	03
Unit 4	Tode. (Tigida-tigdig-thai)	03
Unit 5	Practice sessions.	02
Unit 6	Paran & Tihaei	05
Unit 7	Classical dance on Song	05
Unit 8	Practice sessions.	08


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Course Details:

Class	F. Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119F, Tabla Classical instruments
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119F_1	Discover History of table wadan.
2CVHS119F_2	Demonstration of different Taal in table wadan.
2CVHS119F_3	Develop notation on new music with help of table wadan.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	History & Introduction to Tabla Wadan.	01
Unit 2	Tabla presentation of Taal. Tritaal/ Dadra/ Zaptaal/ Kerwa/ Bhajni	05
Unit 3	Practice sessions.	06
Unit 4	Practice with notation ,& Set one song with tabla	08
Unit 5	Practice sessions & students presentations.	10

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Course Details:

Class	F. Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119G, Western Dance
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119G_1	Describe History of Western dance & basic of western dance.
2CVHS119G_2	Organize western dance individually as well as group with help of western music.
2CVHS119G_3	Compose western dance on songs.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	History of Western dance style & information about western dance.	02
Unit 2	Basic types of western dance: - worm-up, Hand- legs movements.	04
Unit 3	Teaching Basic style (focus on dance / music / movements, how to control body, emotion/feeling of music/ dance.)	06
Unit 4	Training western dance with music (original dance form of western, free style dance)	08
Unit 5	Dance composition.	05
Unit 6	Practice session , & Students Presentation	05


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Course Details:

Class	F.Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119H, Yoga
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119H_1	Discus importance of Yoga with respect to different forms of exercise.
2CVHS119H_2	Perform Different styles of Yoga.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction , importance of yoga, Basic exercise, sun salutation, shavasana taught yogic & excises types	06
Unit 2	Omkar & sleeping position seats (aasn yogic excise type)to teach omkar in a scientific way, to teach mercatasan , makrasan, setubandhan,	04
Unit 3	Opposite sleeping position. Shalabhasan, chakras an, Bhungasan, Makrasan. Pranayam;- Anulom-Vilom,,Bhasarika, Sheetkari, Bhramari, shitali pranayam. Rapid respiration(jalad shwasan)	05
Unit 4	Practice sessions	05
Unit 5	Seats in the sitting position:- padmasan, Wajrasan, Wakrasan, Ardh-machindrasana, Urshtrasan.	04
Unit 6	Seats in Fine Position. (Dand stithi):- Ekpaad vrukrashasan, Veerasan, Patangasan, Trikonasan.	06

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CIVIL ENGINEERING

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S. Y. B. Tech. Structure

SEM III

Course Details:

Class	S.Y. B. Tech, Sem.-III
Course Code and Course Title	2CVBS201, Differential Equations and Calculus
Prerequisite/s	2CVBS101, 2CVBS105
Teaching Scheme: Lecture/Tutorial/Practical	02/01
Credits	03
Evaluation Scheme: ISE /MSE / ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVBS201_1	Solve the Linear Differential Equation on Cantilever, Strut and Beam by using analytical method.
2CVBS201_2	Calculate the Area and Volume of given surface by using concept of Vector Calculus.
2CVBS201_3	Construct the Fourier Series of a given functions by using Euler's Formulae.
2CVBS201_4	Make use of partial differential equations to solve Heat and Wave Equation of boundary value problems.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Linear Differential Equations and Its Application Definitions, Complete solution, Operator D, Rules for finding Complementary function, Inverse operator, Rules for finding the Particular integral, Applications of Linear Differential Equations with constant coefficients Cantilever, Strut, Beam.	07
Unit 2	Vector Calculus Introduction, Scalar and vector point functions - vector operator del, Del applied to scalar point functions - gradient, directional derivative, Del applied to vector point functions - Divergence and curl, Line integral, Green's theorem in the plane	06
Unit 3	Fourier Series Introduction, Euler's Formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, Change of interval, Expansion of odd or even periodic functions, Half range series	07
Unit 4	Partial Differential Equations and its Application Introduction, Partial differential equations with separation of variables, Boundary value problems, vibrations of string, One dimensional heat equation.	06



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Sr. No.	Title of Tutorials (13 Hours)
1	Linear Differential Equations.
2	Applications of Linear Differential Equations.
3	Vector Calculus - I (Gradient, directional derivative, Divergence and curl)
4	Vector Calculus – II (Line integral, Green’s theorem in the plane)
5	Fourier Series – I (Full Range Series)
6	Fourier Series – II (Half Range Series)
7	Partial Differential Equations
8	Applications of Partial Differential Equations

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Higher Engineering Mathematics	Dr. B. S. Grewal	Khanna Publication	44 th	2017
02	Higher Engineering Mathematics.	H. K. Das	S. Chand and company ltd.,	1 st	2011
03	Advanced Engineering Mathematics	Erwin Kreyszig	John Wiley & Sons, Inc.	10 th	2017
04	Engineering Mathematics Vol. I	ITL Education Solution Limited	Cengage Learning	1 st	2015

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Higher Engineering Mathematics.	B.V. Ramana	Tata McGraw Hill Education Pvt., ltd.	1 st	2007
02	Advanced Engineering Mathematics.	Potter Merle C.	Oxford University Press,	3 rd	2005
03	A text book of Applied Mathematics Vol. I and Vol. II	P. N. Wartikar J. N. Wartikar	Pune Vidyarthi Griha Prakashan, Pune	9 th	Reprint 2010
04	Advanced Engineering Mathematics.	O’Neil Peter V	Cengage Learning India Pvt. Ltd.	1 st	2012


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Course Details:

Class	S.Y. B. Tech, Sem.-III		
Course Code and Course Title	2CVPC202, Structural Mechanics		
Prerequisite/s	2CVPC103		
Teaching Scheme: Lecture/Tutorial /Practical	03/00/02		
Credits	04		
Evaluation Scheme	T	ISE / MSE / ESE	40/30/30
	P	ISE	50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVPC202_1	Identify various types of stress and strain in various structural elements by using Hooks law.
2CVPC202_2	Draw shear force and bending moment diagrams for beam supports and various loading conditions with the help of different equilibrium condition.
2CVPC202_3	Calculate stresses and deformation of hallow shaft using torsional equation.
2CVPC202_4	Calculate shear stresses and bending stresses for different sections by using flexural formula and shear stress formula.
2CVPC202_5	Calculate critical load for long columns using Eulers theory.
2CVPC202_6	Compute tensile, compressive, bending, shear strength, hardness and shear centre for different loading conditions by using different instruments.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Stress and Strain Introduction to Elasticity, Plasticity, Brittleness and Strength of materials. Types of stresses and strains, stress strain diagrams, Hooke's law, Behavior of composite sections, Stress distribution in the compound bar and bar of varying c/s, temperature stresses. Elastic constants of isotropic materials.	06
Unit 2	Bending moment and shear force in beams Introduction, Relationship between loading, shear force and bending moment, Shear force and bending moment equations, SFD and BMD with salient values for cantilever beams, simply supported beams and overhanging beams considering point loads, UDL, UVL and Couple, calculate reactions and loadings from SFD and BMD (Reverse Method)	07
Unit 3	Torsion Stresses, strains and deformation in determinate and indeterminate shafts of hollow and solid sections of homogenous and composite materials subjected to torque, concept of torsion on beam and slab.	06


