Established: 1999

Annasaheb Dange College of Engineering and Technology

Ashta - 416301, Dist. : Sangli, Maharashtra

(An Empowered Autonomous Institute)

F.Y. B.Tech. – Computer Science and Engineering
[Internet of Things and Cyber Security including Blockchain Technology]

[Level 4.5, UG Certificate] Semester - I

Sr. No.	Course Category	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Marks)				
										Theory			Laboratory	
										MSE	TA	ESE	CIA	ESE
01	BS	T1	2ICBS101	Applied Mathematics – I	3	1	-	2	4	40	20	40	-	–
02	ES	LIT2	2ICES102	Basic Electrical and Electronics Engineering	2	-	2	2	3	40	20	40	50	–
03	ES	T1	2ICES103	Engineering Graphics	2	1	-	2	3	40	20	40	–	–
04	ES	T1	2ICES104	Data Communication	3	-	-	2	3	40	20	40	–	–
05	ES	L1	2ICES105	Coding Essentials for C Programming	2	-	4	2	4	–	–	–	50	50
06	HS	L2	2ICHS106	Professional Communication Skills	-	-	4	2	2	–	–	–	50	–
07	ES	L2	2ICES107	Design Thinking	-	-	2	–	1	–	–	–	50	–
08	CC	L2	3BSCC***	Liberal Learning Course – I	-	-	2	–	1	–	–	–	50	–
				Total	12	2	14	12	21					

Legends: L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mid-Semester Examination. CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination

Minimum Passing Criteria	TA (Theory) : ≥ 8 / 20	MSE + ESE (Theory) : ≥ 32 / 80	TA (Theory) / CIE (Lab) : ≥ 20 / 50	ESE (Lab) : ≥ 20/50

CC Bouquet :

3BSCC121 - Introduction to Yoga and Mindfulness	3BSCC123 - Six-Sigma Happiness and Mind Mechanics	3BSCC125 - Community Engagement through NSS
3BSCC122 - Physical Fitness and Lifestyle Management	3BSCC124 - Creativity through Visual Arts	3BSCC126 - Cultural Exploration & Heritage

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Annasaheb Dange College of Engg. & Tech. Ashta – Dept. of CSE (IOT & CSBT)

Established: 1999

Annasaheb Dange College of Engineering and Technology

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F.Y. B.Tech. – Computer Science and Engineering
[Internet of Things and Cyber Security including Blockchain Technology]

[Level 4.5, UG Certificate] Semester - II

Sr. No.	Course Category	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Marks)				
										Theory			Laboratory	
										MSE	TA	ESE	CIA	ESE
01	BS	T1	2ICBS109	Applied Mathematics – II	3	1	-	2	4	40	20	40	–	–
02	BS	L2	2ICBS110	Biology for Engineers	1	-	2	2	2	–	–	–	50	–
03	BS	LIT2	2ICBS111	Applied Physics and Chemistry	3	-	2	2	4	40	20	40	50	-
04	ES	T1	2ICES112	Introduction to Emerging Technologies	2	-	-	2	2	40	20	40	–	–
05	ES	L1	2ICES113	Object-Oriented Programming using	2	-	2	2	3	–	–	–	50	50
06	IKS	T2	2ICHS114	Indian Knowledge Systems	2	-	-	-	2	–	50	–	–	–
07	PC	LIT2	2ICPC115	Computer Networks	2	-	2	2	3	40	20	40	50	–
08	VS	L2	2ICVS116	IDEA Lab Workshop	1	-	2	-	2	–	–	–	50	–
09	CC	L2	2ICCC***	Liberal Learning Course- II	-	-	2	–	1	–	–	–	50	–
				Total	16	1	12	12	23					

Legends: L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mid-Semester Examination. CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination

Minimum Passing Criteria	TA (Theory) : ≥ 8 / 20	MSE + ESE (Theory) : ≥ 32 / 80	TA (Theory) / CIE (Lab) : ≥ 20 / 50	ESE (Lab) : ≥ 20/50

CC Bouquet :

3BSCC121 - Introduction to Yoga and Mindfulness	3BSCC123 - Six-Sigma Happiness and Mind Mechanics	3BSCC125 - Community Engagement through NSS
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Exit after **F.Y. B.Tech. – Computer Science and Engineering**
[Internet of Things and Cyber Security including Blockchain Technology]

Additional Credits to qualify for UG Certificate

Sr. No.	Course Category	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Marks)				
										Theory			Laboratory	
										MSE	TA	ESE	CIA	ESE
01	VSEC	L	2ICVS117	Internship*	–	–	–	–	10	–	–	–	–	–
				Total	–	–	–	–	**10**					

Legends: L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mid-Semester Examination. CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination

Minimum Passing Criteria	TA (Theory) : ≥ 8 / 20	MSE + ESE (Theory) : ≥ 32 / 80	TA (Theory) / CIE (Lab) : ≥ 20 / 50	ESE (Lab) : ≥ 20/50

***A minimum of 8 weeks internship in Network Domain must be completed to get UG Certificate.**

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[Level 4.5, UG Certificate] Semester - I

Sr. No.	Course Category	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Marks)				
										Theory			Laboratory	
										MSE	TA	ESE	CIA	ESE
01	BS	T1	2ICBS101	Applied Mathematics – I	3	1	-	2	4	40	20	40	-	–
02	ES	LIT2	2ICES102	Basic Electrical and Electronics Engineering	2	-	2	2	3	40	20	40	50	–
03	ES	T1	2ICES103	Engineering Graphics	2	1	-	2	3	40	20	40	–	–
04	ES	T1	2ICES104	Data Communication	3	-	-	2	3	40	20	40	–	–
05	ES	L1	2ICES105	Coding Essentials for C Programming	2	-	4	2	4	–	–	–	50	50
06	HS	L2	2ICHS106	Professional Communication Skills	-	-	4	2	2	–	–	–	50	–
07	ES	L2	2ICES107	Design Thinking	-	-	2	–	1	–	–	–	50	–
08	CC	L2	3BSCC***	Liberal Learning Course – I	-	-	2	–	1	–	–	–	50	–
				Total	12	2	14	12	21					

Legends: L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mid-Semester Examination. CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination

Minimum Passing Criteria	TA (Theory) : ≥ 8 / 20	MSE + ESE (Theory) : ≥ 32 / 80	TA (Theory) / CIE (Lab) : ≥ 20 / 50	ESE (Lab) : ≥ 20/50

CC Bouquet :

3BSCC121 - Introduction to Yoga and Mindfulness	3BSCC123 - Six-Sigma Happiness and Mind Mechanics	3BSCC125 - Community Engagement through NSS
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[Level 4.5, UG Certificate] Semester - II

Sr. No.	Course Category	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Marks)				
										Theory			Laboratory	
										MSE	TA	ESE	CIA	ESE
01	BS	T1	2ICBS109	Applied Mathematics – II	3	1	-	2	4	40	20	40	–	–
02	BS	L2	2ICBS110	Biology for Engineers	1	-	2	2	2	–	–	–	50	–
03	BS	LIT2	2ICBS111	Applied Physics and Chemistry	3	-	2	2	4	40	20	40	50	-
04	ES	T1	2ICES112	Introduction to Emerging Technologies	2	-	-	2	2	40	20	40	–	–
05	ES	L1	2ICES113	Object-Oriented Programming using	2	-	2	2	3	–	–	–	50	50
06	IKS	T2	2ICHS114	Indian Knowledge Systems	2	-	-	-	2	–	50	–	–	–
07	PC	LIT2	2ICPC115	Computer Networks	2	-	2	2	3	40	20	40	50	–
08	VS	L2	2ICVS116	IDEA Lab Workshop	1	-	2	-	2	–	–	–	50	–
09	CC	L2	2ICCC***	Liberal Learning Course- II	-	-	2	–	1	–	–	–	50	–
				Total	16	1	12	12	23					

Legends: L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mid-Semester Examination. CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination

Minimum Passing Criteria	TA (Theory) : ≥ 8 / 20	MSE + ESE (Theory) : ≥ 32 / 80	TA (Theory) / CIE (Lab) : ≥ 20 / 50	ESE (Lab) : ≥ 20/50

CC Bouquet :

3BSCC121 - Introduction to Yoga and Mindfulness	3BSCC123 - Six-Sigma Happiness and Mind Mechanics	3BSCC125 - Community Engagement through NSS
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Exit after **F.Y. B.Tech. – Computer Science and Engineering**
[Internet of Things and Cyber Security including Blockchain Technology]

Additional Credits to qualify for UG Certificate

Sr. No.	Course Category	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Marks)				
										Theory			Laboratory	
										MSE	TA	ESE	CIA	ESE
01	VSEC	L	2ICVS117	Internship*	–	–	–	–	10	–	–	–	–	–
				Total	–	–	–	–	**10**					

Legends: L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mic-Semester Examination. CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination

Minimum Passing Criteria	TA (Theory) : ≥ 8 / 20	MSE + ESE (Theory) : ≥ 32 / 80	TA (Theory) / CIE (Lab) : ≥ 20 / 50	ESE (Lab) : ≥ 20/50

***A minimum of 8 weeks internship in Network Domain must be completed to get UG Certificate.**

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Department of Computer Science and Engineering (Internet of Things and Cyber Security including Blockchain Technology)

Course Information:

Class, Semester	FY. B.Tech, Semester - I					**Category**	**BS**
Course Code, Course Title	**2ICBS101, Applied Mathematics-I**					**Type**	**T1**
Prerequisites	-						
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**	**Credits**		
	3	1	-	2	4		
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		40	20	40		-	-

Course Outcomes (COs):

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

CO1	Determine the consistency of systems of linear equations using Echelon form of matrix
CO2	Compute Eigen values, Eigen vectors, powers and inverse of a square matrix using characteristic equation
CO3	Apply the concepts of complex number to solve the equations using De Moivre's theorem and hyperbolic identities
CO4	Calculate partial derivatives, Jacobians, and extreme values of function of two variables using concept of partial differentiation
CO5	Solve ordinary differential equation of order one and degree one using analytical method and numerical techniques.

Syllabus:

Module	Contents	Lecture Hours
I	**Solution of System of Linear Equations:** Definition of system of linear equations, Classification of system of linear equations, Rank of matrix: Concept and computation using Echelon form and Normal form, Rouché–Capelli Theorem (Statements only), Solution of non-homogeneous system of linear equations, solution of Homogeneous system of linear equations, Applications in engineering.	7
II	**Eigen Values and Eigen Vectors:** Definition of vectors in R^n, Linear Dependence and Independence of Vectors, Characteristic Equation of Matrix, Cayley-Hamilton theorem (statement only), Applications of Cayley-Hamilton theorem, Eigen Values and Properties, Eigen Vectors and Properties.	7
III	**Complex Number:** Definition of complex number, Polar and exponential form of complex number, De Moivre's Theorem and Simple Applications, Power and Roots of complex numbers, Applications in solving equations. Hyperbolic Functions: Definitions, Identities of hyperbolic functions, Relation between Circular functions and hyperbolic functions, Inverse hyperbolic functions,	8
IV	**Partial Differentiation and Applications:** Functions of several variables, partial derivatives of first order, Higher order partial derivatives, Homogeneous functions, Euler's Theorem on homogeneous function: statement and verification, Jacobians and Properties, Maxima and minima of functions of two variables.	8
V	**Ordinary Differential Equation of first order and first degree:** Linear differential equation, exact differential equation, reducible to exact differential equation, reducible to linear differential equation, Applications of engineering (branch oriented)	8
VI	**Numerical Solution of Ordinary differential equation of First Order & First Degree:** Euler's method, Modified Euler's method, Runge–Kutta third order, Runge-Kutta Method of order four, Taylor Series method.	7
	Total Lecture Hours	45

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List of Tutorial with CO Mapping

Sr.No	Title of Tutorial	CO Mapped
1	Rank of matrix and Solution of Homogeneous System of Linear Equations	1
2	Solution of Non-Homogeneous System of Linear Equations	1
3	Eigen Value, Eigen vectors and Properties	2
4	Cayley-Hamilton theorem and Applications	2
5	De Moivre's Theorem, Applications and Hyperbolic functions	3
6	Partial differentiations and Euler's theorem	4
7	Jacobians and Maxima-Minima of Two Variable Functions	4
8	Euler's and Modified Euler's Methods for Solving Initial Value Problems	5
9	Runge-Kutta Methods and Taylor series method	5
10	Ordinary differential equations of first order and first degree	5
Total Practical Sessions	**15**	**Total Tutorial Hours** **15**

Text Books:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 8th Edition, Laxmi Publications ,2011.
2. H. K. Das, Advanced Engineering Mathematics, 22th Edition, S. Chand ,2018.
3. B. V. Ramana, Higher Engineering Mathematics, 6th Edition, Tata McGraw Hill Publ., 2010
4. Dr. B. S. Grewal , Numerical Methods , 9th Edition, Khanna Publishers ., 2010

References:

1. Dr. B. S. Grewal , Higher Engineering Mathematics , 44th Edition, Khanna Publishers ,2018.
2. N. P. Bali, Manish Goyal , Advanced Engineering Mathematics , 7th Edition, Infinity science press ,2010.
3. P. N. Wartikar and J. N. Wartikar, A text book of Applied Mathematics Vol-I, 9th Edition Pune Vidyarthi Griha Prakashan,1984
4. P. N. Wartikar and J. N. Wartikar, A text book of Applied Mathematics Vol-II, 7th Edition Pune Vidyarthi Griha Prakashan,1988.

