Semester-wise Details of the Courses of B.Tech. (CSE)

SEMESTER 1

Catalog Course Code	Course Code	Course Type	Course Title	Engagement Hrs/Week (Teaching Scheme)				Credits	Continuous Assessment		Term End Examination		Total
				L	T	P	Total		Theory	Practical	Theory	Practical	
STENCS001V0	DP0402032 5101	BSC	Linear Algebra and Differential Calculus	3	1	-	4	4	60	0	40	0	100
STENCS002V0	DP0402032 5102	BSC	Physics for Computing/Electrochemistry & Battery Science	3	-	-	3	3	45	0	30	0	75
STENCS109V0	DP0402032 5103	BSC	Applied Chemistry	3	-	-	3		45	0	30	0	75
STENCS003V0	DP0402032 5104	ESC	Basic Electrical & Electronics Engineering	3	-	-	3	3	45	0	30	0	75
STENCS004V0	DP0402032 5105	ESC	Computer Essentials Workshop	-	-	2	2	1	0	25	0	0	25
STENCS005V0	DP0402032 5106	ESC	Problem Solving through Programming	3	-	-	3	3	45	0	30	0	75
STENCS006V0	DP0402032 5107	ESC	Basic Electrical & Electronics Engineering Lab	-	-	2	2	1	0	25	0	0	25
STENCS007V0	DP0402032 5108	ESC	Problem Solving through Programming Lab	-	-	2	2	1	0	0	0	25	25
STENCS008V0	DP0402032 5109	VSEC	Design Thinking and Prototyping	-	-	4	4	2	0	50	0	0	50

STENCS009 V0	DP0402032 5110	AEC	Professional Communication Skills	-	2	-	2	2	0	50	0	0	50
Co-Curricular Course-I (Choose Any One)													
HLHMCS005 V0	DP0402032 5111	CC	Yoga Education	-	-	4	4	2	0	50	0	0	50
STENCS100V 0	DP0402032 5112	CC	Health & Wellness	-	-	4	4	2	0	50	0	0	50
STENCS101V 0	DP0402032 5113	CC	Dancing	-	-	4	4	2	0	50	0	0	50
STENCS102V 0	DP0402032 5114	CC	Basics of Music Composition	-	-	4	4	2	0	50	0	0	50
STENCS103V 0	DP0402032 5115	CC	Poster Competition/Model Making	-	-	4	4	2	0	50	0	0	50
STENCS104V 0	DP0402032 5116	CC	Photography & Cinematography	-	-	4	4	2	0	50	0	0	50
STENCS105V 0	DP0402032 5117	CC	Personality Development	-	-	4	4	2	0	50	0	0	50
Audit Course-I (Choose Any One)													
-	-	AC	Foreign Language-I (Japanese)	-	-	-	-	AC	-	-	-	-	-
-	-	AC	Foreign Language-I (German)	-	-	-	-	AC	-	-	-	-	-
-	-	AC	Foreign Language-I (French)	-	-	-	-	AC	-	-	-	-	-
-		AC	Professional Ethics	-	-	-	-	AC	-	-	-	-	-
Total Academic Engagement and Credits				**12**	**03**	**14**	**29**	**22**	**195**	**200**	**130**	**25**	**550**

Note: 1 credit= 25 marks
L: Lecture, **T:** Tutorial, **P:** Practical

Dnyaan Prasad Global University
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School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)					Semester		I
Course	Linear Algebra and Differential Calculus					Code		DP04020325101
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
4	3	1	--	60	--	40	--	100

Prerequisite:

Matrices, Determinants, Differentiation, Integration, Maxima and Minima.

Other Courses in this Series:

Differential Equations and Integral Calculus

Course Objectives:

1. To understand and apply the concepts of matrices, system of linear equations, and linear transformations to solve engineering problems and model real-world scenarios like traffic flow and quantum computing.
2. To develop analytical skills by exploring eigenvalues, eigenvectors, Cayley-Hamilton theorem, and matrix diagonalization, with applications to image transformation and quantum state evolution.
3. To use principles of single-variable calculus to solve indeterminate forms, analyse function behaviour, and approximate functions using Taylor's and Maclaurin's series in practical contexts like image compression and website optimization.
4. To learn and analyze the geometry of Cartesian, polar, and parametric curves for modelling robotic motion and cyclic phenomena through mathematical curve tracing.
5. To understand and evaluate functions of several variables, partial derivatives, and their applications, including change of variables and Euler's theorem, with real-world problems like machine learning optimization and image transformation.
6. To enable problem-solving using Jacobian matrices, error approximations, maxima and minima of two-variable functions, and Lagrange's multipliers, focusing on image processing and cloud resource allocation applications.

Course Outcomes:

Upon completion of the course, students will be able to:

CO1: Formulate and solve systems of linear equations using matrices; apply these techniques to model traffic networks and simulate quantum gates using matrix representations.

CO2: **Analyze and compute** eigenvalues, eigenvectors, and matrix diagonalization; understand their applications in image transformation and quantum state evolution.

CO3: **Apply** single-variable calculus techniques, including L'Hôpital's Rule, Rolle's theorem, and Taylor series, to evaluate limits, trace function behaviour, and perform image compression.

CO4: **Interpret and analyze** Cartesian, polar, and parametric curves to model robot motion paths and cyclic patterns using mathematical curve tracing methods.

CO5: **Evaluate** partial derivatives and **apply** the chain rule and change of variables in image transformation and gradient calculation for machine learning.

CO6: **Solve** Jacobian matrices, error approximation, and Lagrange's method to use optimization problems related to image processing and cloud resource allocation.

Course Contents

Unit 1	**Matrices and System of Linear Equations**	**8 Hours**
Rank of a matrix, System of linear equations, Linear dependence and independence, Linear and orthogonal transformations, Applications to problems in engineering		
Case Study#1:	Model and solve a traffic network using systems of linear equations to optimize traffic flow and reduce congestion.	
Case Study#2:	Model and simulate qubits and quantum gates using matrix representations to understand the fundamentals of quantum computing.	
Unit 2	**Eigen Values, Eigen Vectors and Diagonalization**	**8 Hours**
Eigen Values and Eigen Vectors, Cayley Hamilton theorem, Diagonalization of a matrix, Reduction of Quadratic forms to Canonical form by Linear and Orthogonal transformations, Applications to problems in Engineering		
Case Study#3:	Use eigenvectors to understand image transformations like rotation, scaling, and shearing in computer graphics.	
Case Study#4:	Explore how matrix diagonalization simplifies the understanding of quantum state evolution in quantum mechanics.	
Unit 3	**Single Variable Calculus**	**7 Hours**
Rolle's theorem, Mean value theorems, Taylor's and Maclaurin's series , Indeterminate forms and L' Hospital's rule		
Case Study#5:	**Website Traffic Growth Prediction (L'Hôpital's Rule)** • Predict how a **website's user base** grows using L'Hôpital's Rule. • Evaluate limits to **detect saturation** points for server optimization.	
Case Study#6:	**Image Compression using Taylor Series** • Use the **Taylor expansion** of trigonometric functions (like **sin(x)**) to reduce image size by approximating pixel values. • Explain how **JPEG compression** relies on such **mathematical approximations**	
Unit 4	**Curve Tracing**	**7 Hours**
Tangents, Convexity, Singular Points, Point of Inflexion, Multiple points, Node, Cusp, Asymptotes, Tracing of curves – Cartesian, Polar (Rose Curves, Cardioid)		
Case Study#7:	Use parametric curves to model the movement of a robot on a pre-defined	

	path.	
Case Study#8:	Use polar curves to visualize cyclic data such as temperature variation over a year.	
Unit 5	**Multivariable Calculus – Partial Differentiation**	**8 Hours**
Introduction to functions of several variables, Limit, Continuity, and Partial derivatives, Evaluation of partial derivatives using the chain rule, Change of independent variables, Euler's theorem on homogeneous functions		
Case Study#9:	Use partial derivatives and the chain rule to compute gradients for optimizing machine learning models.	
Case Study#10:	Apply the change of variables concept to perform image transformations.	
Unit 6	**Applications of Partial Differentiation**	**7 Hours**
Jacobian and its applications, Errors and Approximations, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers, and applications to problems in Engineering		
Case Study#11:	Use the Jacobian matrix to understand how images are transformed, stretched, or compressed in computer graphics.	
Case Study#12:	Use Lagrange multipliers to optimize CPU and memory allocation in a cloud computing system.	
		Total Hours: 45

Text Books:

1. B. V. Ramana, "Higher Engineering Mathematics", 42th Edition, McGraw Hill Education, ISBN-13 978-0070634190:
2. B.S. Grewal, "Higher Engineering Mathematics", 45th Edition, Khanna Publishers, ISBN-13 978-81-933284-9-1
3. Zill, Dennis G. "Advanced engineering mathematics". 4th Edition, Jones & Bartlett Learning, 2020. ISBN 1284105903

Reference Books:

1. Peter V. O'Neil, "Advanced Engineering Mathematics", CENAGE Learning India Edition, ISBN-13 978-8131517529
2. M.D. Weir, J. Hass, C. Heil, P. Bogacki, "Thomas' Calculus", 15th Edition, Pearson Education, ISBN-13 978-8119896608
3. E. Kreyszig, "Advanced Engineering Mathematics", International Student Version - 10th Edition, J. Wiley and Sons, ISBN: 978-1-118-50664-6
4. D.C. Lay, "Linear Algebra and Its Applications", 5th Edition, Pearson Education, ISBN-13 978-9357059688

E-Books/Online Learning Resources:

1. Jitendra Kumar, Engineering Mathematics-I https://drive.google.com/file/d/1-_k9QB39sYCXDA6fo8gKm5eSs5QnRncr/view
2. Gilbert Strang, Linear Algebra https://ocw.mit.edu/courses/18-06-linear-algebra-spring-2010/
3. David Jerison, Single Variable Calculus https://ocw.mit.edu/courses/18-01-single-variable-calculus-fall-2006/

Online Courses:

1. Prof. Jitendra Kumar, Engineering Mathematics-I https://nptel.ac.in/courses/111105121
2. Prof. Ashok Rao, Prof. M Krishna Kumar, Prof. Arulalan M R, Linear Algebra Through Geometry https://nptel.ac.in/courses/106108482
3. Dr. S.K. Gupta Linear Algebra Basics | Coursera

4. Software tool-Geogebra GeoGebra - the world's favorite, free math tools used by over 100 million students and teachers

CO/PO Mapping Matrix											
CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	3	2	1	2	2	-	-	-	-	-	1
CO2	3	2	1	2	2	-	-	-	-	-	1
CO3	3	2		2	2	-	-	-	-	-	1
CO4	2	2	1	1	1	-	-	-	-	-	1
CO5	3	3	1	2	2	-	-	-	-	-	1
CO6	3	3	2	2	2	1	-	-	-	1	1

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Program	B.Tech. (Computer Science & Engineering)			Semester				I
Course	Physics for Computing			Code				DP04020325102
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
3	3	--	--	45	--	30	--	75

Prerequisite:

Properties of electromagnetic waves, Huygens' principle and wave front, polarization of light, wave particle duality, intrinsic and extrinsic semiconductors, basics of magnetism.

Course Objectives:

To understand and apply fundamental concepts of physics relevant to the development of computing technologies, including data transmission, storage, display systems and emerging areas like quantum computing and optoelectronics

Course Outcomes:

On completion of the course, students will be able to:

CO1: Understand the basics of Polarization and fibre optics for Engineering Applications
CO2: Compare different light sources for the study of optical devices
CO3: Develop the understanding of Quantum mechanics and extend it to emerging technology like quantum computing
CO4: Apply the principles of magnetism to understand modern data storage systems
CO5: Illustrate the properties of nanoparticles and their relevance to computing applications
CO6: Interpret the properties of superconductors and examine their technological applications

Course Contents

Unit 1	Optics	8 Hours

Polarization, Law of Malus, Types of Polarization and its application in Communication system and 7 segment displays, Basics of propagation of light through Optical fibre, Classification of Optical fibre, Attenuation and its causes, ways to minimize the attenuation, Optical fibre communication system, Comparison of optical fibre communication system with conventional communication system.

Case Study# 1	The Evolution and Impact of Optical Fiber Communication Systems in Global Telecommunications Infrastructure

Unit 2	Optoelectronics	8 Hours

Formation of Band Gap, FD Distribution, position of fermi level in semiconductor, LASER characteristics, Comparison of LED and Diode laser as a light source, Photodiode and LDR as light detector, Holography and its applications.		
Case Study#2	The Role of Holography in Modern Medical Imaging: Applications, Advancements and Future Potential	
Unit 3	**Quantum Technology**	**7 Hours**
Wave particle duality, Wave function, Schrodinger's Time independent equation and their applications, Quantum tunnelling, Principle of Quantum computing, Application of Quantum computing		
Case Study#3	Future aspects of advancement in quantum technology in the field of communication	
Unit 4	**Data storage devices**	**8 Hours**
Classification of magnetic materials, MR effect and Kerr effect, Type of storage devices, Magnetic storage devices (Magnetic storage and magneto optical recording)		
Case Study#4	Application of Magnetic Materials and Effects in Modern Data Storage Systems	
Unit 5	**Physics of Nanomaterials**	**7 Hours**
Nanoparticles: Quantum confinement &surface to volume ratio, Properties of Nanoparticles: - Optical, electrical, magnetic, mechanical, Applications: applications in microprocessors and Nano-sensors, Carbon Nanotube and its applications in computer field, Computational Nanotechnology (qualitative).		
Case Study#5	The Role of Carbon Nanotubes in Advancing Microprocessors and Nano-Sensors for the Next Generation of Computing	
Unit 6	**Physics of superconductors**	**7 Hours**
Introduction of superconductivity and BCS theory, Properties of superconductors, Types of superconductors, Josephson effect (AC and DC): SQUID, Applications of superconductors.		
Case Study#6	Josephson Effect and Its Applications in Quantum Technology	
		Total Hours: 45

xtbooks:

1. M. N. Avadhanulu, P. G. Kshirsagar & TVS Arun Murthy, "A Textbook of Engineering Physics",S Chand Publications, ISBN 978-9352833993.
2. R. K. Gaur and S. L. Gupta, "Engineering Physics", Dhanpat Rai Publications, ISBN-8189928228.
3. J. P. Srivastava "Elements of Solid-State Physics." PHI Learning/Prentice-Hall of India publication, ISBN-13: 978-8120350663
4. Charles Kittel," Introduction to Solid State Physics", John Wiley & Sons (Wiley) Publications ISBN-978-0471415268.
5. Govind P. Agrawal, "Fiber-Optic Communication Systems", John Wiley & Sons

(Wiley-Blackwell imprint) Publications, ISBN-13: 978-1119737360.

ference Books:

1. Ajoy K. Ghatak, "Optics", McGraw Hill Education (India), ISBN-13: 978-9390113590
2. A. K. Ghatak & S. Lokanathan, "Quantum Mechanics: Theory & Applications", Laxmi Publications Pvt Ltd ISBN-13: 978-9351382966
3. Dr. Sulabha K. Kulkarni," Nanotechnology: Principles and Practices", Springer International Publishing, ISBN-10: 3319091700
4. Wilson & Hawkes, "Introduction to Optoelectronics" Prentice Hall, ISBN: 9780136387817.
5. D. C. Tayal," Electricity & Magnetism", Himalaya Publishing House, ISBN-13: 978-9351429166.

Books/Online Learning Resources:

1. Richard P. Feynman, Robert B. Leighton, and Matthew Sands," The Feynman Lectures on Physics" Pearson/Addison-Wesley (International Edition), ISBN-13: 978-0805390490, https://www.feynmanlectures.caltech.edu/
2. Arthur Beiser," Concepts of Modern Physics", McGraw-Hill Education,ISBN-13: 978-0072448481, https://nitsri.ac.in/Department/PHYSICS/Beiser_Modern_Physics.pdf

OOC / NPTEL/YouTube Links:

1. Fiber Optic Communication Technology
   a) Instructor: Prof. Deepa Venkitesh IIT Madras
   b) Introduction to optical communication, fiber types, and fabrication techniques
   c) Link: https://onlinecourses.nptel.ac.in/noc20_ee79/preview
2. Quantum Mechanics Lecture Series
   a) Instructor: Prof. Harish Chandra Verma, IIT Kanpur
   b) Phenomena leading to the development of Quantum Mechanics
   c) Link: https://hcverma.in/QuantumMechanics
3. Magnetism and Superconductivity
   a) Instructor: Prof.Arghya taraphder, IIT Kharagpur
   b) Concept in magnetism and Superconductivity
   c) Link: https://archive.nptel.ac.in/courses/115/105/115105131/
4. Exploring Quantum Physics
   a) Instructor: Prof. Ajoy Ghatak, IIT Delhi
   b) Basic Quantum Mechanics
   c) Link: https://nptel.ac.in/courses/115102023
5. Semiconductor Optoelectronics
   a) Instructor: M. R. Shenoy, IIT Delhi
   b) Formation of Band gap, Fermi Level
   c) Link: https://nptel.ac.in/courses/115102103
6. Nanotechnology
   a) Instructor: Prof. Krishanu Biswas, IIT Kanpur
   b) Nanomaterials and their properties

c) Link: https://archive.nptel.ac.in/courses/113/104/113104102/

CO/PO Mapping Matrix											
CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	3	-	-	-	-	1	-	1	1	-	1
CO2	3	-	-	2	-	1	-	1	1	-	1
CO3	3	3	-	3	-	1	-	1	1	-	1
CO4	3	-	-	-	-	1	-	1	1	-	1
CO5	3	3	3	3	3	1	-	1	1	-	1
CO6	3	-	-	-	-	1	-	1	1	-	1

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Program	B.Tech. (Computer Science & Engineering)			Semester				I
Course	Applied Chemistry			Code				DP04020325103
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
3	3	--	--	45	--	30	--	75

Prerequisite:

1) Basics of Chemistry

Course Objectives:

1. To make students understand the concepts of Green Chemistry and water technology.

2. To impart the basic knowledge of renewable energy sources, energy storage devices and its Commercial applications.

3. To study spectroscopic techniques for chemical analysis.

4. To make students understand conductometric and PH metric titrations.

5. To make students acquainted with the knowledge of engineering materials like polymers & Nano materials.

6. To understand the basic principles of corrosion and its prevention.

Course Outcomes:

On completion of the course, students will be able to:

CO1: **Integrate** the basic principles of Green Chemistry and water technology in day to day life.

CO2: **Analyse** different types of alternative fuels.

CO3: **Interpret** chemical compounds based on their structure.

CO4: **Utilize** appropriate electro techniques and methods of material analysis**.**

CO5: **Explain** the importance of advanced engineering materials and applications of nanomaterial.

CO6: **Evaluate** the causes of corrosion and methods for minimizing corrosion.

Course Contents

Unit 1	Green Chemistry and Water Technology	8 Hours

Green Chemistry: Basic principles of Green Chemistry. **Green synthesis**, properties and applications of Polycarbonate. **Hardness of water**: types of hardness, determination of hardness of water using **EDTA** titration method and its numerical. **Alkalinity of water** and its determination, numerical. **Purification of Water** by Demineralization process and Reverse

Osmosis.		
Case Study #1:	Analyse the various hard water samples using saponification process.	
Case Study #2:	Examine the carbonate content of various solutions using alkalinity process.	
Unit 2	**Energy Sources and Lithium Ion Battery**	**8 Hours**
Fractional Distillation of crude oil**. Biofuels –** Properties and applications of Power Alcohol. **Hydrogen** as a future fuel**–**Production and applications of Hydrogen**.** Difficulty in storage of Hydrogen. **CNG-** Properties and applications of CNG. **Li-Ion batteries -** Construction, working and applications of Li-ion batteries**.** Advantages of Li-ion battery for electric vehicles.		
Case Study #3:	Analyse the advantages and limitations of various fuels on the basis of their calorific values.	
Unit 3	**Spectroscopic Techniques**	**7 Hours**
[A] UV-Visible Spectroscopy Introduction, Interaction of electromagnetic radiation with matter, statement of **Beer's law and Lambert's law**. **Terms involved** in UV-visible Spectroscopy- chromophore, auxochrome, bathochromic shift, hypsochromic shift, hyper chromic shift and hypochromic shift. **Instrumentation** of UV-visible spectroscopy. **[B] Infra-Red Spectroscopy:** Introduction, **Principle** of IR Spectroscopy, **Parts** of IR spectrum, fundamental group region, fingerprint region **Types of vibrations**: Stretching (symmetric and asymmetric) and bending (scissoring, rocking, wagging and twisting), vibration of diatomic and polyatomic molecules. **Applications** of IR spectroscopy.		
Case Study #4:	Analyse and identify unknown compounds using fingerprint region of IR spectroscopy.	
Unit 4	**Electrochemistry**	**8 Hours**
Reference Electrode-Calomel electrode. Conductance, Specific conductance, Molar conductance. **Factors affecting** migration of ions. **Conductometry-** conductometric titrations of acid versus base with titration curve. (Strong acid- Strong base). **pH metry**: Introduction, standardization of pH meter, pH metric titration of strong acid versus strong base with titration curve and its applications.		
Case Study #5:	Evaluate the advantages of conductometric titrations over other titrations.	
Unit 5	**Advanced Engineering Materials**	**7 Hours**
Biodegradable polymers: Introduction and their requirements. Preparation, properties and applications of PHBV. **Conducting Polymers:** Introduction, conduction in **Polyacetylene**, Doping and its type with properties and applications. **Nanomaterial:** Introduction, **classification** of nanomaterial based on dimensions. **Graphene** - Structure, properties and applications. **Carbon Nano Tubes**- Structure of single walled CNT and its applications. **Quantum Dots-** Types, properties and applications of Quantum Dots.		

Case Study #6:	Explore a real-world example of conducting polymers. Discuss the real-world example of quantum dots.	
Unit 6	**Corrosion and Prevention**	**7 Hours**

Introduction: Corrosion and its types-Dry and wet corrosion. Nature of metal oxide films and Pilling Bedworth
Ratio (PBR). Factors affecting the rate of corrosion based on nature of metal and environment. Cathodic protection - Sacrificial anode and impressed current methods. Metal coatings – Anodic and Cathodic Coating-
Galvanization, Tinning. Electroplating- Process of electroplating and Applications.

Case Study #7:	Investigate the rate of corrosion in various acidic medium.
Case Study #8:	Compare the Anodic and Cathodic Coating. Discuss which is better for protection of metal from corrosion.

Total Hours:45

Textbooks:

1. Textbook of Engineering Chemistry by Dr. S. S. Dara, Dr. S. S. Umare, S. Chand & Company Ltd.
2. Engineering Chemistry by O. G. Palanna, Tata Magraw Hill Education Pvt. Ltd.
3. B. K. Sharma- A textbook of Industrial Chemistry. 15th Edition, 2020. G.A. Ozin & A.C. Arsenault, "Nanotechnology A Chemical Approach to Nanomaterials". RSC Publishing, 5th Edition, 2020
4. Textbook of Engineering Chemistry by Dr. Sunita Rattan, S. K. Kataria & Sons Publisher.
5. A Textbook of Engineering Chemistry, Shashi Chawla.

Reference Books:

1. Engineering Chemistry, Wiley India Pvt. Ltd.
2. Inorganic Chemistry, 5th edition by Shriver and Atkins, Oxford University Press
3. Basic Concept of Analytical Chemistry, 2ed, S. M. Khopkar, New Age-International Publisher
4. Instrumental Methods of Chemical Analysis, G. R. Chatwal & S. K. Anand, Himalaya Publishing House
5. Spectroscopy of organic compounds, 2nd edition, P. S. Kalsi, New Age-International Ltd., Publisher
6. Polymer Science, V. R. Gowarikar, N. V. Viswanathan, Jayadev Sreedhar, Wiley Eastern Limited

E-Books/Online Learning Resources:

1. https://chem.nju.edu.cn/_upload/article/files/b5/6f/01f0f2434d708df797208aea2613/83f2b441-65ee-44a6-ac47-ed21db462c5d.pdf
2. https://ebooks.himpub.com/product/instrumental-methods-chemical-analysis
3. https://tech.chemistrydocs.com/Books/Spectroscopy/Organic-spectroscopy-PS-Kalsi.pdf

Online Courses:

1. Corrosion - NOC: Corrosion - Part I, IIT Kanpur
   a. Instructor: Dr. Kallol Mondal
   b. Covers fundamentals of corrosion and electrochemical ways of protection of metals and alloys.
   c. C. Link: https://nptel.ac.in/courses/113104082
2. Nano structured materials-synthesis, properties, self-assembly and applications
   a. Instructor: Prof. A.K. Ganguli (IIT Delhi)

b. Covers introduction to Nanotechnology
c. Link: https://nptel.ac.in/courses/118102003

3. Polymers and Polymerization- Manufactured Fibre Technology, IIT Delhi
   a. Instructor: Prof. A.K. Ganguli (IIT Delhi)
   b. Covers the performance properties of fibres
   c. Link: https://nptel.ac.in/courses/116102010

CO/PO Mapping Matrix

CO \ PO	PO1	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	-	-	3	2	-	-	-	1
CO2	3	2	1	-	3	-	-	-	-	1
CO3	3	-	2	2	-	-	-	-	-	1
CO4	3	-	3	3	-	-	-	-	-	1
CO5	3	2	2	2	2	-	-	-	-	1
CO6	3	2	2	-	3	2	-	-	-	1

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Program	B.Tech. (Computer Science & Engineering)			Semester				I
Course	Basic Electrical and Electronics Engineering			Code				DP04020325104
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
3	3	--	1	45		30	--	75

Prerequisite:

1. Basic knowledge of high school physics (electricity and magnetism)
2. Fundamental concepts of algebra and calculus
3. Familiarity with basic circuit components (resistors, capacitors, inductors)
4. Introduction to digital logic (binary systems and simple gate operations)

Other Courses in this Series:

1) Digital Electronics system

Course Objectives:

1. Understand fundamental electrical circuit laws, network theorems, and power systems.
2. Learn the working principles of DC machines, AC machines, and transformers.
3. Study semiconductor devices such as diodes, and transistors.
4. Study digital number system and logic gates.
5. Explore measurement instruments, sensors, and their applications.
6. Gain an understanding of communication systems and emerging technologies.

Course Outcomes: On completion of the course, students will be able to:

CO1: Analyze electrical circuits using circuit laws and network theorems. (BTL 3)

CO2: Explain the construction and working of transformers, DC and AC machines. (BTL 2)

CO3: Demonstrate knowledge of semiconductor devices and their applications. (BTL 2)

CO4: Design basic digital circuits using logic gates. (BTL 4)

CO5: Describe the function of measuring instruments and sensors in electrical systems. (BTL 2)

CO6: Summarize communication principles and emerging technologies. (BTL 2)

Course Contents		
Unit 1	**Electrical Circuits and Network Theorems**	**6 Hours**
• **Electrical Circuit Elements:** Overview of passive elements: resistors, capacitors, inductors and their combinations in series and parallel. Practical applications in voltage division, filtering, and transient analysis. Fundamental laws: Ohm's Law and Kirchhoff's Laws (KVL and KCL) with practical circuit analysis. • **Network Theorems:** Principles and application of Superposition Theorem, and Thevenin's Theorems, in DC and AC circuits. • **AC Circuits:** Concepts of sinusoidal voltages and currents, phasors, calculation of RMS and average values, real and reactive power, impedance, and power factor correction in practical circuits.		
Case Study#1:	Power distribution system in smart homes.	
Case Study#2:	Comparative analysis of power loss in radial vs ring main distribution using network theorems	
Unit 2	**Electrical Machines and Transformers**	**6 Hours**
• **DC Machines:** Basic structure including yoke, armature, field winding, and commutator. Operating principle based on Lorentz force. Classification into shunt, series, and compound types. Applications in electric vehicles, cranes, and battery chargers. • **AC Machines:** Working principles of alternators (synchronous generators) and induction motors (squirrel cage and wound rotor types). Role in power generation and industrial drives. • **Transformers:** Principle of electromagnetic induction, derivation of EMF equation, efficiency calculation, and role in voltage regulation and transmission systems. • **Overview of Power Generation:** Conventional methods (thermal, hydro, nuclear) and renewable sources (solar, wind, biomass). Comparison based on efficiency, cost, and environmental impact.		
Case Study#3:	Transformer selection for residential vs industrial areas.	
Case Study#4:	Comparative performance analysis of synchronous generators and wind turbines in distributed power systems.	
Unit 3	**Semiconductor Devices and Applications**	**6 Hours**
• Diodes: PN junction characteristics, applications as rectifiers and regulators • Zener diodes: breakdown mechanism, voltage regulation • Light Emitting Diodes (LEDs): construction, operation, uses • Bipolar Junction Transistors (BJTs): configurations, characteristics, applications in switching and amplification • Metal-Oxide-Semiconductor Field-Effect Transistors (MOSFETs): Enhancement type, practical applications		
Case Study#5:	Diode-based voltage regulator design.	
Case Study#6:	MOSFET-based switching circuit for energy-efficient LED lighting.	
Unit 4	**Analog and Digital Electronics**	**6 Hours**
• **Analog Electronics:** Overview of rectifiers (half-wave, full-wave, bridge), BJT transistor configurations (CE, CB, CC), and their applications as amplifiers and switches. • **Digital Electronics:** Binary number systems, logic gates (AND, OR, NOT, NAND, NOR, XOR, XNOR), Boolean algebra.		

Case Study#7:	Traffic signal control system using logic gates.	
Case Study#8:	Design of an automatic water level controller using Op-Amps and digital logic.	
Unit 5	**Measurement Instruments and Sensors**	**6 Hours**

- **Measurement Instruments:** Study of CRO (Cathode Ray Oscilloscope) for waveform visualization, Digital and Analog Multimeters for voltage/current/resistance measurement, DC regulated power supply applications in lab setups.
- **Sensors and Transducers:** Working principles and applications of LVDT (Linear Variable Differential Transformer) for displacement, RTD (Resistance Temperature Detector) and Thermocouples for temperature sensing, and Biosensors in healthcare monitoring.

Case Study#9:	Remote temperature monitoring using IoT sensors.	
Case Study#10:	Smart irrigation system using soil moisture sensors and wireless data transmission.	
Unit 6	Communication Systems and Emerging Technologies (06 Hours)**	**6 Hours**

- **Communication Systems Overview:** Basic structure of communication systems including transmitter, receiver, and transmission medium. Types of communication: analog and digital, wired and wireless.
- **GSM System:** Architecture of GSM networks, working of mobile communication, SIM, BTS, MSC components. Applications in telecommunication.
- **Introduction to 5G:** Evolution from 1G to 5G. 5G architecture, frequency bands, features (high speed, low latency, massive connectivity), and use cases in smart cities, IoT, healthcare, and autonomous vehicles.

Case Study#11:	GSM-based fault alert system for electrical distribution transformers.
Case Study#12:	Application of 5G in real-time remote surgery and autonomous vehicle coordination.