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Unit 4	Bending Stresses in Beams Theory of pure bending, Curvature of a beam, Assumptions, flexure formula, Moment of resistance of cross section, Bending stress distribution diagrams for symmetrical and unsymmetrical sections.	07
Unit 5	Shear stresses in Beams Shear Stresses in Beams of various commonly used sections such as rectangular, triangular, T, circular and I section, Concept of Shear Centre.	06
Unit 6	Elastic stability of columns: Introduction – Short and long columns, Euler’s theory on columns, Effective length slenderness ration, radius of gyration, buckling load, Assumptions, derivations of Euler’s Buckling load for different end conditions, Limitations of Euler’s theory, Rankine’s formula and problems.	07

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Strength of Materials	Subramanyam	Oxford University Press	2 nd	2011
02	Text book of Mechanics of Materials	M.N. Shesha Prakash, G.S.Suresh,	PHI, Learning Pvt.Ltd., New Delhi	4 th	2011
03	Strength of Materials	Ramamrutham	Dhanapath Rai Publishers, New Delhi.	6 th	2011
04	Strength of Materials	Bhavikatti S. S.	Vikas Publishers, New Delhi.	3 rd	2009
05	Strength of Materials	Punmia B.C.,Ashok Jain,Arun Jain	Lakshmi Publications,New Delhi.	3 rd	2011

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fundamentals of Solid Mechanics	Gambhir. M.L	PHI Learning Private Limited., New Delhi	1 st	2009
02	Mechanics of Materials	Gere and Timoshenko	CBS Publishers & Distributors Pvt. Ltd. Old Delhi	2 nd	2004
03	Strength of Material	Timoshenko. S. & Young. D. H,	McGraw Hill Book Company Publication	4 th	2006
04	Mechanics of Material	Beer and Johnston	Mc Graw Hill publication	3 rd	2004


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05	Mechanics of Structures, Vol-I	S.B. Journarkar and Dr. H.J. Shah	Charotar Publishing house	6 th	2005
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List of Experiments	
Expt. No.	Title of Experiment
1.	Tension test on mild steel and Tor steel
2.	Compressive strength test on timber
3.	Compressive strength and water absorption test on bricks.
4.	Brinell and Rockwell hardness test on different metals
5.	Impact test on different metals.
6.	Bending test on timber
7.	Shear test on different bars
8.	Shear center test for channel section
9.	Assignments: One assignment per unit.

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Course Details:

Class		S.Y. B. Tech, Sem.-III	
Course Code and Course Title		2CVPC203, Building Design and Drawing	
Prerequisite/s		2CVPC107	
Teaching Scheme: Lecture/Tutorial /Practical		03/00/02	
Credits		04	
Evaluation Scheme	T	ISE / MSE / ESE	40/30/30
	P	ISE / ESE	50/50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVPC203_1	Make use of air conditioning, building finishes, acoustics, plumbing and electrification phenomenon in residential building considering codal provision of IS :3362-1977
2CVPC203_2	Develop the components of residential building for a given site condition with the help of building planning rules and regulations
2CVPC203_3	Draw the residential building plan for given requirement using principles of planning and building Bye laws.
2CVPC203_4	Draw the municipal and working drawing of residential building by using AutoCAD with the reference of National Building Code.
2CVPC203_5	Prepare the site visit report of residential building with the help of submission and working drawing.
2CVPC203_6	Describe the various types of roof structures and materials commonly used in construction sector as per building Bye laws.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Staircase & Openings: Stairs: Technical terms, requirements of a good stair, uses, types, Materials for construction. Ramps, lifts and escalator. Design of stairs (Dog Legged, quarter turn and Open Well). Doors - Classification, Teak wood Paneled Door, Flush Door, Aluminum Glazed Doors, Steel Doors, fixtures and fastening. Windows - Classification, Teakwood Glazed Windows, Aluminum, Glazed Windows, Steel Windows, UPVC Windows, fixtures and fastening	07
Unit 2	Planning of Residential Building-I Procedure of Building Permission Understanding of municipal drawings. and working drawing Planning of Residential Building: Bungalows, Row Bungalows, and Twin Bungalows	06
Unit 3	Planning of Residential Building-II Hostels, apartments, Farmhouses, cottages	06


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Unit 4	<p>Plumbing, Electrification & Fire resistance in building: Plumbing: Plumbing system, Materials used for plumbing work. Various types of traps, Fittings, Chambers, Septic Tank, and Concept of Plumbing & Drainage plan. Electrification: Types of wiring and materials, Requirements & Location of various points. Concept of Earthing. Fire resistance in building: Fire resistant construction and fire safety requirements for buildings</p>	06
Unit 5	<p>Building Finishes, Acoustics, Ventilation, Air conditioning and Thermal insulation Paints: Different types and application methods. Plastering, Pointing and various techniques. Wall cladding, skirting, dado work with various materials. POP, Gypsum plaster, need of curtains, Tile flooring, door fixtures, plywood boards, aluminum windows & partitions, fabrication work (M.S. & S. S.), Railing- Glass, S.S., M.S. Acoustics: Conditions for good acoustics Ventilation Definition and necessity of Ventilation, various systems. Air conditioning: - Necessity, Classification, Systems & Its various Components Thermal insulation: Materials and Methods.</p>	10
Unit 6	<p>Roofs and Roof coverings Terms used, types of roofs, pitched roofs and their types, Steel Trusses types and their suitability. Roof covering materials and their selection Concept of proflex (truss less) roof and their selection.</p>	04

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Building Construction	S. P. Bindra & S. P. Arora	Dhanpat Rai Publications (P)Ltd	5 th	2005
02	Building Construction	Dr. B. C. Punmia & Ashokkumar Jain	Laxmi Publications (P)Ltd	10 th	2008
03	Civil Engineering Design & Drawing	D. N. Ghose	CBS Publications, Distributors(P)Ltd	2 nd	2010
04	Building Drawing	M. G. Shah, C. M. Kale, S. Y. Patki	Tata McGraw-Hill Publications (P)Ltd	5 th	2011 (Reprint)



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Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	SP 7- National Building Code Group 1 to 5		B.I.S. New Delhi	--	--
02	I.S. 962 - 1989 Code for Practice for Architectural and Building Drawings		B.I.S. New Delhi	--	--
03	SP 6 (Part I to Part 6) Handbook for structural engineers -Structural steel sections.		B.I.S, New Delhi	-	-
04	Civil Engineering Drawing	V.B.Sikka	S.K.Kataria & Sons	5 th	2008
05	Building Design and Drawing	Y. S. Sane	Allied Book Stall, Pune	-	-
06	Practical Building Construction & its Management.	Sndeeep Mantri	Satya Prakashan	10 th	2011-12

List of Experiments:

Expt. No.	Title of Experiments
	Note: Prepare all drawings using AutoCAD software
1	Draw the plan of existing residential building by taking measurements on site and prepare a site visit report
2	Draw plan of bungalow
3	Draw plan of twin bungalow
4	Draw plan of Hostel & apartment
5	Design & Draw plan of proposed residential building (G+1)
6	Draw Municipal Submission drawing of proposed residential building
7	Draw working drawing of Foundation / Center Line of designed building
8	Draw working drawing of Furniture layout plan of designed building
9	Draw working drawing of Electrification plan of designed building
10	Draw working drawing of Water supply and drainage plan of designed building


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Course Details:

Class		S.Y. B. Tech, Sem.- III	
Course Code and Course Title		2CVPC204, Surveying	
Prerequisite/s		2CVPC107	
Teaching Scheme: Lecture/Tutorial /Practical		03/00/02	
Credits		04	
Evaluation Scheme	T	ISE / MSE / ESE	40/30/30
	P	ISE / ESE	50/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPC204_1	Calculate the independent coordinates for the station of multisided traverse by using the provided field observations with the help of Gales traverse table.
2CVPC204_2	Make use of the field data to calculate the ground levels of a given station point by using the trigonometrical levelling method
2CVPC204_3	Experiment with total stations to measure angles, distances, and elevations for various engineering projects.
2CVPC204_4	Calculate the tachometer constant for a given tacheometer by using field observations.
2CVPC204_5	Utilize the TS/DGPS to monitor construction activities, and verify layout, by given design plans and specifications.
2CVPC204_6	Apply RS/GIS and GPS techniques for geospatial analysis of a region by considering spatial modelling, data analysis and buffering.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Levelling Construction, Temporary and Permanent Adjustments of Dumpy Level, Tilting and Auto Level, Types of Levelling, Effect of curvature and refraction, Sensitivity of Bubble Tube. Contouring, Characteristics of Contours, Methods of Plotting contours, Uses of Contour Maps.	07
Unit 2	Theodolite Travers surveying Types of theodolite, measurement of angles in both planes, Theodolite traversing - Closing error, Relative error of Closure, and Balancing the traverse. Calculation of Latitude and departure, Gales traverse table. Trigonometric levelling.	07
Unit 3	Photogrammetry Introduction to photogrammetry, Types, and applications in the field of civil engineering, Flight planning, Uses and applications of Satellite Photogrammetry.	07
Unit 4	Tacheometry Significance & Systems, Principle, Calculation of tachometer constants, Distance and elevation formula, Stadia method, Substance method and Tangential system. Advanced instrumentation: Classification, measuring principles, Electronic theodolite, EDM, Total Station, DGPS and Drones.	07


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Unit 5	Remote Sensing Physics of Remote Sensing: Sources of Energy, Active and Passive Radiation, Electromagnetic Radiation - Reflectance, Transmission, Absorption, Thermal Emissions, Interaction with Atmosphere, Data Acquisition Platforms, characteristics of different types of platforms - LANDSAT, SPOT, IRS, ERS, INSAT and other platforms.	06
Unit 6	GPS and GIS: Definition and applications, Basics and applications of Geographical Positioning system (GPS), Basics and applications of GIS, Fundamentals of GIS, Software – Standard Packages like Arcview, ArcGIS, AUTOCAD Map, Map Info etc.	05

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Surveying and Levelling	N. N. Basak	Tata Mcgraw Hill, New Delhi	2 nd	2014
02	Surveying Vol. I and II	S. K. Duggal	Tata Mcgraw Hill, New Delhi	4 th	2009
03	Surveying Vol. I, II and III	Dr. B.C. Punmia,	Laxmi Publishers, New Delhi.	-	2004
04	Surveying and Levelling Vol. I and II	T.P Kanetkar and S.V Kulkarni,	Pune Vidhyarthi Gruha. Pune	-	-

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Elements of Photogrammetry	Paul R. Wolf,	McGraw Hill Publication New Delhi	2 nd	1984
02	Remote sensing and Geographical Information System	A. M. Chandra and S. K. Ghosh	Alpha Science International Ltd	1 st	2005
03	Advanced Surveying - Total Station, GIS and Remote Sensing	Satheesh Gopi, R. Sathi kumar and N. Madhu	Pearson publication	2 nd	2012
04	Remote Sensing and Geographical Information System	M. Anji Reddy	B. S. Publications	4 th	2014



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Codes:

1. IRC: SP: 19 - Manual for surveying, Investigation and preparation of Road Projects
2. IRC: SP: 54 -Project preparation Manual for Bridges
3. IRC: SP: 42 - Guidelines on Road Drainage
4. IRC: SP: 50 – Guidelines on Urban Drainage
5. IRC: 38 – Design Tables for Horizontal Curves for Highways

Course Contents:	
At least 8 experiments along with two surveying projects	
Expt. No.	Title of Experiment
1	To calculate reduced levels by various methods of levelling.
2	Measurement of Horizontal angle in the field.
3	To determine reduced levels by trigonometric levelling
4	To determine reduced levels by tachometric surveying
5	To carry out the study of toposheets.
6	Land surveying and mapping by Total Station
7	Land surveying and mapping by DGPS
8	Introduction to Q-GIS Software and its Applications
9	Traverse project (By using Total Station/Differential Global Positioning System)
10	Surveying Projects (Any one) 1. Profile levelling and Road Project (By using Total Station/Differential Global Positioning System) 2. Block Contouring (By using Total Station/Differential Global Positioning System)



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Course Details:

Class	S. Y. B. Tech, Sem.-III
Course Code and Course Title	2CVPC205, Hydrology and Irrigation Engineering
Prerequisite/s	2CVBS107, 2CVBS156
Teaching Scheme: Lecture/Tutorial /Practical	03/00/00
Credits	03
Evaluation Scheme: ISE /MSE / ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPC205_1	Identify the discharge of catchment area for given time period using the hydrograph methods.
2CVPC205_2	Estimate the flood level of a given site data by using different formulae.
2CVPC205_3	Select the appropriate hydraulic structure for a given site condition with the help of stability condition.
2CVPC205_4	Analyze surface and ground water hydrology parameters for available hydrological data using different formulae.
2CVPC205_5	Select appropriate irrigation methods for given crops patterns by using different parameters like crop-based water requirement and soil conditions.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to hydrology: Hydrological cycle and its components. Brief introduction of government organizations like IMD, CWPRS, MERI, CDO, Hydrology Project Division, NIH, CWC. Precipitation-types and forms, measurement, analysis of Precipitation data, mass rainfall curves, intensity-duration curves, and concept of depth area duration analysis, frequency analysis. Infiltration- factors affecting and measurement methods. Evaporation and Evapotranspiration-factors affecting and measurement methods.	07
Unit 2	Surface Water Hydrology: Runoff- factor affecting, Rainfall runoff relationship. Hydrograph-Component parts of hydrograph, Storm hydrograph, Base flow and Separation of base flow, direct runoff hydrograph, Unit hydrograph, theory, assumptions, limitations and use, S-curve hydrograph, Synthetic unit hydrograph.	08
Unit 3	Stream Gauging: Selection of site, discharge measurement by Area velocity method, slope Area method Floods: Estimation of peak flow - empirical equations, rational method,	06

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	Importance of- Design flood, standard project flood, maximum probable flood, Introduction to flood frequency analysis. QGIS- Introduction to software application in Hydrology (Watershed Delineation)	
Unit 4	Ground water hydrology: Occurrence of ground water Zones of underground water, movement of ground water and its velocity. Specific Yield of Aquifer, Water logging and land drainage, Reclamation of waterlogged Areas, Alkaline and Saline lands reclamation.	07
Unit 5	Minor and Micro Irrigation: Definition and necessity of irrigation, types and methods of irrigation, Crop water requirement: Principal crops and crop seasons, Classes and availability of soil water, Duty, delta, base period and their relationship, factors affecting duty, methods of improving duty, Assessment, and efficiency of irrigation water. Gross command area, cultural command area and command area calculations based on crop water requirement. Depth and frequency of irrigation.	06
Unit 6	Dams And Minor Irrigation: Dam and its classification: Earthen dams and Gravity dams (masonry and concrete) Earthen Dams-Components with function, typical cross section, seepage through embankment and foundation and its control. Methods of construction of earthen dam, types of failure of earthen dam and preventive measures. Gravity Dams-Forces acting on dam, Theoretical and practical profile, typical cross section, drainage gallery, joints in gravity dam, concept of high dam and low dam. Minor Irrigation works - General layout, and main components of Percolation tank, KT Weir and Lift Irrigation	08

Text Books					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Irrigation engineering Vol. 1.	S. K. Garg	Khanna Publication, Delhi	2 nd	2012
02	Engineering Hydrology	Dr. K. Subramanya	Tata McGraw Hill, New Delhi	4 th	2017
03	Hydrology	Dr. P Jaya Rami Reddy	Laxmi Publications, New Delhi	3 rd	2016
04	Engineering Hydrology	Dr. H. M. Raghunath	New Age International Publishers	3 rd	2016