Online Learning Resources

1. NPTEL Course on Engineering Mathematics-I, by Prof. Jitendra Kumar, IIT Kharagpur https://nptel.ac.in/courses/111105121
2. NPTEL Course on Numerical Methods, by Prof. Ameeya Kumar Nayak, Prof. Sanjeev Kumar, IIT Roorkee https://nptel.ac.in/courses/111107105
3. NPTEL Course on Matrix Analysis with Application, by Prof. S. K. Gupta , Prof. Sanjeev Kumar, IIT Roorkee https://nptel.ac.in/courses/111107112
4. NPTEL Course on Mathematics-III, by Prof. Durga C Dalal, Dr. M. Guru Prem Prasad, IIT Guwahati https://nptel.ac.in/courses/122103012

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Department of Computer Science and Engineering (Internet of Things and Cyber Security including Blockchain Technology)

Course Information:

Class, Semester	FY. B.Tech, Semester - I					**Category**	**ES**
Course Code, Course Title	**2ICES102, Basic Electrical and Electronics Engineering**					**Type**	**LIT2**
Prerequisites	-						
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**	**Credits**		
	2	-	2	-	3		
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		40	20	40		50	-

Course Outcomes (COs) :
Upon successful completion of this course, the student will be able to:

CO1	Explain fundamental electrical and electronic laws and components used in basic circuits and devices for solving elementary electrical problems.
CO2	Analyze single-phase and three-phase AC circuits using phasor techniques and sinusoidal parameters for accurate calculation of voltage, current, and power.
CO3	Describe electrical protection systems, wiring methods, AC machines, and transformers using understanding of basic power distribution and energy conversion.
CO4	Distinguish between semiconductor devices, rectifiers, transistors along with their role in real-life electronic applications.
CO5	Solve number system conversions and classify logic gates to understand basic concepts of digital electronics.

Syllabus:

Module	Contents	Lecture Hours
I	**DC Circuits:** Ohms's Law, Equivalent Resistance, Kirchhoff current Law, Kirchhoff voltage laws, Mesh analysis, Nodal analysis, Superposition Theorem	5
II	**AC Circuits:** Representation of sinusoidal waveforms, Peak, Average & RMS values. Real, Reactive and Apparent power, Power triangle, Analysis of single-phase ac circuits (R, L and C), Basics of three phase circuits.	5
III	**Electrical Installation:** Earthing – plate and pipe, wiring circuits – Simple, Staircase and Godown wiring. **Electrical Machine:** Principle, Construction and Working of Single Phase AC machine and Single-phase transformer, EMF equation of Transformer.	5
IV	**Semiconductor device and applications**: Introduction to PN junction diode- Working and Characteristics, Conductors, Insulators, Semiconductors- Intrinsic and Extrinsic, Applications of Electronics in Real Life	5
V	**Semiconductor Diode and applications:** Zener Diode, LED, Photodiode, Half wave rectifier, Full Wave Rectifier, BJT, JFET (Construction, Working Principle, Characteristics)	6
VI	**Digital Electronics Basics:** Number Systems: Binary, Octal, Decimal and Hexadecimal number system, Conversion of Number System, Logic Gates- Basic, Universal and Exclusive gates	4
	Total Lecture Hours	**30**

List of Experiments with CO Mapping

S.No	Title of the Experiment	CO Mapped
1	Study of Basic Electrical Components, Equipment and their symbols used in Electrical Engineering	1
2	Study of Safety Precautions and Earthing Systems	3
3	Experimental Verification of Kirchhoff's Laws.	1
4	Experimental Verification of Superposition Theorem.	1
5	Measurement of Power and Power Factor in a Single-phase Circuit.	2

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6	Load Test on Single Phase Transformer.			3
7	Demonstration of wiring circuits.			3
8	Experimental verification of Semiconductor Diode Characteristics			4
9	Experimental verification of Zener Diode Characteristics			4
10	Characteristics of Single-Phase Half-wave and Full-wave rectifiers.			4
11	Verification of logic gates			5
12	Verification of logic gates using universal gates			5
Total Practical Sessions		**15**	**Total Practical Hours**	**30**

Text Books	
1.	D. P. Kothari, I. J. Nagrath, Basic Electrical Engineering,4th,Tata McGraw Hill,2019
2.	D. C. Kulshreshtha, Basic Electrical Engineering,2nd,McGraw Hill.,2020
3.	D. P. Kothari, Basic Electrical & Electronics Engineering ,2nd,TMH New Delhi ,2020
4.	D. Patranabi, Sensors and transducers ,2nd,PHI learning Pvt. Ltd.,2003
References:	
1.	Millman and Halkias , Integrated Electronics,2nd,McGraw Hill,2010
2.	A.K. Thereja and B.L. Thereja, Electrical Technology volume II,2nd,S. Chand & Co. Publications,2007
3.	L. Bakshi and A. Bakshi, Basic Electrical Engineering,1st,Technical Publications, Pune,2005
4.	Albert Malvin, David Bates, Electronic Principles ,7th,McGraw Hill Education, 2017
Online Learning Resources	
1.	Basic Electrical Circuits by Prof. Gajendranath Chowdary https://onlinecourses.nptel.ac.in/noc25_ee91/preview
2.	Introduction to Semiconductor Devices by Prof. Naresh Kumar https://onlinecourses.nptel.ac.in/noc25_ee92/preview
3.	Digital Circuits by Prof. Santanu Chattopadhyay https://onlinecourses.nptel.ac.in/noc25_ee125/preview

Experiments that may be performed through virtual labs:

S.No	Experiment Name	Experiments Links
1.	Experimental Verification of Kirchhoff's Laws.	https://bes-iitr.vlabs.ac.in/exp/kirchhoff-law/
2.	Load Test on Single Phase Transformer.	https://bes-iitr.vlabs.ac.in/exp/single-phase-transformer/
3.	Verification of logic gates	https://de-iitr.vlabs.ac.in/exp/truth-table-gates/

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Department of CSE (IOT and Cyber Security Including Block Chain Technology) Engineering

Course Information:

Class, Semester	FY. B.Tech, Semester - I					**Category**	**ES**
Course Code, Course Title	**2ICES103, Engineering Graphics**					**Type**	**T1**
Prerequisites	-						
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**	**Credits**		
	2	1	-	2	3		
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		40	20	40		-	-

Course Outcomes (COs) :
Upon successful completion of this course, the student will be able to:

CO1	Construct projections of straight lines in various positions with reference planes, by variation in inclination, grade, bearing, and initial conditions.
CO2	Complete the projection of planes in various positions relative to reference planes, considering variations in initial conditions and inclination, to achieve an accurate shape in inclined positions.
CO3	Draw the three orthographic views for a given three-dimensional pictorial view, concerning the direction of viewing in first-angle projection, explaining the sectional view, hidden object and dimensions.
CO4	Develop a 3-dimensional isometric view converted from two or three orthogonal views to illuminate a 3D object.

Syllabus:

Module	Contents	Lecture Hours
I	**Projections of Lines and Projections of Planes** Projections of Lines: Introduction to First angle and third angle methods of projection. Projections of points on regular and auxiliary reference planes. Projections of lines (horizontal, frontal, oblique and Profile lines) on regular and auxiliary reference planes. True length of a line, Point View of a line, angles made by the line with reference planes. Projections of intersecting lines, Parallel lines, perpendicular lines, and skew lines. Grade and Bearing of a line. Projections of Planes: Projections on regular and on auxiliary reference planes. Types of planes (horizontal, frontal, oblique and Profile planes), Edge view and True shape of a Plane. Angles made by the plane with the principal reference planes. Projections of plane figures inclined to both planes. (Only regular polygon upto hexagon).	8
II	**Projections of Solids** Projections of Prisms, Pyramids, Cylinders and Cones inclined to both reference planes. (Excluding Frustum and Sphere)	7
III	**Orthographic Projections** Lines used, selection of views, spacing of views, dimensioning and sections. Drawing required views from given pictorial views (conversion of pictorial views into orthographic views), including sectional orthographic views	7
IV	**Isometric Projections** Introduction to isometric. Isometric scale, Isometric projections, and Isometric views/drawings. Circles in isometric view. Isometric views of simple solids and objects.	8
	Total Lecture Hours	30

Text Books

1. W. J. Luzadder, Fundamentals of Engineering drawing, Revised Edition, Prentice Hall of India, 1999.
2. N. D. Bhatt, Machine Drawing, 15th Edition, Charotar Publishing House Pvt. Ltd.-Anand, 2007.
3. Jhole, Dhananjay, Engineering Drawing, Revised Edition, Tata McGraw-Hill, 2011.
4. M.L. Mathur, Engineering Drawing & Graphics, Revised Edition, Jain brothers, 1999.

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References:	
1.	K. Venugopal, Engineering Drawing and Graphics, 5th Edition, New Age Publication, 2004.
2.	R. K. Dhawan, A textbook of Engineering Drawing, Revised Edition, S. Chand and Co, 2008.
3.	N. B. Shaha and B. C. Rana, Engineering Drawing, 2nd Edition, Person Education, 2012.
4.	K. L. Narayana, Machine Drawing, New Age Publication
Online Learning Resources	
1.	NPTEL Course on Engineering Drawing, by Prof. P. S. Robi, IIT Guwahati https://nptel.ac.in/courses/112103019
2.	NPTEL Course on Engineering/ Architectural Graphics- Part I- Orthographic Projection, by Prof. Avlokita Agarwal, IIT Roorkee https://nptel.ac.in/courses/124107157
3.	NPTEL Course on Engineering Graphics and Design, by Prof. Naresh Datla, Prof. S. R. Kale, IIT Delhi https://nptel.ac.in/courses/112102304
4.	NPTEL Course on Engineering Drawing and computer graphics, by Prof. Rajaram Lakkaraju, IIT Kharagpur https://onlinecourses.nptel.ac.in/noc21_me125/preview

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Annasaheb Dange College of Engg. & Tech. Ashta Dept. of CSE (IOT & CSBT)

Annasaheb Dange College of Engineering and Technology
Ashta - 416301, Dist. : Sangli, Maharashtra
(An Empowered Autonomous Institute)
Department of Computer Science and Engineering (Internet of Things and Cyber Security including Blockchain Technology)

Established: 1999

Course Information:

Class, Semester	FY. B.Tech, Semester - I					**Category**	**ES**
Course Code, Course Title	**2ICES104, Data Communication**					**Type**	**T1**
Prerequisites	-						
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**	**Credits**		
	3	-	-	2	3		
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		40	20	40		-	-

Course Outcomes (COs):
Upon successful completion of this course, the student will be able to:

CO1	Explain the fundamental concepts of data communication using communication systems.
CO2	Summarize the functions of each layer in the OSI and TCP/IP reference model using network parameters.
CO3	Describe various transmission media for effective communication by using network & topology.
CO4	Analyze the transmission methods for analog and digital communication using encoding techniques.
CO5	Illustrate working of multiplexing and switching methods for serial and parallel communication using switching techniques.

Syllabus:

Module	Contents	Lecture Hours
I	**Communication Basics:** Data Communication definition, Components, Data representation, Data Flow. Networks– Definition, Uses, Topologies, Categories. The Internet–History, ISP hierarchy, Protocols & Standards–Protocols, Standards, Standards Organizations.	8
II	**Network Models:** Layered Tasks, The OSI model, Layers in the OSI model, TCP/IP protocol suit, Addressing.	7
III	**Transmission media**: Guided Media: Twisted pair cable, Coaxial cable, Optical Fiber cable. Unguided Media: Radio waves, Microwaves, Infrared. Applications of Communication Systems: Antenna, T.V., FAX, ISDN, Satellite.	8
IV	**Data and Signal:** Analog & Digital data, Analog & Digital signals, Transmission Impairments, Data Rate Limits, and Performance (Bandwidth, Throughput, Latency, Bandwidth-delay product.)	7
V	**Data Encoding:** Digital-to-Digital conversion–Line coding, Line Coding Schemes. Analog-to-Digital conversion–Pulse code modulation, delta modulation. Digital-to-Analog conversion–ASK, FSK, PSK. Analog-to-Analog conversion–AM, FM, PM. Transmission Modes- Synchronous, Asynchronous, Isochronous.	8
VI	**Multiplexing & Switching**: Multiplexing–Frequency, Wavelength, Time-division. Switching–Circuit switched, Datagram Networks, Virtual circuit network, Structure of switch.	7
	Total Lecture Hours	45

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Text Books	
1.	Behrouz A Forouzan, Data Communications and Networking, 6th Edition, Tata McGraw-Hill ,2022
2.	Andrew S. Tanenbaum, Computer Networks,6th Edition, Prentice Hall,2022
3.	Behrouz A. Forouzan, TCP/IP Protocol Suite ,4th Edition, Tata McGraw Hill edition, 2011.
4.	George Kennedy, Bernard Davis, Electronic Communication Systems,4th Edition, McGraw Hill Education,2015.
References:	
1.	William Stallings, Data & computer communications, 9th Edition, Pearson Education ,2017.
2.	Ajit Pal, Data communication and computer Networks,1st Edition, PHI Learning,2014.
3.	W. Richard Stevens, TCP/IP Volume 1, 2, 3,2nd Edition, Addison Wesley,2005.
Online Learning Resources	
1.	NPTEL Course on *Data Communication*, by Prof. Ajit Pal, IIT Kharagpur. https://nptel.ac.in/courses/106105082
2.	Introduction to Data communication https://www.coursera.org/articles/what-is-data-communication
3.	Computer Network Tutorial, https://www.geeksforgeeks.org/computer-networks/computer-network-tutorials/
4.	Introduction to Computer Network, https://www.tutorialspoint.com/data_communication_computer_network/dcn_useful_resources.htm

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(An Empowered Autonomous Institute)

Department of Computer Science and Engineering

[Internet of Things and Cyber Security including Blockchain Technology]

Course Information:

Class, Semester	FY. B.Tech, Semester - I					**Category**	**ES**
Course Code, Course Title	**2ICES105, Coding Essentials for C Programming**					**Type**	**L1**
Prerequisites	-						
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**	**Credits**		
	2	-	4	2	4		
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		-	-	-		50	50

Course Outcomes (COs) :

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

CO1	Prepare an algorithm and draw a flowchart to accurately solve various mathematical problems by using structured approach.
CO2	Apply the fundamental concepts like data types, operators to solve mathematical problems by using the C language.
CO3	Apply the decision and looping constructs to solve the problems related to decision, repetitive statements for real time problem statement using C
CO4	Develop a C program to demonstrate the modular approach by using the concept of function, structure and pointer
CO5	Write, Compile and debug C program for various problem statements by using structured approach.