Total Hours: 36

Text Books:

1. **D.P. Kothari, I.J. Nagrath**, *Basic Electrical Engineering*, 4th Edition, McGraw Hill Education, ISBN: 978-9353165123
2. **Robert L. Boylestad, Louis Nashelsky**, *Electronic Devices and Circuit Theory*, 11th Edition, Pearson Education, ISBN: 978-9332585224
3. **B.L. Theraja, A.K. Theraja**, *A Textbook of Electrical Technology (Vol. 1: Basic Electrical Engineering)*, 24th Revised Edition, S. Chand Publishing, ISBN: 978-9352533794
4. **A.K. Theraja, B.L. Theraja**, *A Textbook of Electrical Technology (Vol. 11: Basic Electrical Engineering)*, 24th Revised Edition, S. Chand Publishing, ISBN: 978-8121924375

Reference Books:

1. **Vincent Del Toro**, *Fundamentals of Electrical Engineering*, 2nd Edition, Prentice Hall, ISBN: 978-8120305414
2. **Donald A. Neamen,** Microelectronics: Circuit Analysis and Design, 4th Edition, Mc Graw Hill, ISBN: 978-07-338064-3.
3. **Jain, R.P.**, Modern Digital Electronics, McGraw-Hill Education (India) Pvt Limited, 2003, ISBN: 9780070494923

E-Books/Online Learning Resources:

1. Electrical Engineering – Fundamentals
Vincent Del Toro, Fundamentals of Electrical Engineering, 2nd Edition, Prentice Hall, ISBN: 978-8120305414
Link:https://archive.org/details/FundamentalsOfElectricalEngineeringVincentDelToro

2. Basic Electrical Engineering
D.P. Kothari, I.J. Nagrath, Basic Electrical Engineering, 4th Edition, McGraw Hill Education, ISBN:
978-9353165123
Link:https://archive.org/details/basic-electrical-engineering-kothari-nagrath

3. Electronic Devices and Circuit Theory
Robert L. Boylestad, Louis Nashelsky, Electronic Devices and Circuit Theory, 11th Edition, Pearson Education, ISBN: 978-9332585224
Link:https://archive.org/details/ElectronicDevicesAndCircuitTheoryByBoylestad11thEdition

Online Courses:

1. Digital Circuits
Instructor: Prof. Santanu Chattopadhyay (IIT Kharagpur)
Covers fundamentals of digital electronics including logic gates, combinational and sequential circuits.
Link:https://onlinecourses.nptel.ac.in/noc23_ee47/preview

2. Basic Electrical Circuits
Instructor: Prof. Sujit Kumar Biswas (IIT Kharagpur)
Covers fundamentals of electric circuits including circuit elements, Kirchhoff's laws, mesh and nodal
analysis, Thevenin & Norton theorems, transient and steady-state analysis. Platform: NPTEL (Swayam) Link:https://onlinecourses.nptel.ac.in/noc23_ee53/preview

3. Semiconductor Devices and Circuits
Instructor: Prof. S. K. Nandy (IIT Kharagpur)
Covers the physics of semiconductors, PN junctions, BJT, MOSFET, and their application in Electronic circuits.
Platform: NPTEL (Swayam)
Link:https://onlinecourses.nptel.ac.in/noc23_ee01/preview

The CO-PO Mapping Matrix											
CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	2	2	-	-	-		-	-	2
CO2	3	2	-	1	-	-	-		-	-	2
CO3	2	3	-	-	-	-	-		-	-	2
CO4	3	3	3	-	-	-	-		-	-	2
CO5	2	-	-	-	-	-	-		-	-	-
CO6	2	-	-	-	-	-	-		-	-	-

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)			Semester				I
Course	Computer Essentials Workshops			Code				DP04020325105
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
1	--	--	2	--	25	--	--	25

Prerequisite:

1) Nil

Other Courses in this Series:

1) Nil

Course Objectives:

1. To understand computer peripherals and assemble a functional system.
2. To gain proficiency in installing operating system and perform basic hardware troubleshooting.
3. To learn internet connectivity and use of Linux commands for basic system tasks.
4. To learn to create professional documents using word processors and perform data analysis using spreadsheet tools.

Course Outcomes:

On completion of the course, students will be able to:

CO1: **Identify** and **explain** the purpose, functionality, and connectivity of internal and external hardware components, and **assemble** a functional computer system.

CO2: **Install** and **configure** operating systems and **apply** basic hardware troubleshooting techniques to ensure system functionality.

CO3: **Set up** wired and wireless internet connections, and **execute** essential Linux commands for file management, system monitoring, and networking.

CO4: **Create** professional documents and **analyze** data effectively using word processors and spreadsheet tools.

Suggested List of Laboratory Experiments/Assignments
Assignments from Sr. No. 1 to 8 are compulsory

Sr. No.	Experiments/Assignments
1.	**To study various internal and external peripherals of a computer system, understand their purpose, functionality, and connectivity, and assemble these components to build a fully functional system.** Study the various internal and external peripherals of a computer system, including

	components such as the central processing unit (CPU), graphics processing units (GPUs-integrated GPUs and dedicated GPUs), memory modules (RAM and ROM), storage devices (HDD, SSD), power supply units, motherboards, and graphic cards, as well as external peripherals like monitors, keyboards, mice, printers, scanners, external storage devices, and input-output devices. This involves understanding their purpose, functionality, connectivity, and interdependence within the system. Students will also explore how these peripherals contribute to the overall performance of a computer and how to identify compatibility and configuration issues for optimal functionality. Assemble the components of a computer system, including the central processing unit (CPU), motherboard, memory modules (RAM), storage devices (HDD, SSD), power supply unit (PSU), cooling systems, and peripheral connectors, and understand their interconnections. This involves identifying component compatibility, properly installing each part within the system chassis, connecting power and data cables, configuring BIOS/UEFI settings, and ensuring all components are securely integrated. Additionally, students will verify the system's functionality post-assembly through boot testing and troubleshooting to address potential errors.
2.	**To understand the process of installing Linux on a computer system and configuring it for basic usage.** Understand the process of installing Linux on a computer system, including selecting appropriate installation media, preparing the system through BIOS/UEFI configuration, partitioning storage drives, and performing clean installations. This involves exploring different installation methods, such as using bootable USB drives or optical media, and addressing compatibility requirements. Additionally, learn to configure the installed OS for basic usage, including creating user accounts, setting up file systems, managing drivers, and enabling essential services to ensure a functional and user-friendly environment. Gain an introductory understanding of the Linux kernel—its role, architecture, and interaction with hardware and user space. Explore kernel versions, modules, and how the kernel is managed and updated in a Linux system..
3.	**To identify and resolve common hardware issues (hardware troubleshooting) in a computer system, ensuring its proper functionality.** Identify and resolve common hardware issues in a computer system through systematic troubleshooting techniques. This includes diagnosing problems with internal components such as the CPU, RAM, storage drives, power supply, and motherboard, as well as external peripherals like monitors, keyboards, and printers. Students will explore common symptoms of hardware failure, such as system overheating, boot errors, and connectivity problems, and learn to use diagnostic tools, BIOS/UEFI settings, and manual inspections to pinpoint the root cause. Emphasis will be placed on applying appropriate resolutions, such as replacing faulty components, reseating connections, or updating firmware, to ensure the system operates reliably.
4.	**To configure and establish internet connectivity using both wired and wireless connections on a computer system and troubleshoot common network issues.** To configure and establish internet connectivity on a computer system using both wired and wireless connections. This includes setting up network interface cards (NICs),

	configuring IP addresses (static and dynamic), connecting through Ethernet cables or Wi-Fi adapters, and accessing network settings through the operating system. Learn about Media Access Control (MAC) addresses and their role in device identification on a network, as well as commonly used network ports and protocols (e.g., HTTP, HTTPS, FTP, SSH). Students will also learn to troubleshoot common network issues such as connectivity drops, incorrect configurations, hardware malfunctions, and DNS or gateway problems. Emphasis will be placed on using tools like ping, traceroute, and other network diagnostic utilities to identify and resolve issues, ensuring stable and secure internet access.
5.	**To study and execute essential Linux commands for file management, system navigation, process control, system monitoring, and networking.** Study and execute essential Linux commands for various system management tasks, including file management (e.g., creating, deleting, and moving files), system navigation (e.g., using directories and path structures), and process control (e.g., starting, stopping, and monitoring processes). Students will also learn to utilize commands for system monitoring, such as checking system performance, memory usage, and disk space, as well as troubleshooting common issues. Additionally, students will explore networking commands for managing network configurations, troubleshooting connectivity issues, and performing tasks like file transfers and remote access, ensuring a comprehensive understanding of Linux system operations.
6.	**To explore the basic and intermediate features of Word/Google Docs/Liber Office/Excel/Google Spreadsheet/LibreOffice Calc/Power-Point-Presentation, perform data entry, manipulation, analysis, and create visual representations of data.** Explore the basic and intermediate features of Word/Google Docs/Liber Office/Excel/Google Spreadsheet/Libre office cal/Power-Point-Presentation, including functionalities for data entry, formatting, and organization. This involves learning to perform data manipulation tasks such as sorting, filtering, and applying formulas and functions to analyze data effectively. Students will also explore advanced features like conditional formatting, pivot tables, and data validation, enabling them to draw meaningful insights. Additionally, emphasis will be placed on creating visual representations of data using charts, graphs, and dashboards to communicate information clearly and professionally.
7.	**To understand the basics of LaTeX, a typesetting system used for creating well-structured and professional-looking documents.** Understand the basics of LaTeX, a powerful typesetting system used for creating well-structured, professional-looking documents. This includes learning the fundamentals of document formatting, such as setting up document classes, managing sections, headers, footers, and citations. Students will also explore how to format text, create tables, insert figures, and generate mathematical equations using LaTeX. Emphasis will be placed on developing the skills to produce high-quality academic and technical documents, reports, and presentations with proper formatting and referencing.
8.	**To create technical diagrams using AI-assisted tools and to apply AI-based tools for data visualization and analysis using spreadsheet integrations.**

	Technical Diagram Creation: AI-supported diagramming tools such as Diagrams.net (Draw.io) and Tldraw are used to design diagrams like flowcharts, computer system architectures, or basic network setups. AI assistance is utilized for features such as auto-layouts, smart connectors, and text-to-structure prompts (e.g., generated using LLMs). Emphasis is placed on clarity, correctness, and visual representation of technical systems and processes. AI-Based Data Visualization and Analysis: Sample datasets (e.g., student marks, performance logs) are entered into spreadsheet tools like Google Sheets or MS Excel. AI features such as "Explore" in Google Sheets or "Analyze Data" in Excel are used to automatically generate charts, graphs, summaries, and pivot tables. Insights are derived from AI-generated visuals to understand patterns, trends, and anomalies within the dataset.
9.	**To explore AI-based productivity tools for research writing, document creation, grammar correction, content enhancement, and text summarization.** This experiment involves the exploration and practical use of **AI-based productivity tools** that assist in improving the quality, clarity, and efficiency of research writing and academic documentation.This experiment introduces AI-powered tools that support academic writing and documentation. Tools like Elicit assist in research and literature review, Grammarly and QuillBot help improve grammar and clarity, and summarization tools like Resoomer or SMMRY are used to condense long texts. These tools enhance writing quality, save time, and support effective communication in technical and academic tasks.
	Optional Experiments are, ▪ Installing and Configuring Virtual Machines: To install VirtualBox or other VMM to create virtual macines for Ubuntu Linux/Windows 10. ▪ Dual Boot System: To install Linux Ubuntu alongside Windows 10/11 in a dual-boot setup. ▪ Disk Management and Formatting: To study Windows Disk Management and Linux fdisk/gparted tools to create, format and delete partitions, assign custom labels and drive letters, identify file systems and compare their purpose. ▪ Automating Tasks Using Linux Shell Scripting: To write a simple Bash script to automate a repetitive task (e.g., file backup, system monitoring). ▪ Excel Automation Using Macros: To study and execute Excel Automation using Macros for data manipulation, analysis, and task automation.

Text Books:

1. E. Balgurusamy, "Fundamentals of Computers", McGraw Hill Education, ISBN-10 .9780070141605:
2. P. Sinha, P. K. Sinha, "Computer Fundamentals", BPB Publications, 6th Edition, ISBN-13 : 978-8176567527
3. Dr. N. B. Venkateswarlu, "Essential Computer and IT Fundamentals for Engineering and Science Students", S. Chand, ISBN: 9788121940474

4. Mark Minasi, “The Complete PC Upgrade and Maintenance Guide”, Wiley, 16th Edition, ISBN: 978-8126506279
5. Andrew S. Tanenbaum, Todd Austin, “Structured Computer Organization”, Pearson, ISBN: 978-9332571242
6. Scott Mueller, “Upgrading and Repairing PCs”, 22nd Edition, Que Pub, ISBN: 978-0789756107
7. Brian Ward, “How Linux Works”, 3rd Edition, No Search Press, ISBN: 978-1718500402.
8. S. Swapna Kumar, “LATEX - A Beginner Guide to Professional Documentation”, ISBN: 978-9352743964.

Reference Books:

1. Neeharika Adabala, V. Rajaraman, “Fundamentals of Computers”, 6th Edition, PHI Learning, ISBN: 978-8120350670.
2. Peter Norton, “Introduction to Computers”, McGraw Hill Education, 7th Edition, ISBN: 978-9387067028
3. Anita Goel, “Computer Fundamentals”, 1st Edition, Pearson, ISBN: 978-8131733097.
4. Richard Petersen, “Linux: The Complete Reference”, 6th Edition, McGraw Hill Education, ISBN: 978-0070222946.

E-Books/Online Learning Resources:

1. LaTeX Beginner’s Guide https://static.latexstudio.net/wp-content/uploads/2015/03/LaTeX_Beginners_Guide.pdf
2. A comprehensive and free online guide to mastering LaTeX. https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes
3. William Shotts, “The Linux Command Line”, https://linuxcommand.org/tlcl.php

Online Courses:

1. **Computer Fundamentals**
   a. Instructor: By Prof. Sanjay Tanwani and Devi Ahilya Viswavidyalaya, Indore.
   b. This course covers the fundamentals of computers, including the evolution of computers and microprocessors, input/output devices, storage systems, and programming languages. It also introduces hardware and software components, such as the CPU, motherboard, operating systems, and application/system software.
   c. Link: https://onlinecourses.swayam2.ac.in/cec19_cs06/preview
2. **Linux**
   a. This course introduces the basics of the Linux operating system, including commands, file management, process handling, and system utilities.
   b. Link: https://spoken-tutorial.org/tutorial-search/?search_foss=Linux&search_language=English

Software Tools, Simulation Platforms & Hardware Kits:

1. Computer Hardware Toolkit
2. Desktop PC cabinet (openable) with removable components
3. RAM modules, CPU samples, HDD/SSD, motherboard

4. Wi-Fi Routers and Ethernet Switches
5. Spare peripherals (keyboard, mouse, monitor)
6. USB installation drives
7. Raspberry Pi kits
8. Overleaf (Online LaTeX Editor), TeXstudio, MikTeX
9. Ubuntu/Linux/Windows OS Software
10. MS Excel, Google Sheets, Libreoffice, Word etc
11. Virtualbox/ Virtual Machine Manager

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	1	3	1	0	2	2	0	1
CO2	3	3	2	2	3	1	0	2	2	1	1
CO3	2	2	2	1	3	2	0	2	2	0	2
CO4	1	2	2	1	2	0	0	3	3	2	2

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)			Semester				I
Course	Problem Solving through Programming			Code				DP04020325106
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
3	3	--	--	45	--	30	--	75

Prerequisite:

1) Basics of Computers

Other Courses in this Series:

1) Problem Solving through Programming Lab

Course Objectives:

1. To understand problem-solving aspects and basics of the C programming language.
2. To enable understanding and application of decision-making and looping constructs for program flow control.
3. To introduce array and string manipulation techniques for efficient data organization and algorithmic problem solving.
4. To understand modular programming concepts using functions and efficient memory management with pointers.
5. To enable efficient handling and organization of complex data using structures and unions in
6. To introduce file handling concepts for data storage, retrieval, and management in C programming.

Course Outcomes:

On completion of the course, students will be able to:

CO1: **Analyse** problem statements and construct algorithms, flowcharts, and pseudocode; **apply** programming constructs to implement basic C programs.

CO2: **Design** programs using conditional and looping constructs; **evaluate** the effectiveness of various control structures in achieving desired outcomes.

CO3: **Apply** operations such as searching, sorting, and matrix manipulation to arrays and strings; **analyze** algorithm efficiency for array-based solutions.

CO4: **Create** modular programs using functions and pointers; **synthesize** solutions involving dynamic memory allocation to optimize resource utilization.

CO5: **Develop** programs that use structures and unions to model real-world data; **compare** the effectiveness of structures versus arrays for organizing complex data.

CO6: **Implement** file handling operations for sequential and random-access data processing; **evaluate** the suitability of text files and binary files for various applications.

Course Contents		
Unit 1	**Problem Solving and Fundamentals of C Programming**	**8 Hours**
Introduction to Problem Solving: importance of problem-solving, steps in problem-solving, different problem solving strategies. **Idea of Algorithms, Flowcharts, and Pseudocode:** Algorithm design, flowchart basics, writing pseudocode. **Overview of C Programming Language:** Introduction, structure of a C Program, writing, compiling, and executing. Data Types and Variables, Constants, Input and Output Operations, Operators and Expressions.		
Case Study#1:	Analyze the compilation process of a simple C program, identifying each stage (preprocessing, compiling, assembling, linking) and debugging common errors.	
Case Study#2:	Explore the use of preprocessor directives in modular programming.	
Unit 2	**Control Structures**	**8 Hours**
Decision Control Structures: if, if-else, else-if ladder, conditional operator statement, switch-case statement. **Loop Control Structure:** for, while, do-while loops. **Nested Control Structures:** Nested if and loops. **Jump Statements:** break, continue, goto and their uses. Examples and problems involving basic control structures.		
Case Study#3:	Compare the performance of if-else vs. switch-case constructs in a given scenario, such as a grading system. Discuss which is better for scalability and maintainability.	
Case Study#4:	Analyze a nested loop design for generating seating arrangements in a cinema hall. Discuss how loop complexity impacts system performance.	
Unit 3	**Arrays and Strings**	**7 Hours**
Arrays: Declaration, initialization, and accessing elements of single-dimensional and multidimensional arrays, searching, insertion, deletion of an element from an array. **Strings:** String declaration, standard string functions (strlen, strcpy, strcmp, etc.). **Matrix operations:** addition, multiplication, transpose. **Searching and Sorting Algorithms** (bubble sort, linear search, binary search etc).		
Case Study#5:	Array: Analyze a given dataset (e.g., marks of students) stored in a one-dimensional array. Discuss the limitations of static arrays and suggest alternative approaches for dynamic datasets.	
Case Study#6:	String: Study and evaluate pseudocode for string reversal and concatenation. Identify potential improvements and applications	
Unit 4	**Functions and Pointers**	**8 Hours**
Functions: Modular Programming and Functions, Function Declaration & Definition, Function Calling: Call-by-Value, Call-by-Reference, Types of Functions, Scope and Storage Class of Variables, Recursion and Library Functions. **Pointers:** Basics of Pointers, Pointer Arithmetic, Pointers to Arrays, and Pointers to Functions, **Dynamic Memory Allocation:** malloc(), calloc(), realloc(), and free(). Command-Line Arguments.		
Case Study#7:	Examine a real-world scenario (e.g., payroll calculation) where modular programming is used. Analyze the benefits of modularization in terms of code	

	readability, reusability, and debugging.	
Case Study#8:	Investigate the role of pointers in managing dynamic memory in linked lists. Evaluate a diagrammatic representation of memory allocation using malloc() and free(). Examine a real-world scenario (e.g., a text editor like Notepad, ride-booking systems such as Uber/Ola, bank transaction queue management, operating system process management, gaming applications, or browser tab management) where dynamic memory allocation and deallocation take place.	
Unit 5	**Structures and Unions**	**7 Hours**
Structures: Need for structures, Definition, Declaration, Initialization, and Accessing members. Arrays of structures, Pointers to structures, Nested structures, Use of structures. enum, **Unions:** Introduction to Unions, declaring and defining Unions, initializing and accessing union members, Union of Structures, unions with bit fields & pointers to unions.		
Case Study#9:	Study a case where structures are used to model employee records. Evaluate how structures help in organizing complex data and compare their usage with other approaches like arrays.	
Case Study#10:	Explore a real-world example where unions are used. Discuss the trade-offs in memory management.	
Unit 6	**File Handling**	**7 Hours**
Data organizations and introduction to file handling, file types. **File Operations:** opening and closing files, reading from and writing to files, File modes: read, write, append, etc. File pointers and random access. String I/O in Files, Record I/O in Files.		
Case Study#11:	Evaluate the use of text files and binary files for storing and retrieving data in an application like a library management system. Discuss the pros and cons of each file type.	
Case Study#12:	Analyze the advantages and limitations of sequential and random-access file organizations. Provide examples of where each is best suited in real-world systems.	
		Total Hours: 45

Text Books:

1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Pearson Education, ISBN: 9789332549449
2. Yashavant Kanetkar, "Let Us C", 20th Edition, BPB Publications, ISBN: 978-9355515513
3. Behrouz A. Forouzan, "Computer Science: A Structured Programming Approach Using C", 3rd Edition, Cengage India Private Limited; ISBN: 9788131503638

Reference Books:

1. E. Balagurusamy, "Programming in ANSI C", 9th Edition, McGraw Hill Education, ISBN: 978-9355515513
2. Herbert Schildt, "C: The Complete Reference", 4th Edition, McGraw Hill, ISBN: 978-0070411838
3. Ashok N. Kamthane, "Programming in C", 3rd Edition, Pearson Education, ISBN: 978-9332543553

E-Books/Online Learning Resources:

1. Brian W. Kernighan, Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Prentice Hall, ISBN-13: 978-0131103627
   https://archive.org/details/the-ansi-c-programming-language-by-brian-w.-kernighan-dennis-m.-ritchie.org/page/n1/mode/2up

2. https://www.w3schools.com/c/
3. https://www.programiz.com/c-programming
4. Coding Practice and Collaboration Platforms:
    a. Git and GitHub – https://git-scm.com/ and https://github.com
       For version control, team collaboration, and project portfolio building.
    b. LeetCode – https://leetcode.com
       For practicing competitive coding problems, improving algorithmic thinking.
    c. HackerRank – https://www.hackerrank.com
       For learning and testing programming concepts through hands-on challenges.

Online Courses:

1. Problem Solving through Programming in C
    a. Instructor: Prof. Anupam Basu (IIT Kharagpur)
    b. Covers C programming basics and problem-solving techniques.
    c. Link: https://onlinecourses.nptel.ac.in/noc22_cs101/preview
2. Introduction to Programming in C
    a. Instructor: By Prof. Satyadev Nandakumar (IIT Kanpur)
    b. Covers C programming basics.
    c. Link: https://onlinecourses.nptel.ac.in/noc22_cs40/preview
3. Programming, Data structures and Algorithms
    a. Instructor: Prof. Hema A Murthy, Dr. N S. Narayanaswamy, Prof. Shankar Balachandran (IIT Madras)
    b. Covers Programming basics, algorithms and data structures.
    c. Link: https://nptel.ac.in/courses/106106133
4. C for Everyone: Programming Fundamentals
    a. Instructor: Ira Pohl
    b. Covers programming fundamentals
    c. Link: https://www.coursera.org/learn/c-for-everyone

CO/PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	2	-	-	-	-	-	-	-	1
CO2	3	3	3	-	-	-	-	-	-	-	1
CO3	3	3	3	2	-	-	-	-	-	-	1
CO4	3	3	3	2	2	-	-	-	-	-	1
CO5	3	2	3	-	-	-	-	-	-	-	1
CO6	3	3	3	2	2	-	-	-	-	-	1

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)			Semester				I
Course	Basic Electrical and Electronics Engineering Lab			Code				DP04020325107
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
1	--	--	2	--	25	--	--	25

Prerequisite:

1) High-school physics
2) Algebra & calculus
3) Basic electronic components
4) Digital logic fundamentals
5) Laboratory instrument familiarity

Other Courses in this Series:

1) Digital electronics

Course Objectives:

1. Understand fundamental electrical circuit laws, network theorems, and power systems.
2. Learn the working principles of DC machines, AC machines, and transformers.
3. Study semiconductor devices such as diodes, transistors, and operational amplifiers.
4. Introduce digital logic concepts, microprocessors, and microcontrollers.
5. Explore measurement instruments, sensors, and their applications.
6. Gain an understanding of communication systems and emerging technologies.

Course Outcomes:On completion of the course, students will be able to:

CO1: Analyze electrical circuits using circuit laws and network theorems. (BTL 3)

CO2: Explain the construction and working of transformers, DC and AC machines. (BTL 2)

CO3: Demonstrate knowledge of semiconductor devices and their applications. (BTL 2)

CO4: Design basic digital circuits using logic gates. (BTL 4)

CO5: Describe the function of measuring instruments and sensors in electrical systems. (BTL 2)

CO6: Summarize communication principles and emerging technologies. (BTL 2)

Suggested List of Laboratory Experiments/Assignments

Sr. No.	Group A: Electrical Practicals (At least 4)
A	1) Verification of Ohm's Law and Kirchhoff's Laws in DC circuits 2) Thevenin's Theorem application on network models 3) Superposition's Theorem application on network models 4) Load test and efficiency determination of a single-phase transformer 5) Performance characteristic of a DC motor (speed-torque curve)
Sr. No.	**Group B: Basic Electronics Practicals (At least 4)**
B	1) PN junction and Zener diode V-I characteristics and voltage regulator design 2) BJT amplifier: frequency response and gain measurement in CE configuration 3) Construction and analysis of half-wave, full-wave, and bridge rectifiers with filters 4) To study the transfer and drain characteristics of MOSFET. 5) Design and testing of a logic gate combinational circuit (e.g., half-adder)
	Tools & Platforms:

Hardware Tools:

- 1.Function Generator – for signal generation and waveform testing
- Power Supply Unit (PSU) – regulated DC supply for circuits
- Breadboards and Connecting Wires – for prototyping electronic circuits
- LCR Meter – for measuring inductance, capacitance, and resistance
- Microcontroller Boards – such as Raspberry Pi, ESP32
- Sensors & Actuators Kits – temperature, motion, IR sensors, motors

Software Tools / Simulation Platforms:

- LTSpice – free circuit simulation tool for analog/digital systems
- Multisim – powerful tool for simulating complex electronic circuits
- Scilab – open-source alternative to MATLAB for computations
- Xilinx ISE/Vivado – for FPGA and digital logic design
- Keil µVision IDE – for microcontroller (8051, ARM) programming
- Logisim – for digital logic simulation (gates, adders, counters)

Text Books:

1. **D.P. Kothari, I.J. Nagrath**, *Basic Electrical Engineering*, 4th Edition, McGraw Hill Education, ISBN: 978-9353165123
2. **B.L. Theraja, A.K. Theraja**, *A Textbook of Electrical Technology (Vol. 2: AC and DC Machines)*, 24th Edition, S. Chand Publishing, ISBN: 978-8121924379
3. **Robert L. Boylestad,** Louis Nashelsky, *Electronic Devices and Circuit Theory* 11th Edition, Pearson Education**, ISBN:** 978-9332585224

Reference Books:

1. **Vincent Del Toro,** *Fundamentals of Electrical Engineering*, 2nd Edition, Prentice Hall, ISBN: 978-8120305414
Link:https://archive.org/details/FundamentalsOfElectricalEngineeringVincentDelToro

2. **P.S. Bimbhra,** *Power Electronics*, 10th Edition, Khanna Publishers, ISBN: 978-8174092410
Link:https://archive.org/details/PowerElectronicsPSBimbhra

E-Books/Online Learning Resources:

1. Basic Electrical Circuits

Instructor: Prof. Sujit Kumar Biswas (IIT Kharagpur)
Covers fundamental circuit laws, nodal/mesh analysis, network theorems, and transient response of RC, RL, and RLC circuits.
Platform: NPTEL
Link:https://onlinecourses.nptel.ac.in/noc23_ee53/preview

2. Basic Electronics

Instructor: Prof. Shanthi Pavan (IIT Madras)
Covers semiconductor physics, diode and transistor operation, biasing, amplifiers, and digital logic fundamentals.
Platform: NPTEL
Link:https://onlinecourses.nptel.ac.in/noc23_ee112/preview

3. Introduction to Electronics

Instructor: Dr. Bonnie Ferri (Georgia Institute of Technology)
Teaches diodes, transistors, op-amps, and their application in basic analog and digital circuits.
Platform: Coursera
Link:https://www.coursera.org/learn/introduction-electronics

4. Electric Circuits for Beginners

Instructor: Dr. Don Johnson (Rice University)
Focuses on resistive circuits, Ohm's and Kirchhoff's laws, voltage/current division, and intro to AC circuits.
Platform: Coursera
Link:https://www.coursera.org/learn/electric-circuits

The CO-PO Mapping Matrix

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	-	3	-	-	2	-	-	2
CO2	2	1	1	-	3	-	-	2	-	-	2
CO3	3	3	3	2	3	-	-	2	-	-	2
CO4	3	3	3	1	2	-	-	2	-	-	2
CO5	2	3	2	-	-	-	-	2	-	-	2
CO6	2	2	2	2	2	-	-	2	-	-	2

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)			**Semester**	I			
Course	Problem Solving through Programming Lab			**Code**	DP04020325108			
	Teaching Scheme (Hrs/Week)			**Examination Scheme & Marks**				
Credits	**Lectures**	**Tutorials**	**Practical**	**CA**		**TEA**		**Total**
				Theory	**Practical**	**Theory**	**Practical**	
1	--	--	2	--	--	--	25	25

Prerequisite:

1) Basics of Computers

Other Courses in this Series:

1) Problem Solving through Programming

Course Objectives:

1. To understand problem-solving aspects and basics of the C programming language.
2. To enable understanding and application of decision-making and looping constructs for program flow control.
3. To introduce array and string manipulation techniques for efficient data organization and algorithmic problem solving.
4. To understand modular programming concepts using functions and efficient memory management with pointers.
5. To enable efficient handling and organization of complex data using structures and unions in
6. To introduce file handling concepts for data storage, retrieval, and management in C programming.

Course Outcomes:

On completion of the course, students will be able to:

CO7: Analyse problem statements and construct algorithms, flowcharts, and pseudocode; apply programming constructs to implement basic C programs.

CO8: Design programs using conditional and looping constructs; evaluate the effectiveness of various control structures in achieving desired outcomes.

CO9: Apply operations such as searching, sorting, and matrix manipulation to arrays and strings; analyze algorithm efficiency for array-based solutions.

CO10: Create modular programs using functions and pointers; synthesize solutions involving dynamic memory allocation to optimize resource utilization.

CO11: Develop programs that use structures and unions to model real-world data; compare the

effectiveness of structures versus arrays for organizing complex data.

