Vivekanand Education Society's
Institute of Technology
(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Department of Humanities and Applied Sciences

Department of Humanities and Applied Sciences

Syllabus (NEP Scheme)

First year Bachelor of Engineering(B.Tech)

Sem-I & Sem II

w.e.f. A.Y. 2024-25

Group A

Computer Engineering

Information Technology

Vivekanand Education Society's
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Department of Humanities and Applied Sciences

Semester I Scheme

Group A (CMPN & INFT)

Course Type	Course code	Course Name	Teaching Scheme (Contact hrs)			Credits Assigned			
			Th	Pr	Tut	Th	Pr	Tut	Total
Basic Science Course (BS)	NBS11	Fundamentals of Engineering Mathematics-1	02	--	01	02	--	01	03
Basic Science Course (BS)	NBS12	Engineering Physics	02	02	–	02	01	--	03
Engineering Science Course (ES)	NES11	Engineering Mechanics	02	--	–	02	--	--	02
Engineering Science Course (ES)	NES12	Engineering Drawing	–	02 (DH)+ 02(AutoCAD)	–	–	02	--	02
Engineering Science Course (ES)	NES13	Basic Electrical Engineering	03	02	–	03	01	--	04
Indian Knowledge System (IK)	NIK11	Fundamentals of Vedic Mathematics	02	--	–	02	--	--	02
Value Education (VE)	NVE11	Universal Human Values-1	02	--	--	02	--	--	02
Vocational/Skill Enhancement course (VS)	NVS11	Python Programming Lab	--	02*+02	–	--	02	--	02
Co curricular Activity (CC)	NCC11	Co curricular Course (NSS)	--	04	--	–	02	--	02
Total Credits									22

Tutorials to be conducted batchwise

** Instructions should be conducted for the entire class*

Vivekanand Education Society's
Institute of Technology

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Department of Humanities and Applied Sciences

Semester II Scheme Group A (CMPN & INFT)									
Course Type	Course code	Course Name	Teaching Scheme (Contact hrs)			Credits Assigned			
			Th	Pr	Tut	Th	Pr	Tut	Total
Basic Science Course (BS)	NBS21	Fundamentals of Engineering Mathematics-2	02	--	01	02	--	01	03
Basic Science Course (BS)	NBS23	Engineering Chemistry	02	02	–	02	01	--	03
Basic Science Course (BS)	NBS24	Biology for Engineers	02	--	–	02	--	--	02
Engineering Science Course (ES)	NES24	Fundamentals of Programming (C/Java)	03	02	–	03	01	--	04
Programme Core Course (PC)	NPC21	Programme Core Course	02	–	–	02	–	–	02
Ability Enhancement Course (AE)	NAE11	Professional Communications and Ethics-I	01	--	02	01	--	01	02
Value Education (VE)	NVE22	Universal Human Values-2	02	--	--	02	--	--	02
Vocational/Skill Enhancement course (VS)	NVS22	Basic Workshop Practice	–	04	–	–	02	–	02
Co curricular Activity (CC)	NCC22	Co curricular Course (NSS)	--	04	--	–	02	--	02
Total Credit									22

Tutorials to be conducted batchwise

** Instructions should be conducted for the entire class*

NPC21-Programme Core Course for CMPN & INFT

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Department of Humanities and Applied Sciences

Semester I Marks Scheme Group A (CMPN & INFT)								
Course Type	**Course code**	**Course Name**	**TH**	**MT**	**CA**	**TW**	**PR/ OR**	**Total**
Basic Science Course (BS)	NBS11	Fundamentals of Engineering Mathematics-1	60	20	20	--	–	100
Basic Science Course (BS)	NBS12	Engineering Physics	60	20	20	25	–	125
Engineering Science Course (ES)	NES11	Engineering Mechanics	60	20	20	--	–	100
Engineering Science Course (ES)	NES12	Engineering Drawing	–	–		25	25	50
Engineering Science Course (ES)	NES13	Basic Electrical Engineering	60	20	20	25	–	125
Indian Knowledge System (IK)	NIK11	Fundamentals of Vedic Mathematics	–	–	20	--	–	20
Value Education (VE)	NVE11	Universal Human Values-1	-	-	20	--	–	20
Vocational/Skill Enhancement course (VS)	NVS11	Python Programming Lab	–	–	–	25	–	25
Co curricular Activity (CC)	NCC11	Co curricular Course (NSS)	–	–	–	–	25	25
Total Marks								**590**

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Department of Humanities and Applied Sciences

Semester II Marks Scheme Group A (CMPN & INFT)								
Course Type	**Course code**	**Course Name**	**TH**	**MT**	**CA**	**TW**	**PR/ OR**	**Total**
Basic Science Course (BS)	NBS21	Fundamentals of Engineering Mathematics-2	60	20	20	--	–	100
Basic Science Course (BS)	NBS23	Engineering Chemistry	60	20	20	25	–	125
Basic Science Course (BS)	NBS24	Biology for Engineers	60	20	20	--	–	100
Engineering Science Course (ES)	NES24	Fundamentals of Programming (C/Java)	60	20	20	25	–	125
Programme Core Course (PC)	NPC21	Programme Core Course	60	20	20	–	–	100
Ability Enhancement Course (AE)	NAE21	Professional Communications and Ethics-I	–	20	80	--	–	100
Value Education (VE)	NVE22	Universal Human Values-2	-	-	20	--	–	20
Vocational/Skill Enhancement course (VS)	NVS22	Basic Workshop Practice	–	–	–	50	–	50
Co curricular Activity (CC)	NCC22	Co curricular Course (NSS)	–	–	–	–	25	25
Total Marks								**745**

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Institute of Technology
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Department of Humanities and Applied Sciences

Semester I

Syllabus

Group A

Computer Engineering

Information Technology

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Department of Humanities and Applied Sciences

COURSE NAME : FUNDAMENTALS OF ENGINEERING MATHEMATICS-1

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NBS11	Fundamentals of Engineering Mathematics-1 (Theory)	02	---	01*	02	---	01	03

Fundamentals of Engineering Mathematics-1(Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NBS11	Fundamentals of Engineering Mathematics-1 (Theory)	02	---	01	02	---	01	03

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NBS11	Fundamentals of Engineering Mathematics-1 (Theory)	20	20	60	---	---	100

Tutorials to be conducted batchwise

Vivekanand Education Society's
Institute of Technology

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Department of Humanities and Applied Sciences

Course Prerequisite: Matrices and Matrix Operations,Algebraic Properties of Matrices,Method for Finding inverse of a matrix- By elementary transformation and by adjoint of a matrix, Types of real matrices, Basics of Differentiation,Basics of Differential Equations	
Course Objectives:	
1	To provide students with contemporary knowledge about different types of Matrices and their Ranks
2	To learn about concept and applications of complex numbers
3	To explore the solution methods using Partial derivatives and its concepts.
4	To apply concept of Partial differentiation to find extreme values of a function
5	To learn about solution methods of first order and first degree ordinary differential equations
Course Outcomes:	
1	Students would develop the ability to understand and work with real and complex matrices, their properties, ranks and apply these concepts to solve problems in various fields.
2	Students should be introduced to complex functions and their properties. Also understand the concept of using De' Moivre's application to find roots and power of complex numbers.
3	Students are able to gain an overview of partial derivatives which is used for solving various engineering problems.
4	Student would develop the ability to apply concept of partial differentiation to find extreme values of a function.
5	Students would develop the ability to analyze and solve first order and first degree ordinary differential equations, apply mathematical techniques to interpret the solutions in the context of the problem.

Module		Content	Hrs
1		**Matrices and its application**	**8**
	1.1	**Real and Complex Matrices**: Orthogonal Matrices, Symmetric Matrices, Skew-symmetric matrices, Hermitian, Skew-hermitian Unitary matrices (Properties and Examples)	

Department of Humanities and Applied Sciences

	1.2	**Rank of a Matrix:** Elementary Matrices ,rank of a matrix by Echelon form and Normal form,Inverse by PAQ Method	
	1.3	Introduction to Non- Homogeneous Systems of Linear Equations: consistency and solution	
	1.4	Introduction to Systems of Homogeneous Linear Equations: consistency and solution	
2		**Complex Number I**	**12**
	2.1	Powers and Roots of complex numbers (Applications of De' Moivre's theorem)	
	2.2	Circular and Hyperbolic Functions of Complex Numbers, logarithm of complex number, Separation into real and imaginary parts for all functions	
3		**Partial Derivatives**	**6**
	3.1	Functions of Several Variables,Partial Derivatives,The Chain Rule	
	3.2	Euler's theorems on homogeneous functions with two independent variables with proof deductions from Euler's theorem and examples (Two variables)	
4		**Applications of Partial Differentiation**	**2**
	4.1	Extreme Values and Saddle Points, Maxima and Minima	
5		**Differential Equations of first order and first degree**	**6**
	5.1	Exact differential equations,Equations reducible to exact equations by integrating factors.	
	5.2	Linear differential equations, Equation reducible to linear form, Bernoulli's equation.	
		Total	**34**

Vivekanand Education Society's
Institute of Technology

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Department of Humanities and Applied Sciences

Textbooks:	
1	R.K.Jain and S.R.K.Iyengar "Advanced Engineering Mathematics",Alpha science International Ltd.
2	Advanced Engineering Mathematics, H.K Dass,S. Chand Publications
Reference Books:	
1	Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, Inc
2	B.S. Grewal, " Higher Engineering Mathematics",Khanna Publication
3	George B. Thomas, Weir & Hass, "Thomas' Calculus",Pearson
4	George F. Simmons, "Differential Equations with Application", Tata Mc. Graw Hill Edition
5	Howard Anton, Chris Rorres,"Elementary Linear Algebra",wiley Publication

Internal Assessment:

1) Assessment consists of one Mid Term Test of 20 marks and Continuous Assessment of 20 marks.
2) Mid Term test is to be conducted when approx. 50% syllabus is completed.
3) Duration of the midterm test shall be one hour.

Continuous Assessment:

Continuous Assessment is of 20 marks. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

Sr. No	Rubrics	Marks
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks
3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks

7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

End Semester Theory Examination:	
1	Question paper will be of 60 marks
2	Question paper will have a total of five questions
3	All questions have equal weightage and carry 20 marks each
4	Any three questions out of five need to be solved.