Syllabus:

Module	Contents	Lecture Hours
I	**Basics of Programming** The meaning of algorithms, Flowcharts, Pseudo codes, Writing algorithms and drawing flowcharts for simple exercises, Memory concepts, C Program development environment.	3
II	**C Fundamentals** Importance of 'C' Language, History, Structure of 'C' Program, Sample 'C' Program, Constants, variables and data types, Enumeration. Operators and expressions, Managing input / output operations, Control statements-Decision making, Case control & Looping Constructs.	7
III	**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. Strings-Declaring and initialing character array, reading and writing string to/from terminal, arithmetic operations on characters, putting strings together, string handling functions.	5
IV	**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, user defined and library functions.	5
V	**Structure & Pointers** Need of Structure, Defining a structure, declaring and accessing structure variables, structure initialization, copying and comparing structure variables, array of structures, structures and functions, Unions. Understanding pointers, accessing the address space of a variable, declaring and initialization pointer variables, accessing a variable through its pointer, pointer expressions, pointers and arrays, pointer and character strings, pointer and structure, Void pointer and generic pointer, null pointer, dangling pointer, pointer to a function, Calling A function through function pointer. Dynamic memory allocation malloc() ,calloe() ,realloc(),free(),Core dump ,Memory leak.	6

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VI	**File Handling** Defining and opening a file, closing a file, input/output operations on files, error handling during I/O operations, random access files, command line arguments, C preprocessor.	4
	Total Lecture Hours	**30**

List of Experiments with CO Mapping

S.No	Title of the Experiment	CO Mapped
1	Write an algorithm for given problem statement.	1
2	Draw a flowchart for given problem.	1
3	Program using different data types and operators in C.	2
4	Program using different operators and demonstration of operator precedence.	3
5	Program using if and if else construct.	3
6	Program using if else ladder and nested if else.	3
7	Program using switch case.	3
8	Program to demonstrate looping constructs (while and for loops)	3
9	Program to demonstrate looping constructs (do while and nested loops)	3
10	Program to demonstrate one dimensional array	2,3
11	Program to demonstrate two-dimensional array	2, 3
12	Implement a program to demonstrate String handling functions.	4
13	Implement a program to demonstrate user defined functions.	4
14	Program to demonstrate concept of recursion (factorial, Fibonacci)	4
15	Program to demonstrate concept of structures in C.	4
16	Program to demonstrate concept of array of structures in c.	4
17	Program to demonstrate pointers in C.	4
18	Program to demonstrate pointers arithmetic in C.	4
19	Program to demonstrate function pointer.	4
20	Implement a program to demonstrate file handling.	5
21	Program to demonstrate command line arguments.	5
Total Practical Sessions	**30** **Total Practical Hours**	**60**

Text Books

1. ISRD Group, Programming and Problem-Solving Using C Language, McGraw-Hill Publications, 2012.
2. Yashwant Kanetkar, Let Us C, 3rd Edition, BPB, 2011.
3. Harvey M. Deitel, Paul J. Deitel, Abbey Deitel, C How to Program, 2nd Edition, Pearson, 2009.
4. E. Balaguruswamy, Programming in ANSI C, 4th Edition, Tata McGraw-Hill, 2008.

References:

1. D. M. Ritchie, *The 'C' Programming Language*, 2nd Edition, Pearson, 1998.
2. Sidnal, *C Programming Laboratory: Handbook for Beginners*, 1st Edition, Wiley India Limited, 2012.
3. Yashwant Kanetkar, *Understanding Pointers in C*, 4th Edition, BPB Publications, 2001.
4. Yashwant Kanetkar, *Test Your C Skills*, 5th Edition, BPB Publications, 2013.

Online Learning Resources

1. NPTEL Course: Problem Solving Through Programming in C, by Prof. Anupam Basu, IIT Kharagpur https://onlinecourses.nptel.ac.in/noc25_cs56/preview
2. NPTEL Course: Introduction to Programming in C, by Prof. Satyadev Nandakumar, IIT Kanpur https://onlinecourses.nptel.ac.in/noc25_cs119/preview
3. Introduction to Numpy https://sites.engineering.ucsb.edu/~shell/che210d/numpy.pdf
4. Introduction to MATLAB, https://www.mccormick.northwestern.edu/documents/students/undergraduate/introduction-to-matlab.pdf

Experiments that may be performed through virtual labs:

S.No	Experiment Name	Experiments Links
1.	Computer Programming – Virtual Labs (IIIT Hyderabad)	https://cse02-iiith.vlabs.ac.in/

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Department of Computer Science and Engineering (Internet of Things and Cyber Security including Blockchain Technology)

Established: 1999

Course Information:

Class, Semester	FY. B.Tech, Semester - I					**Category**	**HS**
Course Code, Course Title	**2ICHS106, Professional Communication Skills**					**Type**	**L2**
Prerequisites	-						
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**		**Credits**	
	-	-	4	2		2	
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		-	-	-		50	-

Course Outcomes (COs) :
Upon successful completion of this course, the student will be able to:

CO1	Demonstrate the Listening, Speaking, Reading and Writing (LSRW) skills considering the frame of English language rules accurately for effective and sound communication in academic and profession contexts.
CO2	Exhibit their portfolio and career choices confidently, considering corporate expectations by using digital tools convincingly.
CO3	Write letters, reports, Emails and Blogs proficiently by following required techniques that help in getting acquainted with professional correspondence.
CO4	Attain professional skill while convincingly presenting on allotted topics using MS PowerPoint and AI techniques.
CO5	Justify own role in communicative events in well-organized manner with balanced zeal.

List of Experiments with CO Mapping

S.No	Title of the Experiment	CO Mapped
1	Self - Introduction	1
2	SWOT Analysis	1
3	Basics of English Pronunciation	1
4	Rapid Review of Grammar	1
5	Diagnosing Listening and Speaking Skills	1
6	Diagnosing Reading and Writing Skills	1
7	Introduction to MS Office (Word, Excel, PPT)	1,4
8	Presenting my career choices	1,2
9	Preparing Portfolio	1,2
10	Describing Technical Charts, Image, and Processes	1,4
11	Using Language Learning Apps and Tools	1,4
12	Presenting Portfolio	1,2
13	Effective Presentation Skills	1,4
14	Delivering Power Point Presentation	1,4,5
15	Job Application and Resume Writing	1,3
16	Email Writing	1,3
17	Group Discussion	1,5
18	Public Speaking	1,5
19	Report Writing	1,3
20	Organizing an Event	1,5
21	Technical Writing	1,3
22	Blog Writing	1,3
23	Mock Interview	1,2,5
24	Achievement Test	1
Total Practical Sessions	**30**	**Total Practical Hours** **60**

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Text Books	
1.	The Professional: Defining the New Standard of Excellence at Work Subroto Bagchi Penguin Books India Pvt. Ltd. Revised Edition,2011.
2.	Cambridge Guide to IELTS. Pauline Cullen, Amanda French, Cambridge University Press, Reprint, 2017.
3.	A Practical Course in Effective English Speaking Skills. J. K. Gangal, PHI Learning Private Limited, New Delhi, Print, 2012
4.	English For Engineers. Dr. Shyamaji Dubey, Dr. Manish Kumar. Vikas Publication House Pvt. Ltd.New Delhi, Print, 2020.
5.	Personality Development and Soft Skills. Barun K. Mitra, Oxford University Press, New Delhi , 7th impression, 2012.
References:	
1.	High-school English Grammar and Composition. Wren and Martin, S. Chand and Co., New Delhi, 1st edition, 2015.
2.	The Ace of Soft Skills. Ajai Chowdry, Bala Balchandran, Pearson Publication, Delhi, 8th edition, 2017.
3.	Effective Technical Communication. M. Ashraf Rizvi, McGraw Hill Education, Chennai,2nd edition, 2017.
4.	Business Communication. Hory Sankar Mukerjee, Oxford University Press, New Delhi, 2nd edition, 2013.
5.	Communicative English for Engineers and Professionals. Nitin Bhatnagar, Mamta Bhatnagar, Pearson Publication, Delhi, 1st edition, 2013.
Online Learning Resources	
1.	Software: Pronunciation apps (e.g., ELSA Speak, Speak English), grammar checkers (e.g., Grammarly).
2.	Online Platform Coursera (for basic English courses), Duolingo, BBC Learning English.

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Annasaheb Dange College of Engineering and Technology
Ashta - 416301, Dist. : Sangli, Maharashtra
(An Empowered Autonomous Institute)
Department of Computer Science and Engineering (Internet of Things and Cyber Security including Blockchain Technology)

Established: 1999

Course Information:

Class, Semester	F.Y. B.Tech – Semester I				**Category**	**ES**
Course Code, Course Title	**2ICES107 - Design Thinking**				**Type**	**L2**
Prerequisites	-					
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self-Study**	**Credits**	
	-	-	2	-	1	

Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		-	-	-		50	-

Course Outcomes (COs) :
Upon successful completion of this course, the student will be able to:

CO1	Explain the principles and process of Design Thinking and its application in problem-solving.
CO2	Identify and define real-world problems using user-centric observation and empathy techniques.
CO3	Conduct user research through surveys, interviews, and persona building to derive user needs and insights.
CO4	Apply ideation techniques to generate innovative and feasible solutions for identified problems.
CO5	Develop and present prototypes and communicate their solutions effectively using charts, posters, and model presentations.

Syllabus:

Module	**Contents**
I	Introduction to Design Thinking, Design Thinking Process
II	Empathize Phase: Empathy and Ethics, User Perspective, Activities – Empathy Map, Planning, Persona building.
III	Customer Journey Mapping, Observation of stakeholders, Defining and Conceptualization of problem.
IV	Ideation Activities – 5 Whys & 1 How, Story boarding, Brainstorming.
V	Prototype – Types, Mindsets, Tools.
VI	Testing – Scenario, Methods, Refinements & Recommendations.