CO12: Implement file handling operations for sequential and random-access data processing; evaluate the suitability of text files and binary files for various applications.

Suggested List of Laboratory Experiments/Assignments
Assignments from all Groups (A, B, C, D, E, and F) are compulsory

Sr. No.	Group-A (Unit-1 Problem Solving and Fundamentals of C Programming)
1)	**Solve any one,** A. Write a program to take two numbers as input and perform basic arithmetic operations such as addition, subtraction, multiplication, and division. B. Write a program to convert Fahrenheit temperature to Celsius. Get the value of Fahrenheit temperature from the user? C. The distance between two cities (in Km) is input through the keyboard. Write a program to convert and print this distance in meters, feet, inches and centimetres? D. If the basic salary of an employee is input through the keyboard, and the dearness allowance is 50% of the basic salary while the house rent allowance is 20% of the basic salary, write a program to calculate the employee's gross salary. E. If the marks obtained by a student in five different subjects are input through the keyboard, write a program to calculate the aggregate marks and the percentage of marks obtained by the student. Assume that the maximum marks for each subject is 100. F. If the total selling price of 15 items and the total profit earned on them are input through the keyboard, write a program to calculate the cost price of one item. G. Develop a program to calculate the area and perimeter of different geometric shapes (triangle, rectangle, square, circle, hexagon etc). H. Develop a program to calculate the total surface area and volume of different objects (cube, cuboid, prism, cylinder, pyramid, cone, sphere etc). I. Create a program to perform bitwise operations (AND, OR, XOR) on two integers. **Note:** Practice equivalent logic problems on HackerRank/LeetCode.
Sr. No.	**Group-B (Unit-2 Control Structures)**
2)	**Solve any one,** A. Write a program to determine whether a number is even or odd. B. Write a program to check if a given number is positive, negative, or zero. C. Create a program to determine the largest of three numbers. D. If the cost price and selling price of an item are provided as input, write a program to determine whether the seller has made a profit or suffered a loss. Additionally, calculate and display the amount of profit or loss. E. Write a program that takes the ages of three persons: Sachin, Ramesh, and Rahul, as input and determines both the youngest and the oldest among them. F. Write a program to check whether a triangle is valid or not, when the three angles of the triangle are entered through the keyboard. **Note:** Practice equivalent logic problems on HackerRank/LeetCode.
3)	**Solve any one,** A. Write a program to find factorial of a number. B. Write a program to print out all Armstrong numbers between 1 and 500. C. Write a program to display all Prime numbers in a given range. D. Write a program to display Fibonacci series up to n terms. E. Write a program to determine whether a number is palindrome or not. F. Write a program to find GCD and LCM of two numbers.
Sr.	**Group-C (Unit-3 Arrays and Strings)**

No.	
4)	**Solve any one,** A. Write a program that takes n numbers as input from the user, stores them in a 1D array, and performs the following operations: a. Searches for a specific element in the array. b. Identifies the largest and smallest elements. c. Calculates the sum and average of all the elements. B. Accept two 2D matrices and perform matrix addition, multiplication and transpose. **Note:** Solve additional array/string-based problems on HackerRank/LeetCode.
5)	**Solve any one,** A. Write a program to implement basic string operations without using in-built functions: a. Find the length of a string. b. Reverse a string. c. Concatenate two strings. d. Compare two strings. e. Palindrome check. f. Count number of words and vowels. g. Find and replace a word in a sentence. B. Write a program to implement basic string operations without using in-built functions: a. Count the frequency of each character in a string. b. Replace all occurrences of a substring in a string with another substring. c. Find and replace a word in a sentence. d. Implement standard string functions (strlen, strcpy, strcmp, etc.) to demonstrate string manipulation.
6)	**Solve any one,** A. Write a program for binary search on an array of integers. B. Write a program for bubble sort on an array of integers.
Sr. No.	**Group-D (Unit-4 Functions and Pointers)**
7)	**Solve any one,** A. Write a function which receives a float and an int from main(), finds the product of these two and returns the product which is printed through main()? B. Write programs to calculate the factorial of a number entered by the user, using both an iterative function and a recursive function. C. Develop programs to display the Fibonacci series up to n terms using both an iterative function and recursion. **Note:** Solve additional functions & pointers-based problems on HackerRank/LeetCode.
8)	**Solve any one,** A. Write a program to: a. Declare and initialize a pointer to an integer variable. b. Demonstrate pointer arithmetic (increment, decrement, addition, and subtraction). c. Print the memory addresses of an array's elements using pointers. B. Write a program to: a. Accept 5 numbers from the user and store them in an array. b. Use a pointer to traverse the array and find the largest and smallest numbers. C. Write a program in C to create an array using dynamic memory allocation, resize it, display its elements, and free the allocated memory after use. D. Write a program to: a. Accept two numbers and an operator (+, -, *, /) as command-line arguments. b. Perform the operation on the numbers and display the result. c. Handle invalid inputs and display an appropriate error message.

Sr. No.	Group-E (Unit-5 Structures and Unions)
9)	**Solve any one,** A. Define a structure Student with the members roll_no, name, gender, and marks. Write a program to perform the following operations for n students: a. Input and display student details. b. Sort and display the students' data in descending order based on their percentage. c. Search for a student's details using their roll number. B. Define a structure for an inventory system (Item ID, Item Name, Quantity, and Price per Unit). Write a program to: a. Accept details of 10 items. b. Display all items with a quantity of less than 10. c. Find and display the item with the highest value (Quantity × Price per Unit). C. Define a structure for a library management system (Book ID, Title, Author, Price, and Issued Status). Write a program to: a. Accept details of 5 books. b. Search for a book by title and display its details. c. Mark a book as issued and update its status. **Note:** Solve additional structure and unions-based problems on HackerRank/LeetCode.
Sr. No.	**Group-F (Unit-6 File Handling)**
10)	**Solve any one,** A. Write a program to count chars, spaces, tabs and newlines in a file. B. Write a program to add the contents of one file at the end of another. C. Define a structure for Employee (Employee ID, Name, Designation, Department, and Salary). Write a menu-driven program using File handling to, a. Add records b. List records c. Modify records d. Delete records e. Exit D. Write a program to simulate the functionality of the DOS COPY command. The program should copy the contents of one text file (e.g., a .cpp file) to another file. The program should be executed with two command-line arguments: the source file (to copy from) and the destination file (to copy to). For example, the program can be run as follows: C>filecopy source.cpp destination.cpp
Sr. No.	**Mini Projects: Design and Develop any one Mini-Project from Sr. No. 1 to 3**
1)	Develop a Menu-Driven Calculator in C that performs basic arithmetic operations as well as advanced mathematical functions. The calculator should include the following operations: a. Addition b. Subtraction c. Multiplication d. Division e. Modulus (for integers) f. Square Root

	g. Power (Exponentiation) h. Factorial i. Trigonometric Functions (e.g., sine, cosine, tangent) **Note:** All mini-projects must be version-controlled using **Git** and hosted on **GitHub** with appropriate documentation. Students are encouraged to enhance their logic and debugging skills by solving relevant problems on **HackerRank** and **LeetCode**.
2)	Develop a menu-driven program in C to manage employee records for an organization using structures and functions. The program should allow users to perform various operations such as adding, displaying, updating, and deleting employee records, as well as calculating bonuses. Define a structure with following members. Members: Employee ID, Name, Designation, Department, Salary Include following functions. Functions: to add employee, to display employee details, to update employee information, to delete employee record, to calculate bonus (10% of the salary). Create a menu-driven program to perform the following operations: a. Add a new employee. b. Display details of a specific employee. c. Display details of all employees. d. Update employee information. e. Delete an employee record. f. Calculate and display bonuses for all employees. g. Exit.
3)	Develop a mini-project for the any one of the following systems, a. Library Management System b. Hospital Management System c. Banking System d. Payroll System e. Inventory System f. Student Management System

Text Books:

1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Pearson Education, ISBN: 9789332549449
2. Yashavant Kanetkar, "Let Us C", 20th Edition, BPB Publications, ISBN: 978-9355515513
3. Behrouz A. Forouzan, "Computer Science: A Structured Programming Approach Using C", 3rd Edition, Cengage India Private Limited; ISBN: 9788131503638

Reference Books:

1. E. Balagurusamy, "Programming in ANSI C", 9th Edition, McGraw Hill Education, ISBN: 978-9355515513
2. Herbert Schildt, "C: The Complete Reference", 4th Edition, McGraw Hill, ISBN: 978-0070411838
3. Ashok N. Kamthane, "Programming in C", 3rd Edition, Pearson Education, ISBN: 978-9332543553

E-Books/Online Learning Resources:

1. Brian W. Kernighan, Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Prentice Hall, ISBN-13: 978-0131103627
   https://archive.org/details/the-ansi-c-programming-language-by-brian-w.-kernighan-dennis-m.-ritchie.org/page/n1/mode/2up
2. https://www.w3schools.com/c/
3. https://www.programiz.com/c-programming

Online Courses:

1. Problem Solving through Programming in C
   a. Instructor: Prof. Anupam Basu (IIT Kharagpur)

b. Covers C programming basics and problem-solving techniques.
c. Link: https://onlinecourses.nptel.ac.in/noc22_cs101/preview

2. Introduction to Programming in C
   a. Instructor: By Prof. Satyadev Nandakumar (IIT Kanpur)
   b. Covers C programming basics.
   c. Link: https://onlinecourses.nptel.ac.in/noc22_cs40/preview
3. Programming, Data structures and Algorithms
   a. Instructor: Prof. Hema A Murthy, Dr. N S. Narayanaswamy, Prof. Shankar Balachandran (IIT Madras)
   b. Covers Programming basics, algorithms and data structures.
   c. Link: https://nptel.ac.in/courses/106106133
4. C for Everyone: Programming Fundamentals
   a. Instructor: Ira Pohl
   b. Covers programming fundamentals
   c. Link: https://www.coursera.org/learn/c-for-everyone

Software Tools, Simulation Platforms & Hardware Kits:

1. GCC (GNU Compiler Collection) – Standard C compiler for Linux
2. Code::Block Open-source C/C++ IDE with built-in compiler support. https://www.codeblocks.org/
3. OnlineGDB (https://www.onlinegdb.com/) – Online compiler and debugger.
4. CodeChef IDE (https://www.codechef.com/ide) – Competitive coding and practice platform.
5. Programiz C Online Compiler https://www.programiz.com/c-programming/online-compiler/
6. Coding Practice and Collaboration Platforms:
   a. Git and GitHub – https://git-scm.com/ and https://github.com
      For version control, team collaboration, and project portfolio building.
   b. LeetCode – https://leetcode.com
      For practicing competitive coding problems, improving algorithmic thinking.
   c. HackerRank – https://www.hackerrank.com
      For learning and testing programming concepts through hands-on challenges.

CO/PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	2	-	2	-	-	-	-	-	1
CO2	3	3	3	-	2	-	-	-	-	-	1
CO3	3	3	3	2	2	-	-	-	-	-	1
CO4	3	3	3	2	3	-	-	-	-	-	1
CO5	3	2	3	-	2	-	-	-	-	-	1
CO6	3	3	3	2	3	-	-	-	-	-	1

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)			Semester				I
Course VSEC	Design Thinking & Prototyping Lab			Code				DP04020325109
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
2	--	--	4	--	50	--	--	50

Prerequisite:

1) Basics of Communication skills
2) Mathematics
3) Introduction of Computer Science Programming

Other Courses in this Series:

Nil

Course Objectives:

1. To understand and apply the Design Thinking Framework.
2. To develop empathy research for users.
3. To evaluate a wide variety of ideas.
4. To design and build a prototype.
5. To evaluate and iterate designs for problem solving.
6. To communicate ideas effectively.

Course Outcomes:

On completion of the course, students will be able to:

CO1: **Understand** the design thinking process to solve real world engineering problems.

CO2: **Apply** human centred design principals to create empathy maps and personas.

CO3: **Evaluate** creative ideas to find solution for a given problem.

CO4: **Develop** prototypes using tools like Figma ,Marvel POP tocreate interactive models for user testing and iteration.

CO5: **Examine different** designs to improve prototype designs.

CO6: **List** design concepts effectively to develop and present design ideas and prototypes.	
Suggested List of Laboratory Experiments/Assignments **Assignments from all Groups (A, B, C, D, E, and F) are compulsory**	
Sr. No.	**Module -1 Research and Reflection** **Assignment Title**: **Exploring Design Thinking and Innovation**
1)	Create a simple timeline or mind map that outlines the evolution of Design Thinking and its impact on innovation and product development Make cybersecurity awareness more **engaging, relatable, and impactful** for university students so they take proactive security measures. OR Write a reflective journal documenting personal understanding of Design Thinking after reading articles, watching videos, or understanding theory of the subject. **Outcome-**Students will explore different ideas
2)	**Module -2 Design Thinking Framework** **Assignment Title: Analysing Design Thinking Framework**
	Design Thinking Phases **a.** In groups, pick a real-world product or service and map its development journey using the **Empathize, Define, Ideate, Prototype, Test** framework. **b.** Create a visual flowchart illustrating the stages of Design Thinking with examples of real-world products that underwent this process. **c.** Conduct a mini case study using the **IDEO Shopping Cart** case and present findings to the class. **Outcome -**By applying the **5 phases of Design Thinking** (Empathize, Define, Ideate, Prototype, Test) to real-world product/service cases. Student will be able to Create **visual flowcharts** and analyze existing innovations. **Students will able to identify the challenges occurred while exploring a problem**
3)	**Module -3 Empathy & User Design Relationship** **Assignment Title**: **User Research & Empathy Mapping**
	a. Select a real-world problem (e.g., How might we improve urban commuting?). Conduct field visits to relevant places such as hospitals, metro stations, bus stops, malls, schools, homes, shops, or workshops to observe people, their behaviour, and challenges. **b.** Conduct at least **3 user interviews** (in-person or online) to understand users' experiences, needs, and pain points. **c.** Create **Empathy Maps** (Think, Feel, Say, Do) and **Customer Journey Maps** for each user based on observations and interviews. Compile a User Insights Report highlighting key pain points and opportunity areas. **Outcome**: Students will be able to **formulate a clear, user-centered problem statement based on real-world observations and user insights.**

4)	**Module -4 Human Centric tools in Design thinking** **Assignment Title**: **5 Whys & POV Statements**
	Choose one of the problems identified in the previous practical assignment. 1. Apply the **5 Whys** technique to uncover the root cause of the problem. 2. Write a **Point of View (POV) Statement** based on the user insights gathered, focusing on the user's needs and any surprising insights found. 3. Generate at least **3 How Might We (HMW) Questions** that guide potential solutions. **Outcome**- Student will able to find the root cause of problems to frame design challenges.
5)	**Module -5 Ideation and Brainstorming** **Assignment Title**: **Brainstorming and Idea Evaluation**
	a. **Brainstorm** at least **20 potential ideas** for the problem you worked on in the previous assignments (e.g., improving urban commuting). b. Use the **Impact vs. Feasibility Matrix** to evaluate the ideas based on their potential impact and ease of implementation. c. Use **Reverse Brainstorming** and **Edward de Bono's Six Thinking Hats**. d. **Use DVF (Desirability, Viability, Feasibility)** framework from IDEO for evaluating and prioritizing ideas and assess the real-world potential of their ideas. e. Select the **top 3 ideas** based on the evaluation and create a **Justification Report** explaining why those ideas were chosen for further development. **Outcome** -Student will be able to select and justify the **top 3 ideas**.
6)	**Module -6 Process of Product Design** **Assignment Title: Hands-On Product Design**
	a. In groups, choose a **simple daily-use product** (e.g., a better-designed coffee mug, ergonomic pen, or a phone stand). b. Follow the **Design Thinking Process** (Empathize, Define, Ideate, Prototype) and sketch out your product design solution. c. Use **Idea Lab/Fab Lab** resources like **clay modelling**, **laser cutting**, or **3D printing** to prototype your product. d. Present your **prototype** to the class and explain how Design Thinking influenced the design choices. **Outcome -** Students will be able to apply the Design Thinking process **to design and prototype a daily-use product** and **justify design decisions** based on user needs.
7)	**Module -7 Paper Prototypes & Wireframes** **Assignment Title: Creating Low-Fidelity Prototypes**
	a. Based on your top 3 ideas from the ideation phase, select **one idea** to create a **low-fidelity prototype**. b. Use **paper prototypes** or **wireframes** (e.g., hand-drawn screens, sticky notes, or

	cutouts) to visually represent your solution. c. Create **Design Explanation Report.** d. Show the paper prototype to **3 users** (friends or classmates) and record their feedback and make a feedback report e. Revise the prototype based on feedback. **Outcome** -Student will be able to build **paper prototypes or wireframes** for one selected idea and Conduct **user feedback sessions.**
8)	**Module -8 Digital & Electronic Fabrication Prototyping** **Assignment Title: Create Digital Prototypes**
	a. Using tools such as **Marvel POP**, **Figma**, **Adobe XD**, or **Balsamiq**, create a **mid-fidelity digital prototype** of your selected idea. b. Ensure the prototype has key features and navigation flow based on the initial sketches and feedback. c. Share the prototype with **3-5 users** for usability testing. d. Gather feedback and make **improvements** to the prototype based on user insights. **Outcome-**Students will able to use tools like Figma, Adobe XD, Marvel POP, or Balsamiq to design mid-fidelity digital prototypes and Conduct usability testing with real users. They will be able to Iterate and refine based on feedback.
9)	**Module -9 Test & Validate – Final User Testing and Refinement** **Assignment Title: Final Testing & Validation of Prototype Based on User Feedback**
	a. Choose the **most refined prototype** (digital or physical) created in previous modules. b. Select 5-10 target users and prepare a testing plan including: Tasks for users to perform. Feedback questions (e.g., ease of use, usefulness, clarity, satisfaction). c. Record what the users say, do, struggle with, and suggest: Use tools like 1.Usability testing sheets 2.Video or audio recordings 3.Surveys or interviews d. Group feedback into: 1.What worked well 2.What needs improvement 3.Surprising insights e. Make final modifications to improve prototype based on feedback. **Outcome-**Students will be able to conduct **user testing, evaluate prototype usability** using

	structured feedback**,** and **refine the prototype** based on user insights.

Text Books:

1. Lal, D. M, "*Design thinking: Beyond the sticky notes*",First Edition, SAGE Publications Pvt. Ltd. ISBN: 978-9391370701.
2. Norman, Don, "*Emotional Design"*,FirstEdition,ISBN: 978-0465051366.
3. Brown,T.,"Change by Design",7th Edition,HarperCollinsPublishers,NY.ISBN: 978-0062856623.
4. Malik, A. D. M," Design Thinking for Educators" ,First Edition, Notion Press, Chennai, India.

Reference Books:

1. Jeanne Liedtka & Tim Ogilvie, Designing for Growth: A Design Thinking Tool Kit for Managers, 1st Edition, Columbia University Press, ISBN: 9780231158381
2. Thomas Lockwood (Editor), Design Thinking: Integrating Innovation, Customer Experience, and Brand Value, 1st Edition, Allworth Press, ISBN: 9781581156683
3. Michael Lewrick, Patrick Link & Larry Leifer, *The Design Thinking Playbook*, 1st Edition, Wiley, ISBN: 9781119467472
4. Roger Martin, *The Design of Business: Why Design Thinking is the Next Competitive Advantage*, 1st Edition, Harvard Business Review Press, ISBN: 9781422177808

E-Books/Online Learning Resources:

1. **Michael Lewrick, Patrick Link & Larry Leifer**, *The Design Thinking Playbook*, 1st Edition, Wiley, ISBN:9781119467472 https://www.wiley.com/enus/The+Design+Thinking+Playbook%3A+Mindful+Digital+Transformation+of+Teams%2C+Products%2C+Services%2C+Businesses+and+Ecosystems-p-9781119467472
2. https://www.aitskadapa.ac.in/e-books/CSE/DESIGN%20THINKING/Design%20Thinking%20for%20Strategic%20Innovation_%20What%20They%20Can_t%20Teach%20You%20at%20Business%20or%20Design%20School%20(%20PDFDrive%20).pdf
   https://i.experiencepoint.com/free-pdf-download-design-thinking-101-ebook

Online Courses:

1. Design Thinking – A Primer
   a. Instructor: By Prof. Ashwin Mahalingam & Prof. Bala Ramadurai (IIT Madras)
   b. Introduces the fundamentals of design thinking, covering phases like empathize, analyze, ideate, and prototype. Emphasizes human-centered problem-solving approaches.
   c. Link: https://onlinecourses.nptel.ac.in/noc22_mg32/preview
2. Product Engineering and Design Thinking
   a. Instructor: By Prof. Pranab K. Dan & Prof. Prabir Sarkar (IIT Kharagpur)
   b. Focuses on integrating product engineering with design thinking principles.
   c. Link: https://onlinecourses.nptel.ac.in/noc25_me68/preview
3. Understanding Design Thinking and People-Centered Design
   a. Instructor: Prof. Jhumkee Iyengar (IIT Kanpur)
   b. Explores the principles of design thinking with a focus on people-centered design.

c. Link: https://onlinecourses.nptel.ac.in/noc20_hs08/preview

4. Augmenting Design Thinking with Human-Computer Interaction
   a. Instructor: Prof. Sonal Atreya (IIT Roorkee)
   b. Combines design thinking with human-computer interaction principles.
   c. Link: https://onlinecourses.nptel.ac.in/noc25_de09/preview

Software Tools, Simulation Platforms & Hardware Kits:

1. Students can create an **Empathy Map** on large sheets of paper or use digital tools like **Miro**, **MURAL**, or **Lucid chart** to collaboratively build them.
2. Create personas using **Persona Templates** in digital platforms like **Xtensio**, or simply use paper sketches or PowerPoint slides for creating them.
3. Digital tools like **Mind Meister** or **XMind** can help in creating mind maps. Alternatively, use whiteboards or **Google Jamboard** for virtual brainstorming.
4. Students can generate **HMW questions** using **post-its** for in-class activities. Alternatively, **Google Docs** or **Miro** can be used for virtual collaboration.
5. Figma, Adobe XD,Marvel POP ,Balsamiq These popular tool for **UI/UX design** that allows for wireframing, prototyping, and user testing.
6. Tools like **Google Optimize** can be used for **A/B testing** on websites and digital prototypes.
7. Use **Google Forms**, **Survey Monkey**, or **Type form** for collecting structured feedback after prototype testing.
8. Prezi, Canva can be used for presentations, info graphics, and reports.

CO-PO Mapping Matrix

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	2	2	1	2	–	1	1	1	2
CO2	2	3	2	2	1	3	1	2	2	–	2
CO3	2	3	3	2	1	2	–	2	2	1	2
CO4	2	2	3	2	3	1	–	2	2	1	2
CO5	2	2	3	3	2	2	–	2	2	1	3
CO6	1	2	2	1	2	1	–	2	3	2	2

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)					Semester		I
Course AEC	Professional Communication Skills					Code		DP04020325110
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
2		2	--	--	50	--	--	30

Prerequisite: Basic knowledge of English grammar and vocabulary.
Basic reading comprehension and sentence construction.

Other Courses in this Series:

Course Objectives:

- Introduce students to the fundamentals of communication, including its types, principles, and barriers, and to develop effective business writing skills.
- Enhance students' oral communication abilities through structured speaking and listening activities, including presentations, group discussions, and pronunciation exercises.
- Build awareness of behavioral and non-verbal communication techniques such as body language, attire, grooming, and reading strategies for academic and professional contexts.
- Equip students with professional etiquette, ethical understanding, and career skills such as resume writing, self-introduction, and interview preparation for better workplace readiness.

Course Outcomes:

On completion of the course, students will be able to:

CO1: Explain the basic concepts, types, and barriers of communication and identify strategies for overcoming them to ensure effective professional communication.

CO2: Apply principles of effective verbal and non-verbal communication to participate in oral activities such as speeches, group discussions, and presentations.

CO3: Analyze different forms of body language, attire, and grooming standards, and differentiate between effective and ineffective communication behaviors in professional settings.

CO4: Evaluate various etiquette and ethical responsibilities and justify appropriate behavior in social, professional, and corporate environments.

CO5: design professional resumes and cover letters, and develop personalized responses and strategies to perform effectively in job interviews and career-building situations.

Course Contents

Unit 1	Concepts of Communications	6 Hours

Introduction: Definition and Process of Communication,C's of Professional Communication

(Clarity, Conciseness, correctness, Coherent, concrete, courteous and Complete), Forms of Verbal and Non-verbal Communication. **Barriers of Communication:** Communication Barriers and Overcoming Communication Barriers - Guidelines for Effective Communication. **Business Writing:** Direct and Indirect approaches to Business Writing ,Five Main Stages of Writing Business Messages(Planning, Drafting,Revising, Editing, Proofreading).

Case Study#1:	Miscommunication in a Multicultural Team: How Poor Professional Communication Affected Collaboration at Zenith Technologies
Case Study#2:	Ineffective Business Writing and Poor Message Structuring: How Nexus Motors Mishandled Stakeholder Communication During a Product Delay

Unit 2	**Oral Communication**	**Hours**

Developing Speaking Skills: Examples of Speech Acts: Conversations, small talks, speeches, debates, group discussions, elocution, extempore, etc.–their unique features. **Tasks and Activities:** Language Games, Cue – Cards, Strip stories, Jig – saw exercises, Role Plays, Group Discussions, authentic materials, Pronunciation Practice through reading aloud of short paragraphs and recitation of songs, tongue twisters, minimal pairs, etc.**Power Point Presentation:** Planning the Presentation - Delivering the Presentation - Developing & Displaying Visual Aids - Handling Questions from the Audience. **Listening:** Definition - Types of Listening Skills - Features of a Good Listener - Causes and effects of Poor Listening.

Case Study#3:	proving Oral Communication and Listening Skills Among Interns: A Case Study of NovaTech Industries' Professional Communication Bootcamp
Case Study#4:	hancing Customer Service Communication: A Comprehensive Program to Improve Speaking, Listening, and Presentation Skills Among Customer Support Representatives at GlobalConnect Solutions

Unit 3	**Behavioural Techniques**	**6 Hours**

Purpose, Process, Methodologies, Skimming and Scanning, Levels of Reading, Reading Comprehension, Academic Reading Tips Body Language: Facial Expressions - Body Posture - Gestures - Eye Movement - Touch and the use of Personal Space. Business Attire and Grooming: Different types of Attire - Guidelines for Business Attire.

Case Study#5:	osting Reading Comprehension Among Corporate Trainees at NextGen Solutions
Case Study#6:	hancing Professional Presence at Apex Consulting through Body Language and Business Attire Training

Unit 4	**Etiquettes**	**6 Hours**

Etiquettes: Personal Etiquette - Social Etiquette - Greeting Etiquette - Corporate Etiquette - Telephone Etiquette - E-mail Etiquette - Meeting Etiquette - Netiquette - Dining Etiquette, Engineering Ethics:Role ans Responsibilities of Engineer,Work Culture in Jobs

Case Study#7:	Etiquette Training Transforms Workplace Culture at TechPro Innovations
Case Study#8:	**Upholding Engineering Ethics and Work Culture at Skyline Engineering**

Unit 5	**Technical Writing**	**6 Hours**

Types of Technical Documents, Use of Visual Aids (charts, tables, diagrams),Technical Vocabulary and Tone, Editing and Proofreading Techniques,Resume & Cover letter. Interview - The purpose & preparation for an interview. Discover oneself - Self Introduction - Social background (family, home and town) - interests, Hobbies, likes & dislikes (persons, places, food, music, etc.) - Strengths, Weaknesses, Skills, Qualities, Achievements – Opinions (love, life,

marriage, politics, India, etc.) what is life according to me? A creative narration with factual information is expected. Effective Resume writing: structure and presentation – Planning and defining the career objective - strengths and skills set - format - cover letter. Facing Interviews: Interview Process - Understanding employer expectations – Pre-interview planning - Opening strategies - Answering strategies, Frequently Asked Questions (FAQs).

Case Study#9:	Developing career and employability skills: A US case study
Case Study#10:	Career Skills Development of a Student — From Graduate to a Professional

Total Hours:30

Text Books:

1. M Ashraf Rizvi,"Effective Communication Skills", –Tata McGraw-Hill Publication, 2nd Edition,ISBN:0070599521, 9780070599529
2. Sanjay Kumar and Pushp Lata "Communication Skills", 5th Edition,2nd Edition,Oxford University Press ISBN: 9780199457069
3. C. Murlikrishna , Sunita Mishra, "Communication Skills for Engineers", 2nd Edition Pearson - ISBN 978-81-317-3384-4
4. Meenakshi Raman, Sangeeta Sharma, "Technical Communication", 2nd Edition, Principles and Practice Oxford University Press -ISBN 978-13- 16640-08-1

Reference Books:

1. K. K. Sinha ,"Business Communication",Galgotiya Publishing company, New Delhi - ISBN :9789356227064
2. Rajendra Pal, J.S. Korlahalli, "Essentials of Business Communication",Sultan Chand & Sons,New Delhi ISBN 9788180547294
3. John Seely, "Oxford Guide to Writing and Speaking", Oxford University Press

E-Books/Online Learning Resources:

1. **NPTEL Text Transcripts & Slides**
   – From IITs, covering modules like speaking, technical writing, and group discussions.
   📖 https://nptel.ac.in/courses/109/104/109104031/
2. **"Business Communication for Success" – University of Minnesota (OpenStax)**
   – Free, well-structured open textbook.
   📖 https://open.lib.umn.edu/businesscommunication/

Online Courses:

1. Improving Communication Skills (Coursera)
   Instructor: Maurice Schweitzer
   Covers Cooperation, Competition, Comparisons, Trust, Deception, Effective Communication
   Link: https://www.coursera.org/learn/wharton-communication-skills
2. Communication Skills (NPTEL)
   Instructor: Dr. T. Ravichandran (IIT Kanpur)
   Covers Barriers to Communication, Non Verbal Communication, Listening Skills, Business Letter Writings, Group Discussion, Interview Skills, Oral Presenttaion.
   Link: https://nptel.ac.in/courses/109104031

CO/PO Mapping Matrix											
CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	1	-	-	-	-	1	-	-	2	-	1
CO2	-	-	-	-	1	-	-	2	3	-	1
CO3	-	1	-	-	-	2	-	-	2	-	-
CO4	-	-	-	-	-	2	3	-	1	-	-
CO5	-	-	2	-	1	-	-	1	3	2	1

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)			Semester	I			
Course MNC	Yoga and Fitness			Code	DP04020325111			
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
0	--	--	--	-	--	-	--	0

About Course:

In the modern era of fast-paced technological advancement, mental and physical well-being are essential components of sustainable personal and professional success. Yoga offers a holistic approach to health and wellness. The aim of this course is to introduce students to the foundational aspects of Yoga, its philosophy, and practical applications. Students will gain insights into ancient Indian traditions that foster inner peace, emotional balance, physical fitness, and cognitive enhancement. This audit course will lay the groundwork for lifelong wellness practices.