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Institute of Technology

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Department of Humanities and Applied Sciences

COURSE NAME: ENGINEERING PHYSICS

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NBS12	Engineering Physics (Theory)	02	---	---	02	---	---	02
NBS12	Engineering Physics (Lab)	---	02	---	---	01	---	01

Engineering Physics (Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NBS12	Engineering Physics (Theory)	02	---	---	02	---	---	02

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NBS12	Engineering Physics (Theory)	20	20	60	---	---	100

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Institute of Technology

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Department of Humanities and Applied Sciences

Pre- requisites for the course: HSc. level Physics	
Course Objectives:	
1	To provide inclusive knowledge and skill, necessary for solving problems in the engineering field
2	To provide inclusive knowledge and skill, necessary for venturing in the research field.
Course Outcomes:	
1	Learners will be able to understand the foundation of quantum mechanics and how to solve problems in different areas of modern technology
2	Learners will be able to understand the basics and different applications of differently conducting materials like semiconductors and supercapacitors
3	Learners will be able to understand the foundation of fiber optics and their applications in the areas of communication, medical science and instrumentation
4	Learners will be able to interpret and explore basic sensing techniques for physical measurements in modern instrumentations

Engineering Physics (Lab)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tut	Total
NBS12	Engineering Physics (Lab)	---	02	---	---	01	---	01

Course Code	Course Name	Examination Scheme					
		Theory					
		Internal Assessment		End Sem Exam	Term Work	Practical & Oral	Total
		Mid-Term Test	Continuous Assessment				
NBS12	Engineering Physics (Lab)	---	---	---	25	–	25

Vivekanand Education Society's
Institute of Technology

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Department of Humanities and Applied Sciences

Lab Objectives:	
1	To get practical knowledge of the theory learnt and develop experimental skills.
2	To comprehend the importance of precision, accuracy, errors and analyze experimental results.
Lab Outcomes: After successful completion of the course students will be able to:	
1	Learners will be able to understand the dependance of photo current on frequency and intensity of light
2	Learners will be able to understand the efficiency of Supercapacitor in terms of charging and discharging time.
3	Learners will be able to understand the directionality of He-Ne LASER
4	Learners will be able to understand the functioning of photo diode and Hall effect set up as sensor for light and magnetic field respectively.

Engineering Physics (Theory)

Module	Content	Hrs
1	**QUANTUM MECHANICS:** Inadequacy of classical theory; de Broglie hypothesis of matter waves and its experimental verification; Wave packet, group velocity and phase velocity; Heisenberg Uncertainty principle, Thought experiments and applications of HUP, Wave function and its physical interpretation; Schrodinger's time dependent and time independent wave equation; Free particle: finite potential well (qualitatively)	8
2	**DIFFERENTLY CONDUCTING MATERIALS:** **Semiconductors**: Band theory, Direct and Indirect band gap semiconductor; FD distribution function; Fermi energy level in conductors and semiconductor; Intrinsic semiconductors: energy band diagram, Expression for Fermi level; Effective mass; Intrinsic carrier concentration, mobility & conductivity, Extrinsic semiconductors: Fermi energy level, Expression & position; Effect of impurity concentration & temperature on the Fermi level and carrier concentration; Law of mass action, minority charge carrier concentration. Formation of depletion region & potential barrier in a p-n junction, Drift & Diffusion of charge carriers across p-n junction, Drift & Diffusion current density, Energy band diagram & current	9

	densities in unbiased, forward & reverse biased p-n junction. **Supercapacitors:** Principle, construction, materials and applications, Comparison with capacitor and batteries : Energy density, Power density.	
3	**FIBRE OPTICS:** **FIBRE OPTICS:** Working principle, structure & material, advantage; Critical angle; Acceptance angle; Numerical aperture; fractional change in R.I., Modes of propagation, Single & Multimode fiber, R.I. profile – Step & Graded Index fiber; V Number, Allowed modes, Applications – Fiber optic communication system	**4**
4	**PHYSICS OF SENSOR:** Optical sensors: Photodiode, Photoresistor, Solar cell; (construction and uses) Magnetic sensor**:** Principle of Hall effect, Application Mechanical sensors: Concept of piezoelectricity, Applications	**3**
	Total	**24**

Reference Books:	
R1	A text book of Engineering Physics-Avadhanulu & Kshirsagar, S. Chand
R2	Engineering Physics- D. K. Bhattacharya and Poonam Tandon, Oxford Publications
R3	Engineering Physics- H. K. Malik, A. Singh, McGraw Hill
R4	Concepts of Modern Physics- ArtherBeiser, Tata McGraw Hill
R5	Introduction to Solid State Physics- C. Kittle, John Wiley& Sons
R6	Semiconductor Physics and Devices: S. M. Sze, Wiley
R7	Ultracapacitors: The future of energy storage- R.P Deshpande, McGraw Hill
R8	Handbook of Modern Sensors Physics design and application-Jacob Fraden, Springer, AIP press

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Institute of Technology

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Department of Humanities and Applied Sciences

Internal Assessment:

1) Assessment consists of one Mid Term Test of 20 marks and Continuous Assessment of 20 marks.
2) Mid Term test is to be conducted when approx. 50% syllabus is completed.
3) Duration of the midterm test shall be one hour.

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

Sr. No	Rubrics	Marks
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks
3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks
7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

End Semester Theory Examination:	
1	Question paper will be of 60 marks
2	Question paper will have a total of five questions
3	All questions have equal weightage and carry 20 marks each
4	Any three questions out of five needs to be solved.

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Institute of Technology

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Department of Humanities and Applied Sciences

Engineering Physics (Lab)

Suggested Experiments: Students are required to complete at least 10 experiments.	
Star (*) marked experiments are compulsory.	
Sr. No.	**Name of the Experiment**
1	Determination of 'h' using Photo cell.
2	Determination of energy band gap of semiconductor
3	Study of Hall Effect
4	Study of PT100 calibration and use as thermometer.
5	Determination of Numerical Aperture of an optical fiber.
6	Study of I-V characteristics of Photo diode.
7	Charging and discharging characteristics of supercapacitor.
8	Study of divergence of laser beam
9	Determination of number of lines on the grating surface using LASER Source.
10	Determination of radius of curvature of a lens using Newton's ring set up
11	Determination of diameter of wire/hair or thickness of paper using Wedge shape film method.
12	Determination of wavelength using Diffraction grating. (Hg/Na source)

Note: Suggested List of Experiments is indicative. However, flexibilities lie with individual course instructor to design and introduce new, innovative and challenging experiments, (limited to maximum 30% variation to the suggested list) from within the curriculum, so that, the fundamentals and applications can be explored to give greater clarity to the students and they can be motivated to think differently.

Term Work:	
1	Term work should consist of 10 experiments.
2	The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.
3	Total 25 Marks (Experiments: 15-marks, Term work Assessment: 10-marks)

Vivekanand Education Society's
Institute of Technology

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Department of Humanities and Applied Sciences

COURSE NAME: ENGINEERING MECHANICS

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NES11	Engineering Mechanics (Theory)	02	---	---	02	---	---	02

Engineering Mechanics (Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NES11	Engineering Mechanics (Theory)	02	---	---	02	---	---	02

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NES11	Engineering Mechanics (Theory)	20	20	60	---	---	100

Vivekanand Education Society's
Institute of Technology

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Department of Humanities and Applied Sciences

Course Objectives:	
1	To create a strong foundation in basic principles of statics and to apply the knowledge to analyze and solve engineering problems involving different systems of forces, static equilibrium etc.
2	To understand the principles and methods used to analyze the motion and behavior of particles and rigid bodies without the influence of forces.
Course Outcomes:	
1	Understand and analyze the behavior of multiple forces acting in a single plane.
2	Understand the conditions for a body to be in a state of equilibrium and to analyze and solve problems related to the equilibrium.
3	Understand and predict motion, analyze velocity and acceleration, characterize different types of motion without consideration of mass of the body.
4	Do kinematic analysis of linkages and mechanisms by locating instantaneous center of rotation.

Engineering Mechanics (Theory)

Module	Content	Hrs
1	**System of Coplanar Forces:** Classification of force systems, Principle of transmissibility, composition and resolution of forces. Resultant of coplanar force system (Concurrent forces, parallel forces and non-concurrent Non-parallel system of forces). Moment of force about a point, Couples, Varignon's Theorem. Force couple system. Distributed Forces in plane.	**06**
2	**Equilibrium of System of Coplanar Forces:** Equilibrium concept, Conditions of equilibrium for concurrent forces, parallel forces and non-concurrent non- parallel general forces and Couples. Free body diagrams. Equilibrium of rigid bodies. Types of beams, simple and compound beams, type of supports and reaction. Determination of reactions at supports for various types of loads on beams. (Excluding problems on internal hinges)	**08**

3	**Kinematics of Particle:** Motion of particles with variable acceleration. Motion curves. Application of concepts of projectile motion and related numerical. Motion under gravity.	**06**
4	**Kinematics of Rigid Body (Instantaneous center of rotation):** Translation, Rotation and General Plane motion of Rigid body. The concept of Instantaneous center of rotation (ICR) for the velocity. Location of ICR for up to 3 links mechanisms. Velocity analysis of rigid bodies using ICR.	**04**
	Total	**12**

Text Books:	
1	Engineering Mechanics by M.D. Dayal
Reference Books:	
1	Engineering Mechanics by K.K. Tayal

Internal Assessment:

1) Assessment consists of one Mid Term Test of 20 marks and Continuous Assessment of 20 marks.
2) Mid Term test is to be conducted when approx. 50% syllabus is completed.
3) Duration of the midterm test shall be one hour.

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

Sr. No	Rubrics	Marks
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks
3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks

7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

End Semester Theory Examination:	
1	Question paper will be of 60 marks
2	Question paper will have a total of five questions
3	All questions have equal weightage and carry 20 marks each
4	Any three questions out of five need to be solved.

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Department of Humanities and Applied Sciences

COURSE NAME: ENGINEERING DRAWING

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NES12	Engineering Drawing (Lab)	---	02 (DH)+ 02(AutoCAD)	---	---	02	---	02

Engineering Drawing (Lab)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tut	Total
NES12	Engineering Drawing (Lab)	---	02 (DH)+ 02(AutoCAD)	---	---	02	---	02

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NES12	Engineering Drawing (Lab)	---	---	---	25	25	50

Note: 2 Hrs Drawing Hall & 2 Hrs Auto CAD Pr.

Lab Objectives:	
1	To impart and inculcate proper understanding of the theory of projection, the knowledge of reading a drawing and to improve the visualization skill.
Lab Outcomes	
1	Apply the basic principles of projections in converting 3-D view to 2-D drawing with and without section.
2	Read a given drawing and visualize a 3-D object from the given two or three views.