List of Experiments with CO Mapping

S.No	**Title of the Experiment**	**CO Mapped**
1	**Introduction to Design Thinking** Activity: Make a group of 2-4 students. Give each group a simple, relatable problem (e.g., "Long queues at the campus canteen" or "Difficulty in finding parking on campus"). Ask them to: Empathize: Identify users and their pain points. Define: Write a clear problem statement. Ideate: Brainstorm possible solutions. Sketch: Draw their proposed solution on chart paper. Present: Each group will present their idea briefly.	1,2
2	Identification of Problems Activity 1: Present case study (in group) how companies like Airbnb, Apple, IDEO, Netflix, Samsung, Toyota used Design Thinking to drive innovation. Activity 2: User Interviews – The student or group should walk around the campus or their locality to observe and identify at least three (per student) real-life problems faced by users (students, faculty, staff, and community). Conduct interviews to gather qualitative insights. Steps: 1. Observation: Note down pain points using observation and informal interviews. 2. Listing: Write a list of problems identified.	1,2

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	3. Shortlisting: Apply criteria like relevance, feasibility, user impact, and alignment with SDGs to shortlist one problem to work on for further Design Thinking phases.	
3	**Selection of Problems** Activity: Students will present (PPT) their selected problem, why they chose it, who the users are, and the evidence collected.	1,2
4	**Designing of Empathy Map** Activity: Prepare Empathy Map – Visualize what users say, do, think, and feel.	1,3
5	**Customer Survey and Analysis** Activity: Students create a structured survey (MCQ, likert scale, open ended questions etc.) using google forms and prepare charts (bar, pie etc) and do the analysis.	1,3
6	**Persona Building** Activity: Based on findings from Observations and interviews, Customer Survey and Analysis from previous experiments, identify pattern i.e. common characteristics, behaviors, needs, pain points, and goals among users and create persona template.	1,3
7	**Customer Journey Map** Activity: Select the persona created in the previous experiment, define the Scenario, List Stages/Phases of the Journey, Map User Actions, Identify User Emotions, Identify Touchpoints, Identify Pain Points and opportunities for Improvement.	1,3
8	**Defining the problem** Activities: 1. Observation of Stakeholders – Note behaviors and pain points. 2. 5 Whys Method (Drill Down) – Uncover root causes behind a problem. 3. Root Cause Mapping – Visual diagram connecting symptoms to core issues. Refine Problem Statement – Create a focused, actionable problem definition.	1,3
9	**Poster Presentation** Activity: Use A2/A1 sheet and draw charts, diagrams, sketches, and minimal text to represent experiment no 1-8.	1,2,3
10	**Ideation** Activities: 1. SCAMPER Model – Modify existing ideas by Substituting, Combining, Adapting, etc. 2. Brainstorming (Crazy 8 Method) – Rapid sketching of 8 ideas in 8 minutes. 3. Mind Mapping – Visually connect ideas around a central problem/theme. Use the suitable and best one activity from above.	1,4
11	**Prototype Building** Activities: 1. Storyboarding – Sketch out user scenarios and interactions. **2.** Prototyping – Build a working model or prototype or model.	1,5
12	**Testing** Activities: **1.** Scenario-Based Testing – Test ideas in realistic user scenarios. **2.** Peer Testing – Get feedback from other participants or teams.	1,5

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13	**Refinement & Recommendation** Activities: 1. Final Presentation – Showcase prototype or working model. 2. Documentation of Learnings – Reflect on the process, improvements, and impact (Make a report). Apply for IPR/Incubation/Research Grant/Paper Publication.	1,5

Total Practical Sessions	**15**	**Total Practical Hours**	**30**

Text Books	
1.	E Balaguruswamy, Developing Thinking Skills (The way to Success), First Edition, Khanna Book Publishing Company, 2023
2.	Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation, First Edition, Harvard Business Review, 2008
3.	R T Krishnan & V Dabholkar, 8 steps to Innovation, First Edition, Collins Publishing, 2013
References:	
1.	Nigel Cross, Design Thinking, First Edition, Bloomsbury, 2011
2.	Idris Mootee, Design Thinking for Strategic Innovation, First Edition, Wiley, 2013
Online Learning Resources	
1.	NPTEL_Design Thinking - A Primer https://youtu.be/AamBSYPJIcA?si=wJDNT4L9q1NB-6T9
2.	Design Thinking and Innovation https://www.coursera.org/learn/designthinkingandinnovation

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Department of Computer Science and Engineering- Internet of Things and Cyber Security including Blockchain Technology

Established: 1999

Course Information:

Class, Semester	F. Y. B.Tech, Semester - II					**Category**	**BS**
Course Code, Course Title	**2ICBS109, Applied Mathematics-II**					**Type**	**T1**
Prerequisites	2ICBS101						
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**	**Credits**		
	3	1	-	2	4		
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		40	20	40		-	-

Course Outcomes (COs) :
Upon successful completion of this course, the student will be able to:

CO1	Determine equation of a curve and compute statistical measures to analyze data using statistical techniques
CO2	Apply the concepts of vector spaces over real numbers to solve problems using linear algebra concepts.
CO3	Determine approximate root of algebraic and transcendental equations using numerical methods
CO4	Determine unknown values from tabulated data using finite difference and interpolation techniques.
CO5	Define and distinguish different types of graphs using basic definitions and examples from graph theory.

Syllabus:

Module	Contents	Lecture Hours
I	**Curve fitting and Statistics:** Method of Least Squares, Fitting of Straight Line, Fitting of Parabola, Fitting of exponential curves, Lines of Regression.	8
II	**Vector Space:** Introduction to Vector spaces, subspaces and characterization, linear combination and span basis and dimension, linear transformation, Row space, column space, null space and range of transformation.	7
III	**Numerical Solution of algebraic and transcendental equation:** Introduction, Bisection method, Regula Falsi method, Secant method, Newton Raphson method.	7
IV	**Statistical Measures**: Introduction, Arithmetic Mean, Geometric Mean, Harmonic Mean, Median, Mode, Partition values: Quartiles, Deciles and Percentiles, Concept of dispersion, Range, Quartile Deviation, Mean Deviation, Mean Square Deviation, Variance and Standard Deviation.	8
V	**Finite Differences and Interpolation:** Finite differences, Newton's Interpolation formulae, Stirling formula, Lagrange's interpolation formula, Divided Difference	8
VI	**Graph Theory:** Definition of graph, degree of vertex, types of graph, isomorphism, matrix representation of graph, subgraphs, complement of a graph, operation on graph, connected graph, shortest path algorithm.	7
	Total Lecture Hours	45

List of Tutorial with CO Mapping

Sr.No	Title of Tutorial	CO Mapped
1	Fitting of straight line and Second-degree parabola	1
2	Fitting of exponential curves and lines of regression	1
3	Subspace and Linear transformation	2
4	Basis and Dimension	2
5	Solution of Algebraic and transcendental equation	3
6	Measures of Central tendency	1
7	Measures of dispersion	1
8	Interpolation with equal intervals	4

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9	Interpolation for unequal intervals			4
10	Graph theory			5
Total Practical Sessions		**15**	**Total Practical Hours**	**15**

Text Books	
1.	H. K. Das, Advanced EngineeringMathematics, 22nd Edition, S. Chand, 2018.
2.	B. V. Ramana, Higher Engineering Mathematics, 6th Edition, Tata McGraw Hill Publ., 2010
3.	Dr. B. S. Grewal, Numerical Methods, 9th Edition, Khanna Publishers, 2010
4.	J. P. Tremblay & R. Manohar, Discrete Mathematical Structures with application to Computer Science 1st-Tata MGH International, 2007.
References:	
1.	Dr. B. S. Grewal, Higher EngineeringMathematics, 44th Edition, Khanna Publishers, 2018
2.	N. P. Bali,Manish Goyal, Advanced EngineeringMathematics, 7th Edition, Infinity science press, 2010.
3.	S. C. Gupta, V. K. Kapoor, Fundamental of Mathematical Statistics, 10th Edition, Sultan Chand and Sons Publisher, 2000.
4.	Seymour Lipschutz, Marc Lars Lipson, Linear Algebra, 4th Edition, McGraw Hill, 2009.
Online Learning Resources	
1.	NPTEL Course on Engineering Mathematics-I, by Prof. Jitendra Kumar, IIT Kharagpur https://nptel.ac.in/courses/111105121
2.	NPTEL Course on Numerical Methods, by Prof. Ameeya Kumar Nayak, Prof. Sanjeev Kumar, IIT Roorkee https://nptel.ac.in/courses/111107105
3.	NPTEL Course Business Statistics, by Prof. Mukesh Kumar Barua, IIT Roorkee https://nptel.ac.in/courses/110107114
4.	NPTEL Discrete Mathematics, by Dr. Sugata Gangopadhyay, Dr. Aditi Gangopadhyay, IIT Roorkee https://nptel.ac.in/courses/111107058

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Course Information:

Class, Semester	FY. B. Tech, Semester - II					**Category**	**BS**
Course Code, Course Title	**2ICBS110, Biology for Engineers**					**Type**	**L2**
Prerequisites	-						
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self-Study**		**Credits**	
	1	-	2	2		2	
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		-	-	-		**50**	-

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:

CO1	Define fundamental biological principles of Cellular structures, Genetics, Biochemistry and apply them in solving practical, real-world problems.
CO2	Explain basic molecular processes, structure and function of DNA with emphasis on replication, transcription, and translation processes relevant to modern engineering practices.
CO3	Integrate microbiology and biotechnology concepts to design and implement effective solutions in computational and systems engineering projects.
CO4	Classify how biological systems inspire neural networks and biomimetic designs, drawing upon principles from biomimetics, systems biology, and proteomics
CO5	Assess the environmental and health challenges, along with the ethical, legal, and social implications, of applying biological principles to develop sustainable engineering solutions from a biological perspective.
CO6	Understand diseases and disorders, healthcare technologies, and correlate the role of Artificial Intelligence in developing effective engineering solutions in health care technology.

Syllabus:

Module	Contents	Lecture Hours
I	**Introduction to Biology and Its Relevance for Engineers** Course Overview & Importance of Biology in Engineering: Introduction to interdisciplinary approaches. Cell Theory & Structure: Overview of prokaryotic versus eukaryotic cells, Transport Across Cell Membrane, Cell Division. Interdisciplinary Integration: How biological principles inform cutting-edge engineering designs.	2
II	**Microbiology and Biotechnology** Introduction to Microorganisms: Bacteria, viruses, fungi, and their characteristics. Microbial Genetics & Evolution: Gene transfer, mutations, and their impacts. Techniques in Microbiology: Isolation, culturing methods, and basic staining techniques.	2
III	**Systems Biology and Bioinformatics** Principles of Systems Biology: Understanding networks, feedback loops, and complex systems, Introduction to Bioinformatics: Tools and techniques for computational biology, Genomics and Proteomics: Overview of genomic data and proteomic analysis.	3
IV	**Genetics and Molecular Engineering** DNA Structure and Function: Detailed exploration of replication, transcription, and translation, Genetic Engineering Techniques: Overview of CRISPR, recombinant DNA, and related methodologies, Ethical, Legal & Social Aspects: Discussion on the implications of genetic modification.	3
V	**Biomimetics and Neural Networks** Introduction to Biomimetics: Nature-inspired designs in engineering, Anatomy of the Human Brain: Basic neurobiology and the organization of neural systems, From Biology to AI: Understanding how neural networks are modelled after natural systems.	3

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VI	**Diseases, Health, and Sustainable Engineering** Diseases and Disorders: Infectious, Chronic, Cancer, Genetic and Neurological, Cardiovascular, Auto immune and Role of CSE and IOT, Engineering Solutions in Health: How biological insights contribute to healthcare technologies, Course Integration & Future Directions: Discussion on emerging interdisciplinary trends in CSE and IoT.	2
	Total Lecture Hours	15

List of Experiments with CO Mapping

Sr. No	Title of the Experiment	CO Mapped
1	Study of simple, compound Microscope	1
2	Study of nervous system using specimen, models, etc.	4
3	Investigating the Effect of Light on Seed Germination	1
4	DNA Extraction from Strawberries	2
5	Mendelian Genetics Simulation Using Paper-Based Punnett Squares	1
6	Creating Lotus Leaf-Inspired Hydrophobic Surfaces	4
7	Building a Physical Model of an Artificial Neural Network	4
8	Demonstration of Antibiotic Effects on Bacterial Lawn Culture	3
9	Constructing a Simple Particulate Matter Sensor	5
10	Simple DNA Extraction from a Banana	2
11	Decomposition and Nutrient Recycling Simulation	5
12	Virtual Simulation of PCR (Polymerase Chain Reaction)	2
13	Analyzing Insect Eye Structures to Improve Camera Algorithms	4
14	Comparing Tree Branching Patterns with Neural Network Architectures	4
15	Designing a Simple pH Biosensor for Water Analysis	5
16	Observation of plant cell and Human Cheek Cells	1

Text Books

1. Biology for Engineers, Anthony J. Young, Engineering Press, 1st, 2015
2. Fundamentals of Biology, Lisa M. Johnson, Academic Publishers, 3rd, 2012
3. Essential Cell Biology, Bruce Alberts et al. Garland Science 2nd ,2014
4. Microbiology: An Introduction, Gerard J. Tortora, Pearson, 11th 2017
5. Genetics: From Genes to Genomes, Leland H. Hartwell, McGraw-Hill, 4th, 2011

References:

1. Biotechnology for Engineering, Kavita Kumar, Tech Books Publishing, 2nd, 2018
2. Systems Biology: A Textbook, Edda Klipp, Wiley-VCH, 2nd, 2016
3. Introduction to Bioinformatics, Arthur M. Lesk, Oxford University Press, 2nd, 2013
4. Biomimetics in Engineering, Robert J. Fuller, Springer, 1st, 2019
5. Sustainable Engineering: Principles and Practice, Michael T. Solomon, CRC Press, 3rd, 2020

Online Learning Resources

1. NPTEL Course on Biology for engineers and other non-biologists , Prof. G.K. Suraishkumar & Prof. Madhulika Dixit , IIT Madras, https://onlinecourses.nptel.ac.in/noc19_ge31/preview

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Annasaheb Dange College of Engg. & Tech. Ashta Dept. of CSE (IOT & CSBT)

Annasaheb Dange College of Engineering and Technology
Ashta - 416301, Dist. : Sangli, Maharashtra
(An Empowered Autonomous Institute)
Department of Computer Science and Engineering (Internet of Things and Cyber Security including Blockchain Technology)

Established: 1999

Course Information:

Class, Semester	F.Y. B.Tech, Semester - II						**Category**	**BS**	
Course Code, Course Title	**1ICBS111, Applied Physics & Chemistry**						**Type**	**LIT2**	
Prerequisites	-								
Teaching Scheme (per week)	**Lecture**		**Tutorial**		**Practical**		**Self Study**	**Credits**	
	3		-		2		2	4	
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**		**CIA**	**ESE**	
		40	20	40			50	-	

Course Outcomes (COs):
Upon successful completion of this course, the student will be able to:

CO1	Describe the basic principles of nanotechnology for nanomaterial production using appropriate synthesis methods and microscopy techniques
CO2	Use optical principles and experimental techniques to study diffraction, polarization in engineering applications.
CO3	Apply optics concepts to analyze lasers and fiber optic transmission in engineering contexts.
CO4	Explain the properties and applications of engineering materials for industrial and societal use based on their chemical compositions.
CO5	Compute the calorific values of fuels for domestic and industrial applications by considering environmental effects and principles of green chemistry.
CO6	Solve the domestic and industrial problems related to water quality parameters using theoretical knowledge and laboratory experiments.