Other Courses in this Series:

1. Health & Wellness
2. Dancing
3. Basics of Music Composition
4. Poster Competition/Model Making
5. Photography & Cinematography
6. Personality Development

Course Objectives:

1. To introduce the philosophy and origin of Yoga
2. To develop awareness of body, mind, and breath coordination
3. To inculcate basic asanas, pranayama, and meditation techniques
4. To promote healthy lifestyle habits and stress management
5. To Promote stress management, emotional well-being, and mental clarity through yogic principles.

Course Outcomes:

On completion of the course learner will be able to:

CO1: Explain the origin, philosophy, and types of Yoga

CO2: Demonstrate basic asanas and pranayama techniques

CO3: Practice mindfulness and meditation for stress reduction

CO4: Adopt a yogic lifestyle to improve personal health and discipline

CO5: Incorporate yogic values into daily life for holistic development and inner discipline.

Course Contents		
Unit 1	**Introduction to Yoga and Its Philosophy**	**4 Hours**
Definition and origin of Yoga; Branches of Yoga (Raja, Bhakti, Jnana, Karma, Hatha, Ashtanga Yoga); History and philosophy of yoga, anatomy of respiratory and circulatory systems, practical training in asanas and pranayama. Relevance of Yoga in modern life;Overview of Patanjali's Yoga Sutras		
Unit 2	**Yogic Practices – Asanas**	**4 Hours**
Importance and classification of Asanas (standing, sitting, lying); Demonstration and practice of selected basic asanas (e.g., Tadasana, Bhujangasana, Trikonasana, Vajrasana) and their benefits, Comprehensive study of yogic traditions, therapy, and research methodologies.		
Unit 3	**Breathing Techniques – Pranayama**	**4 Hours**
Concept of Prana and Pranayama; Practice of Anulom Vilom, Bhramari, Kapalbhati; Physiological and psychological effects of Pranayama		
Unit 4	**Meditation and Mindfulness**	**4 Hours**
Concept of Dhyana; Guided meditation practices; Mindfulness techniques for focus and stress relief; Role of meditation in emotional balance		
Unit 5	**Yogic Lifestyle and Ethics**	**4 Hours**
Yamas and Niyamas; Balanced diet and sleep; Discipline and time management; Yoga for inner peace and interpersonal relationships		
Unit 6	**Yoga and Stress Management**	**4 Hours**
Causes and symptoms of stress; Yogic approach to stress relief; Practical sessions on relaxation techniques (Shavasana, Yoga Nidra)		

Evaluation

Students will work in groups of 3–5 to prepare a report and presentation on a selected yoga-related topic (e.g., role of yoga in sports, yoga for mental health, comparison of yoga styles). The topic must not be duplicated. Evaluation will be based on predefined rubrics shared at the beginning of the course.

Text Books:

1. B.K.S. Iyengar ,Light on Yoga , Revised edition released on January 1, 1979, Schocken Books, ISBN-13: 978-0805210316
2. T.K.V. Desikachar The Heart of Yoga , 2nd Edition, ISBN-13: 9781594778926

3. Mark Stephens ,Teaching Yoga: Essential Foundations and Techniques,1st Edition, ISBN-13: 978-1556438851 bookfinder.com+14

Reference Books:

1. Dr. Ananda Balayogi Bhavnani, Yoga Asana Handbook, No edition, Jessica Kingsley, ISBN-13 978-1787750937
2. Edwin F. Bryant, Patanjali Yoga Sutras,1st Edition, North Point Press, ISBN-13: 978-0865477360
3. Mark Stephens, Yoga Sequencing: Designing Transformational Yoga Classes,1st Edition, North Atlantic Books, ISBN-13: 978-1583944974

E-Books/Online Learning Resources:

1. Yoga Certification Board: https://yogacertificationboard.nic.in/
2. Ministry of AYUSH: https://yoga.ayush.gov.in/
3. Art of Living: https://www.artofliving.org/

Online Courses:

1. NPTEL Yoga Course (IIT Ropar): https://onlinecourses.nptel.ac.in/noc23ge23 https://onlinecourses.nptel.ac.in/
2. Swayam Yoga Courses: https://swayam.gov.in/
3. Yoga International Courses https://yogainternational.com/courses/

CO/PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	-	-	-	-	2	2	-	1	-	2
CO2	2	-	-	-	-	2	1	1	-	-	2
CO3	1	-	-	-	-	3	2	-	-	-	3
CO4	1	-	-	-	-	3	3	1	-	-	3
CO5	1	-	-	-	-	3	3	1	1	-	3

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)			Semester				I
Co-curricular Course	Health and Wellness			Code				DP04020325112
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
2	-	--	4	-	50	-	-	50

About Course: Health and wellness impart information and abilities about fostering well-being, frequently emphasizing holistic approaches to health that consider mental, emotional, and physical factors. These classes can provide people with the skills they need to manage stress, design individualized wellness programs, and adopt healthy lifestyles.

Other Courses in this Series:

1. Yoga Education
2. Dancing
3. Basics of Music Composition
4. Poster Competition/Model Making
5. Photography & Cinematography
6. Personality Development

Course Objectives:

7. To present the idea of wellbeing and health from a spiritual, mental, emotional, and physical standpoint.
8. To raise awareness of disease prevention, healthy living choices, and balanced diet.
9. To promote consistent exercise, including yoga poses and fitness regimens.
10. To improve mental toughness by practicing meditation, stress reduction, and mindfulness.
11. To develop lasting wellness habits, emotional intelligence, and self-discipline.

Course Outcomes:

On completion of the course learner will be able to:

CO1: Describe the tenets and aspects of wellbeing and health.
CO2: Examine how lifestyle decisions, exercise, and diet affect general well-being.
CO3: Show off your basic yoga poses, pranayama, relaxation methods, and physical exercises.
CO4: Incorporate self-care practices, mindfulness, and stress reduction techniques into your

everyday life.

CO5: Create a customized wellness program based on your health objectives and fitness evaluations.

Course Contents

Unit 1	**Overview of Wellness and Health**	**(6 Hours)**

Physical, mental, emotional, social, and spiritual aspects of health are defined as follows. Health determinants (genetics, environment, lifestyle, etc.), The value of wellbeing and good health in today's world HRQoL, or health-related quality of life, The WHO's definition of health is introduced, An overview of health prevention, wellbeing, and fitness

Unit 2	B**alanced diet and Nutrition**	**(6 Hours)**

Macronutrients (fats, proteins, and carbohydrates) and micronutrients (vitamins and minerals) are two types of nutrients, The fundamentals of a healthy diet, Dietary recommendations and good eating practice, The function of immunity and hydration, Junk and processed food's effects on health, Dietary restrictions (for diabetics, vegans, athletes, etc.)

Unit 3	**Fitness and Physical Activity**	**(6 Hours)**

Cardiovascular endurance, muscular strength, flexibility, and body composition are all elements of physical fitness. Physical activity types include strength training, stretching, anaerobic, and aerobic. Recommendations for weekly and daily physical activity Overview of customized fitness planning Exercise's positive effects on mental and physical health.

Unit 4	**Stress Reduction and Mental Health**	**(6 Hours)**

The meaning and significance of mental health, Common mental health conditions include sadness, anxiety, and stress, Stress's causes and manifestations, Techniques for managing stress include progressive muscle relaxation, deep breathing, and time management. Psychological health and adaptability, When and how to get expert assistance.

Unit 5	**Mindfulness, Yoga, and Meditation**	**(6 Hours)**

Overview of mindfulness and its advantages, Meditation techniques to improve concentration and relaxation, Yoga's contribution to wellness, Basic breathing techniques (pranayama) and yoga poses (asanas), strategies for guided relaxation, such as yoga Nidra, Yoga philosophy's daily regimen and self-discipline techniques.

Text Books:

6. Gordon Edlin and Eric Golanty, Health and Wellness ,14th Edition, Jones & Bartlett Learning, ISBN-13: 978-1284235197
7. T.K.V. Desikachar, The Heart of Yoga, 2nd Edition, Inner Traditions International, ISBN-13: 978-0892817641
8. David Anspaugh, Total Wellness, 8th Edition, McGraw-Hill Education, ISBN-13:

978-0078022500

Reference Books:

1. Rebecca J. Donatelle ,"Health: The Basics" , 14th Edition, Pearson, ISBN-13: 978-0137467099
2. Paul Insel, Walton Roth , "Core Concepts in Health" , 18th Edition, McGraw-Hill, ISBN-13: 978-1260074093

Books/Online Learning Resources:

1. **Yoga Certification Board** (AYUSH):
   https://yogacertificationboard.nic.in/
2. **Ministry of AYUSH (India)**:
   https://yoga.ayush.gov.in/
3. **Khelo India Fitness Assessment**:
   http://schoolfitness.kheloindia.gov.in/UploadedFiles/SampleData/AdminManual.pdf

Online Courses:

1. https://onlinecourses.nptel.ac.in/noc19_ge24/preview
2. https://onlinecourses.nptel.ac.in/noc22_ge18/preview
3. Coursera – The Science of Well-Being

CO/PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	-	-	-	-	2	2	-	1	-	2
CO2	2	1	-	-	-	3	1	-	-	-	2
CO3	3	-	-	-	-	2	2	1	-	-	2
CO4	1	-	-	-	-	3	3	1	-	-	3
CO5	2	1	2	-	-	3	2	1	1	-	3

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)			Semester				I
Co-curricular Course	Dancing			Code				DP04020325113
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
2	-	--	4	-	50	-	--	50

About Course:

The dance course syllabus covers the fundamentals of various dance styles, including classical, folk and contemporary forms. Students will learn basic techniques, rhythm, posture, and expressions. The course also emphasizes body coordination, creativity, and performance skills. Practical sessions and choreography assignments form an essential part of the curriculum.

Other Courses in this Series:

Music – Covers vocal and instrumental training, music theory, and composition.

Course Objectives:

1. To introduce students to various dance styles and their cultural significance.
2. To develop fundamental skills in rhythm, posture, coordination and body movement.
3. To enhance students' creativity, self-expression and confidence through performance.
4. To improve physical fitness, flexibility and discipline through regular practice.

Course Outcomes:

On completion of the course learner will be able to:

CO1: Demonstrate proficiency in basic techniques of dance styles.

CO2: Perform choreographed routines with proper rhythm, posture and coordination.

CO3: Improved physical fitness, flexibility, and stamina through dance practice.

CO4: Express emotions and narratives through body movement and expression.

CO5: **Evaluate and Articulate** insights on dance performances.

Unit 1	Introduction to Dance	(04 hrs Practical)

History and Evolution: Explore the origins and development of dance across various cultures and time periods.

Types of Dance: Introduce different dance forms, including classical, modern, folk and contemporary styles.

Dance as a Cultural Expression: Discuss the role of dance in society, rituals and storytelling.

Unit 2	Basic Dance Techniques and Dance Styles	(04 hrs Practical)

Basic Movement Concepts: Explore concepts like space, time, force and flow in dance.

Body Alignment and Posture: Focus on proper body alignment and posture for efficient and healthy movement.

Warm-up and Conditioning Exercises: Introduce warm-up and conditioning exercises to prepare the body for dance.

Classical Dance: Study specific classical dance forms like Bharatanatyam, Kathak, or Odissi including their history, technique, and repertory.

Folk Dance: Examine various folk dance traditions including their cultural significance and performance styles.

Unit 3	**Dance Composition and Choreography**	**(04 hrs Practical)**

Elements of Choreography: Learn about the elements of choreography such as form, structure and motif.

Creating Choreographic Ideas: Explore different approaches to creating choreographic ideas and sequences.

Collaborative Choreography: Practice creating and performing collaborative choreography.

Unit 4	**Dance Performance and Presentation**	**(04 hrs Practical)**

Stagecraft: Learn about stagecraft, including lighting, set design and costume.

Performance Skills: Develop skills in stage presence, projection, and communication.

Dance as a Performing Art: Discuss the role of dance as a performing art and its impact on audiences.

Unit 5	**Dance Appreciation and Critique**	**(04 hrs Practical)**

Watching and Analyzing Performances: View and critique recorded or live dance performances.

Critical Thinking in Dance: Learn to analyze dance using elements such as theme, style, and technique.

Writing Dance Reviews: Practice expressing observations and opinions about performances in written form.

Ethics and Aesthetics: Discuss ethical considerations and aesthetic values in dance across cultures.

Text Books:

1. Kapila Vatsyayan, “Classical Indian Dance in Literature and the Arts”, 1st Edition, Sangeet Natak Akademi, ISBN: 978-8121502122.
2. Sunil Kothari, “Bharata Natyam: Indian Classical Dance Art”, 1st Edition, Abhinav Publications, ISBN: 978-8170170740.
3. Padma Subrahmanyam, “Bharata's Art: Then and Now”, 1st Edition, Bharata Ilango Foundation, ISBN: 978-8191026011.

Reference Books:

1. Dr. Padma Subrahmanyam, “Natya Sastra and the Body Movement Training”, 1st Edition, Bharata Ilango Foundation, ISBN: 978-8191026028.
2. Ragini Devi, “Dance Dialects of India”, 1st Edition, Motilal Banarsidass Publishers, ISBN: 978-8120800984.
3. Alka Raghuvanshi, “The Art of Kathakali”, 1st Edition, Roli Books, ISBN: 978-8174361939.

E-Books/Online Learning Resources:

1. DancePlug, "Online Dance Classes and Tutorials", Available at: www.danceplug.com
2. Steezy Studio, "Online Urban and Hip Hop Dance Training", Available at: www.steezy.co
3. Coursera, "The Language of Dance", Offered by Leading Universities, Available at: www.coursera.org

Online Courses

1. **Bollywood Dance Workshops**
   a. Instructor: Ganesh Acharya (Bollywood Choreographer, Founder – GADA)
   b. Covers: Bollywood dance workshops, signature choreography routines, and online masterclasses.
   c. Link: https://www.instagram.com/gadaofficial/
2. Contemporary **and Bollywood Dance Certification**
   a. Instructor: Terence Lewis (Contemporary Choreographer, Founder – TLPTI)
   b. Covers: Certification courses in contemporary dance, Bollywood choreography, and fitness training.
   c. Link: https://www.terencelewis.com
3. Iconic **Bollywood Dance Tutorials**
   a. Instructor: Saroj Khan (Legendary Bollywood Choreographer)
   b. Covers: Pre-recorded lessons and classic Bollywood choreography tutorials for dancers of all levels.
   c. Link: https://www.dancewithmadhuri.com
4. Dance **With Madhuri – Multi-Dance Online Platform**
   a. Instructor: Madhuri Dixit Nene and Guest Artists (e.g., Remo D'Souza, Pt. Birju Maharaj)
   b. Covers: Comprehensive lessons in Kathak, Bollywood, Folk, Hip-Hop, and Salsa from top choreographers.
   c. Link: https://www.dancewithmadhuri.com

CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	-	-	-	-	1	1	-	-	-	2
CO2	2	-	-	-	-	2	1	2	-	-	2
CO3	1	-	-	-	-	3	2	-	-	-	3
CO4	1	-	1	-	-	2	2	-	2	-	2
CO5	1	1	-	-	-	2	1	-	3	-	2

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)					Semester		I
Co-curricular Course	Basics of Music Composition					Code		DP04020325114
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
2	-	--	4	-	50	-	--	50

About Course:

The Basics of Music Composition course introduces students to the essential elements of music theory and composition. Students will learn basic musical notation, melody construction, harmony,rhythm and form. The course also emphasizes creativity, structure, and use of music technology tools. Practical listening sessions and short composition projects form an essential part of the curriculum.

Course Objectives:

1. To introduce students to music theory and the fundamentals of composition.
2. To develop an understanding of rhythm, harmony, melody, and form.
3. To encourage creativity and originality in musical ideas.
4. To train students in basic notation and use of music composition software.

Course Outcomes:

On completion of the course learner will be able to:

CO1: Demonstrate knowledge of basic music theory.

CO2: Compose original pieces using appropriate structural elements.

CO3: Identify and apply basic compositional and notational techniques.

CO4: Use digital tools to notate and present their musical ideas.

CO5: Analyze and evaluate musical compositions.

Unit 1	Introduction to Music Composition	(06 Hours)

History and Evolution: Explore the development of music across various cultures and time periods.
Genres and Forms: Introduce different music types, including classical, folk, popular, and electronic styles.
Music as a Cultural Expression: Discuss the role of music in rituals, storytelling, and communication.

Unit 2	Foundations of Music Theory	(06 Hours)

Notation and Rhythm: Learn basic note values, time signatures and rhythmic patterns. **Scales and Chords:** Introduction to major/minor scales, intervals and triads. **Melody and Harmony**: Understand melodic construction and harmonization basics.

Unit 3	**Compositional Techniques**	**(06 Hours)**

Musical Form: Learn about binary, ternary, and rondo forms. **Motif and Phrasing:** Create simple motifs and structured phrases. **Dynamics and Texture:** Use of dynamics and layering in composition.

Unit 4	Composition Projects and Presentation	**(06 Hours)**

Digital Composition Tools: Introduction to MuseScore, FL Studio or GarageBand. **Project Work:** Create and present short original compositions. **Feedback and Refinement:** Share, critique, and refine musical ideas.

Unit 5	**Music Appreciation and Analysis**	**(06 Hours)**

Listening and Interpretation: Analyze diverse musical works from various genres and periods.
Critical Listening Skills: Identify elements like instrumentation, form, rhythm and harmony.
Music Review Writing: Practice articulating observations and critiques in written form.
Ethics and Aesthetics in Music: Explore cultural contexts, aesthetic values and ethical considerations in music creation and performance.

Text Books:

1. V. R. Athavale, "Sangeet Visharad: A Complete Guide to Indian Classical Music", Sangeet Ganga Publication, ISBN: 978-8190671713
2. P. Sambamoorthy, "South Indian Music" (Vol. 1–6), The Indian Music Publishing House, ISBN: 978-8188452073
3. Dr. Lalmani Misra, "Bharatiya Sangeet Vadya", Bharatiya Gyanpeeth, ISBN: 978-8126300884

Reference Books:

1. P. Sambamoorthy, “A Dictionary of South Indian Music and Musicians”, 2nd Edition, The Indian Music Publishing House, ISBN: 978-8188452066
2. Dr. Suneera Kasliwal, “Classical Musical Instruments”, Rupa Publications India, ISBN: 978-8171671406
3. V. R. Athavale, “Sangeet Shastra Darpan: A Comprehensive Text on Indian Classical Music Theory”, Sangeet Ganga Publication, ISBN: 978-8190671768

E-Books/Online Learning Resources:

1. Berklee Online – Music Composition Courses
   Link: https://online.berklee.edu/courses/music-composition
2. MuseScore – Learning and Tutorials
   Link: https://musescore.org/en/learn

Online Courses:

1.**Shankar Mahadevan Academy – Online Music Classes**

a. **Instructor:** Various certified instructors under the guidance of Shankar Mahadevan
b. **Offers:** Structured online courses in Hindustani, Carnatic, devotional, and Bollywood music, along with courses in voice culture, theory, and beginner training
c. **Link:** https://www.shankarmahadevanacademy.com

2. **Raga Labs – Music Education by IndianRaga**
   a. **Instructor:** IndianRaga Fellows and expert artists
   b. **Offers:** Online modules in Indian classical vocals (Hindustani & Carnatic), music theory, rhythm training, and collaborative learning projects
   c. **Link:** https://indianraga.com/ragalabs

3. **A R Rahman's KM Music Conservatory – Online Foundation Courses**
   a. **Instructor:** Faculty from KM Conservatory, founded by A R Rahman
   b. **Offers:** Courses in Western classical music, music theory, composition, and music production (with some available online or hybrid format)
   c. **Link:** https://kmmc.in

CO/PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	-	-	-	-	1	1	-	-	-	2
CO2	2	1	2	-	-	1	1	-	1	-	2
CO3	2	1	1	-	-	1	1	-	1	-	2
CO4	1	-	-	-	3	1	1	-	2	-	2
CO5	1	2	-	-	-	1	1	-	2	-	2

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)			Semester				I
Co-curricular Course	Poster Competition and Model Making			Code				DP0402032 5115
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
2	-	--	4	-	50	-	--	50

Prerequisite:

1) Basic computer and internet usage skills
2) Introductory communication skills

Other Courses in this Series:

1) NIL

About Course:

Through the development of posters and models, this course aims to introduce students to the principles of creativity, visual communication, and scientific presentation. Along with fostering the development of critical soft skills like public speaking and design thinking, it places a strong emphasis on collaboration, creativity, and the real-world application of theoretical knowledge.

Course Objectives:

1. To enhance visual communication and creative thinking in technical presentations.
2. To develop skills in conceptualizing, designing, and creating technical posters.
3To provide hands-on experience in making working or static models.
4. To promote teamwork and project-based learning in an engineering context.
5. To improve public speaking, articulation, and defence of technical ideas.

Course Outcomes:

Upon successful completion of the course, students will be able to:
CO1: Understand the principles of visual design and technical presentation.
CO2: Create informative and visually engaging technical posters.
CO3: Develop physical or digital models to represent engineering concepts.
CO4: Demonstrate teamwork, time management, and problem-solving through group tasks.
CO5: Present and defend technical ideas effectively in front of an audience.

Course Contents

Unit 1	Introduction to Poster Presentation	(06 hrs)

Types of posters: Academic, scientific, awareness, Structure: Title, abstract, content blocks, references, Design principles: Layout, font, color theory, readability, Tools: Canva, PowerPoint, Adobe Illustrator

Unit 2	Scientific and Technical Model Making	(06 hrs)
Types of models: Static, working, digital simulations, Materials and resources: Cardboard, thermocol, 3D printing, software models, Safety and sustainability in model making		
Unit 3	**Idea Generation and Project Planning**	**(06 hrs)**
Brainstorming techniques, Problem identification and theme selection, Planning: Time, material, roles		
Unit 4	**Team Collaboration and Execution**	**(06 hrs)**
Group roles and responsibilities, Conflict resolution, decision-making, Model development and poster creation in teams		
Unit 5	**Presentation Skills**	**(06 hrs)**
Public speaking, body language, audience engagement, Use of AV aids, live demonstrations handling		

Evaluation

Internal Assessment: Class participation and group activities, Poster draft submission and peer feedback, Model prototype review
Final Evaluation: Final poster and model display, Presentations.

Textbooks:

1. **Matt Carter**, *"Designing Science Presentations"*, 1st Edition, Academic Press, ISBN: 978-0123859693
2. **Jill L. Lane & Linda B. Harris**, *A Guide to Poster Presentations*, 1st Edition, University Press, ISBN: 978-0415950125
3. Online Tools: Canva, Tinker cad, Figma, Google Slides

Reference Books:

1. **Garr Reynolds**, *"Presentation Zen"*, 2nd Edition, New Riders, ISBN: 978-0321811981
2. **Tom Kelley & David Kelley**, *"Creative Confidence"*, 1st Edition, Crown Business, ISBN: 978-0385349369
3. **Jonathan Schwabish**, *Better Posters: Plan, Design and Present an Academic Poster*, 1st Edition, Columbia University Press, ISBN: 978-0231195216

E-Books/Online Learning Resources:

1. **Jonathan Schwabish**, *Better Posters: Plan, Design and Present an Academic Poster*, 1st Edition, Columbia University Press, ISBN: 978-0231195216 https://cup.columbia.edu/book/better-posters/9780231195216
2. **Edward R. Tufte**, *The Visual Display of Quantitative Information*, 2nd Edition, Graphics Press, ISBN: 978-0961392147 https://www.edwardtufte.com/tufte/books_vdqi
3. **Nancy Duarte**, *Slide: ology – The Art and Science of Creating Great Presentations*, 1st Edition, O'Reilly Media, ISBN: 978-0596522346 https://www.amazon.in/dp/B0026OR3ZC , https://www.amazon.in/dp/B0026OR3ZC,

Online Courses:

1. "Graphic Design"

a. Instructor: Coursera Project Network

b. Covers: Design principles, visual hierarchy, color theory, and layout skills essential for poster creation.

c. Link: https://www.coursera.org/learn/graphic-design

2. "Presentation Skills: Speechwriting, Slides and Delivery"

a. Instructor: Dr. William Kuskin (University of Colorado Boulder – Coursera)

b. Covers: How to structure presentations, design slides, and effectively deliver content.

c. Link: https://www.coursera.org/learn/presentation-skills

3. "Introduction to Design Thinking"

a. Instructor: Prof. Aman Yadav (NPTEL, IIT Kanpur)

b. Covers: Fundamentals of creativity, problem-solving, and model prototyping techniques.

c. Link: https://onlinecourses.nptel.ac.in/noc22-ge18/preview

4. "Poster Presentation: Design and Delivery"

a. Instructor: University of Leeds (Future Learn)

b. Covers: Designing academic posters, presenting research visually, and effective communication.

c. Link: https://www.futurelearn.com/courses/poster-presentation

CO/PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	-	-	-	1	-	-	-	2	-	1
CO2	2	1	-	-	2	-	-	-	3	-	1
CO3	3	-	3	-	3	1	-	-	-	-	2
CO4	-	1	-	-	-	-	1	3	-	3	1
CO5	-	-	-	-	-	-	-	2	3	-	2

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)			Semester				I
Co-curricular Course	Photography and Cinematography			Code				DP0402032 5116
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
2	-	--	4	-	50	-	--	50

Prerequisite:

1) Basic knowledge of operating digital devices (camera, smartphone, computer)
2) Interest in creative media

Other Courses in this Series:

1) NIL

About Course:

This course introduces students to the fundamentals of photography and cinematography with hands-on training in camera operations, composition, lighting, editing, and storytelling. It focuses on creative visual communication through digital media, blending artistic vision with technical skills.

Course Objectives:

1. To introduce students to the fundamentals of photography and cinematography.
2. To develop an understanding of image composition, lighting, and visual aesthetics.
3. To explore digital tools and techniques used in modern photography and video.
4. To provide hands-on experience in capturing and editing photos and videos.
5. To enable students to create visual content for storytelling and communication.

Course Outcomes:

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

CO1: Understand the principles and history of photography and cinematography.

CO2: Apply composition, lighting, and framing techniques for visual impact.

CO3: Use digital cameras and editing tools for photography and filmmaking.

CO4: Create short photo stories or videos integrating visual narrative techniques.

CO5: Analyse visual content for aesthetics, meaning, and effectiveness in communication.

Course Contents

Unit 1	**Introduction to Photography and Cinematography**	**(06 hrs)**
History and evolution, Camera types and functions, Image formation and exposure triangle (ISO, Aperture, Shutter Speed)		
Unit 2	**Principles of Composition and Lighting**	**(06 hrs)**
Rule of thirds, framing, leading lines, Natural and artificial lighting, White balance and color temperature		
Unit 3	**Camera Handling and Techniques**	**(06 hrs)**
Focus techniques, camera angles, movements, Use of tripods, sliders, and stabilizers, Understanding lenses and depth of field		
Unit 4	**Cinematography Basics**	**(06 hrs)**
Shot sizes, scene blocking, Storyboarding and visual narrative, Audio-video synchronization		
Unit 5	**Editing and post-production**	**(06 hrs)**
Introduction to editing software (e.g., Adobe Premiere, DaVinci Resolve), Photo editing (e.g., Lightroom, Photoshop basics), Color correction, transitions, sound mixing. **Project and Portfolio Development:** Pre-production planning, short film/photo story execution, Portfolio curation and presentation		

Evaluation

- Assignments and practical submissions
- Midterm quiz/project
- Final short video or photo portfolio presentation

Textbooks:

1. **Michael Langford**, *Langford's Basic Photography*, 9th Edition, Focal Press, ISBN: 978-0240520351
2. **Bruce Mamer**, *Film Production Technique: Creating the Accomplished Image*, 6th Edition, Cengage Learning, ISBN: 978-1305077460
3. **Tom Ang**, *Digital Photography Masterclass*, 2nd Edition, DK Publishing, ISBN: 978-1465414755
4. **Joseph V. Mascelli**, *The Five C's of Cinematography: Motion Picture Filming Techniques*, 1st Edition, Silman-James Press, ISBN: 978-1879505414
5. **David Bordwell and Kristin Thompson**, *Film Art: An Introduction*, 12th Edition, McGraw-

Hill Education, ISBN: 978-1260565669

Reference Books:

1. **Blain Brown**, *Cinematography: Theory and Practice – Image Making for Cinematographers and Directors*, 3rd Edition, Routledge, ISBN: 978-1138940925
2. **John Berger**, *Ways of Seeing*, 1st Edition, Penguin Books, ISBN: 978-0140135152
3. **Steven Ascher & Edward Pincus**, *The Filmmaker's Handbook: A Comprehensive Guide for the Digital Age*, 5th Edition, Plume, ISBN: 978-0452297289
4. **Ben Long**, *Complete Digital Photography*, 9th Edition, CDP Press, ISBN: 978-1732636933
5. **David Prakel**, *The Visual Dictionary of Photography*, 1st Edition, AVA Publishing, ISBN: 978-2940373758

E-Books/Online Learning Resources:

1. https://www.udemy.com/course/filmmaking-for-beginners/
2. https://books.google.com/books/about/Langford_s_Basic_Photography.html?id=0W9DDAAAQBAJ
3. https://www.amazon.in/Five-Cs-Cinematography-Picture-Techniques-ebook/dp/B00HNZ2HWK
4. https://www.coursera.org/specializations/photography-basics

Online Courses:

1. **"Photography Basics and Beyond: From Smartphone to DSLR"**
   a. Instructor: Michigan State University (Coursera)
   b. Covers camera controls, composition, lighting, photo editing, and storytelling through images.
   c. Link: https://www.coursera.org/specializations/photography-basics
2. **"The Art of Filmmaking and Editing"**
   a. Instructor: Life Progression Project (Udemy)
   b. Covers cinematography principles, storyboarding, directing, shooting, and video editing.
   c. Link: https://www.udemy.com/course/filmmaking-for-beginners/
3. **"Cinematography Course: Shoot Expert Video on Any Camera"**
   a. Instructor: Phil Ebiner & Video School (Udemy)
   b. Covers framing, lighting, color theory, composition, and professional video shooting techniques.
   c. Link: https://www.udemy.com/course/cinematography-masterclass-video-

production-camera/

4. **"Digital Photography"**

   a. Instructor: Harvard University (via Alison platform)

   b. Covers exposure, composition, digital workflow, and image formats.

   c. Link: https://alison.com/course/digital-photography

CO/PO Mapping Matrix											
CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	2	1	-	-	-	1	-	-	1	-	2
CO2	2	-	2	-	1	-	-	-	2	-	1
CO3	1	-	-	-	3	-	-	-	1	-	2
CO4	-	-	3	-	2	2	-	2	3	1	2
CO5	-	2	-	2	-	1	-	-	3	-	2

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)			Semester				I
Co-curricular Course	Personality Development			Code				DP04020325117
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
2	-	--	4	-	50	-	--	50

Prerequisite:

1) Basic verbal and written communication skills
2) Willingness to participate in group activities and discussions

Other Courses in this Series:

1) NIL

About Course:

In today's competitive world, possessing a strong academic background alone is not sufficient. Employers are increasingly looking for well-rounded individuals who display professionalism, confidence, effective communication, and leadership skills. This course is designed to help engineering students develop essential soft skills, gain self-awareness, and build a compelling personality to succeed in their professional and personal lives. The course combines lectures, group activities, self-assessments, and practical exercises to enable students to emerge as effective and confident individuals.