Vivekanand Education Society's
Institute of Technology

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Department of Humanities and Applied Sciences

Sr No.	Topic	No. of Hrs.
1	**Orthographic Projections:** Fundamentals of orthographic projections. Different views of a simple machine part as per the first angle projection method recommended by I.S.	08
2	**Sectional Orthographic Projections:** Basic concept and significance of sectional orthographic projections. Full sectional view of simple machine parts (Excluding half section).	08
3	**Isometric Views:** Isometric Views, Conversion of Orthographic Views to Isometric Views (Excluding Sphere and circle on an inclined plane).	08
	Total Hours	24

Examination Scheme :

Assessment Tool	Way to Conduct	Marks
Term Work	1. Engineering Drawing A3 size Assignment Sheets -**10 Marks** 2. AutoCAD assignments to be printed on A4 size sheets - **10 Marks** 3. Attendance -**5 Marks**	**25 Marks**
Practical Examination	1. Solve 2 compulsory questions. 2.Question on Orthographic Projection / Sectional Orthographic Projection - 15 Marks 3. Question on Isometric Projection- 10 Marks 4. Should be conducted for 2 Hours.	**25 Marks**

Vivekanand Education Society's
Institute of Technology

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Department of Humanities and Applied Sciences

COURSE NAME: BASIC ELECTRICAL ENGINEERING

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NES13	Basic Electrical Engineering (Theory)	03	---	---	03	---	---	03
NES13	Basic Electrical Engineering (Lab)	---	02	---	---	01	---	01

Basic Electrical Engineering (Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NES13	Basic Electrical Engineering (Theory)	03	---	---	03	---	---	03

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NES13	Basic Electrical Engineering (Theory)	20	20	60	---	---	100

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Institute of Technology

(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Department of Humanities and Applied Sciences

Prerequisite: Resistance, inductance, capacitance, series and parallel connections of resistance, concepts of voltage, current, power and energy and its units. Working of wattmeter, Magnetic circuits, MMF, Magnetic field strength, reluctance, series and parallel magnetic circuits, BH Curve, Time domain analysis of first order RL and RC circuits	
Course Objectives:	
1	To provide knowledge on fundamentals of DC circuits and single phase and three phase AC circuits and its applications.
2	To inculcate knowledge on the basic operation and performance of 1-Φ transformers.
3	To provide knowledge on fundamentals of DC and AC machines.
Course Outcomes:	
1	Apply various network theorems to determine the circuit response / behavior.
2	Evaluate and analyze 1-Φ circuits.
3	Evaluate and analyze 3-Φ AC circuits.
4	Understand the constructional features and operation of 1-Φ transformer
5	Illustrate the working principle of a DC machine.
6	Illustrate the working principle of AC machines.

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Institute of Technology

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Department of Humanities and Applied Sciences

Basic Electrical Engineering (Lab)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tut	Total
NES13	Basic Electrical Engineering (Lab)	---	02	---	---	01	---	01

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NES13	Basic Electrical Engineering (Lab)	---	---	---	25	–	25

Lab Objectives:	
1	To impart the basic concept of network analysis and its application.
2	To provide the basic concept of ac circuits analysis and its application.
3	To illustrate the operation of machines and transformer.
Lab Outcomes	
1	Interpret and analyze the behavior of DC circuits using network theorems.
2	Perform and infer experiment on single phase AC circuits.
3	Demonstrate experiment on three phase AC circuits.
4	Illustrate the performance of single-phase transformer and machines.

Vivekanand Education Society's
Institute of Technology

(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Department of Humanities and Applied Sciences

Basic Electrical Engineering (Theory)

Module		Content	Hrs
1		**DC Circuits**	12
	1.1	(Only independent source) Ideal and practical Voltage and current Sources, Source Transformation, Kirchhoff's Laws,	
	1.2	Star-Delta / Delta-Star Transformation, Mesh and Nodal Analysis.	
	1.3	Superposition, Thevenin's Theorem	
	1.4	Norton's Theorem and Maximum Power Transfer Theorem.	
2		**AC Circuits**	12
	2.1	Generation of alternating voltage, basic definitions, average and rms values, phasor and phase difference, sums on phasors.	
	2.2	Single-phase ac series and parallel circuits consisting of R, L, C, RL, RC, RLC combinations, Definitions - real, reactive and apparent power, admittance (Y), Series and parallel resonance, Q factor.	
3		**Three Phase Circuits**	5
	3.1	Generation of Three-Phase Voltages, voltage & current relationships in Star and Delta Connections,	
	3.2	Power measurement in three phase balanced circuit(Only two wattmeter method).	
4		**Transformers**	5
	4.1	Working principle of single-phase transformer, EMF equation of a transformer, Transformer losses	
	4.2	Actual (practical) and ideal transformer, Phasor diagram (considering winding resistance and magnetic leakage) Equivalent circuit. Open-circuit test (no-load test), short circuit (SC) test, efficiency.	
5		**DC Machines**	3

	5.1	Principle of operation of DC generators and DC motors, constructional details, and classification of DC machines, e.m.f. equation of generator/motor, applications.	
6		**AC Machines**	**2**
	6.1	Rotating magnetic field produced by three phase ac, principle of operation of Three-phase induction motor, constructional details, and classification of Induction machines.	
Self-study Topic		Introduction to type of Batteries, Lithium-ion and Lead Acid Batteries, Charging and Discharging, Application.	
		Total	**39**

Text Books:	
1	V. N. Mittal and Arvind Mittal "Basic Electrical Engineering" Tata McGraw Hill, (Revised Edition)
2	Vincent Del Toro "Electrical Engineering Fundamentals", PHI Second edition, 2011
3	Edward Hughes "Hughes Electrical and Electronic Technology", Pearson Education (Tenth edition)
4	D P Kothari and I J Nagrath, "Theory and Problems of Basic Electrical Engineering", PHI 13th edition 2011.
5	M. Naidu, S. Kamakshaiah "Introduction to Electrical Engineering" McGraw-Hill Education, 2004
6	B.R Patil "Basic Electrical Engineering" Oxford Higher Education
Reference Books:	
1	B. L. Theraja "Electrical Engineering " Vol-I and II.
2	S. N. Singh, "Basic Electrical Engineering" PHI , 2011Book

Internal Assessment:

1) Assessment consists of one Mid Term Test of 20 marks and Continuous Assessment of 20 marks.
2) Mid Term test is to be conducted when approx. 50% syllabus is completed.
3) Duration of the midterm test shall be one hour.

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Department of Humanities and Applied Sciences

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

Sr. No	Rubrics	Marks
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks
3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks
7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

End Semester Theory Examination:	
1	Question paper will be of 60 marks
2	Question paper will have a total of five questions
3	All questions have equal weightage and carry 20 marks each
4	Any three questions out of five need to be solved.

Vivekanand Education Society's
Institute of Technology

(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Department of Humanities and Applied Sciences

Basic Electrical Engineering (Lab)

Suggested Experiments: Students are required to complete at least 10 experiments.	
Star (*) marked experiments are compulsory.	
Sr. No.	**Name of the Experiment**
1	Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors, and inductors.
2	To measure output voltage across load resistor/current through load resistor and verify the result using Mesh and Nodal analysis.
3	Verification of Superposition Theorem.
4	Verification Thevenin's Theorem/ Norton's Theorem.
5	Verification Maximum Power Transfer Theorem.
6	To find resonance conditions in a R-L-C series resonance circuit
7	To find resonance conditions in a R-L-C parallel resonance circuit.
8	To measure relationship between phase and line, currents and voltages in three phase system (star & delta)
9	To measure Power and phase in three phase system by two wattmeter method.
10	To find the equivalent circuit parameters by conducting OC and SC test on single phase transformer.
11	To demonstrate cut-out sections of DC machine.
12	To study AC machine.

Note: Suggested List of Experiments is indicative. However, flexibilities lie with individual course instructor to design and introduce new, innovative and challenging experiments, (limited to maximum 30% variation to the suggested list) from within the curriculum, so that, the fundamentals and applications can be explored to give greater clarity to the students and they can be motivated to think differently.

Term Work:	
1	Term work should consist of 10 experiments.
2	The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.
3	Total 25 Marks (Experiments: 15-marks, Term work Assessment: 10-marks)

Vivekanand Education Society's
Institute of Technology

(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Department of Humanities and Applied Sciences

COURSE NAME : FUNDAMENTALS OF VEDIC MATHEMATICS

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NIK11	Fundamentals of Vedic Mathematics (Theory)	02	---	---	02	---	---	02

Fundamentals of Vedic Mathematics (Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NIK11	Fundamentals of Vedic Mathematics (Theory)	02	---	---	02	---	---	02

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NIK11	Fundamentals of Vedic Mathematics (Theory)	---	20	---	---	---	20

Vivekanand Education Society's
Institute of Technology

(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Department of Humanities and Applied Sciences

Course Objectives:	
1	Students will gain an understanding of the origins, history, and philosophy behind Vedic Mathematics, which is based on ancient Indian mathematical techniques found in the Vedas.
2	They will develop skills to perform arithmetic operations such as addition, subtraction quickly and efficiently.
3	They will learn various techniques to perform multiplication with any number of digits using vedic sutras and also learn to perform multiplication in algebra to solve equations
4	They will learn various techniques to find square and square roots of any number of digits using vedic sutras
5	They will learn various techniques to find cube a,fourth power ,cube roots and fourth root of any number of digits using vedic sutras
Course Outcomes:	
1	Students will develop the ability to perform mathematical calculations mentally and quickly using Vedic techniques.
2	Students will enhance their mental math skills and be able to perform arithmetic operations such as addition, subtraction, multiplication, and division mentally, without relying heavily on paper and pen.
3	They will learn to apply Vedic sutras and methods to solve a wide range of mathematical problems, including algebraic equations.
4	They will be able to break down complex problems into simpler steps and apply Vedic techniques to arrive at solutions more easily.
5	They will learn alternative approaches and multiple methods to solve mathematical problems, fostering creativity and adaptability in their problem-solving approach.

Vivekanand Education Society's
Institute of Technology

(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Department of Humanities and Applied Sciences

Module		Content	Hrs
1		**History and evolution of Vedic Mathematics**	1
	1.1	Historical facts about Vedic Mathematics	
	1.2	Sutras and sub sutras of Vedic Mathematics	
2		**Vedic sutras for addition and subtraction**	4
	2.1	Addition using dot method **(Vedic sutras:Ekadhikenpurvena)**	
	2.2	Addition without carrying **(Vedic sutras: Purnapurnabhyam,sankalan vyavkalanabhyam)**	
	2.3	Subtractions using all from 9 last from 10 **(Vedic sutras:Nikhilam Navatascaramam dasatah, Vinculum method)**	
	2.4	Subtraction using digit separator method (general Method)	
3		**Vedic sutras for multiplication**	10
	3.1	Multiplication by dot and stick method(General Method) **(Vedic sutras:Urdhva triyang [Vertically and crosswise])**	
	3.2	Multiplication when numbers are very close to base (all cases) **(Vedic sutras:Nikhilam Navatashcaramam dashatah)**	
	3.3	Multiplication based on **vedic sutra Antyayordashakepi and Antyayoshatakepi**	
	3.4	Multiplication when numbers are very far from the base (all cases) **(Vedic sutras:Anurupyena)**	
	3.5	Multiplication of three and four numbers	
	3.6	Multiplication by series of 9 and series of 1	
	3.7	Multiplication by observation	
	3.8	Multiplication of binomial equation	

	3.9	Multiplication of algebraic polynomials	
4		**Square and Square Root**	**6**
	4.1	Vedic Methods of finding squares:- 1. Ekadhikena Purvena 2. Yavadunam Tavduni kritya vargena Yojayet 3. Urdhva Tiryagbhyam 4. Duplex method	
	4.2	Vilokanam and Duplex Vedic Method of finding square root	
5		**Cube ,Cube root, Fourth Power of a number and Fourth root of a number**	**6**
	5.1	Vedic Methods of finding cubes:- Yavadunam Anurupyena Nikhilam	
	5.2	Vilokanam and Beejank for finding the cube root of any number	
	5.3	Pascal triangle, the method of finding the fourth power of a number	
	5.4	Vilokanam method for finding out the fourth root of number .	
		Total	**27**

Text Books:	
1	Vedic MathematicsBy Jagadguru Sankracharya Bharti krishna Tirthaji Maharaj
2	The Essentials of vedic mathematics by Rajeshkumar thakur, Rupa Publication
Reference Books:	
1.	Advanced vedic mathematics by Rajeshkumar thakur, Rupa publication
2	Vedic Mathematics made easy by Dhaval bhatia, Jaico publishing house
3.	Vedic Mathematics:Sixteen simple Mathematical formulas from Vedas, Bharti krishna Tirthaji Maharaj, Motilal Banarsidass Publishers Pvt Ltd.