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Reference Books / Handbooks					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Hydrology and water resources	R. K. Sharma	Dhanpatrai and sons, New Delhi	4 th	2018
02	Irrigation Theory and Practice	A M Michael.	Vikas Publications House	2 nd	2015
03	Theory and design of irrigation structures Vol. I and II and II	Varshney, Gupta and Gupta	New Chand and Brothers	2 nd	2015
04	Fundamentals of hydrology	Savindar Singh	Pravalika Publishers Allahabad		2015


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Course Details:

Class	S. Y. B. Tech, Sem.-III
Course Code and Course Title	2CVHS206, Environmental Studies
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS206_1	Develop the concept of Sustainability, in context of environmental components, using pillars of sustainable development.
2CVHS206_2	Model his role in effective implementation of sustainable activities, in the corporate sector, using EIA and EMS.
2CVHS206_3	Select the greener technologies as a tool to achieve Sustainable development by knowing the impact of contemporary issues like population explosion, climate change.
2CVHS206_4	Model the role of an individual in prevention of pollution using various types of pollutions using root cause of various types of pollutions.
2CVHS206_5	Prepare a technical report highlighting importance of environment in human life by using techniques like survey, case studies, mini project.
2CVHS206_6	Develop the concept of Sustainability, in context of environmental components, using pillars of sustainable development.

Course Contents:

The main objective of the course is to infuse an understanding of the various environmental concepts on scientific basis in the functional area of Engineering and technology. The course will provide a foundation to critically assess the approaches to pollution control, environmental and resource management, sustainable development, cleaner technologies, Environmental Legislation based on an understanding of the fundamental, environmental dimensions. The course will help to explore the modern concept of green industry and the impact of excess human population, globalization, and climate change on the environment.

Unit No.	Title	Hrs.
Unit 1	Introduction to Environment and concept of Sustainable development: Natural and Built Environment, Environmental Education: Definition, Scope, Objectives and importance. Components of the Environment: Atmosphere, Hydrosphere, Lithosphere and Biosphere. Biological Diversity: Introduction, Values of biodiversity, Threats to biodiversity, Conservation of biodiversity. Sustainable development goals, pillars of sustainable development.	5
Unit 2	Energy and Natural Resources Energy Scenario: Future projections of Energy Demand, Utilization of various Energy Sources, Conventional Energy Sources and Non- Conventional Energy	4


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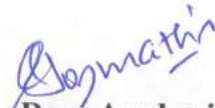

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Reference Books / Handbooks					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Environmental Science: A Global Concern	William Cunningham and Barbara Woodworth Saigo	WCB/McGraw Hill publication	Fifth Edition	1999
02	Peter. H. Raven, Linda. R. Berg, George. B. Johnson	Environment	McGraw Hill publication	Second edition	1998
03	"Adaptive Environmental Management	Catherine Allan & George H. Stanley (Editors),	Springer Publications.	--	2009.
04	Elements of Environmental Science and Engineering	P. Meenakshi	Prentice Hall of India Private Limited, New Delhi	-	2006



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Course Details:

Class	S.Y. B. Tech, Sem.-III
Course Code and Course Title	2CVHS207, Universal Human Values
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS207_1	Integrate the process of self-exploration to achieve Harmony in the human being's based on Holistic perspective of value education.
2CVHS207_2	Understanding Harmony in human being, family, society and nature /existence, based on methods to fulfill human aspiration.
2CVHS207_3	Apply the human values for maintaining the relationships with oneself and others using the principals of harmony.
2CVHS207_4	Adopt the methods of maintaining harmony with the society, nature, and its existence by utilizing the human order systems.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Value Education Introduction, Need, Purpose and motivation for the course, recapitulation from Universal Human Values-I Self-Exploration-what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations, Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority.	4
Unit 2	Understanding Happiness and Prosperity Understanding Happiness and Prosperity correctly, Prevailing sources of happiness, Prosperity and its implications. Method to fulfil the human aspirations: understanding and living in harmony at various levels.	4
Unit 3	Understanding Harmony in the Human Being - Harmony in Myself Understanding human being as a co-existence of the sentient 'I' and the material 'Body', Understanding the needs of Self ('I') and 'Body' - happiness and physical facility Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I' Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure	6


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	Sanyam and Health.	
Unit 4	<p>Understanding Harmony in the Family - Harmony in Human-Human Relationship</p> <p>Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness;</p> <p>Trust and Respect as the foundational values of relationship</p> <p>Understanding the meaning of Trust; Difference between intention and competence</p> <p>Understanding the meaning of Respect, Difference between respect and differentiation;</p> <p>Peer Pressure the Concerns and its Resolution the other salient values in relationship.</p>	7
Unit 5	<p>Understanding Harmony in the Society</p> <p>Understanding the harmony in society: Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals</p> <p>Human order systems and dimensions</p>	4
Unit 6	<p>Understanding Harmony in the Nature and Existence</p> <p>Understanding the harmony in the Nature,</p> <p>Inter-connectedness and mutual fulfilment among the four orders of nature, recyclability and self-regulation in nature</p>	3

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Understanding Human Being, Nature and Existence Comprehensively	UHV Team	UHV	1 st	2022
2	A Foundation Course in Human Values and Professional Ethics	R. R. Gaur, R. Asthana, G P Bagaria	Excel Books	2 nd	2019
3	Teachers' Manual for A Foundation Course in Human Values and Professional Ethics	R. R. Gaur, R. Asthana, G P Bagaria	Excel Books	2 nd	2019
4	Human Values	A.N Tripathy	New Age International	2 nd	2006



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Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	A Foundation Course in Human Values and Professional Ethics	R.R. Gaur, R. Sangal, G.P. Bagaria	Excel Books	3 rd	2010
2	Indian Ethos and Modern Management: Amalgam of the Best of the Ideas from the East and the West	B.L. Bajpai	New Royal Book	1 st	2004
3	Small Is Beautiful	E. F. Schumacher.	Hartley & Marks	1 st	1999
4	An Introduction to Ethics	William Lilly	Allied	1 st	1967

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Course Details:

Class	S. Y. B. Tech, Sem.-III
Course Code and Course Title	2CVCC208, Aptitude and Reasoning Part- I
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs) : The students will be able to:

2CVCC208_1	Solve problems based on Vedic Mathematics, Calendar, Average, Age,
2CVCC208_2	Solve problems based on Speed Time distance and equations
2CVCC208_3	Solve problems based on Blood Relations, Directions, Time Rate Work, Pipes and Tanks, Percentage, Profit and Loss
2CVCC208_4	Solve Problems based on Spot the Error and Jumbled Para

Course Contents:

Unit No	Unit Name	Contact Hours
Unit 1	Vedic Mathematics, Calendar	4 Hrs.
Unit 2	Average, Ages	4 Hrs.
Unit 3	Speed Time Distance, Equations	4 Hrs.
Unit 4	Blood Relations, Directions, Time Rate Work, Pipes and Tanks	4 Hrs.
Unit 5	Percentage, Profit and Loss	4 Hrs.
Unit 6	Spot the Error, Jumbled Para	4 Hrs.
	Self-Study Module	6 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	R.S. Agarwal (Quantitative aptitude)	R. S. Agarwal	S Chand	3 rd	2019
2	R.S. Agarwal (Verbal & Non-verbal Reasoning)	R. S. Agarwal	S Chand	4 th	2010
3	Wren & Martin (Verbal, Grammar)	P. C. Wren	S Chand	4 th	2017