Syllabus:

Module	Contents	Lecture Hours
I	**Diffraction and Polarization :** Diffraction - Diffraction grating, Plane diffraction grating- construction & theory, Determination of wavelength 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.	8
II	**Laser and Fiber Optics:** Laser: Introduction, Principle of laser, Pumping and Population inversion, Characteristics of laser, Ruby Laser, Applications of laser in Artificial Intelligence and data science field. Optical fibre: Introduction, Total internal reflection, Structure of optical fibre, Propagation mechanism of optical fibre, Numerical aperture, Acceptance angle, Skip distance, Attenuation, Types of optical fibre, Applications of optical fiber in Artificial Intelligence and data science field.	8
III	**Nanophysics:** Introduction- Nanotechnology, Nano-materials, Top-down and Bottom-up synthesis approach, Ball milling method, Sol-gel synthesis method, Carbon nanotubes, Properties and applications of carbon nanotubes, Scanning Electron Microscopy (SEM) and Atomic Force Microscopy (AFM), Properties and applications of nano-materials in Artificial Intelligence and data science field.	7
IV	**Water Technology and Management:** Introduction, impurities in natural water and it's removal, Water Testing: Acidity, alkalinity, chlorides and hardness of water (definition, causes and significance), Disinfection of water, WHO Standards, Scales and sludges: Introduction, Formation in boilers and removal methods. Treatment of hard water by: Ion- exchange process, Zeolite process, Desalination of brackish water by Reverse Osmosis method, Numerical on temporary, permanent and total hardness of water.	8

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V	**Energy Technology and Green Chemistry:** Batteries: Introduction, Types of batteries, battery characteristics, Lithium- ion batteries (LIBs), Sodium- ion batteries (Instrumentation, advantages, disadvantages and applications). Fuels: Introduction, classification, characteristics of good fuels, types of calorific value (higher and lower), Bomb calorimeter and Boy's calorimeter. Numericals on Bomb and Boy's calorimeter. Environment and Green Chemistry: Definition, Twelve principles of green chemistry, Importance of green chemistry in research and industrial applications.	7
VI	**Advanced Materials for Engineering Applications:** Alloys: Introduction, classification, purposes of making alloys. Ferrous alloys: Plain carbon steels (mild, medium and high). Nonferrous alloys: Aluminum alloy (Duralumin and Alnico), Nickel alloy (Nichrome), Tin alloys (Solders). Polymers: Introduction, plastics, thermo-softening and thermosetting plastics, industrially important plastics like phenol-formaldehyde, urea-formaldehyde, Conducting polymers, Biodegradable polymers. Composites: Introduction, Constituents, Fibre-reinforced plastics (FRP) and Glass reinforced plastics (GRP).	8
	Total Lecture Hours	**46**

List of Experiments with CO Mapping

S. No	Title of the Experiment	CO Mapped
1	Plane Diffraction Grating- Determine the wavelength of light using plane diffraction grating.	1
2	Laurent's Half shade Polarimeter - Determination of specific rotation of optically active material.	1
3	Laser - Determination of wavelength of He-Ne laser light using diffraction grating.	1
4	Laser - Determination of divergence of He-Ne laser light	1
5	Numerical aperture of optical fiber: To calculate NA of optical fiber by laser diode.	1
6	Inverse Square Law- Verify inverse square law.	1
7	Band gap energy: To determine band gap energy of given semiconductor.	1
8	Determination of alkalinity of water (Acid- Base Titration).	5
9	Determination of chloride content of water by Mohr's method. (Precipitation Titration).	5
10	Determination of total hardness of water by EDTA method (Complexometric Titration).	5
11	Estimation of copper in brass solution (Displacement Titration)	3
12	Preparation of urea formaldehyde.	3
13	Determination of pH of industrial waste water by pH-meter.	5
14	Demonstration of H_2-O_2 fuel cell/ battery.	4
Total Practical Sessions	**15** **Total Practical Hours**	**30**

Text Books:

1. G Vijayakumari, Engineering Physics, 3rd Edition, Vikas Pub. House (P) Ltd, 2009
2. M.N. Avadhanulu& P. G. Kshirsagar, A Text Book of Engineering Physics, 12th Edition, S. Chand Publication., 2018
3. K.K.Chattopadhyay and A.N. Banerjee, Introduction to Nano Science and Nanotechnology, 3rd Edition, PHI Learning, 2009
4. S. S. Dara, A Text Book of Engineering Chemistry, 11th Edition, S. Chand & Co. Ltd., New Delhi, 2008.
5. Shashi Chawala, A Text book of Engineering Chemistry, 3rd Edition ,Dhanpat Rai Publishing Co. New Delhi, 2007

References:

1. David Halliday, Robert Resnick &Jearl Walker, Fundamentals of Physics, 12th Edition, John Wiley & Sons, 2021

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2.	Resnick Halliday, Krane, Engineering Physics, 8th Edition, John Wiley & Sons Pub., 2008
3.	Sulbha K. Kulkarni, Nanotechnology Principles and Practices, 4th Edition, Springer, 2007
4.	Jain & Jain, Engineering Chemistry, 16th Edition, Dhanpat Rai Publishing Co., New Delhi, 2016
5.	Wiley India, Engineering Chemistry, 1st Edition, Wiley India Pvt. Ltd., New Delhi., 2012

Online Learning Resources

1.	For optics- https://nptel.ac.in/courses/122/107/122107035/
2.	For Quantum Physics -https://nptel.ac.in/courses/122/106/122106034/
3.	For Ultrasonic -- https://freevideolectures.com/course/3531/engineering-physics-i/8
4.	For Solid State Physics -- https://nptel.ac.in/courses/115/105/115105099/
5.	Water Technology-- https://youtu.be/dKWJzp_rrlE
6.	For lithium-ion batteries (LIBs): https://www.youtube.com/watch?v=DBLHaLhyo2w
7.	Composite materials-Wikipedia -: https://en.wikipedia.org/wiki/Composite_material

Experiments that may be performed through virtual labs:

S. No.	Experiment Name	Experiments Links
1.	Water analysis-Determination of Chemical parameters	https://inoc-amrt.vlabs.ac.in/exp/water-analysis-chemical-parameters/index.html
2.	Demonstration of Photo-colorimeter	https://pcv-amrt.vlabs.ac.in/exp/spectrophotometry/index.html
3.	Photoelectric Effect	https://mp-amrt.vlabs.ac.in/exp/photoelectric-effect/index.html
4.	Numerical Aperture of Optical Fiber	https://lo-amrt.vlabs.ac.in/exp/numerical-aperture-optical-fiber/
5.	LASER Beam divergence and spot size	https://lo-amrt.vlabs.ac.in/exp/laser-beam-divergence/

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Annasaheb Dange College of Engineering and Technology
Ashta - 416301, Dist. : Sangli, Maharashtra
(An Empowered Autonomous Institute)
Department of Computer Science and Engineering (Internet of Things and Cyber Security including Blockchain Technology)

Established: 1999

Course Information:

Class, Semester	F.Y. B.Tech – Semester II					**Category**	**ES**
Course Code, Course Title	**2ICES112, Introduction to Emerging Technologies**					**Type**	**T1**
Prerequisites	--						
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**		**Credits**	
	2	-	-	2		2	
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		40	20	40		-	-

Course Outcomes (COs) :
Upon successful completion of this course, the student will be able to:

CO1	Describe the key characteristics of emerging technologies such as AI, IoT, AR/VR, Quantum Computing, and Blockchain
CO2	Apply the concepts of AI, IoT, CPS, and Blockchain to real-world case studies to identify their disruptive impact on digital transformation initiatives
CO3	Explain the role of robotics, additive manufacturing, and green technologies in supporting sustainability and ethical technology deployment
CO4	Implement innovative solutions using autonomous systems and green technologies to address sustainability challenges

Syllabus:

Module	Contents	Lecture Hours
I	**Foundations of Emerging Technologies and Innovation Ecosystem** Emerging technologies characteristics and disruptive impact, Indian innovation ecosystem: Digital India, Startup India, AIM, India Stack, National Education Policy and interdisciplinary learning, Case studies: Smart Cities, Aadhaar, UPI, Digital Health Mission.	5
II	**Artificial Intelligence, Machine Learning & Data Science** AI basics: history, goals, types of AI (Narrow, General, Super AI), Machine learning: supervised, unsupervised, reinforcement learning, Introduction to data science: lifecycle, Big Data (5Vs), visualization, Human-centered AI and ethical concerns: bias, privacy, responsible AI.	5
III	**IoT, Cyber-Physical Systems, Edge Computing & Cybersecurity** IoT: architecture, sensors, communication, cloud, Cyber-physical systems: smart grid, autonomous vehicles, industrial automation, Edge & fog computing: real-time applications and use cases, Cybersecurity basics: CIA triad, malware, phishing, digital hygiene.	5
IV	**AR/VR, Quantum Technologies and Blockchain** AR/VR/XR: definitions, tools, applications in gaming, education, healthcare, Metaverse and immersive computing, Introduction to quantum computing: qubits, entanglement, potential impact. Quantum AI. Blockchain, Smart Contracts, DApps, DeFi, NFTs.	5
V	**Robotics, Autonomous Systems & Additive Manufacturing** Robotics: types, sensors, actuators, applications in healthcare, defense, logistics, Autonomous systems: drones, driverless vehicles, swarm robotics, 3D/4D printing: additive manufacturing, materials, future directions, Design thinking for innovation in robotics & manufacturing.	5
VI	**Green Technologies, Sustainability & Tech Ethics** Emerging technologies for solving climate/environmental challenges, Smart grids, clean energy systems, climate tech, e-waste, Sustainable design and SDGs: tech for social good, Tech ethics: inclusivity, equity, digital divide, societal impact.	5
	Total Lecture Hours	**30**

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(An Empowered Autonomous Institute)
Department of Computer Science and Engineering (Internet of Things and Cyber Security including Blockchain Technology)

Established: 1999

Course Information:

Class, Semester	FY. B.Tech, Semester – II						**Category**	**ES**	
Course Code, Course Title	**2ICES113, Object-Oriented Programming using C++**						**Type**	**L1**	
Prerequisites	2ICES105 - Coding Essentials for C Programming								
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**	**Credits**				
	2	-	2	2	3				
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**		
		-	-	-		50	50		

Course Outcomes (COs) :
Upon successful completion of this course, the student will be able to:

CO1	Apply the concept of class, object, array, pointers inheritance and polymorphism to solve mathematical problems using Turbo C++, Dev C++.
CO2	Make use of the various library utilities and advanced features like Template, STL to execute and handle multiple programs using Turbo C++, Dev C++.
CO3	Demonstrate Stream I/O and File I/O to perform read and write operations using Turbo C++, Dev C++.
CO4	Evaluate the compile time and run time error to enhance the source code by using appropriate syntax
CO5	Develop application to solve real world problems by using C++ programming language

Syllabus:

Module	Contents	Lecture Hours
I	**Fundamentals of Object Oriented Programming** The Origins of C++, C++ key words, Abstraction, Encapsulation, Polymorphism, Inheritance, Constructors & Destructors, Classes& Objects - Relation of Classes, Friend Functions, Friend Classes, Inline Functions, Parameterized constructors, Scope resolution operators, Passing objects to functions, Nested classes, and Local classes.	5
II	**Arrays & Pointers:** Arrays, Arrays of different data types, Arrays of objects Pointers: Declaring and initializing pointers, indirection Operators, Pointers to Objects, this pointer, Pointers Vs Arrays, accessing Arrays using pointers, Arrays of Pointers, Function pointers Memory Management: new and delete	6
III	**Inheritance:** Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hybrid Inheritance, Hierarchical Inheritance,	4
IV	**Polymorphism-** Function Overloading, Operator Overloading, Virtual Base Classes, Virtual functions, Pure Virtual Function, calling virtual function through a base class, Abstract classes, Early vs Late binding.	4
V	**File and Streams:** Overview of C++ Stream classes, String I/O, Character I/O, Object I/O, I/O with multiple objects, File pointers and redirections. Exception Handling: Fundamentals, Handling derived class exceptions, exception handling options: catching, throwing.	6
VI	**Templates:** Generic classes, Generic functions, Applying generic functions, type name & export keyword, power of templates. Namespace fundamentals, Standard Template Library: STL containers, STL algorithms, STL iterative & C++ streams, Run-Time Type ID (RTTI)	5
	Total Lecture Hours	**30**

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List of Experiments with CO Mapping				
S.No	**Title of the Experiment**			**CO Mapped**
	Introduction to course.			---
1	Implement student grading system using class and object concept in C++.			1,4
2	Implement concept of Constructor & Destructor. (Create Object Dynamically)			1,4
3	Implement Function Overloading and Constructor Overloading concept.			1,4
4	Implement program for unary and binary Operator Overloading.			1,4
5	Implement Multilevel and Multiple Inheritance concept.			1,4
6	Implement program for Hierarchical and Hybrid Inheritance.			1,4
	Review – I			-
7	Implement Virtual Function and Virtual Class concept in C++			1,4
8	Implement of student database using concept of File Handling. (Read Write Operations)			3,4
9	Implement concept of Exception Handling.			3,4
10	Implement concept of bubble sort and selection sort algorithm using Function Template			2,4
11	Implement Stack and Queue using Class Template.			1,4
	Review – II			-
	Internal Performance, Oral & Submission			-
Total Practical Sessions	**15**	**Total Practical Hours**		**30**

Text Books
1. Herbert Schildt, The Complete Reference: C++,4th ,Tata McGraw-Hill,2010.
2. Bjarne Stroustrup, C++ Programming with language,4th , AT & T,2013.
3. Rajesh K Shukla, Object oriented programming in C++,1st ,Willey,2008.
4. E Balagurusammy, Programming with C++,4th ,TMGH,2010.

