Sardar Vallabhbhai National Institute of Technology (SVNIT) Surat
Department of Electrical Engineering
B.Tech. Electrical Engineering

Sr. No.	Subject	Code	Scheme L-T-P	Credits (Min.)	Notional hours of Learning (Approx.)
	First Semester (1st year of UG)				
1	Basic Electrical Engineering	EE101	3-1-2	5	100
2	Engineering Drawing	ME110	2-0-4	4	100
3	Fundamentals of Physics	PH109	3-0-2	4	85
4	Mathematics-I	MA113	3-1-0	4	70
5	English and Professional Communication	HS110	3-1-0	4	70
			Total	**21**	**410**
6	Vocational Training / Professional Experience (Optional) (Mandatory for Exit)	EEV01 / EEP01	0-0-10	5	200 (20 x 10)
	Second Semester (1st year of UG)				
1	Electrical Circuits	EE102	3-1-0	4	70
2	Electronics Devices and Circuits	EC108	3-0-2	4	85
3	Fundamentals of Computers and Programming	CS110	3-0-2	4	85
4	Applied Thermal Engineering	ME108	3-0-2	4	70
5	Mathematics-II	MA114	3-1-0	4	70
6	Indian Value System and Social Consciousness	HS120	2-0-0	2	35
			Total	**22**	**430**
7	Electrical Workshop Vocational Training / Professional Experience (Optional) (Mandatory for Exit)	EEV02 / EEP02	0-0-10	5	200 (20 x 10)
	Third Semester (2nd year of UG)				
1	Electrical Machines I	EE201	3-1-2	5	100
2	Signals & Systems	EE203	3-1-0	4	70
3	Electromagnetic theory	EE231	3-1-0	4	70
4	Digital Circuits	EC209	3-0-2	4	85
5	Elective	EE2AA	3-X-X	3/4	55/70/85
			Total	**20-21**	**380-410**
	Fourth Semester (2nd year of UG)				
1	Electrical Machines – II	EE202	3-1-2	5	100
2	Elements of Power Systems	EE204	3-1-2	5	100
3	Numerical Methods and Applications to Electrical Engineering	EE232	3-1-2	5	100
4	Professional Ethics, Economics and Business Management	MG210	3-1-0	4	70
5	Elective	EE2BB	3-X-X	3/4	55/70/85
			Total	**22-23**	**425-455**
6	Minor / Honor (M/H#1)	EE2CC	3-X-X	4	70/85
7	Vocational Training / Professional Experience (Optional) (Mandatory for Exit)	EEV04 / EEP04	0-0-10	5	200 (20 x 10)

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	Fifth Semester (3rd year of UG)				
1	Control Systems	EE301	3-1-2	5	100
2	Power Electronic Converters	EE303	3-1-2	5	100
3	Power System Analysis	EE331	3-1-2	5	100
4	Elective	EE3AA	3-X-X	3/4	55/70/85
5	Elective (Specialization#1)	EE3BB	3-X-X	3/4	55/70/85
			Total	**21-23**	**410-470**
6	Minor / Honor (M/H#2)	EE3CC	3-X-X	4	70/85
	Sixth Semester (3rd year of UG)				
1	Electrical and Electronic Measurements	EE302	3-1-2	5	100
2	Micro-processors & Micro-controllers	EE304	3-1-2	5	100
3	Electrical Machine Design	EE332	3-0-2	4	85
4	Elective	EE3DD	3-X-X	3/4	55/70/85
5	Elective (Specialization#2)	EE3EE	3-X-X	3/4	55/70/85
			Total	**20-22**	**395-455**
6	Minor / Honor (M/H#3)	EE3FF	3-X-X	4	70/85
7	Vocational Training / Professional Experience (Optional) (Mandatory for Exit)	EEV06 / EEP06	0-0-10	5	200 (20 x 10)
	Seventh Semester (4th year of UG)				
1	Innovation, Incubation and Entrepreneurship	MG110	3-1-0	4	70
2	Elective	EE4AA	3-X-X	3/4	55/70/85
3	Elective	EE4BB	3-X-X	3/4	55/70/85
4	Elective (Specialization#3)	EE4CC	3-X-X	3/4	55/70/85
5	Elective (Specialization#4)	EE4DD	3-X-X	3/4	55/70/85
			Total	**16-20**	**290-410**
6	Minor / Honor (M/H#4)	EE4EE	3-X-X	4	70/85
	Eighth Semester (4th year of UG)				
1	Industrial Internship / Professional Experience (Mandatory)	EEP08	0-0-40	20	800 (20 x 40)
			Total	**20**	**800**

Sr. No.	**Optional Core**	**Code**	**Scheme L-T-P**
1.	Electromagnetic Theory	EE231	3-1-0
2.	Numerical Methods and Applications to Electrical Engineering	EE232	3-1-2
3.	Power System Analysis	EE331	3-1-2
4.	Electrical Machine Design	EE332	3-0-2