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	APTIPEDIA (Quantitative, Verbal Aptitude)	Face	Wiley	2 nd	2017
2	Wiley (Quantitative Aptitude)	P. A. Anand	Maestro	4 th	2015
3	Arun Sharma (Verbal Ability)	Meenakshi Upadhyay	McGraw Hill	3 rd	2020


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CIVIL ENGINEERING

NEP 170 CREDITS

S. Y. B. Tech. Structure

SEM IV

Course Details:

Class		S. Y. B. Tech, Sem.-IV	
Course Code and Course Title		2CVPC209, Fluid Mechanics	
Prerequisite/s		2CVPC103	
Teaching Scheme: Lecture/Tutorial/Practical		03/00/02	
Credits		04	
Evaluation Scheme	T	ISE / MSE / ESE	40/30/30
	P	ISE / ESE	50/50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVPC209_1	Solve the basic fluid problems for the given fluid conditions based on the properties of fluids.
2CVPC209_2	Apply the knowledge developed in fluid statics, fluid kinematics and fluid dynamics in fluid flow problems using their basic principles.
2CVPC209_3	Examine the losses in fluid when it is in motion using the principles of continuity, momentum and energy.
2CVPC209_4	Analyze the uniform & non-uniform flow in open channels based on the basic principles developed in open channel flows.
2CVPC209_5	Make use of notches to design the weirs in open channels using the discharge equations.
2CVPC209_6	Compile a report stating the use of different concepts of fluid mechanics in the industry based on the site visit

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Properties of fluids & Fluid Statics: Physical Properties of Fluids, Types of Fluids.	07
Unit 2	Fluid Statics: Types of Pressure, Pressure Measurement Devices, Total Pressure and Centre of Pressure for Plane and Curved Surfaces. Fluid Kinematics: Types of Flows.	06
Unit 3	Fluid Dynamics: Euler's Equation along a Streamline, Bernoulli's Theorem: Assumptions & Limitations, Applications: Venturimeter, Orificemeter. Losses in Pipes: Major and Minor Losses, Concept of Equivalent Pipe, Pipes in Series & Parallel, Two Reservoir Problems, Concept of Siphon	07
Unit 4	Uniform Flow in Open Channel: Introduction, Types of Open Channels and flows, Velocity Distribution, Measurement of Velocity - Chezy's and Manning's Formula, Uniform Flow Computations, Hydraulically Efficient Section, Specific Energy & Specific Force. Notches & Weirs: Types, Discharge Equations.	08



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Unit 5	Non-Uniform Flow in Open Channel (GVF & RVF): Gradually Varied Flow (GVF): Classification of Channel Slopes & GVF Profiles, Dynamic Equation of GVF, Direct Step Method of Computation of GVF Profiles.	07
Unit 6	Rapidly Varied Flow (RVF): Hydraulic Jump - Phenomenon, Conjugate Depth Relationship, Uses and Types of Hydraulic Jump, Hydraulic Jump as an Energy Dissipater.	04

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	A text book of Fluid Mechanics	R.K. Rajput	Chand Pub.	9 th	2013
02	Engg. Fluid Mechanics	K.L.Kumar	Eurasia Pub.	7 th	2001
03	Fluid Mechanics	S. Ranmamurtham	Dhanpat Rai & sons	-	2009
04	Fluid Mechanics and Hydraulic Machines	R.K.Bansal	Khanna Pub.	10 th	2013


Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fluid Mechanics – Hydraulic & Hydraulic Mechanics	Modi-Seth	Standard Book House, Delhi	10 th	2011
02	Fluid Mechanics	John F. Douglas et.al.	Pearson Education Co., Delhi	-	2002
03	Fluid Mechanics	Streeter, Wylie, Belford	Mc-Graw hill Pub.	7 th	2009
04	Fluid Mechanics	Frank M White	Mc-Graw hill Pub	9 th	2010
05	Fluid Mechanics	H. Rouse	Toppan C. Ltd. Tokyo	-	2010
06	Fluid Mechanics	Garde-Mirajgaonkar	Nemchand Bros., Roorkee	1 st	2011


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List of Experiments (Any 10)

Expt. No.	Title of Experiment
01	Calibration of Measuring Tank and Measurement of Discharge
02	Study of Pressure Measuring Devices
03	Calibration of Venturimeter
04	Calibration of Orificemeter
05	Verification of Bernoulli's Theorem
06	Determination of hydraulic coefficients of orifice
07	Calculation of Reynolds's number for Laminar and Turbulent flow
08	Study of factors affecting friction factor for pipe flow (at least for two different materials and two different diameters)
09	Study of hydraulic jump for different discharges
10	Plotting specific energy curve for different discharges
11	Calibration of Notches
12	Heleshaw's apparatus for streamline flow
13	Report on visit to CWPRS or hydropower generation plant

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Course Details:

Class		S.Y. B. Tech, Sem.- IV	
Course Code and Course Title		2CVPC210, Concrete Technology	
Prerequisite/s		2CVPC107	
Teaching Scheme: Lecture/Tutorial/Practical		03/00/02	
Credits		04	
Evaluation Scheme	T	ISE / MSE / ESE	40/30/30
	P	ISE	50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVPC210_1	Analyze the use of admixture to achieve the appropriate grade under the various exposure conditions
2CVPC210_2	Determine the different properties for a given grade of cement and aggregates with the help of code provisions.
2CVPC210_3	Examine the properties of fresh concrete for the given grade with the help of code provisions.
2CVPC210_4	Design the concrete mix for the given grade of concrete using available ingredients and IS/ACI code.
2CVPC210_5	Determine the quality and strength of concrete for old buildings by utilizing NDT methods.
2CVPC210_6	Select the type of special concrete for different site conditions based on their properties.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Cement: Portland cement, chemical composition, Hydration, Setting of cement, Structure of hydrate cement, Test on physical properties, Different grades of cement. Admixtures: Types of admixtures, mineral and chemical admixtures.	7
Unit 2	Aggregates: Classification of aggregate, Particle shape & texture, strength & other mechanical properties of aggregate, Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate, Bulking of sand, Deleterious substance in aggregate, Soundness of aggregate, Alkali aggregate reaction, Thermal properties, Sieve analysis, Fineness modulus, Grading curves, Grading of fine & coarse Aggregates, Gap graded aggregate, Maximum aggregate size.	6
Unit 3	Fresh Concrete: Workability, Factors affecting workability, Measurement of workability by different tests, Setting times of concrete, Effect of time and temperature on workability, Segregation & bleeding, Mixing and vibration of concrete, Steps in the manufacture of concrete, Quality of mixing water.	6
Unit 4	Concrete Mix Design Objectives of mix design, Different methods of Mix design, Factors affecting mix proportions, Quality control of concrete, Statistical methods, Acceptance	8


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	criteria. Mix design by IS 10262- 2019, IS 456, Mix design of fly ash concrete by IS 10262, 2019 and Manufactured sand concrete, Mix design by ACI 211.1-91 for high strength concrete.	
Unit 5	Durability of concrete Strength and Durability relationship, the effect of w/c on durability, different exposure conditions as per IS 456 minimum and maximum cement content, Effect of Permeability, Sulphate attack, Methods of controlling sulfate attack. The durability of concrete in seawater. Test on hardened concrete - Flexural strength, Comparison of cube test and cylinder test, Schmidt's rebound hammer, Ultrasonic pulse velocity method.	6
Unit 6	Special concrete Lightweight concrete, No-fines concrete, High density concrete, Self-compacting concrete, Cold weather concreting, Hot weather concreting, Fiber reinforced concrete, ferro-cement concrete, High strength concrete High performance concrete, Manufacturing of ready mix concrete	6