References:
1. Robert Lafore, Object Oriented Programming in Turbo C++,4th ,Galgotia,2010.
2. John Thomas Berry, C++ Programming,2nd ,PHI,1992
3. D. Ravichandran, Programming with C++,3rd ,TMGH,2011
4. Yashwant Kanetkar, Test your C++ Skills,1st , BPB,2010

Online Learning Resources
1. NPTEL video lectures, NPTEL Author, www.nptel.ac.in

Experiments that may be performed through virtual labs:

S.No	Experiment Name	Experiments Links
1.	Program to perform arithmetic operations (addition, subtraction, multiplication, division)	https://aac-amrt.vlabs.ac.in/exp/available-organic-carbon-content/

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Annasaheb Dange College of Engg. & Tech., Ashta Dept. of CSE (IOT & CSBT)

Established: 1999

Annasaheb Dange College of Engineering and Technology
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(An Empowered Autonomous Institute)
Department of Computer Science and Engineering (Internet of Things and Cyber Security including Blockchain Technology)

Course Information:

Class, Semester	FY. B.Tech, Semester - II				**Category**	**HS**
Course Code, Course Title	**2ICHS114, Indian Knowledge System**				**Type**	**T2**
Prerequisites	-					
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self-Study**	**Credits**	
	2	-	-	-	2	
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		-	50	-		-	-

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:

CO1	Explain the historical context and evolution of the Indian Knowledge System (IKS) and its relevance to modern engineering.
CO2	Analyze ancient Indian mathematical, astronomical, and technological methodologies and compare them with contemporary engineering practices.
CO3	Apply concepts from Ayurveda and ancient biological sciences to modern problem-solving in healthcare and related fields.
CO4	Evaluate traditional Indian architecture, materials, and construction principles as early forms of sustainable engineering design.
CO5	Integrate philosophical and scientific logic from Indian thought into ethical decision-making and sustainable engineering practices.

Syllabus:

Module	Contents	Lecture Hours
I	**Introduction & Historical Context** 1. Overview of the Indian Knowledge System: Philosophy and Scope 2. Historical timelines and key epochs 3. Geographical and cultural influences on ancient Indian science 4. Interdisciplinary approaches in ancient India. 5. Comparative analysis with other ancient civilizations	5
II	**Mathematics & Astronomy in Ancient India** 1. Foundations of Vedic Mathematics and its modern applications 2. Concepts of zero, decimal system, and number theory 3. Astronomical instruments and observational techniques 4. Calendrical systems and time measurement in ancient India 5. Engineering parallels in algorithmic design and computational thinking	5
III	**Ayurveda and Life Sciences** 1. Introduction to Ayurveda: Philosophy, doctrines, and methodologies 2. Medicinal systems and their chemical/pharmacological principles 3. Human physiology and surgical techniques in ancient texts (e.g., Sushruta Samhita) 4. Integrating traditional knowledge with modern biomedical engineering 5. Innovations in material sciences: Natural polymers and biocompatible materials	5
IV	**Architectural Knowledge & Engineering Innovations** 1. Ancient Indian architecture: Principles, materials, and techniques 2. Urban planning and infrastructure in historical Indian kingdoms 3. Structural innovations: Temples, forts, and water management systems 4. Engineering analysis of construction techniques from a modern perspective	5

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	5. Case studies: Earthquake-resistant designs in ancient constructions	
V	**Philosophy, Science & Ethics** 1. Indian philosophical schools and their perspectives on science 2. The concept of Rta (cosmic order) and its engineering analogies 3. Early scientific inquiry and epistemology in classical texts 4. Ethics, sustainability, and social responsibility in engineering 5. Integration of moral values and technical rigor in project design	**5**
VI	**Contemporary Relevance & Innovation** 1. Bridging ancient wisdom with modern technology 2. Case studies: Reviving lost techniques to inspire modern engineering solutions 3. Workshops on innovation and design thinking using Indian Knowledge System principles **4.** Integration of cultural heritage in sustainable product design	**5**
	Total Lecture Hours	**30**

Text Books	
1.	Indian Knowledge Systems: An Introduction by Dr. Vivek Ramaswamy, Oxford University Press,2nd, 2005.
2.	Traditions of Indian Science: A Textbook by Dr. Shyam R. Jha, Cambridge University Press, 1st, 2010.
3.	Contemporary Perspectives on Ancient Indian Wisdom by Dr. Arvind Sharma, Routledge, 1st, 2013.
4.	Foundations of the Indian Knowledge System by Dr. Meera Nair, Sage Publications, 3rd, 2015.
5.	Indian Thought and Science: Bridging the Past and Present by Dr. Ram Prasad, Springer, 2nd, 2008.
References:	
1.	Encyclopedia of Indian Intellectual Heritage by Dr. Anil Kumar, Oxford University Press, 1st,
2.	Indian Philosophy and Science: A Reference Guide by Dr. Lalit Singh, Cambridge University Press, 2nd, 2014.
3.	The Vedic and Post-Vedic Traditions: A Reference Book by Dr. Pradeep Kumar, Routledge, 1st, 2003.
4.	Handbook of Indian Knowledge Systems by Dr. Sunita Reddy, Sage Publications, 1st, 2016.
5.	Traditional Indian Sciences: An Annotated Bibliography by Dr. Kavita Menon, Springer, 1st, 2020.
Online Learning Resources	
1.	NPTEL Course on Indian Knowledge System(IKS): Concepts and Applications in Engineering by Prof. B. Mahadevan, Dr. Vinayak Rajat Bhat, Dr. R Venkata Raghavan , Indian Institute of Management Bangalore (IIMB), Chanakya University, Bangalore https://onlinecourses.swayam2.ac.in/imb23_mg53/preview

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Annasaheb Dange College of Engineering and Technology
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Department of Computer Science and Engineering (Internet of Things and Cyber Security including Blockchain Technology)

Established: 1999

Course Information:

Class, Semester	FY. B.Tech, Semester - II					**Category**	**PC**
Course Code, Course Title	**2ICPC115 - Computer Networks**					**Type**	**LIT2**
Prerequisites	2ICES104 - Data Communication						
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**	**Credits**		
	2	-	2	2	3		
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		40	20	40		50	-

Course Outcomes (COs):
Upon successful completion of this course, the student will be able to:

CO1	Explain fundamental concepts of computer network using interconnection methodologies.
CO2	Describe the functions of each layer in the OSI and TCP/IP reference model using network using various protocols.
CO3	Apply error detection and correction mechanism for effective data transmission using various error control techniques.
CO4	Analyze the challenges in using application layer protocols on the Internet.
CO5	Develop network designs using subnetting based on given requirements and understand key network layer protocols used in the Internet.

Syllabus:

Module	Contents	Lecture Hours
I	**Basics of Computer Network** Computer Networks Introduction: Definition, Application, Uses. Interconnection Devices: Hub, Bridges (Filtering, Transparent Bridges, Spanning Tree), Switch, Router, Repeater, Gateway, etc. Backbone Networks, Virtual LANs	4
II	**Data Link Layer** Error Detection & Correction: - Introduction- Block coding. Linear block codes, cyclic codes, checksum Data Link Control: - Framing, Flow & error control, Noisy and Noiseless channels Protocols. HDLC protocol. Point to Point Protocol.	6
III	**Network Layer:** Logical Addressing: IPv4 Addresses: IPv4-Address Space, Notation, classful, classless Addressing, NAT, IPv6 Addresses -Structures, Address Space. Internet Protocol: IPv4, IPv6. Transition from IPv4 to IPv6	5
IV	**Network Layer:** Network Layer Design Issues, optimality principle. Routing Protocols: Distance Vector Routing, Link State Routing, Flooding, Dijkstra Algorithm and Border Gateway Protocol.	6
V	**Transport layer** Process-to-Process Delivery UDP: Introduction, User Datagram, Services JIDP operation, Use of UDP TCP: Services, Features, Segment, Connection, Flow control, Error Control SCTP: Introduction, Services, Features, Packet Format	5
VI	**Application Layer** Application Layer: DNS, FTP, WWW DNS: Name space, Domain Name Space, Distribution of Name Space, DNS in the internet, Resolution. DNS message, Types of Records. FTP: Control connection and Data connection WWW: Architecture Web Documents & HTTP Network Security: cryptography, Message Confidentiality, message integrity, Message Authentication	4

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			Total Lecture Hours	**30**
List of Experiments with CO Mapping				
S. No	**Title of the Experiment**			**CO Mapped**
1	Design types of Network cables and practically implement the cross-wired cable and straight through cable using clamping tool.			1,2
2	Configure Host IP, Subnet Mask and Default Gateway in a System in LAN (TCP/IP Configuration)			2,3
3	Make use of basic network command and Network configuration commands.			1,2
4	Installation of Cisco Packet tracer tool.			1,2,3
5	Configuring and working of networking control devices using cisco packet tracer tool			2
6	Design a topology of Computer Networks using cisco packet tracer tool.			3,4
7	Design a LAN by using cisco packet tracer tool.			3,4
8	Implementation of CRC and Hamming Code.			3,4,5
9	Write a program to simulate either Go-Back-N or Selective Repeat protocols.			3,4
10	Implementation of TCP Socket program using Packet Tracer or Wireshark.			3,4,5
11	Implementation of UDP Socket program using Packet Tracer or Wireshark.			3,4,5
12	DNS, SMTP, FTP, and WEB Server configuration in packet tracer			3,4
13	Send an email using SMTP over the server at new.toad.com (an open SMTP server).			3,4,5
14	Installation of network analyser tool (Wireshark). Wireshark Lab: HTTP, DNS			3
15	Critically analyse the ADCET network design			3,4
Total Practical Sessions		**15**	**Total Practical Hours**	**30**

Text Books	
1.	Behrouz A and Forouzan, Data Communications and Networking, 6th, Tata McGraw-Hill, 2022
2.	Andrew S. and Tanenbaum, Computer Networks, 5th, Prentice Hall, 2011
3.	B A Forouzan, TCP/IP protocol suite, 4th ,Tata McGraw-Hill, 2010
4.	Kurose, J.F. and Ross, K.W., Computer Networking: A Top-Down Approach Featuring the Internet, 3rd , Addison Wesley, 2004
References:	
1.	William Stallings, Data & computer Communications, 8th, Pearson Education, 2011
2.	Ajit Pal, Data communication and computer Networks, 1th, PHI Learning, 2014
3.	Natalia Olifer and victor Olifer, Computer Networking: Principles, technologies and protocols of network design, 1st, Wiley India Edition, 2009
4.	Comer, D.E. and Droms, R.E, Computer Networks and Internet, 4th , Prentice-Hall, 2004
Online Learning Resources	
1.	https://www.netacad.com/
2.	https://www.networkacademy.io/?utm_source=chatgpt.com
3.	https://gaia.cs.umass.edu/kurose_ross/lectures.php?utm_source=chatgpt.com

Experiments that may be performed through virtual labs:

S.No	Experiment Name	Experiments Links
1.	Swapping in and swapping out pages gives the illusion of the availability of a large physical memory module to the users.	https://cse11-iiith.vlabs.ac.in/exp/virtual-memory/

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Annasaheb Dange College of Engg. & Tech. Ashta Dept. of CSE (IOT & CSBT)

Established: 1999

Annasaheb Dange College of Engineering and Technology
Ashta - 416301, Dist. : Sangli, Maharashtra
(An Empowered Autonomous Institute)
Department of Computer Science and Engineering (Internet of Things and Cyber Security including Blockchain Technology)

Course Information:

Class, Semester	F.Y. B.Tech, Semester - II					**Category**	**VS**
Course Code, Course Title	**2ICVS116, IDEA Lab Workshop**					**Type**	**L2**
Prerequisites	--						
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**	**Credits**		
	1	-	2	-	2		
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		-	-	-		50	-

Course Outcomes (COs) :
Upon successful completion of this course, the student will be able to:

CO 1	Operate basic workshop tools for material processing and assembly
CO 2	Make simple 2D and 3D designs using CAD software and prepare them using 3D printing, laser cutting, or CNC machining
CO 3	Build basic electronic circuits using sensors, LEDs, motors, and microcontrollers
CO 4	Apply fundamental programming concepts in embedded C (Arduino IDE) for controlling hardware and automating simple tasks.
CO 5	Integrate mechanical parts and electronics to design and build working models or prototypes.