Vivekanand Education Society's
Institute of Technology

(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Department of Humanities and Applied Sciences

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

Sr. No	Rubrics	Marks
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks
3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks
7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

Vivekanand Education Society's
Institute of Technology

(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Department of Humanities and Applied Sciences

COURSE NAME : UNIVERSAL HUMAN VALUES-1

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NVE11	Universal Human Values-1 (Theory)	02	---	---	02	---	---	02

Universal Human Values 1 (Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NVE11	Universal Human Values-1 (Theory)	02	---	---	02	---	---	02

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NVE11	Universal Human Values-1 (Theory)	---	20	---	---	---	20

Course Objectives:	
1	Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2	Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence

3	Strengthening of self-reflection.
4	Development of commitment and courage to act.
Course Outcomes:	
1	Understanding of natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking
2	Understanding the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation.

Module		Content	Hrs
1		**Course Introduction - Need, Basic Guidelines, Content and Process for Value Education**	
	1.1	Purpose and motivation for the course, recapitulation from Universal Human Values-I	1
	1.2	Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' Continuous Happiness and Prosperity-Right understanding	1
	1.3	Continuous Happiness and Prosperity-Right understanding	1
	1.4	Relationship and Physical Facility	1
	1.5	Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario	1
	1.6	Method to fulfill the above human aspirations: understanding and living in harmony at various levels.	1
2		**Understanding Harmony in the Human Being - Harmony in Myself!**	
	2.1	Understanding human being as a co-existence of the sentient 'I' and the material 'Body'	1
	2.2	Understanding the needs of Self ('I') and 'Body' - happiness and physical	1

		facility	
	2.3	Understanding the Body as an instrument of 'I' ,Understanding the characteristics and activities of 'I' and harmony in 'I'	1
	2.4	Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail	1
		Total	**10**

Mode of Conduction

Lectures hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.

practice sessions for analyzing and discussing the topic, help the students explore the important or critical elements.

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

Sr. No	Rubrics	Marks
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks
3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks
7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

Vivekanand Education Society's
Institute of Technology

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Department of Humanities and Applied Sciences

COURSE NAME: PYTHON PROGRAMMING LAB

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NVS11	Python Programming (Lab)	---	02*+02	---	---	02	---	02

Python Programming (Lab)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tut	Total
NVS11	Python Programming (Lab)	---	02*+02	---	---	02	---	02

Course Code	Course Name	Examination Scheme					
		Theory					
		Internal Assessment		End Sem Exam	Term Work	Practical & Oral	Total
		Mid-Term Test	Continuous Assessment				
NES12	Python Programming (Lab)	---	---	---	25	---	25

** Instructions should be conducted for the entire class*

Vivekanand Education Society's
Institute of Technology

(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Department of Humanities and Applied Sciences

Lab Objectives: The course aims to introduce following python concepts to the learner	
1	Basics of python including data types, operator, conditional statements, looping statements, input and output functions in Python.
2	List, tuple, set, dictionary, string, array and functions.
3	Object Oriented Programming concepts in python.
4	Concepts of packages, multithreading and exception handling.
5	TFile handling and Graphical User Interface.
6	Database programming and Data visualization.
Lab Outcomes: On successful completion, of course, learner/student will be able to:	
1	Understand the structure, syntax, and semantics of the Python language.
2	Interpret advanced data types and functions in python.
3	Illustrate the concepts of object-oriented programming as used in Python.
4	Create Python applications using packages, multithreading and exception handling.
5	Gain proficiency in writing File Handling programs, also create GUI applications
6	Evaluate database operations in python and apply data visualization techniques.

Module	Content	Hrs
1	**Basics of Python**	**6**
	Introduction, Features, Python building blocks – Identifiers, Keywords, Indention, Variables and Comments, Basic data types, Operators, Control flow statements, Loops	
2	**Advanced data types & Functions**	**6**

	Lists, Tuples, Sets, Strings, Arrays, NumPy Functions:Built-in functions in python, Defining function, calling function, returning values, passing parameters, Nested and Recursive functions, Anonymous Functions (Lambda, Map Reduce)	
3	**Object Oriented Programming**	**8**
	Overview of Object-oriented programming, Creating Classes and Objects, Self-Variable, Constructors, Inner class, Static method, Namespaces. Inheritance: Types of Inheritance: Single, Multiple, Multi-level, Hierarchical, Super method, Constructors in inheritance, operator overloading, Method overloading, Method overriding, Abstract class, Abstract method, Interfaces.	
4	**Packages, multithreading and exception handling**	**6**
	Packages: creating user defined packages and importing packages. Multi-threading: process vs thread, use of threads, types of threads, creating threads in python.. Exception handling: Compile time errors, Runtime errors, exceptions, types of exception, try statement, except block, raise statement, Assert statement, User-Defined Exceptions.	
5	**File handling and GUI**	**6**
	File Handling: Opening file in different modes, closing a file, writing to a file, accessing file contents using standard library functions, reading from a file Renaming and Deleting a file, File Exceptions, Pickle. Graphical user interface: different GUI tools in python (Tkinter, PyQt, Kivy etc.), Working with containers, Canvas, Frame, Widgets (Button, Label, Text, Scrollbar, Check button, Radio button, Entry, Spinbox, Message)	
6	**Database Programming and Data visualization**	**2**
	Connecting GUI with databases to perform CRUD operations. (on supported databases like SQLite, MySQL, Oracle, PostgreSQL etc.). Visualization using Matplotlib: Matplotlib with Numpy, working with plots (line plot, bar graph, histogram, scatter plot, area plot, pie chart etc.), working with multiple figures.	
	Total Hrs	**34**

Textbooks:	
1	Dr. R. Nageswara Rao," Core Python Programming", Dreamtech Press, Wiley Publication

2	M. T. Savaliya , R. K. Maurya, "Programming through Python", StarEdu Solutions.
3	E Balagurusamy, "Introduction to computing and problem-solving using python", McGraw Hill Publication.
4	Yashavant Kanetkar, "Let Us Python", BPB Pub
Reference Books:	
1	Zed A. Shaw, "Learn Python 3 the Hard Way", Zed Shaw's Hard Way Series.
2	Martin C. Brown," Python: The Complete Reference", McGraw-Hill Publication.
3	Paul Barry," Head First Python", 2nd Edition, O'Reilly Media, Inc.

Python Programming (Lab)

Suggested Experiments: Students are required to complete at least 10 experiments.	
Star (*) marked experiments are compulsory.	
Sr. No.	**Name of the Experiment**
1	Write python programs to understand ● Basic data types, Operators, expressions and Input Output Statements ● Control flow statements: Conditional statements (if, if...else, nested if) ● Looping in Python (while loop, for loop, nested loops)
2	Write python programs to understand ● Different List and Tuple operations using Built-in functions ● Built-in Set and String functions ● Basic Array operations on 1-D and Multidimensional arrays using Numpy ● Implementing User defined and Anonymous Functions
3	Write python programs to understand ● Classes, Objects, Constructors, Inner class and Static method ● Different types of Inheritance ● Polymorphism using Operator overloading, Method overloading, Method overriding, ● Abstract class, Abstract method and Interfaces in Python.
4	Write python programs to understand ● Creating user defined multithreaded application ● Creating a menu driven application covering built-in exceptions in python
5	Write python programs to understand ● Different File Handling operations in Python ● Designing Graphical user interface (GUI) using built-in tools in python (Tkinter, PyQt, Kivy etc.).
6	Write python programs to implement ● GUI database connectivity to perform CRUD operations in python (Use any one database like SQLite, MySQL, Oracle, PostgreSQL etc.)

	• Different types of plots using Numpy and Matplotlob

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

Sr. No	Rubrics	Marks
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks
3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks
7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

Note: Suggested List of Experiments is indicative. However, flexibilities lie with individual course instructor to design and introduce new, innovative and challenging experiments, (limited to maximum 30% variation to the suggested list) from within the curriculum, so that, the fundamentals and applications can be explored to give greater clarity to the students and they can be motivated to think differently.

Term Work:	
1	Term work should consist of 10 experiments.
2	The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.
3	Total 25 Marks (Experiments: 15-marks, Term work Assessment: 10-marks)

Vivekanand Education Society's
Institute of Technology

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Department of Humanities and Applied Sciences

COURSE NAME : CO CURRICULAR ACTIVITY(NSS)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NCC11	Co curricular Activity (NSS)	02	---	---	02	---	---	02

Co Curricular Activity

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NCC11	Co curricular Activity (NSS)	---	04	---	---	02	---	02

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NCC11	Co curricular Activity (NSS)	---	---	---	---	25	25

In the first year curriculum, students are allocated 25 marks in each semester for engaging in social work . This initiative involves a range of activities such as cleaning college premises, participating in Kalash Yatra, tree plantation drives, beach cleaning campaigns, organizing cultural programs, attending yoga courses, environmental awareness programs, and more. These activities aim to instill a sense of social responsibility and civic engagement among students, fostering a well-rounded educational experience that goes beyond the classroom.