Course Objectives:

1. To provide an understanding of key aspects of personality and self-development.
2. To enhance communication and interpersonal skills essential for personal and professional success.
3 To build confidence, leadership, and teamwork skills through practical learning.
4. To enable students to handle stress, manage time effectively, and stay motivated.
5. To foster professional ethics, positive attitude, and life-long learning habits.

Course Outcomes:

Upon successful completion of the course, students will be able to:
CO1: Understand key concepts of personality, self-awareness, and emotional intelligence.
CO2: Develop effective communication and interpersonal skills.
CO3: Demonstrate skills in leadership, teamwork, and conflict resolution.
CO4: Apply time management and stress management techniques to improve personal productivity.

CO5: Exhibit ethical behaviour, professional attitude, and positive work culture mindset.

Course Contents

Unit 1	**Self-Awareness and Personality Types**	**(06 hrs)**

Definition and dimensions of personality, self-awareness tools, understanding strengths and areas of improvement, Johari Window, MBTI and DISC personality profiles. **Emotional Intelligence and Positive Thinking:** Self-regulation, empathy, social skills, developing a positive mindset, optimism, handling failures.

Unit 2	**Communication Skills**	**(06 hrs)**

Verbal and non-verbal communication, effective listening, assertiveness, public speaking, group communication, email etiquette.

Unit 3	**Leadership and Teamwork**	**(06 hrs)**

Leadership traits and styles, working effectively in teams, group dynamics, conflict resolution, decision making.

Unit 4	**Grooming and Professional Etiquette**	**(06 hrs)**

Personal hygiene and grooming, dress code, professional conduct, business etiquette, dining etiquette.

Unit 5	**Time Management and Stress Management**	**(06 hrs)**

Goal setting, prioritization, timewasters, techniques for managing academic and work stress, work-life balance. **Interview Techniques and Group Discussions:** Resume writing, facing HR and technical interviews, mock interviews, GD rules and assessment criteria, do's and don'ts in GD.

Evaluation

Students must participate in classroom activities, submit a portfolio of self-development exercises, and make a final presentation. Faculty will evaluate using rubrics focused on growth, participation, presentation quality, and practical application.

Textbooks:

1. **Barun K. Mitra**, *Personality Development and Soft Skills*, 2nd Edition, Oxford University Press, ISBN: 978-0199459742
2. **Stephen R. Covey**, *The 7 Habits of Highly Effective People*, 1st Edition, Free Press, ISBN: 978-0743269513
3. **Carnegie Dale**, *How to Win Friends and Influence People*, Revised Edition, Simon & Schuster, ISBN: 978-0671027032
4. **Alex K.**, *Soft Skills: Know Yourself and Know the World*, Revised Edition, S. Chand Publishing, ISBN: 978-8121931921
5. **Hurlock, Elizabeth B.**, *Personality Development*, 28th Reprint, Tata McGraw-Hill, ISBN: 978-0070993612

Reference Books:

1. **Norman Vincent Peale**, *The Power of Positive Thinking*, Revised Edition, Touchstone, ISBN: 978-0743234801

2. **Brian Tracy**, *Eat That Frog! 21 Great Ways to Stop Procrastinating and Get More Done in Less Time*, 3rd Edition, Berrett-Koehler Publishers, ISBN: 978-1626569416
3. **Daniel Goleman**, *Emotional Intelligence: Why It Can Matter More Than IQ*, 10th Anniversary Edition, Bantam, ISBN: 978-0553383713
4. **Shiv Khera**, *You Can Win: A Step by Step Tool for Top Achievers*, 1st Edition, Macmillan India, ISBN: 978-9382951711
5. **Deborah Tannen**, *The Power of Talk: How Words Shape Our Lives*, 1st Edition, Ballantine Books, ISBN: 978-0345370522
6. **Laurie Rozakis**, *Communication Skills: Success in 20 Minutes a Day*, 1st Edition, Learning Express, ISBN: 978-1576850712

E-Books/Online Learning Resources:

1. https://www.amazon.in/7-Habits-Highly-Effective-People-ebook/dp/B00GOZV3TM
2. https://www.amazon.in/How-Win-Friends-Influence-People-ebook/dp/B003WEAI4E
3. https://www.amazon.in/Emotional-Intelligence-Matter-More-Than-ebook/dp/B000OCXGZS

Online Courses:

1. "Developing Soft Skills and Personality"
   a. Instructor: Prof. T. Ravichandran (IIT Kanpur)
   b. Covers: Personality traits, communication skills, leadership, time management, and workplace etiquette.
   c. Link: https://onlinecourses.nptel.ac.in/noc24-hs17/preview
2. "Personality Development"
   a. Instructor: Dr. Sushmita Biswas (NITTTR Chennai)
   b. Covers: Self-awareness, interpersonal relationships, group dynamics, and professional behavior.
   c. Link: https://swayam.gov.in/nd1_noc24_ge05/preview
3. "Interpersonal Communication for Engineering Leaders"
   a. Instructor: Dr. Ashok Krishnamurthy (Rice University – Coursera)
   b. Covers: Effective speaking, listening, giving feedback, team communication, and conflict resolution.
   c. Link: https://www.coursera.org/learn/interpersonal-communication
4. "English for Career Development"
   a. Instructor: University of Pennsylvania (Coursera)
   b. Covers: Resume building, cover letters, interview skills, and professional communication.
   c. Link: https://www.coursera.org/learn/careerdevelopment

CO/PO Mapping Matrix											
CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	-	-	-	-	-	1	-	-	-	-	2
CO2	-	-	-	-	-	-	-	1	3	-	2
CO3	-	-	-	-	-	-	-	3	1	2	2
CO4	-	-	-	-	-	-	-	-	-	3	2
CO5	-	-	-	-	-	2	3	1	-	-	1

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)			Semester				I
Audit Course	Foreign Language -Japanese Module-I			Code				---
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
AC	-	--	--	-	--	-	--	-

About Course:

In today's globalized world, the knowledge of foreign languages plays a vital role in enhancing cross-cultural communication and expanding career opportunities. This introductory course in Japanese language is designed specifically for B.Tech. students to provide foundational skills in reading, writing, speaking, and listening to Japanese.

The course aims to familiarize students with the Japanese script systems—Hiragana, Katakana, and basic Kanji—and enable them to engage in simple conversations related to everyday situations. Emphasis is also placed on understanding Japanese culture, etiquette, and social norms, which are essential for effective communication and collaboration in academic or professional contexts.

By the end of the course, students will be able to:

- Read and write basic Japanese characters.
- Introduce themselves and others.
- Engage in simple dialogues related to travel, university life, and technology.
- Develop an appreciation of Japanese culture and work ethics.

This course is ideal for engineering students looking to broaden their global perspective, particularly those interested in working with Japanese companies or pursuing higher studies or internships in Japan.

Other Courses in this Series: Nil

Course Objectives:

1. To meet the needs of ever-growing industry with respect to language support.
2. To get introduced to Japanese society and culture through language.
3. To able to Explain basics concept and facts of Japanese language.
4. To able to Compare demonstrative pronouns to ask information.
5. To able to Select different verbs, demonstrative pronouns for place

6. To able to Outline Japanese etiquette by using vocabularies related to daily activities and time

Course Outcomes:

On completion of the course learner will be able to:

CO1: Demonstrate basic Japanese language skills required to support communication in industrial and professional environments.

CO2: Illustrate an introductory understanding of Japanese society and culture through language expressions.

CO3: Explain fundamental concepts and linguistic features of the Japanese language, including basic vocabulary and structure.

CO4: Compare and use demonstrative pronouns appropriately while seeking or providing information.

CO5: Select and apply correct Japanese verbs and demonstrative pronouns to indicate people, places, and objects.

CO6: Outline basic Japanese etiquette using vocabulary related to time, routine, and daily activities.

Course Contents

Unit 1	**Introduction to Japanese and Communication in Industrial Contexts**	**6 Hours**

Introduction to the Japanese language and its significance in global industries, Basic greetings and daily expressions (Ohayou, Konnichiwa, Arigatou, etc.), Introducing oneself and others in formal/informal settings, Vocabulary and phrases used in technical/industrial environments, Listening practice: Japanese workplace conversations and formal greetings, Reading simple signs, labels, instructions related to office or industry

Unit 2	**Basic Grammar and Structure of Japanese Language**	**6 Hours**

Introduction to Japanese sentence structure (SOV pattern), Japanese Scripts: Hiragana and Katakana (writing and recognition practice), Introduction to basic Kanji characters (5–10 characters), Use of particles (wa, ga, o, ni, de) and sentence formation, Verbs: masu form, basic verb conjugation in present tense, Adjectives and basic expressions with time, Writing and speaking short sentences using learned grammar

Unit 3	**Japanese Society and Culture**	**6 Hours**

Overview of Japanese social values and customs, Japanese festivals, food habits and traditional etiquette, Comparison between Indian and Japanese work culture, Bowing and expressions of politeness (sumimasen, onegaishimasu), Introduction to Japanese punctuality and hierarchical communication, Cultural videos and simple discussions in class, Vocabulary related to family, workplace hierarchy, and honorifics

Unit 4	**Demonstrative Pronouns and Asking Information**	**6 Hours**

Introduction to demonstratives: Kore, Sore, Are, Dore (this, that, which), Koko, Soko, Asoko, Doko (here, there, where), Usage of demonstratives with objects and places, Asking and answering location-based questions, Vocabulary: places (gakkou, toshokan, shokudou, etc.), Practical dialogues for classroom and campus settings, Translation exercises (English ⇄

Japanese)

Unit 5	Verbs, Actions and Daily Routines	6 Hours

Verb types: ru-verbs and u-verbs, Verb conjugation: Present, negative, past (introduction), Vocabulary related to daily routines (okiru – to wake up, taberu – to eat, etc.), Making simple affirmative and negative sentences using verbs, Pair work: describing daily routine in Japanese, Practice conversations using verbs and time expressions, listening comprehension exercises based on action verbs

Unit 6	Japanese Etiquette and Time-related Vocabulary	6 Hours

Vocabulary: Days of the week, months, telling time, Expressions of frequency (itsumo, tokidoki, mainichi, etc.), Describing schedules using learned vocabulary, Etiquette expressions: greetings, farewells, apologies, and requests, Writing short passages about a typical day using correct time-related structures, Role plays based on classroom, meeting, and dining situations, Cultural norms in Japanese formal conversation (dos and don'ts)

Evaluation

Students should select any one of the topic in a group of 3 to 5. Students should submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics defined by him/her/them at start of course.

Text Books:

1. Taeko Kamiya, Japanese For Fun Phrasebook & Dictionary: The Easy Way to Learn Japanese Quickly, Rev Edition 2017 Tuttle Publishing, (ISBN 10- 4805313986, ISBN 13 - 9784805313985)
2. Eri Banno, Genki I: An Integrated Course in Elementary Japanese , 3rd Edition 2020, The Japan Times, (ISBN13: 9784789017305)
3. Sushama Jain, Japan : The Living Culture, Har-anand Publications, 2009, (ISBN 10: 8124114870 / ISBN 13: 9788124114872)
4. Minna no Nihongo, Goyal Publisher, Delhi

Reference Books:

1. Kanji Power Handbook for the Japanese Language Proficiency Test, 1994, ARC Press (ISBN: 9784872343144)
2. Yukiko Ogata, Kana Sumitani, Yasuko Hidari, Yukiko Watanabe, Nihongo fun and Easy -I Survival Japanese
   Conversation for Beginners,
3. Eriko Sato, Japanese Demystified: A Self-Teaching Guide, 2008, McGraw-Hill Companies, McGraw-Hill Demystified Series (ISBN 10-0071477268, ISBN 13-9780071477260)

E-Books/Online Learning Resources:

a. https://www.duolingo.com/course/ja/en/Learn-Japanes

b. https://www.freejapaneselessons.com/

c. https://minato-jf.jp/ (Japan Foundation)

Online Courses:

1. **Japanese for Beginners Free Online Course by Coursera**
   a. Presented by the St Petersburg State University through the online course platform known as Coursera.
   b. Covers basics of the Japanese language for the beginners.
   c. Link: https://www.youtube.com/watch?v=keHP75wg3FA

2. **Introduction to Japanese Language and Culture**
   a. Instructor: Prof. Vatsala Misra (IIT Kanpur)
   b. It focuses on conversational skills and basic training in sentence construction
   c. Link: https://onlinecourses.nptel.ac.in/noc25_hs43/preview?utm_source=chatgpt.com

CO/PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	1	1	-	-	2	-	2	3	1	2
CO2	1	-	-	-	-	3	2	2	2	-	2
CO3	2	1	-	-	-	-	-	-	2	-	2
CO4	1	2	-	-	-	-	-	1	2	-	1
CO5	1	2	-	-	-	-	-	1	2	-	1
CO6	-	-	-	-	-	3	3	2	2	-	2

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)			Semester				I
Audit Course	Foreign Language -German			Code				---
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
AC	-	--	--	-	--	-	--	-

About Course:

This foundational course in the German language is designed specifically for B.Tech. students to equip them with essential communication skills in one of the most widely spoken languages in Europe and the language of major global technology and engineering firms.

German Language – Module I introduces students to the basics of the German script, pronunciation, and grammar. The course focuses on enabling students to read, write, and understand simple German texts, while also learning to construct basic sentences and engage in elementary conversations related to everyday topics such as greetings, introductions, numbers, time, family, and university life.

In addition to linguistic competence, the course also aims to create cultural awareness by introducing students to German customs, traditions, and formal etiquette. This cultural insight is especially valuable for students aiming to pursue higher studies, internships, or career opportunities in German-speaking countries or multinational companies.

At the end of this module, students will be able to:

- Recognize and pronounce German alphabets and phonetics.
- Understand and use basic grammar structures such as articles, nouns, verbs, and sentence formation.
- Communicate using simple phrases in common daily life scenarios.
- Develop a basic understanding of German culture and formal communication norms.

This course lays the groundwork for further language proficiency (Module II and beyond) and aligns with global education and employability trends under the NEP 2020 framework.

Other Courses in this Series: Nil

Course Objectives:

1. To enable students to comprehend and use German language for day-to-day and workplace communication
2. To build a foundational understanding of German grammar and sentence structure
3. To introduce students to the cultural aspects of living and working in Germany
4. To develop basic writing skills in German

5. To enhance speaking and pronunciation skills in German
6. To raise awareness about environmental and social issues

Course Outcomes:

On completion of the course learner will be able to:

CO1: Understand and respond appropriately to simple spoken and written German used in daily and workplace settings.

CO2: Apply German grammar rules and sentence structures accurately using basic pronouns, tenses, articles, and prepositions.

CO3: Compare and describe key cultural aspects of life and work in Germany and India.

CO4: Fill forms, write short messages, emails, and error-free sentences in German using correct punctuation and structure.

CO5: Use appropriate pronunciation, vocabulary, and expressions in spoken German for common every day and workplace situations.

CO6: Discuss basic environmental and social issues in simple German, drawing comparisons between Indian and German contexts.

Course Contents

Unit 1	**German in day-to-day life and at work**	**6 Hours**

Daily routine, work routine and leisure time; Weather and health care; Living and working in Germany , Listening skills: Listen and understand short conversations in day-today life and at work place, Reading skills: Read and comprehend from instruction boards, advertisements, simple texts, short messages, letters, and emails in German

Unit 2	**German Grammar and Sentence Structure**	**6 Hours**

Personal Pronouns: Nominative, accusative, dative ,Verbs: With dative and accusative case ,Tenses: Present, past (Perfekt) ,Types of Articles: Definite, indefinite, negative, possessive, demonstrative , Cases: Nominative, accusative, dative ,Prepositions: With accusative and dative case , Basic German conjunctions: and, or, but, because Solving grammar exercises to get used to basic sentence structure in German

Unit 3	**Cultural Aspect**	**6 Hours**

Understanding the German living and working culture, Presenting the Indian living and working culture

Unit 4	**Writing Skills**	**6 Hours**

Filling up personal details in varied registration forms Filling up schedules in daily planner Using German punctuation and orthographic rules correctly in given texts Correcting errors in given texts Rearranging the parts of sentences to get a correct text Writing simple texts, short

messages, letters and emails on given topics

Unit 5	Speaking Skills	6 Hours

Practicing phonetics Asking for information and providing required information in day-to- day life and at workplace Requesting and responding to requests in proper manner Writing simple German dialogues on situations of day-to-day life and at workplace and presenting them

Unit 6	Environmental Protection and Sustainability	6 Hours

Environmental and social awareness among Germans, Environmental and social awareness among Indians, Describing a social and environmental issue

Evaluation

Students should select any one of the topic in a group of 3 to 5. Students should submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics defined by him/her/them at start of course.

Text Books :

1. Studio d A1 : Deutsch als Fremdsprache, Cornelsen Verlag GmbH, Berlin, 2005
2. Menschen A1.2: Sandra Evnas, Angela Pude, Franz Pecht, Hueber Verlag, Ismaning Germany, 2016
3. Netzwerk A1: Dengler, Rusch, Schmitz, Sieber, Ernst Klett Sprachen, Stuttgart Germany, Goyal Publishers & Distributors, Delhi, 2015

Reference Books:

1. Linie 1 A1: Kaufmann, Moritz, Rodi, Rohrmann, Sonntag,Klett-Langenscheidt GmbH, München Germany, Goyal Publishers & Distributors, Delhi, 2018
2. Begegnungen A1+: Anne Buscha, Szilvia Szita, Schubert Verlag, Leipzig Germany, 2006
3. Tangram aktuell 1: Dallapiazza, Eduard von Jan, Schönherr, Max Hueber Verlag, Ismaning, Germany, Goyal Publishers & Distributors, Delhi, 2005

E-Books/Online Learning Resources:

1. DW Learn link: https://learngerman.dw.com/en/learn-german/s-9528
2. Goethe-Institut Link: https://www.goethe.de/en/spr/ueb.html

Online Courses:

1. **German for Beginners (German-I) Free Online Course by NPTEL**
   a. Instructor: Prof. Milind Brahme, IIT Madras
   b. Covers basics of the German language for the beginners
   c Link: https://onlinecourses.nptel.ac.in/noc21_hs30/preview
2. **Learn German with easy German**
   a. Easy German is an online video series presented by the different German people
   b. covering a wide range of topics and fluency levels.
   c. Link: Easy German

CO/PO Mapping Matrix											
CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	2	1	1	-	-	2	-	2	3	1	2
CO2	2	2	-	-	-	1	-	1	2	-	2
CO3	1	-	-	-	-	3	2	2	2	-	2
CO4	1	1	-	-	-		-	1	3	-	2
CO5	1	1	-	-	-	1	-	2	3	-	2
CO6	-	-	-	-	-	3	3	2	2	-	2

SEMESTER 2

atalog Course Code	Course Code	Course Type	Course Title	Engagement Hrs/Week (Teaching Scheme)				Credits	Continuous Assessment		Term End Examination		Total
				L	T	P	Total		Theory	Practical	Theory	Practical	
STENCS160V0	DP04020325201	BSC	Differential Equations and Integral Calculus	3	1	-	4	4	60	0	40	0	100
STENCS002V0	DP04020325202	BSC	Physics for Computing	3	-	-	3	3	45	0	30	0	75
STENCS109V0	DP04020325203	BSC	Applied Chemistry	3	-	-	3	3	45	0	30	0	75
STENCS012V0	DP04020325204	ESC	Digital Logic Design & Microprocessor	2	-	-	2	2	30	0	20	0	50
STENCS013V0	DP04020325205	ESC	Discrete Mathematics	3	-	-	3	3	45	0	30	0	75
STENCS014V0	DP04020325206	PCC	Computational Thinking & Programming	2	–	-	2	2	30	0	20	0	50
STENCS015V0	DP04020325207	VSEC	Project Based Learning	-	-	4	4	2	0	50	0	0	50
STENCS190V0	DP04020325208	IKS	Indian Knowledge System in Engineering Sciences	-	2	-	2	2	0	50	0	0	50
STENCS016V0	DP04020325209	ESC	Digital Logic Design & Microprocessor Lab	-	-	2	2	1	0	25	0	0	25
STENCS017V0	DP04020325210	PCC	Computational Thinking & Programming Lab	-	-	2	2	1	0	0	0	25	25

Co-Curricular Course-II (Choose Any One)													
STENCS170V0	DP04020325211	CC	Industry 4.0: Managing The Digital Transformation	2	-	-	4	2	0	50	0	0	50
STENCS180V0	DP04020325212	CC	Recommender System	2	-	_	4	2	0	50	0	0	50
Audit Course-II (Choose Any One)													
STENCS191V0	DP04020325213	AC	Foreign Language-II (Japanese)	-	-	-	-	AC	-	-	-	-	-
STENCS192V0	DP04020325214	AC	Foreign Language-II (German)	-	-	-	-	AC	-	-	-	-	-
STENCS193V0	DP04020325215	AC	Foreign Language-II (French)	-	-	-	-	AC	-	-	-	-	-
Total Academic Engagement and Credits				**13**	**03**	**12**	**28**	**22**	**210**	**175**	**140**	**25**	**550**

Note: 1 credit= 25 marks

L: Lecture, **T:** Tutorial, **P:** Practical

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. CSE					Semester		II
BSC	Differential Equations and Integral Calculus					Code		DP04020325201
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Term work	Theory	Practical	
4	3	1	--	60		40	--	100

Prerequisite:

Differentiation, Integration, Curve Tracing

Other Courses in this Series:

Linear Algebra and Differential Calculus

Course Objectives:

1. To develop the ability to formulate and solve first and higher-order differential equations and apply them to physical and computational systems, including electrical circuits, population dynamics, and network modelling.
2. To equip students with the ability to analyse and apply differential equations to real-world engineering problems such as system reliability, malware propagation, and thermal regulation using mathematical modelling.
3. To provide a comprehensive understanding of advanced integration techniques and their practical applications in areas such as data compression, signal integrity, and error approximation.
4. To enhance problem-solving and analytical skills by applying advanced integration and differentiation techniques to complex engineering and computing tasks, including image analysis and data clustering.
5. To apply multiple integrals and their applications in computing volume, surface area, centre of mass, and moments of inertia. It emphasizes solving real-world engineering problems in areas like cloud computing, energy systems, fault tolerance, and fluid mechanics.

Course Outcomes:

Upon completion of the course, students will be able to:

CO1: Formulate and solve first-order differential equations to model data packet delays and user growth in computer networks.

CO2: Solve higher-order differential equations and apply them to simulate temperature regulation and model malware propagation in real-world computational environments.

CO3: Use differential equations to solve and analyse real-world applications such as system failures in hardware, population dynamics and rectilinear motion.

CO4: Evaluate and apply advanced integration techniques to analyse data compression efficiency and signal degradation in communication systems.

CO5: Compute double and triple integrals to model pixel intensity variations and evaluate data cluster densities in machine learning.

CO6: Apply multiple integrals to calculate energy consumption in cloud systems and optimize data distribution in fault-tolerant systems.

Course Contents

Unit 1	**Linear Differential Equations**	**8 Hours**
Exact differential equations, Differential equations reducible to exact form, Linear differential equations, Differential equations reducible to linear form		
Case Study#1:	Model and predict data packet delay using differential equations in computer networks.	
Case Study#2:	Apply first-order differential equations to model user growth on digital platforms.	
Unit 2	**Higher Order Linear Differential Equations**	**8 Hours**
n order with constant coefficients, Finding complementary functions and particular integrals, Cauchy and Legendre's differential equations, Simultaneous differential equations		
Case Study#3:	Use second-order differential equations to model temperature regulation in data centers.	
Case Study#4:	Apply differential equations to model and predict malware propagation.	
Unit 3	**Applications of Differential Equations**	**7 Hours**
Applications to orthogonal trajectories, heat conduction, mass-spring systems, and rectilinear motion.		
Case Study#5:	Use differential equations to predict system failures in computer hardware using reliability models.	
Case Study#6:	Apply differential equations to model and predict malware propagation.	
Unit 4	**Integral Calculus**	**8 Hours**
Reduction formulae, Beta and Gamma functions, Differentiation under integral sign, Error functions.		

Case Study#7:	Use Beta and Gamma functions to model data compression efficiency.	
Case Study#8:	Apply error functions to model and predict noise in communication systems.	
Unit 5	**Multiple Integrals**	**8 Hours**
Double and triple integrals in Cartesian and polar coordinates, Change of order of integration		
Case Study#9:	Model pixel intensity variations using double integrals.	
Case Study#10:	Apply triple integrals to determine the density of data clusters.	
Unit 6	**Applications of Multiple Integrals**	**6Hours**
Applications: Area, Volume, Center of Gravity, and Moment of Inertia.		
Case Study#11:	Use triple integrals to calculate energy consumption in cloud data centres.	
Case Study#12:	Model data distribution for fault-tolerant systems using triple integrals.	
Total Hours: 45		

Text Books:

1. B.V. Ramana, "Higher Engineering Mathematics", 42nd Edition, McGraw Hill Education, ISBN-13 :978-0070634190
2. B.S. Grewal, "Higher Engineering Mathematics", 45th Edition, Khanna Publishers, ISBN-13 978-81-933284-9-1
3. Zill, Dennis G. "Advanced engineering mathematics", 4th Edition, Jones & Bartlett Learning, 2020. ISBN 1284105903

Reference Books:

1. P.V. O'Neil, "Advanced Engineering Mathematics", CENAGE Learning India Edition, ISBN-13 978-8131517529
2. M.D. Weir, J. Hass, C. Heil, P. Bogacki, "Thomas' Calculus", 15th Edition, Pearson Education, ISBN-13 978-8119896608
3. E. Krey zig, "Advanced Engineering Mathematics", International Student Version-10th Edition, J. Wiley and Sons, ISBN: 978-1-118-50664-6

E-Books/Online Learning Resources:

1. Integral and Vector Calculus by Prof. Hari Shankar Mahato
   https://drive.google.com/file/d/1tkaU4Coyf-LRKmfi6RdWohPeg7ajPeuC/view
2. Differential Equations for Engineers by Prof. Shrinivasa Rao Manan
   https://drive.google.com/file/d/19HD54hugmWlsrjFCXqLwetO-yLvMKUAJ/view
3. Differential Equations by Prof. Arthur Mattuck
   https://ocw.mit.edu/courses/18-03sc-differential-equations-fall-2011/
4. Paul's Online Notes
   https://tutorial.math.lamar.edu/

Online Courses:

1. Differential Equations with the Math Sorcerer (Udemy Course)
   a. Instructor: The Math Sorcerer
   b. Supports Units 1-3 by explaining and solving first and higher-order differential equations with practical examples.
   c. Link: https://www.udemy.com/course/differential-equations-with-the-math-sorcerer
2. Differential Equations for Engineers
   a. Instructor: Prof. Shrinivasa Rao Manan (IIT Madras)
   b. Aligns with Units 1-3 through systematic coverage of ODEs and introductory PDEs used in engineering models.
   c. Link: https://onlinecourses.nptel.ac.in/noc22_ma72/preview
3. Integral and Vector Calculus
   a. Instructor: Prof. Hari Shankar Mahato (IIT Kharagpur)
   b. Supports Units 4–6 by covering multiple integrals, vector calculus, and their applications in science and engineering.
   c. Link: https://onlinecourses.nptel.ac.in/noc22_ma03/preview

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1	2	2	-	-	-	-	-	1
CO2	3	3	1	2	2	-	-	-	-	-	1
CO3	3	3	2	2	1	-	-	-	-	-	1
CO4	3	2	1	2	2	-	-	-	-	-	1
CO5	3	2	1	2	2	-	-	-	-	-	1
CO6	3	3	2	2	2	1	-	-	-	1	1

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (CSE,AI&ML,CS,C&E)					Semester		II
BSC	Physics for Computing					Code		DP0402032520 2
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
3	3	--	--	45	--	30	--	75

Prerequisite:

Properties of electromagnetic waves, Huygens' principle and wave front, polarization of light, wave particle duality, intrinsic and extrinsic semiconductors, basics of magnetism.

Course Objectives:

To understand and apply fundamental concepts of physics relevant to the development of computing technologies, including data transmission, storage, display systems and emerging areas like quantum computing and optoelectronics

Course Outcomes:

On completion of the course, students will be able to:

CO1: Understand the basics of Polarization and fibre optics for Engineering Applications
CO2:Compare different light sources for the study of optical devices
CO3:Develop the understanding of Quantum mechanics and extend it to emerging technology like quantum computing
CO4: Apply theprinciples of magnetism to understand modern data storage systems
CO5:Illustrate the properties of nanoparticles and their relevance to computing applications
CO6: Interpret the properties of superconductors and examine their technological applications

Course Contents

Unit 1	Optics	8 Hours
Polarization, Law of Malus, Types of Polarization and its application in Communication system and 7 segment displays, Basics of propagation of light through Optical fibre, Classification of Optical fibre, Attenuation and its causes, ways to minimize the attenuation, Optical fibre communication system, Comparison of optical fibre communication system with conventional communication system.		
Case Study# 1	The Evolution and Impact of Optical Fiber Communication Systems in Global Telecommunications Infrastructure	
Unit 2	**Optoelectronics**	**8 Hours**
Formation of Band Gap, FD Distribution, position of fermi level in semiconductor, LASER characteristics, Comparison of LED and Diode laser as a light source, Photodiode and LDR as light detector, Holography and its applications.		
Case Study#2	The Role of Holography in Modern Medical Imaging: Applications, Advancements and Future Potential	
Unit 3	**Quantum Technology**	**7 Hours**
Wave particle duality, Wave function, Schrodinger's Time independent equation and their applications, Quantum tunnelling, Principle of Quantum computing, Application of Quantum computing		
Case Study#3	Future aspects of advancement in quantum technology in the field of communication	
Unit 4	**Data storage devices**	**8 Hours**
Classification of magnetic materials, MR effect and Kerr effect, Type of storage devices, Magnetic storage devices (Magnetic storage and magneto optical recording)		
Case Study#4	Application of Magnetic Materials and Effects in Modern Data Storage Systems	
Unit 5	**Physics of Nanomaterials**	**7 Hours**
Nanoparticles: Quantum confinement &surface to volume ratio, Properties of Nanoparticles: - Optical, electrical, magnetic, mechanical, Applications: applications in microprocessors and Nano-sensors, Carbon Nanotube and its applications in computer field, Computational Nanotechnology (qualitative).		
Case Study#5	The Role of Carbon Nanotubes in Advancing Microprocessors and Nano-Sensors for the Next Generation of Computing	
Unit 6	**Physics of superconductors**	**7 Hours**
Introduction of superconductivity and BCS theory, Properties of superconductors, Types of superconductors, Josephson effect (AC and DC): SQUID, Applications of superconductors.		
Case Study#6	Josephson Effect and Its Applications in Quantum Technology	
		Total Hours: 45

Textbooks:

1. M. N. Avadhanulu, P. G. Kshirsagar & TVS Arun Murthy, "A Textbook of Engineering Physics",S Chand Publications, ISBN 978-9352833993.
2. R. K. Gaur and S. L. Gupta, "Engineering Physics", Dhanpat Rai Publications, ISBN-8189928228.
3. J. P. Srivastava "Elements of Solid-State Physics." PHI Learning/Prentice-Hall of India publication, ISBN-13: 978-8120350663
4. Charles Kittel," Introduction to Solid State Physics", John Wiley & Sons (Wiley) Publications ISBN-978-0471415268.
5. Govind P. Agrawal, "Fiber-Optic Communication Systems", John Wiley & Sons (Wiley-Blackwell imprint) Publications, ISBN-13: 978-1119737360.