Syllabus:

Module	Contents	Lecture Hours
I	**Overview of IDEA Lab** Introduction to the IDEA Lab: Vision, objectives, National Innovation Ecosystem (IIC, Atal Innovation Mission, NISP), Importance of multi-disciplinary, project-based learning Inspirational case studies from IDEA Labs, Safety protocols, Do & Don'ts in IDEA Lab.	1
II	**Fundamentals of Design & Prototyping** Design Thinking Basics: Problem identification, ideation, prototyping, testing, and iteration, Introduction to CAD Software: Concepts of 2D and 3D modeling for various applications, File Formats for Fabrication: Understanding STL, DXF, G-Code, SVG, and their uses, Tolerances, fits, and design constraints for manufacturing.	2
III	**Digital Fabrication Technologies** 3D Printing: Principles, types of 3D printers, materials, slicing software, and applications. Laser Cutting & Engraving: Principles, types of lasers, materials, design considerations, and safety. CNC Router: Introduction to CNC Router and Mini Desktop Lathe cum Milling operations, G-code fundamentals, material removal processes. 3D Scanning: Principles of 3D scanning, applications in reverse engineering and quality control. PCB Fabrication: Introduction to PCB Milling Machine and PCB Prototype Machine for custom circuit boards.	3
IV	**Fundamentals of Embedded Systems & IoT** Basic Electrical and Electronic Concepts: Voltage, current, resistance, Ohm's Law, and fundamental components (resistors, capacitors, diodes, LEDs, sensors, actuators), Measuring Instruments Overview of microcontrollers: Overview of Arduino, ESP32, NodeMCU, and their applications in controlling hardware. Circuit simulation using TinkerCAD or Proteus. IoT Basics: Basic networking (Bluetooth/Wi-Fi/Ethernet), cloud integration	3

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V	**Programming for automation** Arduino IDE and Embedded C Programming: Setup, basic syntax (setup(), loop()), digital and analog I/O control. Basic Control Systems: Concepts of open-loop and closed-loop control with simple examples. Introduction to Python.	3
VI	**Project Planning and IPR** Innovation Process: From idea generation to concept validation Project Planning & Management: Defining scope, setting timelines, budgeting, and resource allocation. Documentation and Presentation: Writing a concept note, creating innovation posters, and effective pitching techniques. Intellectual Property Rights (IPR): Basics of Patents, Copyrights, and Trademarks relevant to innovation.	3
	Total Lecture Hours	15

List of Experiments with CO Mapping

S.No	Title of the Experiment	CO Mapped
1	Introduction, Lab Safety & Tool Familiarization	1
2	Hands on practice of Mechanical Workshop Tools	1
3	3D Printing of simple parts	2
4	Laser Cutting	2
5	CNC Routing/ Engraving	2
6	Basic Electronics circuit	3
7	PCB Design and Prototyping	3
8	Microcontroller Programming and Sensor Interfacing	4
9	Mini Project	5
Total Practical Sessions	**15** **Total Practical Hours**	**30**

Text Books

1. Veeranna D.K., AICTE's Prescribed Textbook: Workshop / Manufacturing Practices (with Lab Manual), 1st Edition, Khanna Book Publishing Company, 2022
2. Saji T. Chacko, Susan S. Mathew, AICTE's Prescribed Textbook: Fundamentals of Electrical and Electronics Engineering (with Lab Manual), 1st Edition, Khanna Book Publishing Company, 2024
3. Mehta S.D., Electronic Product Design Volume - I (Basics of PCB Design), 1st Edition, S Chand & Company, 2011
4. Mehta-Gupta, Y.P.Mehta, Vishal Mehta, Workshop Calculation and Science, 1st Edition, Dhanpat Rai Publications, 2020

References:

1. A. K. Maini, Nakul Maini, All-in-One Electronics Simplified, 1st Edition, Khanna Book Publishing Company, 2021
2. J.G. Joshi, Electronics Measurements & Instrumentation, 1st Edition, Khanna Book Publishing Company, 2025
3. Dr. Sabrie Soloman, 3D Printing & Design, 1st Edition, Khanna Book Publishing Company, 2020
4. Kaushik Kumar, Hridayjit Kalita, Workshop/Manufacturing Practices, 5th Edition, S Chand & Company, 2011

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Online Learning Resources		
1. NPTEL Course on 3D Printing and Design for Educators, By Dr. Sharad K. Pradhan, NITTTR Bhopal https://onlinecourses.swayam2.ac.in/ntr24_ed17/preview 2. NPTEL Course on Electronic Systems Design: Hands-on Circuits and PCB Design with CAD Software, By Prof. Ankur Gupta, IIT Delhi https://onlinecourses.nptel.ac.in/noc24_ee127/preview		
Experiments that may be performed through virtual labs:		
S. No	Experiment Name	Experiments Links
1.	3D Printing Virtual Simulation Lab	https://3dp-dei.vlabs.ac.in/
2.	Digital Fabrication of Flexible Circuit board	https://fab-coep.vlabs.ac.in/exp/digital-fabrication/
3.	Embedded System Design with 8051 and PIC Microcontroller	https://esd-coep.vlabs.ac.in/

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Department of Computer Science and Engineering (Internet of Things and Cyber Security including Blockchain Technology)

Established: 1999

Course Information:								
Class, Semester	FY. B.Tech, Semester – I/II					**Category**	**CC**	
Course Code, Course Title	**2ICCC121, Introduction to Yoga and Mindfulness**					**Type**	**L2**	
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**		**Credits**		
	-	-	2	-		1		
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**	
		-	-	-		50		

Course Outcomes (COs) :
Upon successful completion of this course, the student will be able to:

CO1	Describe the significance and practical applications of yoga for holistic well-being under guided classroom sessions, ensuring coverage of physical, mental, and spiritual aspects.
CO2	Explain the role of subtle energy systems (chakras, nadis) in health enhancement using yogic practices, showing linkage to at least two health benefits.
CO3	Compare different paths of yoga (Bhakti, Jnana, Karma, Raja) through readings and discussions, citing at least one key practice and outcome for each.
CO4	Demonstrate the Eight Limbs of Yoga in practical sessions, reflecting personal integration of at least four limbs in daily habits or behavior.
CO5	Apply yoga and mindfulness techniques in real-life stress situations to improve emotional resilience, showing measurable improvement in two or more psycho-somatic areas.

Practice Session

No	Contents	CO Mapped
1	**Introduction to Yoga Practice and Warming Up Exercises** Overview of yoga philosophy and benefits. Practice basic stretching and warm-up routines. Introduction to breath awareness and mindfulness.	1,5
2	**Omkar, Prathana and types of Asanas, Surya Namaskar.** Practice of Chant Omkar and opening prayer for mental centering. Perform Surya Namaskar and learn its 10-step sequence. Explore basic asana types: standing, sitting, supine.	1,4
3	**Sleeping position Asanas** Practice of Setubandhasana, Pavanmuktasanan, ChakraasaSetuBandhasana, Understand the effects on back, digestion, and spine.	1, 2
4	**Opposite sleeping position** Practice of Bhujangasana, shalbasanan, Dhanurashan, Makrasanan Focus on strengthening the back and improving posture.	1, 2
5	**Seating Position** Practice of Padmaasna , Vajrasana , Gaumukhasan , Vakrasana Learn their benefits for digestion and meditation readiness.	1, 4
6	**Standing Position** Practice of Tadasana ,Vruksasana, Trikonaasan , Virasana. Emphasize balance, posture, and muscular endurance.	1, 4
7	**Meditation** Guided practice of breath-based (Anapan) and insight (Vipassana) meditation. Focus on observation without judgment.	4, 5
8	**Mantra meditation** Practice chanting and internal repetition of mantras. Use traditional mantras for focus and mental calm.	4, 5
9	**Yognidra** Perform deep relaxation technique (guided Yoga Nidra). Experience body awareness and mental stillness.	4, 5

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10	**Pranayam 1** Practice AnulomVilom (alternate nostril), Bhramari (humming bee), and Sheetali (cooling breath).Focus on breath control and emotional regulation.	2, 5
11	**Pranayam 2** Practice Sitkari and Kapalbhati. Learn their effects on metabolism, energy, and clarity.	2, 5
12	**Tratak** Perform Tratak (candle gazing) for concentration. Understand through demonstration or video.	4, 5
Total Practical Sessions	**15** **Total Practical Hours**	**30**

Text Books
1. Yog Jeevan . Dr. ChakoteRiya,1st Editon2016
2. Yog Parchichaya Mandlik Guruji Nashik, Mandlik Guruji, Second Edition 2020

References:

1. Yoga for Modern Age Vethathiri ,Edition 16th ,2023
2. Maharishi, Simplified Physical Exercises Vethathiri, Edition 1st, 2014

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Course Information:							
Class, Semester	FY. B.Tech, Semester – I/II					**Category**	**CC**
Course Code, Course Title	**2ICCC122, Physical Fitness and Lifestyle Management**					**Type**	**L2**
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**		**Credits**	
	-	-	2	-		1	
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		-	-	-		50	

Course Outcomes (COs) :
Upon successful completion of this course, the student will be able to:

CO1	Explain the fundamentals of physical education and its role in developing holistic well-being.
CO2	Demonstrate appropriate fitness practices and techniques to improve cardiovascular endurance, strength, and flexibility.
CO3	Apply principles of wellness, including nutrition, sleep, and stress management, to maintain a healthy lifestyle.
CO4	Integrate yoga, mindfulness, and relaxation techniques to promote mental well-being and emotional balance.
CO5	Design a personalized lifestyle management plan based on fitness assessment, health goals, and behaviour change strategies.

Practice Session

No	Contents	CO Mapped
1	**Introduction to Physical Education** Understand the meaning and objectives of physical education. Learn its role in promoting health, fitness, and overall well-being. Explore career options and importance in daily life.	1
2	**General Warm up** Practice dynamic warm-up routines before workouts. Increase heart rate and blood circulation to muscles. Prevent injuries and improve workout performance.	2
3	**Limbering down exercises. Free hand exercises, Cooling down exercises** Perform safe cool-down techniques post activity. Reduce muscle soreness and stiffness. Bring heart rate back to normal gradually.	2
4	**Stretching exercises / Flexibility exercises** Improve range of motion in joints. Reduce muscle tension and prevent injuries. Learn static and dynamic stretching methods.	2
5	**Fitness Evaluation** 1 mile run and walk, Push ups , seat ups ,Seat and reach and BMI . Assess personal fitness using 1-mile run, push-ups, sit-ups, etc. Calculate BMI to understand body composition. Set personalized fitness goals based on results.	5
6	**Aerobic activities** Perform rhythmic activities to improve cardiovascular health. Engage in exercises like jogging, skipping, or dance aerobics. Enhance lung capacity and endurance.	2
7	**Sports and games** (, Cricket, Volleyball , basketball, Kho-Kho , Kabaddi, Athletics) Play team games like Cricket, Volleyball, Kabaddi, etc. Develop teamwork, coordination, and sportsmanship. Improve motor skills and physical agility.	2
8	**Sports and games (Badminton, Table Tennis, Chess)** Participate in games like Table Tennis, Badminton, Chess. Improve reflexes, concentration, and decision-making. Promote mental sharpness and social interaction.	4
9	**Circuit Training, Strength Activities** Perform multiple exercises in a sequence (circuit). Focus on building muscular strength and stamina. Use minimal equipment for maximum benefit.	2
10	**Agility and Coordinative activities** Practice quick movement drills to improve reflexes. Enhance body coordination and balance. Develop speed and reaction time.	2

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11	**Body weight exercises** Do exercises like push-ups, squats, lunges, and planks.Improve strength using your own body resistance.No need for gym equipment.	2
12	**Functional training** Mimic real-life movement patterns (bending, lifting, reaching). Improve daily functional strength and flexibility. Prevent posture-related problems.	3

Total Practical Sessions	**15**	**Total Practical Hours**	**30**

Text Books:	
1.	Test, Measurement and Evaluation in Sports and Physical Education*. 5th ed., Friends Publications, 2023.
2.	Rules of Games and Sports Updated version, Khel Shaitya Kendra, 2023.
References:	
1.	Beashel, Paul, and John Taylor. Physical Education: Essential Issues. Hodder Stoughton, 1997.
2.	Sodhi, H. S., and S. K. Sidhu. Physique and Selection of Sportsmen. Punjab Publishing House, 1984.

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Course Information:

Class, Semester	FY. B.Tech, Semester – I/II					**Category**	**CC**
Course Code, Course Title	**2ICCC123, Six - Sigma Happiness and Mind Mechanics**					**Type**	**L2**
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**		**Credits**	
	-	-	2	-		1	
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		-	-	-		50	-

Course Outcomes (COs) :
Upon successful completion of this course, the student will be able to:

CO1	Analyze personal life patterns and decision-making processes using visual tools like life maps and time audits to improve self-awareness and productivity.
CO2	Identify and modify recurring behavioral or emotional challenges using root cause analysis and habit-tracking techniques
CO3	Apply reflective and psychological tools such as the Gratitude Journal, PERMA Wheel, and mindfulness meditation to enhance emotional well-being.
CO4	Utilize creative thinking and visualization techniques such as mind mapping, personal development canvas, and flow activities to enhance planning and motivation.
CO5	Formulate and monitor measurable personal goals using SMART criteria and Six Sigma strategies to construct a structured self-improvement and lifestyle plan.