Vivekanand Education Society's
Institute of Technology
(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Department of Humanities and Applied Sciences

Semester II

Syllabus

Group A

Computer Engineering

Information Technology

Vivekanand Education Society's
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(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Department of Humanities and Applied Sciences

COURSE NAME : FUNDAMENTALS OF ENGINEERING MATHEMATICS-2

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NBS21	Fundamentals of Engineering Mathematics-2 (Theory)	02	---	01	02	---	01	03

Fundamentals of Engineering Mathematics-2(Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NBS21	Fundamentals of Engineering Mathematics-2 (Theory)	02	---	01	02	---	01	03

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NBS21	Fundamentals of Engineering Mathematics-2 (Theory)	20	20	60	---	---	100

Tutorials to be conducted batchwise

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Department of Humanities and Applied Sciences

Course Prerequisite: Coordinate Geometry (H.Sc. Level)	
Course Objectives:	
1	To learn about solution methods of higher order linear differential equations
2	To explore concepts of beta and Gamma functions
3	To provide students with complete understanding about the concept of double integration.
4	To learn about applications of multiple integration
5	To apply the concept of inverse of a matrix for coding and decoding of a message.
Course Outcomes:	
1	**Differential Equations**– Students would develop the ability to analyze and solve higher order linear differential equations, model real-world phenomena, apply mathematical techniques to solve differential equations, and interpret the solutions in the context of the problem**.**
2	**Improper Integrals**– Students should develop the ability to manipulate and simplify expressions involving the beta and gamma functions, utilizing properties and identities, and recognizing connections to other mathematical functions.
3	**Double Integral**–Students should be able to apply double integration to solve problems in various fields, such as physics, engineering, economics, and probability.
4	**Applications of Double Integrals**–Students should understand the geometric interpretation of double integrals,the approach for finding areas, volumes, centers of mass, moments of inertia, and computing average values and expected values in probability and statistics.
5	**Coding and Decoding:**Students should understand the application of inverse of a matrix to code and decode the message

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Department of Humanities and Applied Sciences

Module		Content	Hrs
1		**Higher order Linear Differential Equations with constant coefficient**	**10**
	1.1	Complementary function and particular integrals of differential equations of the type f(D)y = 0 (Homogeneous case)	
	1.2	Complementary function and particular integrals of differential equations of the type f(D)y = X (Nonhomogeneous case) where X is e^{ax}, sin (ax+b), cos (ax+b), x^n, $e^{ax}V$, xV.	
	1.3	Method of variation of parameters	
2		**Beta and Gamma function and Curve tracing**	**6**
	2.1	Beta and Gamma functions and its properties,Examples	
	2.2	Curve tracing	
3		**Double Integrals**	**12**
	3.1	Double and Iterated Integrals over Rectangles Double Integrals over General Regions	
	3.2	Double Integral by change of order	
	3.3	Double Integrals in Polar Form,Double integration by change of coordinates(Cartesian to polar)	
4		**Application of Double Integration:**	**2**
	4.1	Area and Mass by Double Integration	
5		**Coding and Decoding**	**4**
	5.1	Methods of Encoding and decoding	
	5.2	Hill Cipher coding and decoding using modulo function	
	5.3	Examples of coding and decoding.	
		Total	**34**

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Department of Humanities and Applied Sciences

Textbooks:	
1	R.K.Jain and S.R.K.Iyengar "Advanced Engineering Mathematics",Alpha science International Ltd.
2	Advanced Engineering Mathematics, H.K Dass,S. Chand Publications
Reference Books:	
1	Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, Inc
2	B.S. Grewal, " Higher Engineering Mathematics",Khanna Publication
3	George B. Thomas, Weir & Hass, "Thomas' Calculus",Pearson
4	George F. Simmons, "Differential Equations with Application", Tata Mc. Graw Hill Edition
5	Howard Anton, Chris Rorres,"Elementary Linear Algebra",wiley Publication

Internal Assessment:

1) Assessment consists of one Mid Term Test of 20 marks and Continuous Assessment of 20 marks.
2) Mid Term test is to be conducted when approx. 50% syllabus is completed.
3) Duration of the midterm test shall be one hour.

Continuous Assessment:

Continuous Assessment is of 20 marks. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

Sr. No	**Rubrics**	**Marks**
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks
3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks

6	GATE Based Assignment test/Tutorials etc	10 marks
7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

End Semester Theory Examination:	
1	Question paper will be of 60 marks
2	Question paper will have a total of five questions
3	All questions have equal weightage and carry 20 marks each
4	Any three questions out of five need to be solved.

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Department of Humanities and Applied Sciences

COURSE NAME: ENGINEERING CHEMISTRY

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NBS23	Engineering Chemistry (Theory)	02	---	---	02	---	---	02
NBS23	Engineering Chemistry (Lab)	---	02	---	---	01	---	01

Engineering Chemistry (Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NBS23	Engineering Chemistry (Theory)	02	---	---	02	---	---	02

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NBS23	Engineering Chemistry (Theory)	20	20	60	---	---	100

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Department of Humanities and Applied Sciences

Course Objectives:	
1	The course is aimed to develop the basic skills of engineering students that are imperative for effective understanding of engineering subjects. The topics introduced will serve as basic tools for specialized studies in many fields of engineering and technology.
Course Outcomes:	
1	Thermodynamics-:To understand basic concepts of thermodynamics & implement it on relative topics in other modules like fuel.
2	Water-:Analyze the quality of water and suggest suitable methods of treatment
3	Fuel-:Explain the knowledge of determining the quality of fuel and quantify the oxygen required for combustion of fuel.
4	Learners will be able to interpret and explore basic sensing techniques for physical measurements in modern instrumentations

Engineering Chemistry (Lab)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tut	Total
NBS23	Engineering Chemistry (lab)	---	02	---	---	01	---	01

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NBS23	Engineering Chemistry (lab)	---	---	---	25	–	25

Vivekanand Education Society's
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Department of Humanities and Applied Sciences

Lab Outcomes	
1	Determine Chloride content and hardness of water sample
2	Determine the hardness of a given sample of water by complexometric titration using EDTA.
3	Determine metal ion concentration of given sample solution using colorimeter.
4	Synthesize UF, PF polymers.
5	Determine the moisture content of the given coal sample.
6	Measure the saponification number of given oil samples.
7	Determine the acid value of the given oil sample.

Engineering Chemistry (Theory)

Module	Content	Hrs
1	**Thermodynamics** Thermodynamic terms & basic concepts, System,boundary, surrounding, homogeneous and heterogeneous system, types of thermodynamic system (isolated, closed, open), Intensive & extensive properties, equilibrium, nonequilibrium states, Thermodynamic processes (adiabatic, isothermal, isobaric, isochoric), Reversible & irreversible processes, Units of heat and work, sign and convention of heat & work, Pressure, volume work, Isothermal reversible expansion work, Isothermal irreversible expansion work, Maximum work done in reversible expansion, Units of internal energy, 1st law of thermodynamics, Enthalpy of system, Units & sign convention of enthalpy, Relation between ΔH & ΔU, Heat Capacity, Molar heat capacity at constant volume, Molar heat capacity at constant pressure, Relation between ΔE & ΔH, Exothermic and Endothermic Reaction, Enthalpy of a reaction, Calculation ΔE & ΔH, Heat of reaction/enthalpy of reaction, Heat of Formation, Heat of Combustion, Hess's Law, Numericals related to the topics.	**6 Hrs**
2	**Water** Introduction-Impurities in water, hardness of water-units, types and numerical problems, determination of hardness of water by EDTA method and numericals, Softening of water by an Ion Exchange process and numericals, BOD, COD- definition, significance and numericals, Water purification-membrane technology-: Electrodialysis, Reverse Osmosis and Ultrafiltration	**6 Hr**
3	**Fuel** Definition, classification, characteristics of a good fuel, units of heat, Calorific value-Definition, Gross or	**6 Hr**

Department of Humanities and Applied Sciences

	Higher calorific value and Net or lower calorific value, Dulong's formula and numericals for calculations of Gross and Net Calorific Values Solid fuels-Analysis of coal-Proximate and Ultimate Analysis-numericals and significance Liquid fuels-Petrol-knocking, Octane Number, Cetane number, Anti Knocking agents, unleaded petrol, oxygenates (MTBE), catalytic converter Combustion-calculation for requirement of oxygen and air (by weight and by volume only for given fuels.)	
4	**Corrosion** Definition, Mechanism of Corrosion-(i) Dry / Chemical Corrosion- (a) Due to Oxygen (b) Due to other gasses (ii) Wet/ Electrochemical Corrosion- Mechanism (a) Evolution of hydrogen (b) Absorption of oxygen gas Types of Corrosion- Galvanic Cell Corrosion, Concentration Cell Corrosion, Pitting Corrosion, Intergranular Corrosion, Stress Corrosion Factors affecting the rate of corrosion-(i)Nature of metal, (ii) Nature of corroding environment Methods of corrosion control-Material selection and proper designing, Cathodic protection-(i)Sacrificial anodic protection, (ii) Impressed current method, Metallic coatings- cathodic coating (Tinning) and anodic coating (Galvanizing)	**6 Hr**
	Total	**24**

Reference Books:	
R1	Engineering Chemistry - Jain & Jain (Dhanpat Rai)
R2	Engineering Chemistry – Dara & Dara (S Chand)
R3	A Text Book of Engineering Chemistry – Shashi Chawla (Dhanpat Rai)

Internal Assessment:

1) Assessment consists of one Mid Term Test of 20 marks and Continuous Assessment of 20 marks.
2) Mid Term test is to be conducted when approx. 50% syllabus is completed.
3) Duration of the midterm test shall be one hour.

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

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Department of Humanities and Applied Sciences

Sr. No	Rubrics	Marks
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks
3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks
7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

End Semester Theory Examination:	
1	Question paper will be of 60 marks
2	Question paper will have a total of five questions
3	All questions have equal weightage and carry 20 marks each
4	Any three questions out of five needs to be solved.

Engineering Chemistry (Lab)

Suggested Experiments: Students are required to complete at least 10 experiments.	
Star (*) marked experiments are compulsory.	
Sr. No.	**Name of the Experiment**

Department of Humanities and Applied Sciences

1	To determine Chloride content of water by Mohr's Method.
2	To determine total, temporary and permanent hardness of water sample by EDTA
3	To determine metal ion concentration using a colorimeter.
4	Synthesis of polymers
5	To determine the moisture content of the coal
6	To determine the saponification number of oil.
7	To determine the acid value of the oil

Note: Suggested List of Experiments is indicative. However, flexibilities lie with individual course instructor to design and introduce new, innovative and challenging experiments, (limited to maximum 30% variation to the suggested list) from within the curriculum, so that, the fundamentals and applications can be explored to give greater clarity to the students and they can be motivated to think differently.