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Concrete Technology	M. S. Shetty	S. Chand & Company Ltd, New Delhi	1 st	2007
02	Concrete Technology	M. L. Gambhir	Tata McGraw-Hill New Delhi	2 nd	2001
03	Concrete Technology	Santakumar A.R.	Oxford University Press.	-	2009
04	Textbook of Concrete Technology	P.D. Kulkarni, R.K. Ghosh	Newage International	3 rd	2007

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Concrete Technology	Neville and Brooks	Pearson Education, New Delhi	3 rd	2003
02	Concrete Technology	Dr. Aminul Islam laskar	Laxmi Publication	1 st	2013
03	IS 456: 2000		-	-	2000
04	IS 10262 – 2015, ACI 211.1-91		-	-	2009


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Course Contents for practical	
Expt. No.	Title of Experiment
01	Determination of fineness of cement by Sieve analysis
02	Determination of the standard consistency of cement.
03	Determination of soundness of cement by Le-Chatelier's apparatus/Auto Clave.
04	Determination of initial and final setting time of cement.
05	Determination of compressive strength of cement.
06	Determination of particle size distribution of fine, coarse, and all in aggregate by a sieve analysis (grading of aggregate and FM).
07	Determination of specific gravity, water absorption of fine and coarse aggregates.
08	Nondestructive test on concrete.
09	Mix Design of Concrete using IS10262- 2009, IS 456 and making cubes of concrete. Tests for compressive strength of various grades of concrete cubes (IS 10262- 2009 and IS 456).
10	Determination of workability of fresh concrete by using a slump cone.
11	Determination of compaction factor for the workability of fresh concrete.


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Course Details:

Class	S.Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVPC211, Structural Analysis
Prerequisite/s	2CVPC202
Teaching Scheme: Lecture/Tutorial/Practical	03/00/00
Credits	03
Evaluation Scheme: ISE /MSE /ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVPC211_1	Determine static and kinematic degree of determinacy using equilibrium equation.
2CVPC211_2	Compute principle stress, strain for different loading conditions with the help analytical and graphical method
2CVPC211_3	Draw Influence line diagram for determinate structure by using Muller-Breslau's principle.
2CVPC211_4	Calculate slope and deflections of determinate beams with the help of different methods.
2CVPC211_5	Compute strain energy stored in material under different loading by using concepts of strain energy.
2CVPC211_6	Compute stresses for different structures under different loading using combined stresses theory.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Structural Systems and Energy Concept Forms of structures, Conditions of equilibrium, Degree of freedom, Linear and Nonlinear structures. One, two, three dimensional structural systems, Determinate and indeterminate structures [Static and Kinematics]. Theorem of minimum potential energy, Law of conservation of energy, Principle of virtual work.	07
Unit 2	Principal stresses and strains Concept of principal planes and principal stresses, normal and shear stresses on an oblique plane, magnitude and orientation of principal stresses and maximum shear stress. Mohr's circle for plane stresses.	06
Unit 3	Influence line diagrams Muller-Breslau's principle, influence line diagram for simple and compound beams. Application of influence line diagram to determinate 2D trusses under moving load.	07
Unit 4	Strain energy Concept, expression of strain energy for axially loaded member under gradual, sudden and impact loads. Strain energy due to self-weight.	06


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Unit 5	Slope and deflection of determinate beams Double integration method and Macaulay's method. Moment area method, Conjugate beam method.	06
Unit 6	Combined direct and bending stresses Combined direct and bending stresses, eccentric load on short columns, kern of a section, eccentricity of load about both axes of section. Chimney subjected to wind pressure, problems on dams and retaining walls.	07

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Strength of Materials	Subramanyam	Oxford University Press	2 nd	2011
02	Text book of Mechanics of Materials	M.N. SheshaPrakash, G.S.Suresh,	PHI, Learning Pvt. Ltd., New Delhi	-	2011
03	Strength of Materials	Ramamrutham	Dhanapath Rai Publishers, New Delhi.	-	2011
04	Strength of Materials	Bhavikatti S. S.	Vikas Publishers, New Delhi.	3 rd	2009
05	Strength of Materials	Punmia B.C., AshokJain, Arun Jain	Lakshmi Publications, New Delhi.	-	2011

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fundamentals of Solid Mechanics	Gambhir. M.L	PHI Learning Private Limited., New Delhi	1 st	2009
02	Mechanics of Materials	Ugural. A.C	Wiley India Pvt. Ltd., New Delhi	-	2013
03	Strength of Material	Timoshenko. S.& Young. D. H,	McGraw Hill Book Company Publication	4 th	2006
04	Mechanics of Material	Beer and Johnston	Mc Graw Hill Publication	3 rd	2004
05	Mechanics of Structures, Vol-I	S.B. Jurnarkar and Dr. H.J.Shah	Charotar Publishing House	6 th	2005



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Course Details:

Class	S.Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVPC212, Construction Management and Economics
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE /MSE /ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVPC212_1	Apply the principles of management for decision making by using the management theories.
2CVPC212_2	Make use of ABC and EOQ technique for optimizing inventory of construction material.
2CVPC212_3	Choose the best feasible solution for a given condition using economic comparison techniques.
2CVPC212_4	Select the better investment/business option for a given project by using various economic comparison methods.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Elements of Management Definitions of management, Principle of management (Henry Fayol), Functions of management, Decision Making: Process, Decision Tree, Management theories Neoclassical theory and Maslow's theory.	06
Unit 2	Inventory Management Objectives, Need for Inventory Control, EOQ Analysis, ABC analysis, Safety Stock, Purchase Procedure, Stores Record. (Introduction to material management software.)	07
Unit 3	Economics: Importance, Time Value of Money, Equivalence Present Worth Method, Equivalent Uniform Annual Cost method (EUAC), Future worth method.	07
Unit 4	Economic Comparison Methods: Linear Break Even Analysis, Net Present Value, Rate of Return, Payback Period Method, Benefit- Cost Ratio	06



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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Management	Stoner	Pearson Education	6 th	2003
02	Operation Research	S. H. Deshpande	Mcgraw Hill Publishing Ltd.	3 rd	2014
03	Engineering economics and financial accounting	Prasanna Chandra	Tata Mcgraw Hill Publishing Ltd.	4 th	2005
04	Management information system	K. C. and J. P. Laudon	Prentice Hall	4 th	2011

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Management and Engineering Economics	G.A.Taylor.	-----	---	----
02	Material Management	Gopal Krishnan, Sdveshan	McGraw Hill Education	1 st	2001



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Course Details:

Class	S. Y. B-Tech Sem.-IV
Course Code and Course Title	2CVSA213, Satellite Geodesy
Prerequisite/s	2CVPC204
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE /MSE /ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVSA213_1	Identify the geometry and its relationship with the Earth using different coordinate systems to locate points on Earth.
2CVSA213_2	Choose different coordinate systems used for satellites geodesy under various laws of motion.
2CVSA213_3	Apply satellite geodetic methods to determine the shape, and size of Earth's surface by various coordinate systems.
2CVSA213_4	Make use of the various coordinate system to locate a point on Earth's surface by geodetic applications.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Geodesy Definition, historical background, and importance of geodesy. Geodetic reference systems and datum. Geodetic coordinate systems and transformations. Geodetic Datum and Reference Frames Earth's shape and size. Geoid and its significance. Datum and their evolution. Transformation between datum.	06
Unit 2	Geodetic Measurements and Instruments Basic geodetic measurements (angles, distances, and heights). Introduction to surveying instruments (total stations, theodolites, GNSS receivers, levelling equipment, etc.). Error sources and propagation in geodetic measurements.	07
Unit 3	Satellite Geodesy Global Navigation Satellite Systems (GNSS) - GPS, GLONASS, Galileo, BeiDou, IRNSS etc. Satellite orbit determination. Satellite altimetry and gravimetry. Satellite-based Earth Observation and InSAR (Interferometric Synthetic Aperture Radar).	06
Unit 4	Geodetic Datum and National Coordinate Systems Local, regional, and global geodetic datum. National coordinate systems and map projections.	07