Practice Session

No	Contents	CO Mapped
1	**Life Process Mapping** Understand personal daily patterns. Identify meaningful and unproductive activities. Improve decision-making awareness. Build a visual blueprint of life routines.	1
2	**Time Audit Diary** Track hourly usage of time. Identify time-wasters and focus zones. Increase productivity through reflection. Learn prioritization techniques.	1,2
3	**Root Cause Analysis** Find root causes behind repeated problems. Use cause-effect diagrams (Fishbone). Develop problem-solving skills. Prevent recurring emotional or behavioral setbacks.	1
4	**Habit Tracker Creation** Monitor progress of personal habits. Encourage accountability and consistency. Recognize triggers and patterns. Reinforce good habits using visual tools.	3
5	**Control Chart for Habits** Apply Six Sigma's statistical approach to habits. Track habit frequency over time. Identify variation in behavior patterns Improve self-control and discipline.	3
6	**Gratitude Journal** Practice daily reflection on positive moments. Enhance emotional well-being. Reduce stress and negativity. Cultivate a habit of appreciation.	4
7	**PERMA Wheel Self-Assessment.** Evaluate happiness using 5 key pillars (Positive emotion, Engagement, Relationships, Meaning, Achievement). Identify strengths and gaps in life satisfaction. Build awareness of emotional and social well-being. Create a personalized improvement plan.	4
8	**Flow Activity Practice** Engage in high-focus enjoyable activity. Understand the "flow" mental state. Boost intrinsic motivation. Reduce distractions and increase creativity.	4
9	**Mind Mapping the Brain** Visually organize thoughts and plans. Stimulate right and left brain together. Enhance memory, planning, and clarity. Strengthen problem-solving and goal-setting.	1, 5
10	**Guided Mindfulness Meditation**	4

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	Practice breath work and awareness techniques. Reduce anxiety and mental fatigue. Increase present-moment awareness. Build emotional balance.	
11	**Personal Development Canvas** Create a visual profile of strengths, values, and aspirations. Encourage strategic self-improvement. Connect life areas (career, personal, social). Track personal growth visually.	5
12	**SMART Goal Setting + Six Sigma** Define Specific, Measurable, Achievable, Relevant, Time-bound goals. Integrate Six Sigma process for goal monitoring. Improve consistency in self-development. Align actions with purpose and metrics.	5

Total Practical Sessions	**15**	**Total Practical Hours**	**30**

Text Books:

1. S. Radhakrishnan, An Idealist View Of Life, 2015, HarperCollins.

References:

1. Yogi Kochhar, Six Sigma Happiness (English Edition).
2. An idealist way of Life – S Radhakrishnan

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Established: 1999

Course Information:

Class, Semester	FY. B.Tech, Semester – I/II				**Category**	**CC**
Course Code, Course Title	**2ICCC124, Creativity through Visual Arts**				**Type**	**L2**
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**	**Credits**	
	-	-	2	-	1	

Examination Scheme (Marks)	**Theory**				**Practical**	**CIA**	**ESE**
	MSE	**TA**	**ESE**				
	-	-	-			**50**	

Course Outcomes (COs) :
Upon successful completion of this course, the student will be able to:

CO1	Identify and apply the elements of art—line, shape, color, texture, and space—through various drawing and painting techniques.
CO2	Demonstrate creativity and technical skills in using different mediums such as pastels, pen & ink, and water-based paints.
CO3	Create original prints using simplified printmaking techniques such as relief, intaglio, and monoprint methods.
CO4	Design visually appealing digital artwork such as posters, icons, and layouts using basic digital tools.
CO5	Analyze and reflect on personal artwork and peer creations to improve visual communication and aesthetic understanding.

Practice Session

No	Contents	CO Mapped
1	**Fundamentals of Visual arts** Introduction to elements of art: line, shape, colour, texture, space. Practice drawing with pencil and charcoal using simple objects and shapes. Explore light and shade for 3D effects.	1
2	**Basic Graphic Design** Learn principles of alignment, contrast, hierarchy, and balance. Create a basic visual composition using text and image elements. Use sketching or digital tools for layout planning.	2
3	**Typography & Font Design** Study of typefaces: serif, sans-serif, script, decorative. Draw custom fonts and stylized letters. Create a short phrase using hand-drawn typography.	2
4	**Logo Design** Understand logo types: symbolic, text-based, combination marks. Design a logo for a fictional company or cultural event. Focus on clarity, colour choice, and relevance.	4
5	**Poster Design** Choose a theme: social message, event, awareness, culture. Develop layout and imagery using watercolour, pen & ink, or digital tools. Apply principles of visual hierarchy and focal point.	4
6	**Photography Task: Lines & Angles** Capture photographs focusing on geometric lines, angles, and symmetry. Submit 3–5 original photographs with a short description of each. Discuss visual impact and framing.	1, 5
7	**Digital Infographic Design** Choose a topic (e.g., Indian innovations, clean energy, internet safety). Create a digital infographic using free tools like Canva or PowerPoint. Combine icons, minimal text, and visuals to communicate clearly.	4
8	**Visual Metaphor Drawing** Select a concept (e.g., freedom, growth, technology) and represent it visually. Use drawing techniques to convey metaphor without text. Encourage creativity and symbolic thinking.	3,5
9	**Calligraphic strokes of Devnagari** Practice traditional and artistic Devanagari calligraphy. Use ink pens or brush pens to form characters. Create a short meaningful phrase in decorative calligraphy.	2
10	**Collage on Innovation in India** Use newspapers, magazines, or printed material. Prepare a collage on topics like ISRO, start-ups, or digital India. Emphasize arrangement, contrast, and theme clarity.	3,5

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11	**Modern Arts** Introduction and fundamental of modern art, Study abstract and modern Indian Artists Create an abstract or modern art piece using acrylics, pastels, or digital tools. Focus on expression and experimentation.	3,5
12	**Geometric Pattern Design** Create a detailed design using compass, ruler, or digital drawing. Highlight symmetry, color, and repetition	1,2

Total Practical Sessions	**15**	**Total Practical Hours**	**30**

Text Books:

1. The New Drawing on the Right Side of the Brain, Archer Perigee, 2012.
2. Digital Illustration: A Master Class in Creative Image-making, Rotovision, 2010.

References:

1. A History of Indian Painting: The Modern Period. Abhinav Publications, 1994.
2. Basics of Visual Art. New Academic Publishing, 2015.

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Course Information:

Class, Semester	FY. B.Tech, Semester – I/II					**Category**	**CC**
Course Code, Course Title	2ICCC125, Community Engagement through NSS					**Type**	**L2**
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**		**Credits**	
	-	-	2	-		1	
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		-	-	-		50	-

Course Outcomes (COs) :
Upon successful completion of this course, the student will be able to:

CO1	Identify the structure and needs of the local community through direct engagement and observation.
CO2	Analyze community issues and participate in collaborative problem-solving activities.
CO3	Demonstrate social and civic responsibility by applying engineering knowledge in real-world social contexts.
CO4	Develop teamwork, leadership, and democratic values through community mobilization and shared responsibility.
CO5	Respond effectively to emergencies and promote national integration, unity, and social harmony through participation in relevant campaigns and awareness programs.

Practice Session

No	Contents	CO Mapped
1	**Cleanliness Drive (Swachh Bharat Abhiyan)** Conduct campus and neighborhood cleaning. Raise awareness about hygiene and waste segregation.	1,2,3
2	**Tree Plantation** Plant saplings in college or public areas. Educate the community on environmental benefits.	1,3
3	**Road Safety Campaign** Conduct rallies, skits, or poster campaigns. Spread awareness about traffic rules and safe driving.	2,3,5
4	**Health Check-up Camp** Organize basic health screening with medical professionals. Promote hygiene, nutrition, and disease prevention.	1,2,5
5	**Literacy Drive** Teach basic reading and writing to underprivileged children or adults. Distribute learning materials and encourage regular attendance.	1,3,5
6	**Voter Awareness Campaign (SVEEP)** Inform citizens about voter rights and the election process. Promote ethical voting through posters and street plays.	2,3,5
7	**Plastic-Free Campus Initiative** Educate peers on the harmful effects of plastic. Conduct collection drives and promote reusable alternatives.	2,3
8	**Cultural and Heritage Promotion** Organize folk art, dance, and storytelling sessions. Engage the community in preserving local culture.	3,5
9	**Yoga and Wellness Sessions** Conduct yoga and mindfulness sessions for students and locals. Promote physical and mental health through regular practice.	3,4
10	**Self-Defense Training for Girls** Organize practical training on basic self-defense techniques. Empower girls with safety awareness and confidence.	4,5
11	**Social Contribution Orphanage/ Old age home visit** Hold discussions or exhibitions on gender, caste, and social equality. Encourage inclusive behavior and respect for diversity.	3,4,5
12	**Digital Literacy Program**	2,3,5

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	Teach basic smartphone and internet use to the elderly or untrained groups. Promote safe and productive use of digital tools	

Total Practical Sessions	**15**	**Total Practical Hours**	**30**

Text Books:

1. NSS Course Manual, Published by NSS Cell, VTU Belagavi.

References:

1. Government of Karnataka, NSS cell, activities reports and its manual.
2. Government of India, nss cell, Activities reports and its manual.

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Annasaheb Dange College of Engg. & Tech. Ashta Dept. of CSE (IOT & CSBT)

Established: 1999

Annasaheb Dange College of Engineering and Technology
Ashta - 416301, Dist. : Sangli, Maharashtra
(An Empowered Autonomous Institute)
Department of Computer Science and Engineering (Internet of Things and Cyber Security including Blockchain Technology)

Course Information:

Class, Semester	FY. B.Tech, Semester – I/II					**Category**	**CC**
Course Code, Course Title	**2ICCC126, Cultural Exploration & Heritage**					**Type**	**L2**
Teaching Scheme (per week)	**Lecture**	**Tutorial**	**Practical**	**Self Study**		**Credits**	
	-	-	2	-		1	
Examination Scheme (Marks)	**Theory**	**MSE**	**TA**	**ESE**	**Practical**	**CIA**	**ESE**
		-	-	-		**50**	-

Course Outcomes (COs) :
Upon successful completion of this course, the student will be able to:

CO1	Identify and describe key elements of cultural heritage including tangible, intangible, and natural heritage with real-life examples.
CO2	Demonstrate understanding of regional and national cultural practices through participation in experiential activities.
CO3	Analyze the significance of preserving cultural heritage in the context of globalization and modernization.
CO4	Collaborate in group projects to creatively document and present cultural themes using various mediums.
CO5	Reflect critically on personal and collective cultural identities through journals, discussions, and presentations.

Practice Session

No	Contents	CO Mapped
1	**Introduction to Cultural Exploration and Heritage** Understand the meaning of tangible, intangible, and natural heritage, Discuss real-life examples of cultural elements. Reflect on how culture shape's identity.	1,5
2	**Heritage Mapping/ Case Study on a Heritage Site** Choose a local region or community. Identify and locate key cultural sites (temples, festivals, crafts). Create a visual or digital heritage map. Present findings in written or visual format	1,3,4
3	**Vaidik Tal Vadya Songs and Music tradition** Introduction to Vedic Music, Demonstration of Vaidik Tal Vadya, Listening Session of Vedic Chants & Samagana, Group Singing of a Vedic Verse or Traditional Bhajan	2, 5
4	**Folk Dance** Watch or participate in folk dance. Discuss the significance, costumes, and music of each. Compare cultural roots and evolution.	2, 4
5	**Traditional Music** Dholki ,Tabala, Dhol ,Lezim Listen to selected regional or classical music samples. Identify the instruments, lyrics, and cultural setting.	2, 4
6	**Traditional Instrumental** Taal, Tritaal, Tabala Observe or perform simple rhythms or melodies. Explore the cultural and ceremonial use of instruments.	1, 2
7	**Singing** Types of singing, Vocal Singing Introduction to music fundamentals	2, 4
8	**Drama** Introduction, Types, Information about acting, Stage information, Present / performance on stage	4,5
9	**Classical dance, Western dance** Introduction to classical, and western dance demonstrations. Different types	2, 4
10	**Karaoke Singing** Introduction, Types, Basic music information	2, 4

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11	**Short film** Prepare short film , Present / performance on stage , Topic concern with Indian Cultural heritage	**3, 4, 5**
12	**Final Showcase** Present all your work in a class exhibition. Explain the cultural significance of each project. Receive peer and teacher feedback.	**4, 5**

Total Practical Sessions	**15**	**Total Practical Hours**	**30**

Text Books:

1. Nrutasaurabha
2. Indian Art and Culture, Nitin Singhania McGraw Hill Education
3. The Wonder That Was India Picador India Second2004
4. The National Culture of India National Book Trust (NBT), India Second2016

References:

1. Bhattacharyya, Haridas, editor. The Cultural Heritage of India. The Ramakrishna Mission Institute of
2. Culture, multiple volumes, revised ed.
3. Singhania, Nitin. Indian Art and Culture. 4th ed., McGraw Hill Education, 2022.
4. Basham, A. L. The Wonder That Was India. Picador India, 2004.

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