Term Work:	
1	Term work should consist of 10 experiments.
2	The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.
3	Total 25 Marks (Experiments: 15-marks, Term work Assessment: 10-marks)

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Department of Humanities and Applied Sciences

COURSE NAME: BIOLOGY FOR ENGINEERS

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NBS24	Biology for Engineers (Theory)	02	---	---	02	---	---	02

Biology for Engineers (Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NBS24	Biology for Engineers (Theory)	02	---	---	02	---	---	02

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NBS24	Biology for Engineers (Theory)	20	20	60	---	---	100

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Department of Humanities and Applied Sciences

Course Objectives:	
1	To introduce the students to the basic concepts of biological systems.
2	To provide awareness about the similarity between human systems and machines.
3	To motivate for applying technology for challenges in biological systems
Course Outcomes: On successful completion of course learner/student will be able to:	
1	Describe the basic working of human cell and bio-signal generation
2	Describe the fundamentals of human nervous system
3	Identify the similarity between human neural system and artificial neural system
4	Explain the development of artificial assist devices mimicking human sense organs

Biology for Engineers (Theory)

Module	Content	Hrs
Prerequisite: Knowledge of various biological systems.		
1	**Need of Biology for engineers** Role of Biology in Next Generation Technology Development – Cell Structure, Cell Potential, Action Potential, Bio-signals such as ECG, EEG and EMG and their specifications.	**06**
2	**Fundamentals of Human nervous system** Nervous system- Nerve cell, neuronal communication, nerve-muscle physiology, Central Nervous system, Peripheral nervous system, Brain and its lobes, Brain centres, Brain plasticity and accelerated learning *.	**06**
3	**Artificial Neural Network** Comparison of human neuron with artificial neuron, Evolution of Artificial Neural Networks, Neural Networks and Representation: Perceptron, Multilayer perceptron, weights and bias, Gradient Descent, basic concept of back propagation.	**07**
4	**Sense organs and prosthetic devices**	

	Sense organs and their working, mechanism of sensing, artificial sense organs and their development, basics of artificial eye, artificial ear and prosthetic limb, introduction to cardiac pacemaker.	**07**
	Total	**26**

Text Books:	
1	Leslie Cromwell, Biomedical Instrumentation, Prentice Hall, 2011.
2	Thyagarajan S., Selvamurugan N., Rajesh M. P., Nazeer R. A., Thilagaraj W., Barathi S., and Jaganthan M. K., Biology for Engineers, Tata McGraw Hill, New Delhi, 2012.
Reference Books:	
1	John E Hall, Gyton's Medical Physiology, 12th edition, 2011.
2	Joseph J. Carr and John M. Brown, "Introduction to Biomedical Equipment Technology", PHI/Pearson Education, 4th edition, 2001.
3	L. E. Baker L. A. Geddes, "Principles of Applied Biomedical Instrumentation", John Wiley and Sons, 3rd Edition, 1991.
Any other (Access to AI tools / Data driven insights (if applicable) or any other):	
1	https://jamesclear.com/wp-content/uploads/2016/08/ABriefGuidetoAcceleratedLearning.pdf
2	**You-tube video links:** By Dr. Siddharth Warrier, Neurologist i) The neuroscience of learning: https://www.youtube.com/watch?v=iVXV4KuBVKY ii) How to think better: https://www.youtube.com/watch?v=bGsA0agLlTY iii) 9 Insane Memory Hacks from a Neurologist: https://www.youtube.com/watch?v=7PNsoLKBKMM iv) How to achieve anything: https://www.youtube.com/watch?v=anjZDliSYww v) Neuroscience and Creativity: https://www.youtube.com/watch?v=GrIHnO6W8Ko

Internal Assessment:

1) Assessment consists of one Mid Term Test of 20 marks and Continuous Assessment of 20 marks.

2) Mid Term test is to be conducted when approx. 50% syllabus is completed.
3) Duration of the midterm test shall be one hour.

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

Sr. No	Rubrics	Marks
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks
3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks
7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

End Semester Theory Examination:	
1	Question paper will be of 60 marks
2	Question paper will have a total of five questions
3	All questions have equal weightage and carry 20 marks each
4	Any three questions out of five need to be solved.

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Department of Humanities and Applied Sciences

COURSE NAME: FUNDAMENTALS OF PROGRAMMING (C/JAVA)
C-Programming

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NES24	C-Programming (Theory)	03	---	---	03	---	---	03
NES24	C-Programming (Theory)	---	02	---	---	01	---	01

C-Programming (Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tut	Total
NES24	C-Programming (Theory)	03	---	---	03	---	---	03

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NES24	C-Programming (Theory)	20	20	60	---	---	100

Vivekanand Education Society's
Institute of Technology

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Department of Humanities and Applied Sciences

Course Objectives:	
1	To learn the fundamentals of computers and algorithms.
2	To understand various steps in program development and control structures.
3	To understand the concept of functions in C programming.
4	To understand usage of arrays and strings in C language.
5	To understand usage of Structures and Union in C language.
6	To understand the concept of pointers and dynamic memory allocation
Course Outcomes:	
1	To formulate simple algorithms for arithmetic and logical problems and translate them into programs in C language.
2	To implement conditional branching and iteration
3	To decompose problem into functions and synthesize complete program
4	To implement usage of arrays and strings in C language.
5	To implement usage of Structures and Union in C language.
6	To comprehend pointer concepts and dynamic memory allocation

C-Programming (Lab)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tut	Total
NES24	C-Programming (Lab)	---	02	---	---	01	---	01

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NES24	C-Programming (Lab)	---	---	---	25	–	25

Lab Prerequisite: Basic understanding of Computer Programming terminologies.	
Lab Objectives:	
1.	To learn the fundamentals of computers and algorithms.
2.	To understand various steps in program development and control structures.

3.	To understand the concept of functions in C programming.
4.	To understand usage of arrays and strings in C language.
5.	To understand usage of Structures and Union in C language.
6.	To understand the concept of pointers and dynamic memory allocation
Lab Outcomes:	
LO1	To formulate simple algorithms for arithmetic and logical problems and translate them into programs in C language.
LO2	To implement conditional branching and iteration
LO3	To decompose problem into functions and synthesize complete program
LO4	To implement usage of arrays and strings in C language.
LO5	To implement usage of Structures and Union in C language.
LO6	To comprehend pointer concepts and dynamic memory allocation

C-Programming (Theory)

Module	Content	Hrs
1	**Introduction, Fundamental of C Programming.** Introduction to components of a Computer System. Introduction to Algorithm and Flowchart ● Keywords, Identifiers Constants and Variables. ● Expression and In-built functions. ● Datatype and Operators in C. ● Expressions and Precedence of Operators. ● In- built Functions, Pre-processor Directives, library, Header Files.	5
2	**Control Structure, Branching and looping structures.** Introduction to Control Structures. ● If statement, If-else statement, Nested if-else, else-if Ladder. ● Switch statement ● For loop, while loop, do while loop ● Break, continue and go to statements	6
3	**Functions** ● Introduction to functions. ● Function prototype, Function definition, accessing a function and parameter passing: Call by Value and Call by reference. ● Recursive function.	4

4	**Array and Strings** ● Introduction to Arrays. ● Declaration and initialization of one. dimensional and two- dimensional arrays. ● Definition and initialization of String. ● String functions.	4
5	**Structure and Union** ● Concept of Structure and Union. ● Declaration and Initialization of structure and union. ● Nested structures. ● Array of Structures .	3
6	**Pointers** ● Fundamentals of pointers ● Declaration, initialization and dereferencing of pointers. ● Concept of dynamic memory allocation.	4
	Total	**26**

Text Books:	
1	E. Balaguruswamy, Programming in ANSI C, McGraw-Hill
2	Kernighan , Ritchie, "The C programming Language", Prentice Hall of India
3	Sumitabha Das, Computer Fundamentals and C Programming, McGraw-Hill
4	Pradeep Day and ManasGosh ,"Programming in C", Oxford University Press.
Reference Books:	
1	Byron Gottfried, "Programming with C", McGraw Hill (Schaum"s outline series)
2	KanetkarYashwant," "Let Us C", BPB Publication.

Internal Assessment:

1) Assessment consists of one Mid Term Test of 20 marks and Continuous Assessment of 20 marks.
2) Mid Term test is to be conducted when approx. 50% syllabus is completed.
3) Duration of the midterm test shall be one hour.

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

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Sr. No	Rubrics	Marks
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3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks
7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

End Semester Theory Examination:	
1	Question paper will be of 60 marks
2	Question paper will have a total of five questions
3	All questions have equal weightage and carry 20 marks each
4	Any three questions out of five need to be solved.

C-Programming (Lab)

Suggested Experiments: Students are required to complete at least 10 experiments.	
Star (*) marked experiments are compulsory.	
Sr. No.	**Name of the Experiment**
1	Familiarization with programming environment
2	Simple computational problems using arithmetic expressions
3	Problems involving control structures & Looping
4	Demonstrate 1D,2D Array and Strings
5	Programs to demonstrate simple functions
6	Programs to demonstrate recursive functions
7	Problems involving structures

8	Programs to demonstrate the concept of pointers
9	Program to understand the concept of dynamic memory Allocation

Note: Suggested List of Experiments is indicative. However, flexibilities lie with individual course instructor to design and introduce new, innovative and challenging experiments, (limited to maximum 30% variation to the suggested list) from within the curriculum, so that, the fundamentals and applications can be explored to give greater clarity to the students and they can be motivated to think differently.

Term Work:	
1	Term work should consist of 10 experiments.
2	The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.
3	Total 25 Marks (Experiments: 15-marks, Term work Assessment: 10-marks)

Object Oriented Programming Methodology - Java Programming

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NES24	Object Oriented Programming Methodology - Java Programming (Theory)	03	---	---	03	---	---	03
NES24	Object Oriented Programming Methodology - Java Programming	---	02	---	---	01	---	01

Vivekanand Education Society's
Institute of Technology

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Department of Humanities and Applied Sciences

Object Oriented Programming Methodology - Java Programming (Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NES24	Object Oriented Programming Methodology - Java Programming (Theory)	03	---	---	03	---	---	03

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NES24	Object Oriented Programming Methodology - Java Programming (Theory)	20	20	60	---	---	100

Course Objectives:	
1	Understand the fundamental principles of Object-Oriented Programming and how they apply to Java development.
2	Develop proficiency in creating and manipulating classes, objects, and inheritance hierarchies in Java.
3	Learn the features of object orientation - encapsulation, abstraction, and polymorphism in Java programs.
4	Master the concepts of interfaces and abstract classes for creating flexible and modular Java applications.
5	Learn to implement interfaces and abstract classes for achieving contract-based programming and also exception handling to ensure robust and error-resistant Java programs.
Course Outcomes: At the end of the course learner will be able to	

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Department of Humanities and Applied Sciences

1	Create and utilize classes, objects, and methods effectively to encapsulate data and behavior in Java programs.
2	Use inheritance and polymorphism concepts to facilitate code reuse and extensibility in Java applications.
3	Design and implement interfaces and abstract classes to achieve contract-based programming in Java.
4	Apply exception handling techniques to ensure robustness and fault tolerance in Java programs.
5	Utilize advanced OOP features like generics and design patterns to enhance code quality and maintainability in Java projects.
6	Explain and apply string matching techniques.