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Geodesy	Wolfgang Torge	Walter de Gruyter	3 rd	2001
02	Geodesy	Guy Bomford	Nabu Press	3 rd	2010

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Geodesy: The Concepts.	Vanícek, P and Krakiwsky, E	Elsevier	2 nd	1986
02	Satellite Geodesy	Seeber, G	Walter de Gruyter.	2 nd	1996
03	Theory of Satellite Geodesy: Applications of Satellites to Geodesy	Kaula, W.M.	Dover Publications.	3 rd	2000
04	Satellite Orbits.	Montenbruck, O. and Gill, E.	Springer	3 rd	2000
05	Geodesy	Tom Herring	Elsevier	2 nd	2009
06	Introduction to Geodesy,	James R.Smith	John wiley and Sons	3 rd	1997


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Course Details:

Class	S. Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVEN214, Air Pollution and Control
Prerequisite/s	2CVHS206
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE /MSE /ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVEN214_1	Identify the various types of air pollutants, both indoor and outdoor, on the virtue of their potential effects on human health, animals, plants, and materials.
2CVEN214_2	Demonstrate knowledge of meteorological variables in the dispersion of air pollutants based upon lapse rate, inversions, stability conditions, and wind rose diagrams.
2CVEN214_3	Select the different methods of controlling air pollutants at the source, based upon the type of pollutant by making use of process changes and equipment modification.
2CVEN214_4	Apply various direct and indirect methods to control vehicular pollution on the basis of its detrimental effect caused.
2CVEN214_5	Inspect air quality index values for major cities, based upon the standards and legislation governing air quality, using the concept of ambient air quality monitoring.
2CVEN214_6	Identify the applications of software used in the field of air pollution, as a tool of pollution monitoring, using their capabilities to analyze and manage air quality data.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Air Pollution Scope, significance, Air pollutant classification. Indoor air pollution and noise pollution. Effects on Human Health, Animals, Plants and Materials. Major environmental air pollution episodes.	5
Unit 2	Meteorology Meteorological variables, Lapse Rate, Inversions, Stability conditions, Wind rose diagram, General characteristics of Stack plumes, introduction to meteorological models.	4
Unit 3	At source Control of air pollutants Control at source, Process changes, Equipment Modification, Study of air pollution control equipment's-Settling Chambers, Centrifugal separators, Filters dry and wet scrubber and Electrostatic precipitators.	5
Unit 4	Air Pollution Due to Automobiles Air pollution due to petrol-driven and diesel driven engines, Effects, Direct and Indirect methods of control. Traffic and Environment: Detrimental effect of traffic on the environment- Air	4


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	pollution, Pollutants due to traffic. Measures to reduce air pollution due to traffic.	
Unit 5	Ambient Air Quality Monitoring, Standards and Legislation Air quality networks in Maharashtra. National Air Quality index, State Air Quality Index. Study of AQI of major cities. Air Quality and Emission Standards Legislation and Highlights of Air (prevention and control of pollution) Act, 1981.	4
Unit 6	Applications of Software Introduction of various software used in monitoring air pollution and their capabilities.	4

Text Books:


Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Sewage disposal and air pollution engineering	S. K. Garg	Khanna Publishers, New Delhi	33 rd	2015
02	Environmental pollution and control	Dr. H. S. Bhatia	Galgotia Publication	2 nd	2018
03	Air pollution and control	Keshav Kant	Khanna Publishing	1 st	2018
04	Air pollution	Rao M.N. and Rao H. V	Tata McGraw Hill	2 nd	1990

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Environmental Engineering	H. S. Peavy, D. R. Rowe	McGraw Hill	2 nd	1985
02	Chemistry for Environmental Engineering	C. N. Sawyer, P. L. McCarty and G. F. Parkin	Tata McGraw Hill	9 th	1967
03	Air pollution and control	K. V. S. G. Murali Krishna	USP	1 st	2017
04	Air pollution control: A design approach	C David Cooper	Medtech	4 th	2015
05	Mechanics of Structures, Vol-I	S. B. Jurnarkar and Dr. H.J. Shah	Charotar Publishing House	6 th	2005


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Course Details:

Class	S.Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVHS215, Psychology
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVHS215_1	Identify types of emotions, domains of emotional intelligence and their effects on individual and group behavior for fostering empathy and positive relationships.
2CVHS215_2	Explain human behavior, cognition, and emotions by psychological theories in real-life scenarios and contexts.
2CVHS215_3	Discuss effective time management strategies to overcome time-related challenges.
2CVHS215_4	Interpret psychological factors that contribute procrastination to recognize the situational triggers.
2CVHS215_5	Apply the A-B-C model to manage stress for well-being.
2CVHS215_6	Identify types of emotions, domains of emotional intelligence and their effects on individual and group behavior for fostering empathy and positive relationships.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Psychology Definition of Psychology, Different fields of Psychology, Introduction and Need of psychology	2
Unit 2	Emotional Intelligence (EI) (Part one) Role of Emotions, Types of Emotions, Emotions/ stress and performance	4
Unit 3	Emotional Intelligence (EI) (Part Two) Definition of Emotional Intelligence, Key signs of emotional Intelligence, How EI helps students, Marshmallow Experiment, Five domains of Emotional Intelligence	6
Unit 4	Time Management Definition of Time Management, Need and importance of Time management for an individual, Effective steps/ strategies of Time Management, Obstacles of Time Management	4
Unit 5	Procrastination Definition of Procrastination, Types of Procrastination excuses, How to work on excuses, Why Do People Procrastinate?, Procrastination Cycle, Challenging Your assumptions, techniques to beat Procrastination	5
Unit 6	Stress Management Definition of Stress, A-B-C model for Stress, Identifying Stressful Thoughts and identifying cognitive distortions, Restructuring, Behavioural Coping Strategies	5


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Organizational Behaviour- An Evidence-Based Approach	Fred Luthan	McGraw-Hill/Irwin	12 th	2011
02	Essentials of Organizational Behaviour	Stephen P. Robbins Timothy A. Judge Katherine E. Breward	Pearson	3 rd	2018
03	Essentials of organizational Behaviour	Stephen P. Robbins	Prentice Hall	7 th	2002
04	Understanding and Managing Organizational Behaviour	Jennifer M. George Gareth R. Jones	Pearson	6 th	2012
05	Emotional Intelligence at Work A Professional Guide	Dalip Singh	Response Books A division of Sage Publications	3 rd	2006



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Course Details:

Class	S.Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVHS216, Constitution of India
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	01/00/00
Credits	01
Evaluation Scheme: ISE	25

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVHS216_1	Explain the meaning, important acts and history related to Indian constitution.
2CVHS216_2	Illustrate the features of Indian constitution and interpretation of Preamble.
2CVHS216_3	Interpret fundamental rights and duties of the Indian Citizen to inculcate morality and their social responsibilities.
2CVHS216_4	Identify different laws and regulations based upon Information Acts.
2CVHS216_5	Distinguish the functioning of Indian parliamentary system and legislative system at the centre and state level.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Constitution: Basic Structure Meaning of the constitution law and constitutionalism, Historical perspective of the constitution of India, Government of India Act of 1935 and Indian Independence Act of 1947.	02
Unit 2	Making of Indian Constitution Enforcement of the Constitution, Meaning and importance of Constitution, Making of Indian Constitution – Sources, Salient features of Indian Constitution, Preamble.	02
Unit 3	Fundamental Rights Fundamental Rights – Features and characteristics, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies.	03
Unit 4	Fundamental Duties Directive Principles-Definition and Meaning, 42 nd Constitutional Amendment Act, List and Importance of Fundamental Duties.	02
Unit 5	Regulation to Information Introduction, Right to Information Act:2005, Information Technology Act 2000, Electronic Governance in India, Secure Electronic Records and Digital Signatures, Digital Signature Certificates, Cyber Regulations Appellate Tribunal, Limitations of an Information Technology Act	03
Unit 6	Government of The Union and States President of India – Election and Powers, Prime Minister of India - Election and Powers, Lok Sabha - Structure, Rajyasabha – Structure, Governor of State, Chief Minister and Council of Ministers in a state.	02