Reference Books:

1. Ajoy K. Ghatak, "Optics", McGraw Hill Education (India), ISBN-13: 978-9390113590
2. A. K. Ghatak & S. Lokanathan, "Quantum Mechanics: Theory & Applications", Laxmi Publications Pvt Ltd ISBN-13: 978-9351382966
3. Dr. Sulabha K. Kulkarni," Nanotechnology: Principles and Practices", Springer International Publishing, ISBN-10: 3319091700
4. Wilson & Hawkes, "Introduction to Optoelectronics" Prentice Hall, ISBN: 9780136387817.
5. D. C. Tayal," Electricity & Magnetism", Himalaya Publishing House, ISBN-13: 978-9351429166.

E-Books/Online Learning Resources:

1. Richard P. Feynman, Robert B. Leighton, and Matthew Sands," The Feynman Lectures on Physics" Pearson/Addison-Wesley (International Edition), ISBN-13: 978-0805390490, https://www.feynmanlectures.caltech.edu/
2. Arthur Beiser," Concepts of Modern Physics", McGraw-Hill Education,ISBN-13: 978-0072448481, https://nitsri.ac.in/Department/PHYSICS/Beiser_Modern_Physics.pdf

MOOC / NPTEL/YouTube Links:

1. Fiber Optic Communication Technology
   a) Instructor: Prof. Deepa Venkatesh IIT Madras
   b) Introduction to optical communication, fiber types, and fabrication techniques
   c) Link: https://onlinecourses.nptel.ac.in/noc20_ee79/preview

2. Quantum Mechanics Lecture Series
   a) Instructor: Prof. Harish Chandra Verma, IIT Kanpur
   b) Phenomena leading to the development of Quantum Mechanics
   c) Link: https://hcverma.in/QuantumMechanics

3. Magnetism and Superconductivity
   a) Instructor: Prof. Arghya taraphder, IIT Kharagpur
   b) Concept in magnetism and Superconductivity
   c) Link: https://archive.nptel.ac.in/courses/115/105/115105131/

4. Exploring Quantum Physics
   a) Instructor: Prof. Ajoy Ghatak, IIT Delhi
   b) Basic Quantum Mechanics
   c) Link: https://nptel.ac.in/courses/115102023

5. Semiconductor Optoelectronics
   a) Instructor: M. R. Shenoy, IIT Delhi
   b) Formation of Band gap, Fermi Level
   c) Link: https://nptel.ac.in/courses/115102103

6.Nanotechnology
   a) Instructor: Prof. Krishanu Biswas, IIT Kanpur
   b) Nanomaterials and their properties
   c) Link: https://archive.nptel.ac.in/courses/113/104/113104102/

CO/PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	-	-	-	1	-	1	1	-	1
CO2	3	-	-	2	-	1	-	1	1	-	1
CO3	3	3	-	3	-	1	-	1	1	-	1
CO4	3	-	-	-	-	1	-	1	1	-	1
CO5	3	3	3	3	3	1	-	1	1	-	1
CO6	3	-	-	-	-	1	-	1	1	-	1

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. CSE					Semester		II
BSC	Applied Chemistry					Code		DP040203252 03
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
3	3	--	--	45	--	30	--	75

Prerequisite:

1) Basics of Chemistry

Course Objectives:

1. To make students understand the concepts of Green Chemistry and water technology.
2. To impart the basic knowledge of renewable energy sources, energy storage devices and its Commercial applications.
3. To study spectroscopic techniques for chemical analysis.
4. To make students understand conductometric and PH metric titrations.
5. To make students acquainted with the knowledge of engineering materials like polymers & Nano materials.
6. To understand the basic principles of corrosion and its prevention.

Course Outcomes:

On completion of the course, students will be able to:

CO1: Integrate the basic principles of Green Chemistry and water technology in day to day life.
CO2:Analyse different types of alternative fuels.
CO3:Interpretchemical compounds based on their structure.
CO4:Utilize appropriate electro techniques and methods of material analysis**.**
CO5:Explain the importance of advanced engineering materials and applications of nanomaterial.
CO6:Evaluate the causes of corrosion and methods for minimizing corrosion.

Course Contents

Unit 1	Green Chemistry and Water Technology	8 Hours

Green Chemistry: Basic principles of Green Chemistry. **Green synthesis**, properties and applications of Polycarbonate. **Hardness of water**: types of hardness, determination of hardness of water using **EDTA** titration method and its numerical. **Alkalinity of water** and its determination, numerical. **Purification ofWater** by Demineralization process and Reverse Osmosis.		
Case Study #1:	Analyse the various hard water samples using saponification process.	
Case Study #2:	Examine the carbonate content of various solutions using alkalinity process.	
Unit 2	**Energy Sources and Lithium Ion Battery**	**8 Hours**
Fractional Distillation of crude oil**. Biofuels –** Properties and applications of Power Alcohol. **Hydrogen** as a future fuel**–**Production and applications of Hydrogen**.** Difficulty in storage ofHydrogen. **CNG-** Properties and applications of CNG. **Li-Ion batteries -** Construction, working and applications of Li-ion batteries**.** Advantages of Li-ion battery for electric vehicles.		
Case Study #3:	Analyse the advantages and limitations of various fuels on the basis of their calorific values.	
Unit 3	**Spectroscopic Techniques**	**7 Hours**
[A] UV-Visible Spectroscopy Introduction, Interaction of electromagnetic radiation with matter, statement of **Beer's law and Lambert's law**. **Terms involved** in UV-visible Spectroscopy- chromophore, auxochrome, bathochromic shift, hypsochromic shift, hyper chromic shift and hypochromic shift. **Instrumentation** of UV-visible spectroscopy. **[B] Infra-Red Spectroscopy:** Introduction, **Principle** of IR Spectroscopy, **Parts** of IR spectrum, fundamental group region, fingerprint region **Types of vibrations**: Stretching (symmetric and asymmetric) and bending (scissoring, rocking, wagging and twisting), vibration of diatomic and polyatomic molecules. **Applications**of IR spectroscopy.		
Case Study #4:	Analyse and identify unknown compounds using fingerprint region of IR spectroscopy.	
Unit 4	**Electrochemistry**	**8 Hours**
Reference Electrode-Calomel electrode. Conductance, Specific conductance, Molar conductance. **Factors affecting** migration of ions. **Conductometry-** conductometric titrations of acid versus base with titration curve. (Strong acid- Strong base). **pH metry**: Introduction, standardization of pH meter, pH metric titration of strong acid versus strong base with titration curve and its applications.		
Case Study #5:	Evaluate the advantages of conductometric titrations over other titrations.	
Unit 5	**Advanced Engineering Materials**	**7 Hours**

Biodegradable polymers: Introduction and their requirements. Preparation, properties and applications of PHBV. **Conducting Polymers:** Introduction, conduction in **Polyacetylene**, Doping and its type with properties and applications.

Nanomaterial: Introduction, **classification** of nanomaterial based on dimensions. **Graphene** - Structure, properties and applications. **Carbon Nano Tubes**- Structure of single walled CNT and its applications. **Quantum Dots-** Types, properties and applications of Quantum Dots.

Case Study #6:	Explore a real-world example of conducting polymers. Discuss the real-world example of quantum dots.

Unit 6	**Corrosion and Prevention**	**7 Hours**

Introduction: Corrosion and its types-Dry and wet corrosion. Nature of metal oxide films and Pilling Bedworth Ratio (PBR). Factors affecting the rate of corrosion based on nature of metal and environment. Cathodic protection - Sacrificial anode and impressed current methods. Metal coatings – Anodic and Cathodic Coating- Galvanization, Tinning. Electroplating- Process of electroplating and Applications.

Case Study #7:	Investigate the rate of corrosion in various acidic medium.
Case Study #8:	Compare the Anodic and Cathodic Coating. Discuss which is better for protection of metal from corrosion.

Total Hours:45

Textbooks:

1. Textbook of Engineering Chemistry by Dr. S. S. Dara, Dr. S. S. Umare, S. Chand & Company Ltd.
2. Engineering Chemistry by O. G. Palanna, Tata Magraw Hill Education Pvt. Ltd.
3. B. K. Sharma- A textbook of Industrial Chemistry. 15th Edition, 2020. G.A. Ozin& A.C. Arsenault, “Nanotechnology A Chemical Approach to Nanomaterials”. RSC Publishing, 5th Edition, 2020
4. Textbook of Engineering Chemistry by Dr. Sunita Rattan, S. K. Kataria & Sons Publisher.
5. A Textbook of Engineering Chemistry, Shashi Chawla.

Reference Books:

1. Engineering Chemistry, Wiley India Pvt. Ltd.
2. Inorganic Chemistry, 5th edition by Shriver and Atkins, Oxford University Press
3. Basic Concept of Analytical Chemistry, 2ed, S. M. Khopkar, New Age-International Publisher
4. Instrumental Methods of Chemical Analysis, G. R. Chatwal & S. K. Anand, Himalaya Publishing House
5. Spectroscopy of organic compounds, 2nd edition, P. S. Kalsi, New Age-International Ltd., Publisher
6. Polymer Science, V. R. Gowarikar, N. V. Viswanathan, Jayadev Sreedhar, Wiley Eastern Limited

E-Books/Online Learning Resources:

1. https://chem.nju.edu.cn/_upload/article/files/b5/6f/01f0f2434d708df797208aea2613/83f2b441-65ee-44a6-ac47-ed21db462c5d.pdf
2. https://ebooks.himpub.com/product/instrumental-methods-chemical-analysis
3. https://tech.chemistrydocs.com/Books/Spectroscopy/Organic-spectroscopy-PS-Kalsi.pdf

Online Courses:

1. Corrosion - NOC: Corrosion - Part I, IIT Kanpur
   a. Instructor: Dr. Kallol Mondal
   b. Covers fundamentals of corrosion and electrochemical ways of protection of metals and alloys.
   c. C. Link: https://nptel.ac.in/courses/113104082
2. Nano structured materials-synthesis, properties, self-assembly and applications
   a. Instructor: Prof. A.K. Ganguli (IIT Delhi)
   b. Covers introduction to Nanotechnology
   c. Link: https://nptel.ac.in/courses/118102003
3. Polymers and Polymerization- Manufactured Fibre Technology, IIT Delhi
   a. Instructor: Prof. A.K. Ganguli (IIT Delhi)
   b. Covers the performance properties of fibres
   c. Link: https://nptel.ac.in/courses/116102010

CO/PO Mapping Matrix

CO \ PO	PO1	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	-	-	3	2	-	-	-	1
CO2	3	2	1	-	3	-	-	-	-	1
CO3	3	-	2	2	-	-	-	-	-	1
CO4	3	-	3	3	-	-	-	-	-	1
CO5	3	2	2	2	2	-	-	-	-	1
CO6	3	2	2	-	3	2	-	-	-	1

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. CSE					Semester		II
ESC	Digital Logic Design and Microprocessor					Code		DP0402032520 4
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
2	2	--	2	30	--	20	--	50

Prerequisite:

1) Basic Electronics Engineering
2) Basic Electrical & Electronics Engineering

Other Courses in this Series:

1) NA

Course Objectives:

1. **To understand and explain** Boolean function minimization using K-maps and the classification and applications of digital codes.
2. **To develop and explain** code conversion techniques, arithmetic circuits, comparators, and MSI-based logic implementations.
3. **To understand and develop** sequential circuits using latches, flip-flops, and register configurations.
4. **To develop and illustrate** counter circuits and data converters used in digital systems.
5. **To introduce and explain** the features and functional blocks of the 8085 microprocessor.

Course Outcomes:

On completion of the course, students will be able to:

CO1: Apply Karnaugh map techniques to minimize Boolean functions and classify digital codes for appropriate applications.

CO2: Analyze and designcode converters, arithmetic circuits, comparators, and logic functions using MSI ICs.

CO3: Analyze and designsequential circuits using latches, flip-flops, and various register configurations.

CO4: Design and illustratedigital counter circuits and apply data conversion techniques in digital systems.

CO5: Explain and illustratethe architecture, pin configuration, and signal functions of the 8085 microprocessor.

Course Contents

Unit 1	**Introduction to Digital Systems**	**6 Hours**

Logic minimization: Minimization of Boolean function using K-map (up to 4 variables), Minimization of SOP and POS using K-map, Don't Care Conditions.

Classification of Codes : Weighted and Non-weighted Codes, Error Detecting and Correcting Codes ,Self-complementary codes, Reflective Codes (Binary , BCD, Gray code and Excess-3 code)

Case Study#1:	Digital locks using logic gates.
Case Study#2:	1) Practical applications of various codes in computers 2) Four basic arithmetic operations using floating point numbers in a calculator.

Unit 2	**Combinational Logic Design**	**6 Hours**

Code Conversion: Binary to Gray and Gray to Binary code conversion, BCD to Excess-3, Half-Adder, Full Adder, Half Subtractor, Full Subtractor, 4 Bit Parallel Adder, Magnitude Comparator (1 bit & 2 bit).

Introduction to MSI chips: Binary Adder (IC7483), Multiplexer (IC 74153), Demultiplexer (IC 74138), Decoder (74238), Encoder (IC 74147) and Implementation of logic functions using IC 74153 & 74138.

Case Study#3:	Use of combinational logic design in 7 segment display interface.
Case Study#4:	Use of combinational circuits in Medical Domain

Unit 3	**Sequential Logic Design -I**	**6 Hours**

Introduction to sequential circuits: Difference between combinational circuits and sequential Circuits; Memory element-latch & Flip-Flop. Flip-Flop: SR, JK, D,T, MSJK, Truth Tables and Excitation tables, Conversion of Flip-Flop, Preset & Clear, Master Slave configuration and Study of 7474, 7476 flip flop ICs

Applications of Flip flop: **Registers:** Shift Registers (SISO, SIPO, PISO, PIPO), Bidirectional Shift Register, Universal Shift Register

Case Study#5:	Use of sequential logic design in Electronic Voting Machine (EVM)	
Case Study#6:	Use of sequential logic design in register organization	
Unit 4	**Sequential Logic Design -II**	**6 Hours**
Applications of Flip flop: **Counters:** Asynchronous Counter, Synchronous Counter, BCD Counter, Modulus of the counter (IC 7490) Logic Families & Converters**:** TTL, ECL, CMOS Logic & Characteristics; Tristate Logic; A/D & D/A Converters		
Case Study#7:	Use of Tristate Digital Buffer for Data Bus control	
Case Study#8:	Use of sequential logic design in a traffic light controller	
Unit 5	**Introduction to microprocessor**	**6 Hours**
Introduction Features of 8085, PIN diagram, Internal Architecture of 8085 processor, Control and status signals, Interrupt signals of 8085		
Case Study#9:	Study of Multi-Core and Many-Core Architectures	
Case Study#10:	Study of Introduction to AI-focused processors: CPU (Central Processing Unit), GPU (Graphics Processing Unit), TPU (Tensor Processing Unit), NPU (Neural Processing Unit), VPU (Vision Processing Unit).	
		Total Hours: 30

Textbooks:

1. **Modern Digital Electronics** by R.P.Jain, 4th Edition, ISBN 978-0-07-06691-16 Tata McGraw Hill
2. **Digital Logic and Computer Design** by Moris Mano, Pearson , ISBN 978-93-325-4252-5
3. **Ramesh S. Gaonkar**, “Microprocessor Architecture, Programming, and Applications with the 8085”, Penram International
4. **Barry B. Brey**, “The Intel Microprocessors (8th Edition or later)”, Pearson Education.

Reference Books:

1. **John Yarbrough**, "Digital Logic applications and Design", Cengage Learning, ISBN-13: 978-81-315-0058-3
2. **D. Leach, Malvino, Saha**, "Digital Principles and Applications"||, Tata McGraw Hill, ISBN 13:978-0-07-014170-4.
3. **Ajay Wadhwa**, "Microprocessor 8085: Architecture, Programming, and Interfacing", PHI Learning, ISBN-13: 978-8120340138
4. **Douglas Hall,** Microprocessor and Interfacing ||, Mc Graw Hill Education

E-Books/Online Learning Resources:

1. https://www.springer.com/gp/book/9783030361952
2. https://www.mheducation.co.uk/ebook-fundamentals-of-digital-logic-9780077144227-emea
3. Digital Circuits, by Prof. Santanu Chattopadhyay, https://swayam.gov.in/nd1 noc19 ee51/preview.
4. Digital Circuits and Systems, Prof. S. Srinivasan https://nptel.ac.in/courses/117/106/117106086/
5. Switching Circuits and Logic Design by Prof. Indranil Sengupta W https://swayam.gov.in/nd1 noc20 cs67/preview.

Online Courses:

Digital Electronics and Logic design circuits

1. Digital Circuits, by Prof. Santanu Chattopadhyay, https://swayam.gov.in/nd1_noc19_ee51/preview
2. Digital Circuits and Systems , by Prof. S. Srinivasan https://nptel.ac.in/courses/117/106/117106086/
3. Digital Systems, by Prof. N.J. Raohttps://nptel.ac.in/courses/106108099
4. Digital Electronics & Microprocessor by By Dr.V.Jeyalakshmi https://onlinecourses.swayam2.ac.in/cec21_cs16/preview

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1	-	-	-	-	-	-	-	1
CO2	3	2	3	-	2	-	-	-	-	-	1
CO3	3	2	3	2	2	-	-	-	-	-	1
CO4	3	2	3	2	2	-	-	-	-	-	1
CO5	3	2	2	-	2	-	-	-	-	-	2

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. CSE					Semester		II
ESC	Discrete Mathematics					Code		DP040203252 05
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
3	3	--	--	45	--	30	--	75

Prerequisite: None

Other Courses in this Series:

1) Data Structures and Algorithms

Course Objectives:

1. To study the fundamentals of logic and set theory.
2. To understand the notion of functions and relations.
3. To study fundamental principles of graphs and their applications.
4. To explore tree structures and their role in computing.
5. To understand Boolean algebra, coding theory, and combinatorial principles in problem-solving.

Course Outcomes:

On completion of the course, students will be able to:

CO1: Demonstrate the use of logical arguments, proof techniques, and set theory principles.

CO2: Illustrate types, properties, and applications of relations and functions.

CO3: Solve problems using graph methods, shortest path algorithms, and network optimization.

CO4: Apply tree models for problem-solving in searching, prefix codes.

CO5: Implement Boolean algebra and coding theory concepts for cryptography.

CO6: Utilize permutations and combinations to solve counting and optimization problems.

Course Contents		
Unit 1	**Set Theory**	**8 Hours**
Sets: Definition and Representation of Sets, Types (Finite, Infinite, Countable, Uncountable), Set Operations, Venn Diagrams, Cartesian Product, Power Set, Principle of Inclusion-Exclusion, Multisets. Propositional Logic: Logic and Propositional Equivalences, Predicate Logic and Quantifiers, Rules of Inference and Applications, Mathematical Proof Techniques: Direct, Contradiction, Contrapositive, Mathematical Induction & Strong Induction, Automatic Theorem Proving		
Case Study#1:	Set Operations in Programming Implementation using Python, C, or Java.	
Case Study#2:	Study the contribution of Georg Cantor in Discrete mathematics	
Unit 2	**Relations and Functions**	**7 Hours**
Relation: Definition & Types (Reflexive, Symmetric, Transitive, Antisymmetric Relations), Representation of Relations (Matrix & Graph), Equivalence Relations & Partitions, Partial Orderings, Hasse Diagrams, Chains, Anti-Chains, and Lattices, Transitive Closure &Warshall's Algorithm Function: Definition, Types of Functions (Injective, Surjective, Bijective), Inverse Functions and Function Composition, Identity, Constant, Partial, and Recursive Functions, Applications of functions: Pigeonhole Principle and its Applications, Recurrence Relations (Homogeneous and Non-Homogeneous)		
Case Study#3:	To apply relations, functions, and recurrence relations to develop an optimized task scheduling algorithm.	
Case Study#4:	The department manages student project submissions where each student is assigned a guide (possibly shared). It aims to represent student-guide relationships, group students by project types, track task dependencies, and predict submission growth over time, write solution for this.	
Unit 3	**Algebraic Structures and coding theory**	**8 Hours**
Introduction to Algebraic Systems, Semi Groups, Monoids, Groups, Cyclic Groups, Homomorphism, Normal Subgroups, Rings, Coding theory: Need for Coding Theory in Computer Science, Hamming Codes, Minimum Distance, Parity Check Codes, Polynomial Codes and their Role in Data Transmission		
Case Study#5:	Error Detection and Correction Using Hamming Codes	
Case Study#6:	Reliability Improvement in Data Transmission Using Linear Codes	
Unit 4	**Graph**	**8 Hours**
Graph: Vertices, Edges, Degree, Paths, Circuits, Special Types of Graphs: Regular, Bipartite, Complete, Multigraphs, Weighted Graphs, Graph Colouring, Graph Representation: Adjacency Matrix, Adjacency List, Graph Isomorphism & Subgraphs, Connectivity: Vertex & Edge Connectivity, Handshaking Lemma, Euler Paths & Circuits, Hamiltonian Paths & Circuits, Graph Traversal: Dijkstra's Algorithm, Travelling Salesman Problem.		
Case Study#7:	Study Smart Parcel Delivery Using Google Maps and Graph Theory	
Case Study#8:	Create a conflict-free exam timetable where no student has overlapping exams. Represent subjects as vertices, add edges between subjects with common students, and use graph colouring to assign the minimum number of time slots.	

Unit 5	Trees	7 Hours
Introduction to trees, properties, and applications in computer science. Binary trees and Binary Search Trees (BST), Decision trees and their applications. Prefix codes and Huffman coding for data compression. Cut sets and fundamental circuits in graph theory. Spanning trees and Minimum Spanning Trees (MST) with Kruskal's and Prim's algorithms. Max Flow – Min Cut Theorem for transport networks.		
Case Study#9:	udy & Implement Binary Search Tree for Family	
Case Study#10:	epare case study on Google Search Suggestion Tree	
Unit 6	**Permutation and Combination**	**7 Hours**
Basic Counting Principles: Addition and multiplication rules, factorial notation and fundamental counting problems. Permutations and Combinations: Highlighting their formulas, differences, and real-world applications like seating arrangements and lottery probability. Binomial and Multinomial Theorems: Introduce binomial expansion and the calculation of coefficients.		
Case Study#11:	Distribute N tasks among M servers and find the number of ways using permutations and combinations works. Optimizing execution time and resource use while preventing server overload.	
Case Study#12:	Optimizing Seating Arrangements for a Coding Competition in a Computer Lab	
		Total Hours: 45

Textbooks:

1. Kenneth H. Rosen, *Discrete Mathematics and Its Applications*, Tata McGraw-Hill, ISBN 978-0-07-288008-3, 7th Edition.
2. C. L. Liu, *Elements of Discrete Mathematics*, TMH, ISBN 10:0-07-066913-9.
3. Richard Johnsonbaugh, *Discrete Mathematics*, Pearson, ISBN 978-0131593183, 7th Edition.
4. Ralph P. Grimaldi, *Discrete and Combinatorial Mathematics: An Applied Introduction*, Pearson, ISBN 978-0321211033, 5th Edition.
5. J.P. Tremblay and R. Manohar, *Discrete Mathematical Structures with Applications to Computer Science*, McGraw-Hill, ISBN 978-0074631133.

Reference Books:

1. Norman L. Biggs, *Discrete Mathematics*, Oxford University Press, ISBN 978-0198507178, 2nd Edition.
2. Gerard O'Regan, *Mathematical Foundations of Computing*, Springer, ISBN 978-1447124995.

E-Books/Online Learning Resources:

1. Liu, C. L. (Chung Laung), "Elements of Discrete Mathematics" 2nd Edition, TMH, ISBN 10:0-07-066913-9.

https://www.academia.edu/26410650/Elements_of_discrete_mathematics_Liu_C_L_

2. Kenneth H. Rosen, "*Discrete Mathematics and Its Applications"*, 7th Edition, Tata McGraw-Hill, ISBN 978-0-07-288008-3.

Rosen_Discrete_Mathematics_and_Its_Applications_7th_Edition.pdf - Google Drive

3. J.P. Tremblay and R. Manohar, *Discrete Mathematical Structures with Applications to Computer Science*, McGraw-Hill, ISBN 978-0074631133.

Discrete Mathematical Structures With Applications To Computer Science by J.P. Tremblay, R. Manohar PDF | PDF | Teaching Mathematics | Computing And Information Technology

4. https://web.stanford.edu/class/cs103x/cs103x-notes.pdf
5. https://discrete.openmathbooks.org/pdfs/dmoi-tablet.pdf

Online Courses:

1. Discrete Mathematical Structure
   a. Instructor: Dr. Kamala Krithivasan (IIT Madras)
   b. Covers all concepts of Discrete Mathematical Structure
   c. Link: https://archive.nptel.ac.in/courses/106/106/106106094
2. Discrete Mathematics
   a. Instructor: Prof. Sudarshan Iyengar (IIT Ropar)
   b. Covers all concepts of Discrete Mathematics
   c. Discrete Mathematics - IIT Ropar - Course
3. Discrete Mathematics - IIITB
   a. Instructor: Prof. Ashish Choudhury (IIIT Bangalore)
   b. Covers all concepts of Discrete Mathematical Structure
   c. Link: Discrete Mathematics - IIITB - Course

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11
CO1	3	3	1	–	–	–	–	–	–	–	2
CO2	3	2	1	–	–	–	–	–	–	–	2
CO3	3	3	2	1	2	–	–	–	–	–	2
CO4	3	3	2	–	2	–	–	–	–	–	2
CO5	3	2	2	–	2	–	1	–	–	–	2
CO6	3	3	1	–	–	–	–	–	–	–	2

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. CSE					Semester		II
PCC	Computational Thinking and Programming					Code		DP040203252 06
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
2	2	--	--	30	--	20	--	50

Prerequisite:

1) Basics of Computers

Other Courses in this Series:

2) Computational Thinking and Programming Lab

Course Objectives:

1. To understand the fundamentals of Python programming, including Python basic constructs, control structures and loops.
2. To learn the use of Python's built-in data structures to efficiently manage and manipulate data.
3. To learn and utilize functions, modules, packages and libraries for modular program development.
4. To learn Object-Oriented Programming (OOP) principles using Python.
5. To acquire file handling in Python and exception handling for robust applications.

Course Outcomes:

On completion of the course, students will be able to:

CO7: Apply python programming basics, including variables, control structures, and loops, to solve real-world problems effectively.

CO8: Analyze Python's data structures such as lists, tuples, dictionaries, and sets for efficient data management and manipulation.

CO9: Develop modular programs by leveraging Python functions, libraries, and custom modules to enhance reusability and maintainability.

CO10: Implement Object-Oriented Programming principles like encapsulation, inheritance, and polymorphism to design scalable and reusable software.

CO11: Implement file operations and manage exceptions to create robust Python applications for diverse use cases.

Course Contents		
Unit 1	**Introduction to Python Programming**	**6 Hours**
Introduction, Features, History, Applications, Python Installation & Setup, Variables, Expressions, Statements, Data Types, Input and Output Operations, Operators, Control Flow Statements: (if, if-else, if-elif-else, Loops-while, for, nested loops, Loop manipulation statements)		
Case Study#1:	Python in Real-World Applications - Analyse how Python has been used in various industries (e.g., web development, data analysis, machine learning). Discuss how Python's features make it suitable for these applications.	
Case Study#2:	Study the use of loops and conditionals in real-world applications.	
Unit 2	**Data Structures in Python**	**6 Hours**
List & Tuples: Creating, accessing, and modifying lists and tuples, List comprehensions, Common list and tuple operations. Dictionaries and Sets: Creating, accessing, and modifying dictionaries and sets, Dictionary comprehensions, Common dictionary and set operations.		
Case Study#3:	udy how data structures are used in applications like search engines, databases, and social media platforms etc.	
Unit 3	**Functions, Modules, and Packages**	**6 Hours**
Functions: defining and calling functions, function arguments and return values, global and local variables, scope and lifetime of variables, Lambda expression, map and filter functions, recursive functions. Modules and Packages: Importing modules, standard library overview, creating and using custom modules, create a user defined package, importing package, using built in package.		
Case Study#4:	udy performance of iterative vs recursive approaches to solve problems like calculating Fibonacci numbers, factorials, and summing a list of numbers.	
Unit 4	**Object-Oriented Programming in Python**	**6 Hours**
roduction to Object-Oriented Programming, need & difference between procedural and object-oriented programming, Classes & Objects: defining class, creating objects, constructor, Attributes & Methods, Encapsulation, Abstraction, Inheritance, and Polymorphism: method overloading, method overriding.		
Case Study#5:	plore the role of inheritance and polymorphism in software development.	
Unit 5	**File Handling**	**6 Hours**
Introduction to file handling, File Paths and Modes: Relative and absolute paths, Understanding Modes, File Operations: Opening and Closing Files, Reading Files, Writing to Files, Appending Data, Exception Handling.		
Case Study#6:	Explore how file operations are used in real-world applications such as logging, data analysis, and configuration file management.	
		Total Hours: 30
Text Books:		

1. Dr. Charles R. Severance, "Python for Everybody: Exploring Data Using Python 3", 1st Edition, Shroff Publishers, ISBN: 9789352136278
: 978-9352134755
3. Zed A. Shaw, "Learn Python the Hard Way: A Very Simple Introduction to the Terrifyingly Beautiful World of Computers and Code", 3rd Edition, Addison-Wesley, ISBN-13: 978-0321884916

Reference Books:

1. Mark Lutz, "Learning Python: Powerful Object-Oriented Programming", 5th Edition, O'Reilly Media, ISBN-13: 978-1449355739;
: 978-9387572942
: 978-9355420831

E-Books/Online Learning Resources:

1. Rupesh Nasre, "Python Programming", AICTE, ISBN : 978-81-959863-5-4 https://gnindia.dronacharya.info/IT/NC-Course-2nd-Year/Downloads/Python-Programming/Books/Python-Programming.pdf
2. Python Programming Lab, IITK VLABs, https://python-iitk.vlabs.ac.in/
3. The Python Tutorial, https://docs.python.org/3/tutorial/index.html
4. Python 3.4.3, Spoken Tutorials, https://spoken-tutorial.org/tutorial-search/?search_foss=Python+3.4.3&search_language=English

Online Courses:

1. Programming, Data Structures, and Algorithms using Python
   a. Instructor: Prof. Madhavan Mukund, Chennai Mathematical Institute
   b. Content: Covers Python basics, data structures (stacks, queues, linked lists), algorithms (searching, sorting, recursion), and their implementation in Python.
   c. Link: https://nptel.ac.in/courses/106106145
2. The Joy of Computing using Python
   a. Instructor: Prof. Sudarshan Iyengar from IIT Ropar
   b. Content: Introduces Python programming in a fun and engaging manner.
   c. Link: https://nptel.ac.in/courses/106106182

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO 3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1	-	2	-	-	1	-	-	2
CO2	3	3	2	-	2	-	-	1	-	-	2
CO3	2	2	3	1	3	-	-	1	-	-	2
CO4	2	2	3	1	2	-	-	1	-	-	2
CO5	2	2	2	1	3	-	-	1	-	-	2

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. CSE					Semester		II
VSEC	Project Based Learning					Code		DP0402032520 7
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
2	--	--	4	--	50	--	--	50

Prerequisite:

1) Computational Thinking & Programming
2) Problem Solving through Programming

Other Courses in this Series:

1) Mini Project

Course Objectives:

1. To help students identify and understand real-life problems related to their field of study and plan simple, practical ways to solve them through small projects.
2. To guide students in comparing different ideas and methods, and choosing the best tools and techniques to build effective solutions.
3. To encourage students to use knowledge from different subjects and apply it together while working on hands-on projects.
4. To give students early exposure to how projects are done in real companies or industries, so they learn to work with practical limitations and user needs.
5. To develop teamwork, communication, leadership, and ethical values by working both independently and in groups, and to motivate students to think creatively about new ideas or improvements.