Object Oriented Programming Methodology - Java Programming(Lab)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tut	Total
NES24	Object Oriented Programming Methodology - Java Programming (Lab)	---	02	---	---	01	---	01

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NES24	Object Oriented Programming Methodology - Java Programming (Lab)	---	---	---	25	–	25

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Department of Humanities and Applied Sciences

Object Oriented Programming Methodology - Java Programming(Lab)

Prerequisite: Structured Programming Approach	
Lab Objective:	
1	To learn the basic concepts of object-oriented programming
2	To study JAVA programming language
3	To study various concepts of JAVA programming like multithreading, exception Handling, packages, etc.
4	To explain components of GUI based programming
Lab Outcome: At the end of the course, the students should be able to:	
1	Implement classes, objects, and methods effectively to encapsulate data and behavior in Java programs.
2	Efficiently use code reuse with inheritance and polymorphism concepts in Java Applications.
3	Handle Data Objects for CRUD operations and use arrays
4	Apply the idea of Exception Handling in program and to define user defined exceptions
5	Design ,Create,Interact using UI and to perform events from the UI
6	Perform multithreading

Object Oriented Programming Methodology - Java Programming (Theory)

Module		Detailed Content	Hours
1		**Introduction to Object Oriented Programming**	**2**
	1.1	OOP concepts: Objects, class, Encapsulation, Abstraction, Inheritance, Polymorphism, message passing.	
	1.2	Java Virtual Machine	
	1.3	Basic programming constructs: variables, data types, operators, unsigned right shift operator, expressions, branching and looping.	
2		**Class, Object, Packages and Input/output**	**2**

	2.1	Class, object, data members, member functions, Constructors, types, static members and functions, Packages in java, types, user defined packages, Input and output functions in Java	
	2.2	Array, Strings, String Buffer, Vectors	
3		**Inheritance and Interface**	**3**
	3.1	Types of inheritance, Method overriding, super, abstract class and abstract method, final, Multiple inheritance using interface, extends keyword	
4		**Exception handling and Multithreading**	**2**
	4.1	Exception handling using try, catch, finally, throw and throws, Multiple try and catch blocks, user defined exception	
	4.2	Thread lifecycle, thread class methods, creating threads using extends and implements keywords.	
5		**GUI programming in JAVA**	**3**
	5.1	5.1 AWT: working with windows, using AWT controls for GUI design	
	5.2	Swing class in JAVA, Introduction to JavaFX- Animation, Button, Canvas, Chart	
			12

Textbooks:	
1	Herbert Schildt, 'JAVA: The Complete Reference', Ninth Edition, Oracle Press.
2	E. Balagurusamy, 'Programming with Java', McGraw Hill Education.
References:	
1	Ivor Horton, "Beginning JAVA", Wiley India.
2	Dietal and Dietal, "Java: How to Program", 8th Edition, PHI .
3	"JAVA Programming", Black Book, Dreamtech Press.
4	"Learn to Master Java programming", Staredu solutions
Digital material:	
1	www.nptelvideos.in
2	www.w3schools.com
3	www.tutorialspoint.com
4	https://starcertification.org/Certifications/Certificate/securejava

Internal Assessment:

1) Assessment consists of one Mid Term Test of 20 marks and Continuous Assessment of 20 marks.
2) Mid Term test is to be conducted when approx. 50% syllabus is completed.
3) Duration of the midterm test shall be one hour.

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Department of Humanities and Applied Sciences

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

Sr. No	Rubrics	Marks
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks
3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks
7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

End Semester Theory Examination:	
1	Question paper will be of 60 marks
2	Question paper will have a total of five questions
3	All questions have equal weightage and carry 20 marks each
4	Any three questions out of five need to be solved.

Object Oriented Programming Methodology - Java Programming(Lab)

Suggested Experiments: Students are required to complete at least 10 experiments.	
Star (*) marked experiments are compulsory.	
Sr. No.	**Name of the Experiment**
1	Implementing Classes and Objects for a scenario using object arrays.
2	Implementing Interactive Object Creation: Empowering Users to Generate Objects using Scanner Class
3	Implementing polymorphism using Method and Constructor for String Manipulation in Java

4	Implementing Inheritance and Interfaces for a scenario.
5	Implementation of Abstract Class and Abstract Method for a scenario.
6	Implementing JSON File Handling in Java to implement Create, Display, Update and Delete data objects.
7	Handling data with 2D arrays and ArrayList
8	Implement Exception Handling with User Defined Exception
9	Implementing Swing and AWT for creating UI
10	Implementing a class for performing Interaction of UI with JSON data Files.
11	Implementing Action Listeners for UI
12	Implementing Multithreading in Java for a File Processing

Note: Suggested List of Experiments is indicative. However, flexibilities lie with individual course instructor to design and introduce new, innovative and challenging experiments, (limited to maximum 30% variation to the suggested list) from within the curriculum, so that, the fundamentals and applications can be explored to give greater clarity to the students and they can be motivated to think differently.

Term Work:	
1	Term work should consist of 10 experiments.
2	The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.
3	Total 25 Marks (Experiments: 15-marks, Term work Assessment: 10-marks)

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Department of Humanities and Applied Sciences

COURSE NAME: PROGRAMME CORE COURSE (CMPN & INFT)

Digital Logic & Computer Organization and Architecture

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NPC21	Digital Logic and computer Organization and Architecture (Theory)	02	---	---	02	---	---	02

Digital Logic & Computer Organization and Architecture (Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NPC11	Digital Logic and computer Organization and Architecture (Theory)	02	---	---	02	---	---	02

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NPC11	Digital Logic and computer Organization and Architecture (Theory)	20	20	60	---	---	100

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Department of Humanities and Applied Sciences

Prerequisite: Knowledge on number systems	
Course Objectives:	
1	To have the rough understanding of the basic structure and operation of basic digital circuits and digital computer.
2	2To discuss in detail arithmetic operations in digital system.
3	To discuss generation of control signals and different ways of communication with I/O devices.
4	To study the hierarchical memory and principles of advanced computing.
Course Outcomes:	
1	To learn different number systems and basic structure of computer system.
2	To demonstrate the arithmetic algorithms.
3	To understand the basic concepts of digital components and processor organization.
4	To understand the generation of control signals of computer.
5	To demonstrate the memory organization.
6	To describe the concepts of parallel processing and different Buses.

Digital Logic & Computer Organization and Architecture (Theory)

Module		Detailed Content	Hours
1		**Computer Fundamentals**	6
	1.1	Introduction to Number System and Codes	
	1.2	Number Systems: Binary, Octal, Decimal, Hexadecimal,	
	1.3	Codes: Grey, BCD, Excess-3, Boolean Algebra.	
	1.4	Logic Gates: AND, OR, NOT, NAND, NOR, EX-OR	
	1.5	Overview of computer organization and architecture.	
	1.6	Basic Organization of Computer and Block Level functional Units, Von- Neumann Model.	
2		**Data Representation and Arithmetic algorithms**	6

	2.1	Binary Arithmetic: Addition, Subtraction, Multiplication, Division using Sign Magnitude, 1's and 2's compliment, BCD and Hex Arithmetic Operation, Half adder, Full adder.	
	2.2	Booths Multiplication Algorithm, Restoring and Non-restoring Division Algorithm.	
	2.3	IEEE-754 Floating point Representation.	
3		**Processor Organization and Architecture**	3
	3.3	Register Organization, Instruction Formats, Addressing modes, Instruction Cycle.	
4		**Control Unit Design**	3
	4.1	Hardwired Control Unit: State Table Method, Delay Element Methods.	
	4.2	Microprogrammed Control Unit: Micro Instruction-Format, Sequencing and execution, Micro operations.	
5		**Memory Organization**	3
	5.1	Introduction and characteristics of memory, Types of RAM and ROM, Memory Hierarchy, 2-level Memory Characteristic,	
6		**Cache Memory**	3
	6.1	Concept, locality of reference, Design problems based on mapping	
		techniques, Cache coherence and write policies.	
		Total	**24**

Textbooks:	
1	R. P. Jain, "Modern Digital Electronic", McGraw-Hill Publication, 4thEdition.
2	William Stalling, "Computer Organization and Architecture: Designing and Performance", Pearson Publication 10TH Edition.
3	John P Hayes, "Computer Architecture and Organization", McGraw-Hill Publication, 3RD Edition.
4	Dr. M. Usha and T. S. Shrikanth, "Computer system Architecture and Organization", Wiley publication.
Reference Books:	
1	Andrew S. Tanenbaum, "Structured Computer Organization", Pearson Publication.
2	B. Govindarajalu, "Computer Architecture and Organization", McGraw-Hill Publication.
3	Malvino, "Digital computer Electronics", McGraw-Hill Publication, 3rdEdition.
4	Smruti Ranjan Sarangi, "Computer Organization and Architecture", McGraw-Hill Publication.

Internal Assessment:

1) Assessment consists of one Mid Term Test of 20 marks and Continuous Assessment of 20 marks.
2) Mid Term test is to be conducted when approx. 50% syllabus is completed.
3) Duration of the midterm test shall be one hour.

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Department of Humanities and Applied Sciences

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

Sr. No	Rubrics	Marks
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks
3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks
7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

End Semester Theory Examination:	
1	Question paper will be of 60 marks
2	Question paper will have a total of five questions
3	All questions have equal weightage and carry 20 marks each
4	Any three questions out of five need to be solved.

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Department of Humanities and Applied Sciences

COURSE NAME : PROFESSIONAL COMMUNICATIONS AND ETHICS-1

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NAE21	Professional Communications and Ethics-1 (Theory)	01	---	02	01	---	01	02

Professional Communications Ethics-1 (Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NAE21	Professional Communications and Ethics-1 (Theory)	01	---	02	01	---	01	02

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NAE21	Professional Communications and Ethics-1 (Theory)	20	80	---	---	---	100

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Department of Humanities and Applied Sciences

Course Objectives:	
1	To demonstrate the fundamental concepts of interpersonal and professional communication.
2	To encourage active listening with focus on content, purpose, ideas and tone.
3	To facilitate fluent speaking skills in social, academic and professional situations
4	To train in reading strategies for comprehending academic and business correspondence.
5	To promote effective writing skills in business, technology and academic arenas.
6	To inculcate confident personality traits along with grooming and social etiquettes.
Course Outcomes:	
1	Eliminate barriers and use verbal/non-verbal cues at social and workplace situations.
2	Employ listening strategies to comprehend wide-ranging vocabulary, grammatical structures, tone and pronunciation.
3	Prepare effectively for speaking at social, academic and business situations.
4	Use reading strategies for faster comprehension, summarization and evaluation of texts.
5	Acquire effective writing skills for drafting academic, business and technical documents.
6	Successfully interact in all kinds of settings, displaying refined grooming and social skills.