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Indian Polity	M.Laxmikanth	Mc Graw Hill Publications Delhi	7 th	2023
02	The Constitution of India	P.M. Bakshi	Lexis Nexis	19 th	2023
03	Introduction to the Constitution of India	Durga Das Basu	Lexis Nexis	26 th	2022
04	Governance in India	M. Laxmikanth	Mc Graw Hill Publications Delhi	3 rd	2021

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Constitution of India	V.N.Shukla	EBC	14 th	2022
02	The Constitutional Law of India,	J.N. Pandey	Allahabad; Central Law Agency	59 th	2022
03	Constitution of India	V.N.Tripathi	Premier Publishing Company	9 th	2021
04	India's Constitution	M.V.Pylee	S. Chand Publications New Delhi	18 th	2020



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Course Details:

Class	S. Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVPC217, Building Planning & Drawing Laboratory
Prerequisite/s	2CVPC156, 2CVPC253
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	01
Evaluation Scheme: ISE / ESE	50 / 50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVPC217_1	Draw the plan, elevation and section of existing and proposed public building as per National Building code of India
2CVPC217_2	Develop the working drawing of public building considering foundation, furniture, electrification, water supply and drainage as per IS- 962 : 1967
2CVPC217_3	Prepare the site visit report of public building with respect to merits and demerits with the help of submission and working drawing
2CVPC217_4	Create the municipal drawing of a public building by using AutoCAD with the reference of submission drawing

List of Experiments

Expt. No.	Title of Experiment
Note: Prepare all drawings using AutoCAD software	
01	Introduction to prerequisites of planning of public building with reference to national building code (type of public buildings & their specifications)
02	Write site visit report of existing public building (Building units, principles of planning, Building bye laws, dimensions of units etc.)
03	List & Design the units in proposed public building (Area of Building 300-1000 m ²)
04	Draw the plan of proposed public building
05	Draw Municipal Drawing of proposed public building
06	Draw Working drawing of proposed building- Centre line drawing
07	Draw Working drawing of proposed building- Furniture layout
08	Draw Working drawing of proposed building- Electrification layout
09	Draw Working drawing of proposed building- Details of water supply and drainage system


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Course Details:

Class	S. Y. B. Tech, Sem.-IV
Course Code & Course Title	2CVCC218, Aptitude and Reasoning Part- II
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVCC218_1	Solve problems based on HCF, LCM, Interest, Clock, Cubes and Puzzles
2CVCC218_2	Solve problems based on Coding and Decoding, Seating Arrangements and Venn diagrams.
2CVCC218_3	Solve problems based on Ratio Proportion, Partnership, Allegation, Divisibility and Number Theory
2CVCC218_4	Demonstrate presentations using concepts delivered on confidence building and time management skills.

Course Contents:

Unit No	Unit Name	Contact Hours
Unit 1	Vedic Mathematics, Calendar	04
Unit 2	Average, Ages	04
Unit 3	Speed Time Distance, Equations	04
Unit 4	Blood Relations, Directions, Time Rate Work, Pipes and Tanks	04
Unit 5	Percentage, Profit and Loss	04
Unit 6	Spot the Error, Jumbled Para	04
	Self-Study Module	06

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	R.S. Agarwal (Quantitative aptitude)	R. S. Agarwal	S Chand	3 rd	2019
2	R.S. Agarwal (Verbal & Non-verbal Reasoning)	R. S. Agarwal	S Chand	4 th	2010
3	Wren & Martin (Verbal, Grammar)	P. C. Wren	S Chand	4 th	2017


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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	APTIPEDIA (Quantitative, Logical, Verbal Aptitude)	Face	Wiley	2 nd	2017
2	Wiley (Quantitative Aptitude)	P. A. Anand	Maestro	4 th	2015
3	Arun Sharma (Verbal Ability)	Meenakshi Upadhyay	McGraw Hill	3 rd	2020


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Course Details:

Class	S. Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVEL219, Product Development Laboratory
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVEL219_1	Identify the study area for developing a product based on the need of Innovation.
2CVEL219_2	Survey the market needs for the selected prototype using market survey techniques
2CVEL219_3	Test for various characteristics for the generated prototype using appropriate equipment/tests.
2CVEL219_4	Develop the prototype for the identified area based on the market needs and test results.

List of Experiments

This course is designed to provide students with the necessary skills and knowledge to develop innovative solutions to real-world problems. The course will cover the entire process of innovation, from idea generation to prototype development and testing. Students will learn how to identify market needs, develop new ideas, and create prototypes that meet user needs.

Students in a group of 3 to 5 have to identify the real life problem and need to find a viable solution for the same and have to present it for the evaluation. Every group will be provided with one faculty member as mentor.

Expt. No.	Title of Experiment
01	To study the need of Innovation & Prototype Development in material and technology selection
02	Identify the Prototype Development area.
03	Understanding market needs Idea screening and concept development.
04	Selection of Product development (Software base / Manufactured goods) Idea.
05	Material and technology selection for Product development.
06	Preparing the framework for Innovation and Prototype Development idea.
07	Design and fabrication of a prototype Innovation Product.
08	Testing and evaluation of the prototype Innovation Product.


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Rapid Prototyping: Projects in 3D Design	Eddie Hanebuth	Digital Quest, Inc	1 st	2015
02	The Innovator's Solution: Creating and Sustaining Successful Growth	Clayton M. Christensen and Michael E. Raynor	The Innovator's Dilemma Series (4 books)	1 st	2013
03	Design thinking – A primer (E-book available on internet)	Ashwin Mahalingam and Bala Ramadurai	IIT, Madras	1 st	2018
04	The Right Way to Select Technology: Get the Real Story on Finding the Best Fit (Digital Reality Checks)	Tony Byrne (Author), Jarrod Gingras (Author)	Kindle Edition	1 st	2017



Head of Department



Dean Academics



Director



Executive Director

Course Details:

Class	S. Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVES220, General Proficiency
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVES220_1	Apply the communication skills for debate/group discussion/letter writing using appropriate English grammar.
2CVES220_2	Identify the key traits in oneself for personality development using appropriate attitude skill and knowledge.
2CVES220_3	Prepare any article using identified adjectives from reading a news article
2CVES220_4	Develop presentation skills on any given topic using presentation tools
2CVES220_5	Create a Curriculum Vitae (CV) for oneself using CV writing techniques
2CVES220_6	Prepare a literature review article for the chosen research topic based on research papers analyzed

List of Experiments (Any 10)

Expt. No.	Title of Experiment
01	Self-awareness: Personality Development
02	Communication Skills & Letter Writing, Email writing
03	News article reading and finding unique words
04	Group Discussion/Debate
05	SWOC Analysis & Decision Making
06	Use of Power Point Presentation tools
07	Use of Microsoft Excel
08	Use of Microsoft Word tools
09	Preparing Curriculum Vitae
10	Searching Research Papers/Journals
11	Writing Literature Review



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