Course Outcomes:

On completion of the course, students will be able to:

CO1: Identify, define, and analyze real-life or community-based problems using fundamental domain knowledge, and propose practical solutions.

CO2: Compare alternative solution approaches and select appropriate tools, methods, and technologies to design and implement feasible, sustainable solutions.

CO3: Apply basic project management skills such as planning tasks, managing time and resources, and assessing risks during project execution.

CO4: Demonstrate analytical thinking, creativity, and professional behavior while tackling practical challenges similar to those encountered in industry.

CO5: Work effectively in teams and independently, communicate project outcomes clearly, and develop a positive attitude towards continuous learning and innovation through hands-on project experience.

Course Contents

	Introduction:

	Project-Based Learning (PBL) is an instructional methodology designed to equip students with both knowledge and practical skills by engaging them in real-world, meaningful projects. It goes beyond traditional classroom projects, focusing on authentic, complex problems or challenges that require deep investigation and sustained engagement. At its core, PBL emphasizes "learning by doing." In a world increasingly shaped by the ability to conceptualize, manage, and complete projects, preparing students for success means equipping them to thrive in a project-based environment. PBL embodies this vision by integrating active learning and inquiry-based learning practices. Unlike conventional learning environments, PBL places the student at the centre of the learning process. Students work collaboratively or independently to explore open-ended questions, conduct research, experiment with solutions, and present findings or prototypes. The process promotes critical thinking, creativity, and problem-solving abilities. This model of learning also redefines the role of educators. Rather than solely delivering content through lectures, instructors become mentors, facilitators, and guides supporting students in navigating complex tasks and fostering collaborative knowledge development. A key component of PBL is regular mentoring and feedback from faculty throughout the project lifecycle. Faculty involvement ensures students stay aligned with their objectives and achieve meaningful outcomes. To maintain the effectiveness of this model, student groups are typically composed of 3 to 4 members, allowing for effective collaboration and division of tasks. Projects may involve idea implementation, real-life problem solving, complex assignments, or interdisciplinary activities. These efforts span the full academic term and are assessed based on continuous internal evaluation, student progress, and final outcomes such as demonstrations, reports, or presentations.
	Identifying the Project/Problem:
	The foundation of Project-Based Learning lies in identifying a meaningful and relevant problem that initiates the learning journey. This problem should emerge from a student's curiosity, inquiry, or real-world observation and serve as the central focus for project development. Projects are encouraged to adopt a problem-oriented model, where learning begins with a well-defined challenge and evolves through exploration, analysis, and solution-building within a disciplinary or interdisciplinary context. Students should choose a problem that is meaningful and relevant it may be practical, theoretical, social, technical, cultural, or scientific. The selected problem should encourage deep thinking and the application of domain knowledge to develop practical insights or solutions. Projects can range from solving community issues and conducting field studies to building prototypes or writing detailed reports. Use of technology for research, collaboration, and presentation is strongly encouraged. A well-chosen, interdisciplinary problem ensures a rich learning experience in line with the core goals of Project-Based Learning.
	Project Structure & Phases:

	1. Orientation & Group Formation (Week 1): Students form teams of 3–4 members, supported by mentors. 2. Problem Identification & Proposal (Weeks 2–3): Projects aligned to real issues in domains like smart cities, cybersecurity, healthcare, environmental tech, etc. 3. Design & Planning (Weeks 4–6): Define requirements, design solution architecture, and select tools/platforms. 4. Implementation & Testing (Weeks 7–11): Prototype development, iterative testing, integration, and refinements. 5. Documentation & Report (Weeks 12): Prepare technical documentation, user manuals, and source code repositories. 6. Presentation & Demonstration (Weeks 13–14): Showcase working models to panels with faculty, possibly including industry reviewers.
	Assessment and Review Process:
	The institution, along with faculty and mentors, uses a clear and continuous review and assessment process to ensure that Project-Based Learning (PBL) is effective and meaningful for students. Students' progress is monitored regularly through weekly reviews, which help provide timely feedback and keep the project on track. The evaluation covers not only the final project outcome but also how well students plan, work in teams, manage their tasks, and solve problems creatively. Mentors guide students, check team coordination, and encourage innovation throughout the project. Students are expected to work responsibly, help each other, and stay motivated. To support this, the college provides orientation, mentorship, and necessary resources. Assessment includes individual performance, teamwork quality, clear documentation, and a professional presentation or demonstration of the project. Whenever possible, students are encouraged to showcase their work to others, highlighting practical results and real-world learning.
	Evaluation and Assessment Rubrics for PBL:

It is essential that all project activities under Project-Based Learning (PBL) are systematically documented and assessed on a regular basis. Both students and mentors are expected to maintain comprehensive records through a structured PBL Workbook, capturing the progress, feedback, and development of the project over time. Each department or institute must ensure that mentors maintain a Continuous Assessment Sheet (CAS) to track student performance and project evolution consistently. The recommended evaluation framework includes the following weighted parameters

Assessment Criteria	Description	Weightage (%)	Marks Allotted
1. Idea Inception & Awareness	Originality of idea, relevance to real-world problems, awareness of environmental, ethical, safety & legal considerations	10%	5
2.Problem-Solving Ability & Quality of Final Product	Effectiveness in addressing the problem, innovation, technical quality, feasibility, individual & team contribution	40%	20
3. Documentation & Process	Requirement gathering, design documents, use of tools, implementation plan, version control, final report	15%	7
4. Demonstration & Presentation Quality	Quality of presentation/demo, user interface design, usability, ability to answer questions	20%	10
5. Participation & Outreach	Participation in contests/exhibitions, research publication, patents, external recognition	15%	8
Total		100%	50

Activities Suggested :

1. **Observation in Daily Life**

   Pay close attention to inefficiencies, frustrations, or gaps in:

   - College (e.g., attendance system, lab equipment use)
   - Home (e.g., energy wastage, security)
   - Transportation (e.g., parking, traffic management)
   - Public places (e.g., waste segregation, queue management)

	2. User Interviews & Surveys Talk to real people: ● Students ● Teachers ● Local shopkeepers ● Bus drivers ● Hospital staff ● Farmers
	3. **Field Visits / Community Engagement** Go to locations such as: ● Hospitals ● Local municipalities ● Villages ● Industrial areas ● Startups or incubators
	4. **News, Reports & Research Papers** Study: ● News headlines ● UN Sustainable Development Goals (SDGs) ● NITI Aayog reports ● Govt of India problem statements (Smart India Hackathon) ● Research gaps mentioned in recent IEEE or ACM papers

Text Books:

1. Project-Based Learning: A Student-Centered Approach – Mahnaz Moallem, Woei Hung, Nada Dabbagh, Wiley India.
2. STEM Project-Based Learning: An Integrated Science, Technology, Engineering, and Mathematics Approach – Robert Capraro, Mary Margaret Capraro.
3. A New Model of Problem-Based Learning – Terry Barrett, AISHE, ISBN: 978-0-9935254-6-9.
4. Project-Based Learning Handbook – Markham, Larmer, and Ravitz, Buck Institute for Education.
5. Project Management (2nd Indian Edition) – Gopalan.
6. Teaching and Learning through Project-Based Learning – William N. Bender, Corwin Press.

Reference Books:

1. The Art of Agile Development – James Shore and Shane Warden, O'Reilly Media.
2. Problem-Based Learning: Case Studies, Experience and Practice – Dave Wilson (Editor).
3. Management of Change: Implementation of Problem-Based and Project-Based Learning in Engineering – E. De Graaff & A. Kolmos, Sense Publishers.
4. The Project Approach: Making Curriculum Come Alive – Sylvia Chard.
5. Outcome-Based Education: A Practical Guide for Teachers – William Spady.

E-Books/Online Learning Resources:

1. SWAYAM – https://swayam.gov.in
2. NPTEL – https://nptel.ac.in
3. AICTE ELIS Portal – https://free.aicte-india.org
4. Google for Education – https://edu.google.com
5. IIT Bombay Spoken Tutorial – https://spoken-tutorial.org
6. Open Library – https://openlibrary.org
7. Edutopia (PBL Resources) – https://www.edutopia.org

Online Courses:

1. Coursera – Courses on PBL, Agile Development, Design Thinking https://coursera.org
2. edX – Project Management, Innovation, and PBL-aligned courses https://edx.org
3. FutureLearn – PBL and 21st Century Teaching Skills https://futurelearn.com
4. Udemy – Applied Project Management, IoT Prototyping, and Design https://www.udemy.com
5. IIT NPTEL (India-specific MOOCs) – Introduction to PBL, Agile, and Teamwork https://nptel.ac.in
6. TCS iON Digital Learning Hub – Industry-based project courses https://learning.tcsionhub.in

Software Tools, Simulation Platforms & Hardware Kits:

Software Tools:
Trello / Asana – Project planning and task management
Google Workspace / Microsoft Teams – Collaboration and documentation
GitHub / GitLab – Version control and collaborative development
Figma / Canva – UI/UX design and prototyping
Arduino IDE / MIT App Inventor – Programming embedded systems and mobile apps
Python / Jupyter Notebook – Data analysis and rapid prototyping

Simulation Platforms:
Tinkercad – Circuit design and 3D simulation (Arduino-friendly)
Proteus – Advanced electronics simulation and PCB layout
MATLAB / Simulink – Mathematical modeling and simulations
Cisco Packet Tracer – Network configuration and simulation
Multisim – Circuit design and simulation for electrical projects

The CO-PO Mapping Matrix

CO/ PO	PO1	PO2	PO 3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	1	–	–	–	–	–	–	–
CO2	3	2	2	–	–	–	–	–	–	–	–
CO3	3	3	3	2	–	–	–	–	–	–	–
CO4	2	2	3	2	2	–	–	–	–	–	–
CO5	2	3	2	–	–	–	–	–	–	–	–

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. CSE							Semester	II
IKS	Indian Knowledge Systems (IKS) for engineering sciences							Code	DP04020325208
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks					
Credits	Lectures	Tutorials	Practical	CA		TEA		Total	
				Theory	Practical	Theory	Practical		

2	2	--	--	--	50	--	--	50

2) **Basics of Indian Knowledge Systems (IKS)**

Course Objectives:

1. To introduce students to the foundations and philosophy of Indian Knowledge Systems
2. To understand the scientific and systematic nature of IKS
3. To explore applications of IKS in basic sciences and engineering
4. To analyze real-life case studies demonstrating relevance of IKS in modern contexts

Course Outcomes:

On completion of the course, students will be able to:

CO1: Explain the fundamentals and historical evolution of Indian Knowledge Systems

CO2: Appreciate the interdisciplinary and holistic nature of IKS

CO3: Identify applications of IKS in basic sciences

CO4: Apply IKS principles in engineering and technological contexts

CO5: Analyze case studies linking traditional knowledge with modern innovations

Course Contents

Unit 1	**Introduction to Indian Knowledge Systems (Basics – I)**	**6 Hours**

- Meaning and definition of Indian Knowledge Systems
- Philosophy and worldview of IKS (Dharma, Karma, Rta, Purusharthas)
- Sources of IKS: Vedas, Upanishads, Itihasas, Puranas, Smritis
- Oral and written traditions of knowledge transmission (Guru–Shishya Parampara)
- Characteristics of IKS: holistic, experiential, sustainable, interdisciplinary
- Comparison between Indian and Western knowledge systems

Unit 2	**Historical Development and Domains of IKS (Basics – II)**	**6 Hours**

- Evolution of knowledge in ancient India
- Major domains of IKS:
  - Mathematics and Astronomy
  - Medicine and Health (Ayurveda, Yoga)
  - Architecture and Town Planning (Vastu Shastra)
  - Linguistics and Literature
  - Arts, Crafts, and Metallurgy
- Contributions of Indian scholars: Aryabhata, Charaka, Sushruta, Panini, Bhaskaracharya
- IKS and sustainability, ethics, and social harmony

Unit 3	**Applications of IKS in Basic Sciences**	**6 Hours**

- **Mathematics**:
  - Concept of zero, decimal system, Vedic mathematics
- **Physics**:
  - Atomic concepts in Vaisheshika philosophy
  - Sound and light concepts in ancient texts
- **Chemistry**:
  - Rasashastra and ancient chemical processes
  - Natural dyes, metallurgy, corrosion resistance (Iron Pillar of Delhi)

Unit 4	**Applications of IKS in Engineering Sciences**	6 Hours

- **Computer Science & Systems Thinking**:
  - Paninian grammar and its relevance to computational linguistics
  - Algorithms and logic in ancient Indian texts
- **Environmental Engineering**:
  - Sustainable construction, waste management, climate-responsive designs
- **Management & Engineering Ethics**:
  - Leadership and decision-making concepts from Indian texts

Unit 5	**Case Studies on Indian Knowledge Systems**	4 Hours

Case Study 1:

Iron Pillar of Delhi

- Corrosion resistance through ancient metallurgical techniques
- Scientific relevance and modern validation

Case Study 2:

Traditional Indian Water Management Systems

- Stepwells, temple tanks, and irrigation systems
- Sustainability and relevance to modern water crisis

CO/PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO10	PO11
CO1	2	1	-	-	-	2	2	2	-	-
CO2	2	2	-	-	-	2	3	2	1	-
CO3	3	2	1	-	-	-	2	1	-	-
CO4	3	3	2	1	-	-	2	2	-	-
CO5	3	3	2	1	1	1	3	3	1	-

Program	B.Tech. CSE				Semester	II		
ESC	Digital Logic Design and Microprocessor lab				Code	DP04020325209		
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
1	--	--	2	--	25	--	--	25

Prerequisite:

3) Basic Electronics Engineering
4) Basic Electrical & Electronics Engineering

Other Courses in this Series: NA

Course Objectives:

On completion of the course, students will be able to:

1: To apply Boolean minimization techniques to realize logic functions

2: To design combinational circuits using MSI logic implementations

3: To construct sequential circuits using flip-flops and shift registers

4: To design asynchronous and synchronous counter circuits

5: To develop microprocessor and embedded system applications.

Course Outcomes:

On completion of the course, students will be able to:

CO1: Apply Boolean algebra and Karnaugh map (K-map) techniques to minimize Boolean functions and realize them using basic logic gates.

CO2: Design and implement combinational logic circuits, including code converters, arithmetic circuits (adders/comparators), and multiplexers, using MSI ICs.

CO3: Construct and analyze sequential logic circuits by utilizing latches, flip-flops (SR, D, JK, T), and shift registers.

CO4: Design asynchronous and synchronous counter circuits and explain the operation of data converters in digital systems.

CO5: Students will be able to design basic applications, such as a digital clock, using the 8085 microprocessor.

Suggested List of Laboratory Experiments/Assignments
Assignments from all Groups (A, B, C, D) are compulsory

Sr. No.	Group-A (Combinational Logic Design -I)

1)	**Solve any four:** a. Design and implement Code Converters-Binary to Gray b. Design and implement Code Converters- 4-bit BCD to Excess-3 code c. Design and implement an 8:1 multiplexer using IC 74153. d. Design and implement a given SOP expression with the help of a function table. e. Design and implement a demultiplexer/decoder using IC 74151,74153,74138 f. To verify the truth table of the two-bit comparator using IC7485. g. Design and implement a 4-bit binary adder using IC 7483
Sr. No	**Group-B (Sequential Logic Design -II)**
2)	**Solve any four:** a. Design, implement, and verify the operation of SR, D, and JK Flip-flops. b. Design and implement 3-bit Ripple/Asynchronous counter. c. Design and implement 3-bit UP and DOWN synchronous counter. d. Realization of Mod-N counter using (Decade Counter IC 7490) e. Design and implement 4-bit Shift Register SISO,SIPO,PISO,PIPO.
Sr. No	**Group-C (Case Study)**
3)	**Solve any one,** a. Design a 2-bit Arithmetic Logic Unit (ALU). b. Design a digital clock with an alarm using an 8085 microprocessor
Sr. No	**Group-D (Mini Project)**

4)	1. **Seven-Segment Display Interface:** Design and implement a BCD to 7-Segment Decoder circuit to display decimal numbers (0-9) driven by a 4-bit binary input. 2. **Combinational Circuits in the Medical Domain:** Design a "Patient Health Monitoring Alarm System" that triggers a specific logic alarm when critical parameters (simulated by logic inputs for temperature, heart rate, pressure) exceed a predefined safety threshold. 3. **Electronic Voting Machine (EVM):** Design a vote-counting circuit using flip-flops and counters that records votes for up to three candidates and displays the winner when a "Result" switch is toggled. 4. **Traffic Light Controller:** Develop a 4-way traffic light control system using a sequential state machine (Moore/Mealy) that cycles through red, yellow, and green states with specific timing delays. 5. **Register Organization:** Design a 4-bit Universal Shift Register capable of performing Shift-Left, Shift-Right, Parallel-Load, and Hold operations based on mode selection inputs. 6. **Digital Lock System:** Create a secure digital lock using logic gates and flip-flops that opens (outputs High) only when a specific 4-bit binary sequence is entered; entering the wrong code triggers an error LED. 7. **Bidirectional Visitor Counter:** Design a digital counter system with two sensors (entry/exit) that increments the count when a person enters a room and decrements when they leave, displaying the total on a 7-segment display. 8. **Digital Stopwatch/Timer:** Construct a modulo-60 counter circuit that counts seconds (00-59) and resets, suitable for use as a basic digital stopwatch. 9. **Sequence Detector for Security:** Design a synchronous sequential circuit that detects a specific non-overlapping binary pattern (e.g., "1011") in a serial data stream and activates an output flag upon detection.

Text Books:

1. **Modern Digital Electronics** by R.P.Jain, 4th Edition, ISBN 978-0-07-06691-16 Tata McGraw Hill
2. **Digital Logic and Computer Design** by Moris Mano, Pearson, ISBN 978-93-325-4252-5

Reference Books:

1. **John Yarbrough**, "Digital Logic applications and Design", Cengage Learning, ISBN-13: 978-81-315-0058-3
2. **D. Leach, Malvino, Saha**, "Digital Principles and Applications"||, Tata McGraw Hill, ISBN 13:978-0-07-014170-4.

E-Books/Online Learning Resources:

Virtual Lab Resources:

1. https://de-iitr.vlabs.ac.in/
2. https://da-iitb.vlabs.ac.in/
3. https://dec-iitkgp.vlabs.ac.in/

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	1	-	-	-	1	1	-	-
CO2	3	2	3	2	1	-	-	1	1	-	-
CO3	3	2	2	2	-	-	-	1	1	-	-
CO4	3	2	3	2	-	-	-	1	1	-	-

CO5	3	2	3	2	2	-	-	1	1	-	1

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. CSE					**Semester**	II
PCC	Computational Thinking and Programming Lab					**Code**	DP0402032 5210
	Teaching Scheme (Hrs/Week)			**Examination Scheme & Marks**			
Credits	**Lectures**	**Tutorials**	**Practical**	**CA**		**TEA**		**Total**
				Theory	**Practical**	**Theory**	**Practical**	
1	--	--	2	--	--	--	25	50

Prerequisite:

1) Problem Solving through C Programming

Other Courses in this Series:

1) Computational Thinking and Programming

Course Objectives:

1. To understand the fundamentals of Python programming, including Python basic constructs, control structures and loops.
2. To learn the use of Python's built-in data structures to efficiently manage and manipulate data.
3. To learn and utilize functions, modules, packages and libraries for modular program development.
4. To learn Object-Oriented Programming (OOP) principles using Python.
5. To acquire file handling in Python and exception handling for robust applications.

Course Outcomes:

On completion of the course, students will be able to:

CO1: Apply fundamental Python programming concepts such as variables, data types, input/output operations, control structures, and looping constructs to solve basic computational problems.

CO2: Analyze problem statements and utilize appropriate Python data structures including lists, tuples, dictionaries, and sets to store, process, and manipulate data efficiently.

CO3: Design and develop modular Python programs using functions, built-in libraries, custom modules, and functional programming constructs to improve code reusability and maintainability.

CO4: Implement object-oriented programming principles such as classes, objects, encapsulation, inheritance, and polymorphism to develop structured and scalable Python applications.

CO5: Demonstrate file handling techniques and exception handling mechanisms in Python to create robust programs capable of handling real-world data and runtime errors.

Suggested List of Laboratory Experiments/Assignments

Assignments from all Groups (A, B, C, D, E,F and G) are compulsory

Sr. No.	Group-A (Unit-1 Introduction to Python Programming)

5)	**Solve any one,** a. If the basic salary of an employee is input through the keyboard, and the dearness allowance is 50% of the basic salary while the house rent allowance is 20% of the basic salary, write a program to calculate the employee's gross salary. b. If the cost price and selling price of an item are provided as input, write a program to determine whether the seller has made a profit or suffered a loss. Additionally, calculate and display the amount of profit or loss. c. If the marks obtained by a student in five different subjects are input through the keyboard, write a program to calculate the aggregate marks and the percentage of marks obtained by the student. Assume that the maximum marks for each subject is 100. d. If the total selling price of 10 items and the total profit earned on them are input through the keyboard, write a program to calculate the cost price of one item.
6)	a. Write a program to take two numbers as input and perform basic arithmetic operations such as addition, subtraction, multiplication, division, modulus, square root, power (exponentiation) etc. b. Develop a program to calculate the area and perimeter of different geometric shapes (triangle, rectangle, square, circle, hexagon etc). c. Develop a program to calculate the total surface area and volume of different objects (cube, cuboid, prism, cylinder, pyramid, cone, sphere etc). d. Create a program to accept a string from the user and display it in reverse.
Sr. No.	**Group-B (Unit-1 Introduction to Python Programming)**

7)	**Solve any one,** a. Write a program to check if a given number is positive, negative, or zero. b. Develop a program to determine whether a given year is a leap year or not. a. Write a program to check whether a given character is a vowel or consonant. b. Create a program to determine the largest of three numbers. c. Develop a program to classify a triangle as equilateral, isosceles, or scalene based on user input. d. Create a program to calculate the grade of a student based on the following marks: o >=90: Grade A o >=80 and <90: Grade B o >=70 and <80: Grade C o <70: Fail e. Write a program to calculate the total bill amount for a shopping cart where each item has a quantity and price. Apply a discount based on the total amount: o >=500: 10% discount o >=1000: 20% discount
8)	**Solve any one,** a. Write a program to print the first n Fibonacci numbers. b. Write a program to display all prime numbers within a given range. Modify the program to count the number of prime numbers in the range. c. Write a program to find factorial of a number. d. Create a program to find the sum of all even numbers between 1 and 100. e. Write a program using a while loop to reverse a given number. f. Write a program to generate a multiplication table for numbers from 1 to 10. g. Write a program to check if a given string is a palindrome. Modify the program to ignore case sensitivity.
Sr. No.	**Group-C (Unit-2 Data Structures in Python)**

9)	**Solve any one,** **a.** Create a list of integers and perform the following: ▪ Add, remove, and modify elements. ▪ Sort the list in ascending and descending order. ▪ Find the maximum, minimum, and sum of the list. ▪ Write a program to remove duplicates from a list. ▪ Implement list slicing to extract sub-lists. **b.** Given a list of temperatures in Celsius, use list comprehension to convert them to Fahrenheit. **c.** Create a tuple of mixed data types and access elements using indexing. Write a program to: ▪ Find the index of an element. ▪ Count the occurrences of an element in the tuple. ▪ Convert a tuple to a list and back to a tuple after modifications. **d.** Create a dictionary to store student details (e.g., name, roll number, marks). Write a program to: ▪ Add, update, and delete key-value pairs. ▪ Iterate through keys, values, and items. ▪ Implement a program to count the frequency of words in a given string using a dictionary. **e.** Create two sets of integers and perform the following operations: ▪ Union, intersection, difference, and symmetric difference. ▪ Check for subset and superset relationships. ▪ Remove duplicate elements from a list using a set. ▪ Write a program to find common elements between two lists using sets. **f.** Create a matrix and perform the following: ▪ Add and subtract two matrices. ▪ Find the transpose of a matrix. ▪ Write a program to perform matrix multiplication. ▪ Implement a program to check if a given matrix is symmetric.
Sr. No.	**Group-D (Unit-3 Functions, Modules, and Libraries)**

10)	**Solve any one,** a. Write a function to calculate the factorial of a number using recursion. b. Write a function to check whether a number is prime using function. c. Create a function that takes a list as input and returns the largest and smallest elements. d. Use a lambda function to calculate the square of a number. e. Write a program to filter even numbers from a list using filter and a lambda function. f. Use reduce to compute the sum of elements in a list. g. Write a function that accepts any number of arguments and returns their average. h. Implement a function that demonstrates both *args and **kwargs usage. i. Create a custom module named math_utils with functions for addition, subtraction, multiplication, and division. Import and use these functions in another program. j. Explore and use Python's built-in math module to perform the following: o Calculate the square root of a number. o Compute the value of sine, cosine, and tangent for a given angle. k. Use the random module to generate: a. A random integer between two numbers. b. A random floating-point number. c. A random element from a list. l. Use the os module to: a. Get the current working directory. b. List all files in a directory. c. Create a new directory. m. Use the datetime module to: a. Display the current date and time. b. Compute the difference between two dates. n. Use the statistics module to calculate mean, median, and mode of a list of numbers.
Sr. No.	**Group-E (Unit-4 Object-Oriented Programming in Python)**

11)	**Solve any one,** **a.** Define a class Student with attributes: name, roll number, and marks. Create methods to: ▪ Input data for a student. ▪ Display the student's details. Create multiple student objects and test the methods. **b.** Create a class Bank Account with the following attributes: Private account number, balance, and owner name. Provide methods to: ▪ Initialize an account with a default balance. ▪ Deposit and withdraw money (with validation for sufficient funds). ▪ Display account details. **c.** Define a class Employee with attributes: emptied, name, and salary. ▪ Use a constructor to initialize the attributes. ▪ Define a destructor that prints a message when an object is deleted. ▪ Create and delete employee objects to observe the behavior of the destructor. **d.** Create a base class Shape with a method area(). Define two derived classes: ▪ Circle with a specific implementation of area() to calculate the area of a circle. ▪ Rectangle with a specific implementation of area() to calculate the area of a rectangle. Demonstrate polymorphism by creating objects of both derived classes and calling the area() method. **e.** Create a class Person with attributes like name and age. ▪ Derive a class Employee from Person, adding attributes like emptied and department. ▪ Further derive a class Manager from Employee, adding an attribute team size. ▪ Demonstrate the usage of attributes and methods from all levels.
Sr. No.	**Group-F (Unit-5 File Handling)**

12)	**Solve any one,** **a.** Write a Python program to create a file named example.txt, write a paragraph of text to it, and close the file. ▪ Reopen the file in read mode and display its contents. ▪ Open the file in append mode and add an additional line of text. ▪ Reopen the file in read mode and verify the updated content. **b.** Write a Python program to read the contents of a text file story.txt. ▪ Split the contents into words and count the frequency of each word. ▪ Display the words along with their frequencies in descending order of frequency. **c.** Write a Python program to copy the contents of source.txt into destination.txt. Ensure the program handles the case where source.txt does not exist, displaying an appropriate error message using exception handling. **d.** Create a sample log file access.log containing records of web server access logs (timestamp, IP address, URL). ▪ Write a Python program to extract and display all unique IP addresses. ▪ Count the number of occurrences of each IP address. **e.** Write a Python program to create a CSV file data.csv with fields: ID, Name, and Age. ▪ Insert 5 records into the file. ▪ Read and display the contents of the CSV file. ▪ Search and display a specific record by ID. **f.** Write a Python program to store student records in a file students.txt. Each record should contain fields: Roll Number, Name, and Marks. ▪ Provide options to: o Add a new record. o Display all records. o Search for a student by Roll Number. o Implement appropriate exception handling for invalid inputs or missing files.
Sr. No.	**Mini Projects: Design and Develop any one Mini-Project**

Sample Mini Project

1. Create a mini project to develop a student management system that stores, updates, deletes, and displays student records using file handling in Python.
2. Create a mini project to design a simple calculator that performs basic arithmetic operations through a menu-driven program.
3. Create a mini project to implement a number guessing game in which the system generates a random number and provides hints to the user.
4. Create a mini project to simulate an ATM system that performs balance inquiry, cash withdrawal, and deposit operations.
5. Create a mini project to build a password strength checker that validates passwords based on security rules.
6. Create a mini project to develop a quiz application that evaluates users using multiple-choice questions.
7. Create a mini project to maintain library book records such as book title, author, and availability using files.
8. Create a mini project to extract the username and domain name from a given email address.
9. Create a mini project to simulate a dice rolling application using random number generation.
10. Create a mini project to develop a contact book application for storing and searching contact details.