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Department of Humanities and Applied Sciences

Sr No.	Topic	No. of Hrs.
M1	Fundamentals of Communication: - 1.1. Introduction to Theory of Communication ● Definition ● Objectives ● The Process of Communication ● Organizational Communication 1.2. Methods of Communication 1.3. Barriers to Communication 1.4 Developing Reading and Writing Skills	**04 Hrs**
M2	2.1. Vocabulary Building ● Meaning of Words in Context ● Synonyms & Antonyms ● Collocations ● Prefixes & Suffixes 2.2. Grammar ● Identifying Common Errors ○ Subject - Verb Agreement ○ Misplaced Modifiers ○ Articles ○ Prepositions ● Tautologies ● Pleonasms (Redundancies) ● Idioms	**2 Hr**
M3	BUSINESS CORRESPONDENCE 4.1. Seven Cs of Business Correspondence ● Completeness ● Conciseness ● Consideration ● Concreteness ● Clarity ● Courtesy ● Correctness 4.2. Parts of a Formal Letter and Formats ● Parts/Elements of a Formal Letter ○ Letterheads and/or Sender's Address	03

	○ Dateline ○ Inside Address ○ Reference Line (Optional) ○ Attention Line (Optional) ○ Salutation ○ Subject Line ○ Body ○ Complimentary Close ○ Signature Block ○ Enclosures/Attachments ● Complete/Full Block Format 4.3. Emails ● Format of Emails ● Features of Effective Emails ● Language and style of Emails 4.4. Types of Letters in Both Formal Letter Format and Emails ● Claim and Adjustment Letters ● Request/Permission Letters ● Sales Letters	
M 4	Personality Development and Social Etiquettes 6.1. Personality Development ● Introducing Self and/or a Classmate ● Formal Dress Code 6.2. Social Étiquettes ● Formal Dining Étiquettes ● Cubicle Étiquettes ● Responsibility in Using Social Media ● Showing Empathy and Respect ● Learning Accountability and Accepting Criticism ● Demonstrating Flexibility and Cooperation ● Selecting Effective Communication Channels	**3**
M5	**Book Review** ● Review of a book.: Students have to read and analyze the book given and should be able to write a two page review on it. ● Book review presentation	**02**
	Total Engagement Hours	**14**

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Department of Humanities and Applied Sciences

List of Tutorials:

S.No	Details of Assignment	Details of Activity	Hours	Marks
1	Case Studies on types of communication, Barriers to effective Communication and its consequences.	Discussion and understanding the various concepts of communication theory with the help of case studies.	4	10
2	Written record of reading activities	Advanced level reading comprehension with MCQs (similar in level and format to CAT, GRE and GMAT verbal sections)	2	10
3	Aptitude test	Aptitude test on vocabulary and grammar (similar in level and format to CAT, GRE and GMAT verbal sections)	2	10
4	2 types of letters in complete block format/Email		4	10
5	Presentation on the topics assigned by the teachers (Ethical practices and soft skills)	Presentation on the topics assigned by the teachers based on Module 4	4	20

Textbooks:	
1	Sanjay Kumar & Pushp Lata (2018). Communication Skills with CD. New Delhi:Oxford University Press.
2	Hemphill, P.D., McCormick, D. W., & Hemphill, R. D. (2001). Business Communication with writing improvement exercises. Upper Saddle River, NJ:Prentice Hall.
3	Locker, Kitty O. Kaczmarek, Stephen Kyo. (2019). Business Communication: Building Critical Skills. Place of publication not identified: Mcgraw-hill.
4	Murphy, H. (1999). Effective Business Communication. Place of publication not

	identified: Mcgraw-Hill.
5	Raman, M., & amp; Sharma, S. (2016). Technical Communication: Principles and practice. New Delhi: Oxford University Press.University of Mumbai, First Year Engineering, (Common for all Branches of Engineering) REV2019 'C' Scheme 51/61
6	Kaul, A. (2015). Effective Business Communication. Place of publication not identified: Prentice-Hall of India.
7	Rizvi, A. M. (2010). Effective Technical Communication: A guide for Scientists and Engineers. New Delhi: Tata McGraw Hill.
8	Lewis, N. (2014). Word power made it easy. Random House USA.
Book Review : 20 Marks **List of books will be selected by the respective teachers**	

Internal Assessment:

1) Assessment consists of one Mid Term Test of 20 marks and Continuous Assessment of 20 marks.
2) Mid Term test is to be conducted when approx. 50% syllabus is completed.
3) Duration of the midterm test shall be one hour.

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

Sr. No	Rubrics	Marks
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks
3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks

Vivekanand Education Society's
Institute of Technology

(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Department of Humanities and Applied Sciences

7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

Vivekanand Education Society's
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Department of Humanities and Applied Sciences

COURSE NAME : UNIVERSAL HUMAN VALUES-2

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NVE22	Universal Human Values-2 (Theory)	02	---	---	02	---	---	02

Universal Human Values 2 (Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NVE22	Universal Human Values-2 (Theory)	02	---	---	02	---	---	02

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NVE11	Universal Human Values-2 (Theory)	---	20	---	---	---	20

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Institute of Technology

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Department of Humanities and Applied Sciences

Course Objectives:	
1	Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2	Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3	Strengthening of self-reflection.
4	Development of commitment and courage to act.
Course Outcomes:	
1	Broad Reflection on relationships in family, hostel and institute as extended family,
2	Understanding of human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.
3	Understanding of the conduct as an engineer or scientist etc.

Module		Content	Hrs
1		**Understanding Harmony in the Family - Harmony in Human-Human Relationship**	
	1.1	Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and its fulfillment to ensure mutual happiness	1
	1.2	Understanding the meaning of Trust; Difference between intention and competence	1
	1.3	Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship	1
2		**Understanding Harmony inSociety**	
	2.1	Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals	1

Department of Humanities and Applied Sciences

	2.2	Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family	1
3		**Understanding Harmony in the Nature and Existence - Whole existence as Coexistence**	
	3.1	Understanding the harmony in the Nature	1
	3.2	Understanding Existence as Coexistence of mutually interacting units in all-pervasive space	1
	3.3	Holistic perception of harmony at all levels of existence.	1
4		**Implications of the above Holistic Understanding of Harmony on Professional Ethics**	
	4.1	Natural acceptance of human values	1
	4.2	Definitiveness of Ethical Human Conduct	1
	4.3	Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order	1
	4.4	Competence in professional ethics	1
5		**Introduction : The Constitution of India and Fundamental Rights (NPTEL Video Lecture)**	
	5.1	Introduction to Constitution and Constitutional Law • Constitution, Constitutionalism and Constitutional Law • Difference between Constitutional law and other laws • Types of Constitution • Salient Features of the Constitution of India • Preamble to the Constitution of India: Its Role, Vision, Interpretation and Amendment	1
	5.2	Fundamental Rights and Directive Principles of State Policy • Concept of Fundamental Rights vis a vis Directive Principles of State Policy • Definition of State and Instrumentalities of State • Enumerated Fundamental Rights • Enforceability of Fundamental Rights vis -a -vis Directive Principles of State Policy	1

		• Primacy of Fundamental Rights and Directive Principles of State Policy • Constitutional Remedies to derogation of Fundamental Rights	
		Total	**14**

Mode of Conduction

Lectures hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.

practice sessions for analyzing and discussing the topic, help the students explore the important or critical elements.

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

Sr. No	Rubrics	Marks
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks
3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks
7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

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Institute of Technology

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Department of Humanities and Applied Sciences

COURSE NAME: BASIC WORKSHOP PRACTICE

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NVS22	Basic Workshop Practice (Lab)	---	04	---	---	02	---	02

Basic Workshop Practice (Lab)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tut	Total
NVS22	Basic Workshop Practice (Lab)	---	04	---	---	02	---	02

Course Code	Course Name	Examination Scheme					
		Theory					
		Internal Assessment		End Sem Exam	Term Work	Practical & Oral	Total
		Mid-Term Test	Continuous Assessment				
NES22	Basic Workshop Practice (Lab)	---	---	---	50	---	50

Sr No.	Topic	No. of Hrs.
Trade-1	**Fitting :** Use and setting of fitting tools for chipping, cutting, filing, marking, center punching, drilling, tapping. Term work to include one job involving following operations : filing to size, one simple male-female joint, drilling and tapping.	10
Trade-2	**Carpentry :**	10

	Use and setting of hand tools like hacksaws, jack planes, chisels and gauges for construction of various joints. Term work to include one carpentry job involving a joint.	
Trade-3	**Basic Electrical workshop:** **House Wiring** Electrical safety in the workplace. Protective equipment and tools. Different types of cables, electrical wiring diagrams, types of circuits, types of switches. Different wiring methods: Godown wiring, Staircase wiring, House wiring, Extension board. **PCB** Design, Layout drawing, Positive and negative film making, PCB etching and drilling, Tinning and soldering technique, component mounting and circuit testing.	**08**
Trade-4	**Hardware and Networking :** Dismantling of a Personal Computer (PC), Identification of Components of a PC such as power supply, motherboard (Chipset), processor, hard disk, memory (RAM, ROM), CMOS battery, CD drive, monitor, keyboard, mouse, printer, scanner, Pen drives disk drives etc. Assembling a Personal Computer. Installation of Operating System (any one), Boot-up sequence and Device drivers. Installation of application software's, Basic Troubleshooting and Maintenance. Identification of network components LAN card, wireless card, switch, hub, router, different types of network cables (straight cables, crossover cables and rollover cables), Basic networking (LAN, WAN, configure IP address etc) and crimping.	**08**
	Total Engagement Hours	**36**

Assessment Tool	Rubrics with Marks	Total Marks
Term Work	**Mechanical Workshop:-** **Fitting :** Job Submission - 10 Marks **Carpentry :** Job Submission - 10 Marks Job Sheet for Fitting and Carpentry - 05 Marks **Basic Electrical workshop:** **House Wiring :** Demonstration with Job sheet : 05 Marks **PCB :** Project with Journal : 05 Marks **Hardware and Networking :** Oral along with journal submission - 10 Marks **Attendance : 05 Marks**	**50 Marks**

Vivekanand Education Society's
Institute of Technology

(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Department of Humanities and Applied Sciences

COURSE NAME : CO CURRICULAR ACTIVITY(NSS)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NCC22	Co curricular Activity (NSS)	02	---	---	02	---	---	02

Co Curricular Activity

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/PR	Tut	Total
NCC22	Co curricular Activity (NSS)	---	04	---	---	02	---	02

Course Code	Course Name	Examination Scheme					
		Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NCC22	Co curricular Activity (NSS)	---	---	---	---	25	25

In the first year curriculum, students are allocated 25 marks in each semester for engaging in social work . This initiative involves a range of activities such as cleaning college premises, participating in Kalash Yatra, tree plantation drives, beach cleaning campaigns, organizing cultural programs, attending yoga courses, environmental awareness programs, and more. These activities aim to instill a sense of social responsibility and civic engagement among students, fostering a well-rounded educational experience that goes beyond the classroom.