Text Books:

1. Dr. Charles R. Severance, “Python for Everybody: Exploring Data Using Python 3”, 1st Edition, Shroff Publishers, ISBN: 9789352136278
: 978-9352134755
3. Zed A. Shaw, “Learn Python the Hard Way: A Very Simple Introduction to the Terrifyingly Beautiful World of Computers and Code”, 3rd Edition, Addison-Wesley, ISBN-13: 978-0321884916

Reference Books:

1. Mark Lutz, “Learning Python: Powerful Object-Oriented Programming”, 5th Edition, O’Reilly Media, ISBN-13: 978-1449355739;
: 978-9387572942
: 978-9355420831

E-Books/Online Learning Resources:

1. Rupesh Nasre, "Python Programming", AICTE, ISBN : 978-81-959863-5-4 https://gnindia.dronacharya.info/IT/NC-Course-2nd-Year/Downloads/Python-Programming/Books/Python-Programming.pdf
2. Python Programming Lab, IITK VLABs, https://python-iitk.vlabs.ac.in/
3. The Python Tutorial, https://docs.python.org/3/tutorial/index.html
4. Python3.4.3,SpokenTutorials,https://spoken-tutorial.org/tutorial-search/?search_foss=Python+3.4.3&search_language=English

Online Courses:

1. Programming, Data Structures, and Algorithms using Python
   a. Instructor: Prof. Madhavan Mukund, Chennai Mathematical Institute
   b. Content: Covers Python basics, data structures (stacks, queues, linked lists), algorithms (searching, sorting, recursion), and their implementation in Python.
   c. Link: https://nptel.ac.in/courses/106106145
2. The Joy of Computing using Python
   a. Instructor: Prof. Sudarshan Iyengar from IIT Ropar
   b. Content: Introduces Python programming in a fun and engaging manner.
   c. Link: https://nptel.ac.in/courses/106106182

Software Tools, Simulation Platforms & Hardware Kits:

1) CPython : Python interpreter
2) Anaconda: Python distribution with data science libraries
3) Git + GitHub: Version Control
4) Pip: Package Management
5) Jupyter Notebook: Code Editor

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1		2	-	-	1	-	-	2
CO2	3	3	2		2	-	-	1	-	-	2
CO3	2	2	3	1	3	-	-	1	-	-	2
CO4	2	2	3	1	2	-	-	1	-	-	2
CO5	2	2	2	1	3	-	-	1	-	-	2

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)					Semester		II
Course	Industry 4.0: Managing The Digital Transformation					Code		DP04020325211
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
2	2	--	--		--		--	50

3) **Basics of Indian Knowledge Systems (IKS)**

Course Objectives:

1. .**To** Understand the evolution, principles, and global perspectives of Industry 4.0 and Digital Transformation, including insights from leading global studies and frameworks.

2. **To** Explain the foundation and advanced technologies enabling Industry 4.0 such as IoT, cloud computing, big data analytics, AI, edge computing, automation, and immersive technologies.
3. **To** Analyze Industry 4.0 implementation roadmaps, value chains, reference architectures, and best practices through global lighthouse case studies.
4. **To** Develop awareness of cybersecurity, AI security, data governance, and data protection regulations relevant to digital and smart manufacturing ecosystems.
5. **To** Explore the transition from Industry 4.0 to Industry 5.0, smart and intelligent manufacturing systems, and future trends shaping the digital economy and workforce.

Course Outcomes:

On completion of the course, students will be able to:

CO1. Explain the concepts, evolution, principles, and strategic importance of Industry 4.0, Digital Transformation, and Industry 5.0 in modern industrial ecosystems.

CO2. Describe and relate core Industry 4.0 technologies including IoT architectures, cloud platforms, big data analytics, AI, edge computing, additive manufacturing, AR/VR, and computer vision to real-world industrial applications.

CO3. Analyze Industry 4.0 business and process value chains, digital infrastructure reference architectures, and implementation roadmaps using global lighthouse use cases.

CO4. Evaluate cybersecurity, AI security, data management, governance frameworks, and data protection laws in the context of Industry 4.0 and smart manufacturing environments.

CO5. Explain smart and intelligent manufacturing concepts such as connected workers, assets, plants, digital twins, autonomous systems, robotics, and AI-driven operational intelligence.

CO6. Assess future trends, business models, maturity frameworks (such as SIRI), digital public infrastructure initiatives, and workforce transformation required for Industry 4.0 / 5.0 adoption.

Course Contents

Unit 1	Foundations and Playbook for Industry 4.0 and Digital Transformation	**6 Hours**

Evolution of the Fourth Industrial Revolution (4IR) and Overview of Industry 4.0
Highlights of studies on Industry 4.0 of World Economic Forum and McKinsey, Digital Transformation and Industry 4.0 principles, Advanced technology domains of 4IR
Foundation technologies of Industry 4.0: Connectivity, IoT, Big Data and Cloud, Deep down on IoT – Internet of Things, IoT Ecosystem ,IoT architecture, What is IoT Platform, Conceptual framework of Connected Products and new value of data, Deep dive on Edge Computing, Framework of Data Collection and processing, Brief overview of Cloud, Big Data and Data Analytics, Industry examples of IoT and use of analytics
A brief overview of AI and associated technologies, Collaboration and convergence of technologies for Industry 4.0 ,Automation of enterprise using RPA and Intelligent RPA, Additive manufacturing and 3D-based revolution in manufacturing, Benefits of augmented technologies, Augmented reality concepts and live examples, Virtual reality concepts and live examples, Difference between AR/VR and Mixed Reality ,
Computer Vision & Visual AI

Unit 2	**Implementation Roadmap and security for Industry 4.0**	**6 Hours**

Industry 4.0 business value chain, Industry 4.0 process value chain and automation, Industry 4.0 framework, Digitalization and Digital Transformation Strategy for Industry 4.0, Learnings of Global Lighthouse Best Practices for implementation of Industry 4.0, Representative use cases of Global Lighthouses

Introduction of reference architecture for setting up Digital Infrastructure for Industry 4.0

A brief about Application Layer and API Platform as a Service for Application Integration, Introduction of Data Management, Data Warehouse and Data Lake, Overview of Digital Data Products, Cybersecurity and AI Security, AI Security considerations and Governance Framework, and an overview of Data Protection and Privacy Laws

Case Study #1	Tata Steel	
Unit 3	**Overview of Industry 5.0 and Smart Manufacturing and Intelligent Manufacturing**	**6 Hours**

Innovation Playbook of Industry 4.0, Emergence of Industry 5.0: Transcending I4.0 to I5.0 , Role of AI in building Industry 5.0 solutions, Introduction of Digital Twin: Use cases for Industry 5.0, Introduction of reference architecture for setting up Digital Infrastructure for Industry 4.0, A brief about Application Layer and API Platform as a Service for Application Integration ,Introduction of Data Management, Data Warehouse and Data Lake, Overview of Digital Data Products, Cybersecurity and AI Security, AI Security considerations and Governance Framework, and an overview of Data Protection and Privacy Laws

Introduction of Smart Manufacturing and Intelligent Manufacturing, Framework of Smart Manufacturing, Use Cases, and concepts of Connected Workers, Connected Assets, Connected Plants and Connected Factories, Automation vs Autonomous Systems and role of Robotics, Humanoids, and GenAI, Operational Intelligence and AI Playbook for Smart Manufacturing, Strategy for preparing workers for Smart Manufacturing, and brief overview of Smart Supply Chain and Logistics

Case Study #2	Introduction of Digital Twin	
Unit 5	**Smart Manufacturing and Intelligent Manufacturing, Future trends**	**6 Hours**

Defining Business Model of Smart Manufacturing and Drivers of Change with a Case Study, Re-envisioning the Digital Workplace for Industry 4.0 / 5.0, Smart Manufacturing Maturity Assessment elements and brief overview of the global SIRI Framework, Democratization of Industry 4.0 in other industry disciplines with snapshots of broad frameworks for BFSI, Retail, Automobile, Agriculture and others

Key Success Factors for adoption of Industry 4.0 / 5.0 and preparing Industry 4.0 and AI Mindset

A brief on Digital Public Infrastructure and introduction of various technology-embedded initiatives including India Stack and ONDC

AI Acceleration by Government of India, plans, schemes and AI initiatives by the Defence sector, Future of Work and Future of Industry

Reference Books :

Total Hours : 30

1. Schwab, K. (2016). *The Fourth Industrial Revolution*. Geneva, Switzerland: World Economic Forum.
2. Brynjolfsson, E., & McAfee, A. (2014). *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. New York, NY: W. W. Norton & Company.
3. Ustundag, A., & Cevikcan, E. (2018). *Industry 4.0: Managing the Digital Transformation*. Cham, Switzerland: Springer International Publishing.
4. Bagnoli, C., & Albarelli, A. (2020). *Digital Business Models for Industry 4.0: How Innovation and Technology Shape the Future of Companies*. Cham, Switzerland: Springer International Publishing.
5. World Economic Forum. (n.d.). *Industry 4.0 and Global Lighthouse Network*. World Economic Forum publications and reports on advanced manufacturing and digital transformation.
6. McKinsey & Company. (n.d.). *Industry 4.0, Smart Manufacturing, and Digital Transformation Articles*. McKinsey Global Institute and McKinsey Operations Practice publications.
7. McKinsey & Company. (n.d.). *What Are Industry 4.0, the Fourth Industrial Revolution, and 4IR?* McKinsey Insights.
8. World Economic Forum & Industry Case Studies. (n.d.). *Live Industry 4.0 Use Cases and Lighthouse Case Studies* — Tata Steel, Tata Motors, Bosch, Royal Philips, Schneider Electric, and other leading Indian and global manufacturing organizations.
9. Singapore Economic Development Board (EDB). (2019). *Smart Industry Readiness Index (SIRI): Maturity Assessment Framework*. Singapore: EDB.

CO/PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2				1			1		2
CO2	3	2	2		3						2
CO3	2	3	3	1	2	1		1		2	2

CO4	1	2				3	3				2
CO5	2	2	3		2	1		1			2

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. (Computer Science & Engineering)						**Semester**	II
Course	Recommender System						**Code**	DP04020325212
	Teaching Scheme (Hrs/Week)			**Examination Scheme & Marks**				
Credits	**Lectures**	**Tutorials**	**Practical**	**CA**		**TEA**		**Total**
				Theory	**Practical**	**Theory**	**Practical**	
2	2	--	--		--		--	50

Course Objectives:

To introduce the fundamental concepts, importance, and business applications of recommender systems, along with different data types and system classifications.
To develop the ability to apply memory-based collaborative filtering techniques using similarity and distance measures for user-based and item-based recommendations.
To enable students to analyse and implement model-based collaborative filtering approaches, including matrix factorization methods such as SVD and its variants.
To equip students with skills to design and build content-based recommender systems using feature engineering, dimensionality reduction, and supervised learning techniques.
To provide knowledge of evaluation methods for recommender systems, including offline and online metrics, and to understand and compare advanced recommendation techniques.

Course Outcomes:

On completion of the course, students will be able to:

CO1: Explain the fundamental concepts, business value, data types, and classification of recommender systems.
CO2: Apply memory-based collaborative filtering techniques using similarity and distance measures for user-based and item-based recommendation.
CO3: Analyze and implement model-based collaborative filtering using matrix factorization techniques such as SVD and its variants.
CO4: Design content-based recommender systems using feature engineering, dimensionality reduction, and supervised learning approaches.
CO5: Evaluate recommender systems using appropriate offline and online metrics and compare advanced recommender system paradigms.

Course Contents

Unit 1	**Fundamentals of Recommender Systems**	**6 Hours**

Introduction to Recommender Systems, Business value of Recommender System, A conceptual framework for understanding recommender system, Types of recommender system, Data for recommendation: Explicit Vs Implicit data collection, Scales of measurement

Unit 2	**Collaborative Filtering Techniques**	**6 Hours**

Statistical and machine learning foundations for recommender system, Data preprocessing, Introduction to collaborative filtering, Collaborative filtering approaches: Memory based and model based, Memory based collaborative filtering foundations: Distance and similarity measures, User based collaborative filtering; Item based collaborative filtering

Unit 3	**Model-Based Recommendation and Matrix Factorization**	**6 Hours**

Model based collaborative filtering foundations, Matrix factorization, UV decomposition, Singular value decomposition, Model based collaborative filtering techniques, SVD, SVD++ etc

Unit 4	**Content-Based Recommendation and Feature Engineering**	**6 Hours**

Content based recommender system foundations, Examples with text data, Feature engineering, Feature extraction, feature selection, Dimensionality reduction, Dimensionality reduction, Content based recommender system examples with few supervised machine learning techniques

Unit 5	Evaluation and Advanced Recommender Systems	6 Hours
Evaluation of recommender systems: Online and offline evaluation, Metrics such as RMSE, AME, Good Item MAE, Good predicted item MAE, Precision, Recall, F1 Measure, NDCG, Average Reciprocal Rank, Top @N Measure, Overview of other types of recommender systems such as trust based, Overview of other types of recommender systems such as social network based, and context aware systems		
		Total Hours : 30

Reference Books , links and courses :

1. Ricci, Rokach, Shapira (eds.), Recommender Systems Handbook, Springer, 2011.

2. C. C. Aggarwal, Recommender Systems: The Textbook, Springer, 2016.

3. NPTEL course: Recommender Systems (Prof. Mamata Jenamani, IIT Kharagpur) — https://onlinecourses.nptel.ac.in/noc24_ge35/preview

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CO/PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2				1			1		2
CO2	3	2	2		3						2
CO3	2	3	3	1	2	1		1		2	2
CO4	1	2				3	3				2
CO5	2	2	3		2	1		1			2

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. CSE					Semester		II
Audit Course	Foreign Language -Japanese (Module II)					Code		DP0402032521 3
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
-	-	--	--	-	--	-	--	-

About Course:

This course is a continuation of the foundational Japanese language study (Module I), specifically designed for B.Tech. students to build upon their basic knowledge and progress toward intermediate-level proficiency. Japanese Language – Module II emphasizes the practical application of grammar, sentence structure, and vocabulary to improve communication skills in academic, technical, and everyday contexts.

Students will deepen their understanding of **Hiragana, Katakana**, and an expanded set of **Kanji characters**, enabling them to read and comprehend short texts, technical instructions, and basic dialogues. The course also introduces polite forms of speech (keigo), essential for professional interactions and cultural competence.

Through interactive lessons, listening practices, and conversation-based activities, students will be able to:

- Construct more complex sentences using verbs, adjectives, and particles correctly.
- Discuss simple technical topics and daily routines in Japanese.
- Read and write short passages related to technology, student life, and Japanese society.
- Gain cultural insights relevant to Japanese workplace etiquette and social behavior.

This module prepares students for further advanced study or certifications such as the **JLPT N5/N4 level**, and enhances their eligibility for internships, research, and career opportunities with Japanese companies in India and abroad.

Other Courses in this Series:

1) Foreign Language -Japanese (Module I)

Course Objectives:

1. To develop the Japanese communicative competence of students with small sentence formation.to make primitive social conversation in Japanese.
2. To enable students with comprehension ability of Japanese grammar.
3. To enable students to translate simple conversations from English to Japanese and vice a versa.
4. To make students aware about Japanese Culture and Customs.
5. To able to Select different verbs, demonstrative pronouns for place
6. To open more doors and job opportunities

Course Outcomes:

On completion of the course learner will be able to:

CO1 : Demonstrate the ability to engage in basic Japanese conversations using short and correct sentences.

CO2 : Apply fundamental Japanese grammar rules in reading, writing, and speaking tasks.

CO3 : Translate simple sentences and short conversations between English and Japanese accurately.

CO4 : Display awareness and respect for Japanese culture, customs, and social norms.

CO5 : Appropriately use Japanese verbs and demonstrative pronouns to describe people, places, and objects.

CO6 : Recognize the relevance of Japanese language skills in enhancing career opportunities and employability.

Course Contents

Unit 1	**Japanese Conversation**	**(02 hrs +04hrs Self Study)**
Oral practice of conversation in situations such as declining an invitation, reporting an event, narrating a story, short formal speeches on occasions such as welcoming, introducing and thanking a guest, talking about Japanese and Indian festivals, hostel life etc		
Unit 2	**Japanese Text and Kanji**	**(02hrs +04 hrs Self Study)**

Diverse texts based on Japanese culture, customs, history, food habits, and science etc, for the development of communicative competence of students; skimming, scanning of texts with emphasis on advanced sentence patterns, grammatical structures and idiomatic phrases, reading and writing of approximately 400 kanji.

Unit 3	**Japanese Grammar and Composition**	**(02 hrs +04 hrs Self Study)**

Basic sentence patterns to be applied in self-introduction, identifying things; time of the day; calendar; counting using Japanese numerical classifiers; describing things; making comparisons; talking of daily activities; kinship terms used for address and reference; seasons; giving and receiving; shopping; making requests; talking of one's likes and dislikes

Unit 4	**Japanese – English Translation**	**(02hrs +04 hrs Self Study)**

Practice in English to Japanese and Japanese to English translation of short passages on various topics such as culture, society, religion and life style taken from books, newspapers, magazines, internet etc.

Unit 5	**Language and Literature of Japan**	**(02 hrs.)**

History of Japanese language, literary trends, religions, spread of Chinese influence, development of art and culture in Japan.

Text Books:

1. 1.EriBanno, Genki I: An Integrated Course in Elementary Japanese , 3rd Edition 2020, The Japan Times, (ISBN13: 9784789017305)
2. George Trombley , Yukari Takenaka, Japanese From Zero, 6th Edition, Learn From Zero Publishers (ISBN10- 0976998122, ISBN13-9780976998129)
3. Tae Kim, A Guide to Japanese Grammar, 2012, CreateSpace Publishing, (ISBN-1469968142, ISBN13- 9781469968148) http://www.guidetojapanese.org/learn/grammar

Reference Books:

1. Yukiko Ogata, Kana Sumitani, Yasuko Hidari, Yukiko Watanabe, Nihongo fun and Easy -II, Basic Grammar for Conversation
2. Nobuo Akiyama, Carol Akiyama, Japanese Grammar (Barron's Grammar), 3rd edition 2012, Barrons Educational Series
3. Storry Richard, A History Of Modern Japan, 1973, Penguin Books Ltd,
4. James W. Heisig, Remembering the Kanji 1 : A Complete Course on How Not To Forget the Meaning and Writing of Japanese Characters, 6h Edition, University of Hawai'i Press (ISBN10 0824835921, ISBN13-9780824835927)
5. Minna No Nihongo,"Japanese for Everyone", Elementary Main Text book1-1 (Indian Edition), Goyal Publishers and Distributors Pvt.Ltd.
6. Genki:" An Integrated Course in Elementary Japanese I",The Japan Times Publishing,ISBN: 978-4789017305

Books/Online Learning Resources:

1.https://www.duolingo.com/course/ja/en/Learn-Japanese

2. https://www.freejapaneselessons.com/

3. https://minato-jf.jp/(Japan Foundation)

Online Courses:

1. **Japanese for Beginners Free Online Course by Coursera**
   a. Presented by the St Petersburg State University through the online course platform known as Coursera.
   b. Covers basics of the Japanese language for the beginners.
   c. Link: https://www.youtube.com/watch?v=keHP75wg3FA

2. **Introduction to Japanese Language and Culture**

a. Instructor:Prof. Vatsala Misra (IIT Kanpur)

b. It focuses on conversational skills and basic training in sentence construction

c. Link: https://onlinecourses.nptel.ac.in/noc25_hs43/preview?utm_source=chatgpt.com

CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1									2	3	
CO2	2									2	
CO3	2									2	
CO4								1	2	1	1
CO5	2									2	
CO6									2	2	1

Program	B.Tech. CSE			Semester				II
Audit Course	Foreign Language -German (Module-II)			Code				DP0402032521 4
	Teaching Scheme (Hrs/Week)			Examination Scheme & Marks				
Credits	Lectures	Tutorials	Practical	CA		TEA		Total
				Theory	Practical	Theory	Practical	
-	-	--	--	-	--	-	--	-

About Course:

This course is a continuation of the introductory German language course (Module I) and is designed for B. Tech students to build on their foundational knowledge of German. It focuses on enhancing the learners' proficiency in basic communication, grammar structures, and vocabulary while introducing more complex sentence formations and everyday conversational contexts.

The course aims to equip students with practical language skills relevant to academic, technical, and cultural settings. Emphasis is placed on developing reading comprehension, writing short texts, engaging in spoken interactions, and understanding audio-visual content. In addition, students will be introduced to German culture, traditions, and communication etiquette to foster intercultural competence.

This module is aligned with the **A1-A2 level of the Common European Framework of Reference for Languages (CEFR)** and prepares students to confidently engage in simple conversations and comprehend frequently used expressions in routine situations.

Other Courses in this Series:

1) Foreign Language -German (Module I)

Course Objectives:

1. To strengthen and expand foundational German grammar and vocabulary learned in Module-I
2. To develop the ability to comprehend and engage in conversations
3. To improve students' speaking and listening proficiency
4. To build confidence in reading and writing short texts
5. To introduce complex grammatical concepts
6. To enhance cultural understanding and intercultural competence

Course Outcomes:

On completion of the course learner will be able to:

CO1: Demonstrate improved understanding and application of essential German grammar

CO2: Comprehend and respond appropriately to spoken German in familiar scenarios

CO3: Engage in short spoken interactions and role plays with correct pronunciation and basic fluency.

CO4: Read and understand short German texts and extract relevant information.

CO5: Write simple sentences, messages, and short descriptions in German using correct vocabulary and grammar.

CO6: Display awareness of German cultural practices and demonstrate appropriate behaviour in intercultural settings.

Course Contents

Unit 1	**Revision of Module-I Basics**	**6 Hours**
Overview of alphabets, pronunciation, greetings, numbers, Articles (definite and indefinite), personal pronouns, Verb conjugation (present tense), sentence structure		
Unit 2	**Daily Life and Routine**	**6 Hours**
Talking about daily activities, Telling the time, days of the week, months, Separable and reflexive verbs, Expressions for scheduling and appointments		
Unit 3	**Describing People and Places**	**6 Hours**
Adjectives and their usage with nouns, Family, professions, nationalities, describing physical appearance and personality traits, Talking about places: cities, countries, institutions		
Unit 4	**Food, Travel, and Shopping**	**6 Hours**
Vocabulary related to food, restaurants, and shopping, Dialogue practice: ordering food, buying items, Usage of modal verbs (können, müssen, wollen), Asking for directions and using public transport vocabulary		
Unit 5	**Speaking Skills**	**6 Hours**
Practicing phonetics, giving presentations in elementary level German on relevant topics, carry out role plays on the given topics		
Unit 6	**German Culture and Intercultural Communication**	**6 Hours**
Introduction to festivals, customs, and traditions, Social norms and etiquette, Comparison between Indian and German cultural practices, Role plays and situational conversations		

Evaluation

Students should select any one of the topic in a group of 3 to 5. Students should submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics defined by him/her/them at start of course.

Textbooks:

1. Menschen A2.1: Anna Breitsameter, Sabine Glas-Peters, Angela Pude, Hueber Verlag, Ismaning Germany, 2017
2. Netzwerk A2: Dengler, Rusch, Schmitz, Sieber, Ernst Klett Sprachen, Stuttgart Germany, Goyal Publishers & Distributors, Delhi, 2015

Reference Books:

1. Linie 1 A2: Dengler, Hoffmann, Kaufmann, Moritz, Rodi, Rohrmann, Rusch, Scherling, Sonntag, Klett-Langenscheidt GmbH, München Germany, Goyal Publishers & Distributors, Delhi, 2018
2. Begegnungen A2+: Anne Buscha, Szilvia Szita, Schubert Verlag, Leipzig Germany, 2006
3. Tangram aktuell 2: Dallapiazza, Eduard von Jan, Schönherr, Max HueberVerlag, Ismaning, Germany, Goyal Publishers & Distributors, Delhi, 2005

E-Books/Online Learning Resources:

1. DW Learn link: https://learngerman.dw.com/en/learn-german/s-9528
2. Goethe-Institut Link: https://www.goethe.de/en/spr/ueb.html

Online Courses:

1. **German for Beginners (German-I) Free Online Course by NPTEL**
   a. Instructor: Prof. Milind Brahme, IIT Madras
   b. Covers basics of the German language for the beginners
   c. Link: https://onlinecourses.nptel.ac.in/noc21_hs30/preview
2. **Learn German with easy German**
   a. Easy German is an online video series presented by the different German people
   b. covering a wide range of topics and fluency levels.
   c. Link: Easy German

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	2	2	-	-	-	-	-	-	-
CO2	2	3	2	3	-	-	-	-	-	-	-
CO3	2	2	2	3	1	-		-	-	-	-
CO4	2	3	2	2	-	-	-	-	-	-	-
CO5	3	2	3	2	-	-	-	-	-	-	-

CO6	1	2	1	1	1	3	2	-	-	-	-

Dnyaan Prasad Global University
Dr. D. Y. Patil Unitech Society
School of Technology and Research

Program	B.Tech. CSE			**Semester**		II
Audit Course	Foreign Language -French (Module-II)			**Code**		DP04020325215
	Teaching Scheme (Hrs/Week)			**Examination Scheme & Marks**		
Credits	**Lectur**	**Tutori**	**Pract**	**CA**	**TEA**	**Total**

	es	als	ical	Theo ry	Practical	Theory	Practical	
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About Course:

French Language – Module II is designed as a continuation of the foundational French Language – Module I course. It aims to enhance the linguistic and communicative competence of B. Tech students by advancing their skills in listening, speaking, reading, and writing in French. This course moves toward **CEFR A2 level** and deepens grammatical understanding, vocabulary, and cultural insights.

Students will learn to form more complex sentences, comprehend longer texts, express opinions, and participate in real-life conversations. The course introduces more nuanced grammar such as past tenses, object pronouns, and comparative structures. Emphasis is placed on academic, social, and workplace situations relevant to engineering and international collaboration.

By the end of this course, students will be able to:

- Communicate in French with greater fluency and accuracy in everyday and technical contexts.
- Understand and apply intermediate-level grammar structures including past tense, object pronouns, and conjunctions.
- Read and interpret medium-length texts such as announcements, schedules, personal narratives, and workplace instructions.
- Write structured paragraphs, letters, and short reports in French.
- Demonstrate deeper awareness of Francophone cultures, professional etiquette, and societal values.

This course not only supports **interdisciplinary communication and international mobility** but also enhances the employability of engineering graduates in global and multicultural environments.

Other Courses in this Series:

1) Foreign Language -French (Module-I)

Course Objectives:

2) To strengthen students' ability to use French in real-life scenarios
3) To build upon foundational grammar
4) To develop reading comprehension skills through exposure to authentic texts
5) To improve writing proficiency
6) To advance oral fluency, allowing students to participate in conversations
7) To deepen cultural competence, highlighting professional norms, workplace etiquette, and values of Francophone societies.

Course Outcomes:

On completion of the course learner will be able to:

CO1: Engage in longer conversations and express opinions clearly using appropriate vocabulary and grammar.

CO2: Apply intermediate grammar structures in oral and written communication.

CO3: Read and comprehend a variety of moderately complex French texts used in social and professional contexts.

CO4: Write coherent and grammatically correct texts such as letters, descriptions, and short reports in French.

CO5: Present basic information about technical subjects, personal experiences, and future plan in French.

CO6: Exhibit awareness of professional communication norms and cultural practices in Francophone countries.

Course Contents

Unit 1	**Every day and Extended Communication**	**6 Hours**

Engage in dialogues about hobbies, routines, and weekend plans; Express opinions, preferences, and justifications; introduce oneself in professional and social settings; Listen and respond to audio conversations involving greetings, requests, and opinions; Vocabulary: daily life, emotions, weather, travel

Unit 2	**Grammar Expansion – Intermediate Structures**	**6 Hours**

Past tenses: Passé Composé (avoir and être), introduction to Imparfait; Object pronouns (le, la, les, lui, leur); Relative pronouns: qui, que; Common conjunctions and sentence connectors; Grammar drills and transformation exercises

Unit 3	**Reading and Interpretation of Texts**	**6 Hours**

Reading job advertisements, schedules, and event announcements; Analyzing short narratives, notices, and formal messages; Identifying main ideas and details; Vocabulary building: professions, places, transport; Reading comprehension exercises (true/false, Q&A)

Unit 4	**Writing in Formal and Informal Contexts**	**6 Hours**

Writing short letters: apology, inquiry, thank-you; Descriptive writing (people, objects, places); Email formatting and basic résumé (CV) in French; Grammar focus: article agreement, verb conjugation; Punctuation and paragraph organization

Unit 5	**Oral Proficiency and Public Speaking**	**6 Hours**

Participating in basic debates and discussions; Describing a technical project in simple French Giving Short presentations (structured topics); Pronunciation: liaison, intonation, rhythm; Conversation practice in pairs/groups

Unit 6	**Cultural Awareness and Professional Etiquette**	**6 Hours**

Workplace etiquette in Francophone countries; Introduction to business customs and norms; Key cultural values in French-speaking societies; Comparison with Indian professional culture; Use of polite forms and formal expressions

Evaluation

Students should select any one of the topic in a group of 3 to 5. Students should submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics defined by him/her/them at start of course.

Textbooks:

1. Cosmopolite 2 – A2 Textbook: Nathalie Hirschsprung, Tony Tricot, Goyal Publishers, April 28, 2017
2. À Propos: Livre de l'Élève A2: Catherine Metton, Annabelle Nachon, Fabienne Nugue, Cristelle Carenzi, Presses Universitaires de Grenoble, January 2016
3. Saison 2 – Méthode de Français: Marie-Noëlle Cocton, Anouchka de Oliveira, Dorothée Dupleix, Goyal Publishers & Distributors Pvt. Ltd., 2016

Reference Books:

1. Alter Ego+ A2: Méthode de Français: Annie Berthet, Catherine Hugot, Véronique M. Kizirian, Béatrix Sampsonis, Monique Waendendries, Hachette Livre, Goyal Publishers & Distributors Pvt. Ltd. 2012
2. Grammaire Progressive du Français – Niveau Débutant: Maïa Grégoire, CLE International, Indian distributor: Goyal Publishers & Distributors Pvt. Ltd., 2010

E-Books/Online Learning Resources:

1. https://apprendre.tv5monde.com
2. https://www.duolingo.com/course/fr/en/Learn-French
3. https://www.bbc.co.uk/languages/french/

Online Courses:

1. **Foundations Of French**
   a. Instructor: Ramya Jagannathan, IIM Bangalore
   b. It covers foundation French Course For the beginners
   c. NPTEL SWAYAM Link: https: https://onlinecourses.swayam2.ac.in/imb25_mg88/preview
2. **French Intermediate course B1-B2**
   a. Instructor: Julie André
   b. It will cover the knowledge about language competency, intellectual competence, Higher education
   c. Link: https://www.coursera.org/learn/etudier-en-france
3. **Online, personal AI language tutor will teach you how to speak French like a local.**
   Link: https://www.memrise.com/en/learn-french

The CO-PO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2								3	3	
CO2	3									3	
CO3								2	2	2	2
CO4	2									3	
CO5	2								2	3	
CO6								3	2	2	2