Sr. No.	**Elective**	**Code**	**Scheme L-T-P**
1.	Forecasting and Planning Methods	EE251	3-0-0
2.	Renewable Energy Sources	EE252	3-0-0
3.	Modern Material for Electrical Engineering	EE253	3-0-0

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4.	Optimization Methods	EE254	3-0-0
5.	Data structures	EE255	3-0-2
6.	Principles and Applications of Electrochemistry	CY211	3-0-0
7.	Special Machines	EE256	3-0-0
8.	Power Plant Engineering	EE257	3-0-0
9.	Energy Audit and Management	EE259	3-0-0
10.	Reliability Evaluation of Electrical Systems	EE260	3-0-0
11.	Modeling of Electrical Machines (PEED)	EE281	3-1-0
12.	Computer Methods for Power Systems (PS)	EE282	3-1-0
13.	State Variable Analysis (IC)	EE283	3-1-0
14.	Electrical Traction and Linear Machines	EE351	3-0-0
15.	Utilization of Electrical Energy	EE352	3-0-0
16.	Power System Operation and Control	EE354	3-0-0
17.	Random Processes	EE355	3-0-0
18.	Power Electronic Systems and Electrical Drives (PEED)	EE381	3-1-0
19.	Switch Gear and Protection (PS)	EE382	3-1-0
20.	Discrete-time Control Systems (IC)	EE383	3-1-0
21.	Robotics	EE356	3-0-0
22.	Advanced Industrial Automation	EE357	3-0-0
23.	Instrumentation	EE358	3-0-0
24.	Cryptography and Cyber Security for Smart Grid	EE359	3-0-0
25.	Restructuring and Deregulation of Power Systems	EE360	3-0-0
26.	Wind and Solar Energy Conversion	EE361	3-0-0
27.	Power Quality Disturbances and Mitigation	EE451	3-0-0
28.	Advanced Electrical Drives	EE452	3-0-0
29.	Power System Transients	EE453	3-0-0
30.	HVDC Transmission	EE454	3-0-0
31.	Nonlinear Control	EE455	3-0-0
32.	Advanced Optimization Methods	EE456	3-0-0
33.	Electric Vehicles	EE457	3-0-0
34.	Switched Mode Power Supply	EE458	3-0-0
35.	Power Filter Technology	EE459	3-0-0
36.	EHV AC Transmission	EE460	3-0-0
37.	Distributed Power Generation and Micro-grid	EE461	3-0-0
38.	Smart Grid Technologies	EE462	3-0-0
39.	Advanced Power Electronics (PEED)	EE481	3-1-0
40.	Flexible AC Transmission (Common to PEED and PS)	EE482	3-1-0
41.	High Voltage Engineering (PS)	EE483	3-1-0
42.	Optimal Control (IC)	EE484	3-1-0

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43.	Advanced Industrial Instrumentation (IC)	EE485	3-1-0

Sr. No.	B.Tech (Civil, Mech, ChE) (Minor in Electrical Engineering)	Code	Scheme L-T-P
1.	Electrical Circuits	EE282	3-1-0
2.	Electrical Machines	EE381	3-0-2
3.	Power Systems	EE382	3-0-2
4.	Electrical and Electronic Measurements	EE481	3-0-2

Sr. No.	B.Tech (CSE, ECE) (Minor in Electrical Engineering)	Code	Scheme L-T-P
1.	Electrical Machines	EE284	3-0-2
2.	Power Systems	EE384	3-0-2
3.	Power electronics	EE386	3-0-2
4.	Electrical and Electronic Measurements	EE483	3-0-2

Sr. No.	B.Tech (EE) (Honor in Electrical Engineering)	Code	Scheme L-T-P
1.	Introduction To Object Oriented Programming	EE291	3-0-2
2.	Artificial Intelligence Techniques	EE391	3-0-2
3.	Digital Signal Processing	EE392	3-0-2
4.	Advanced Micro controller	EE491	3-0-2

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B. Tech. I (EE), Semester I BASIC ELECTRICAL ENGINEERING EE101	Scheme	L	T	P	Credit
		3	1	2	05

1.	Course Outcomes (COs): At the end of the course, the students will be able to
CO1	Explain the principles of magnetic circuits and electromagnetic induction
CO2	Examine the series and parallel ac circuits
CO3	Solve electric circuit problems by using network theorems
CO4	Analyse polyphase circuits
CO5	Describe the principles of transformer, induction motors and wiring schemes

2.	Syllabus	
	MAGNETIC CIRCUIT AND ELECTROMAGNETIC INDUCTION	**(09 Hours)**
	Amperes circuital law, analogy between electric & magnetic circuits, fringing, leakage, series, parallel, series-parallel circuits, Faradays law, Lenz law, self-inductance, mutual inductance, coefficient of mutual inductance, coefficient of coupling, inductance in series, parallel, series-parallel, Analysis of coupled coils, dot rule, conductively coupled equivalent circuit.	
	SERIES AND PARALLEL AC CIRCUITS	**(06 Hours)**
	Complex algebra and its application to circuit analysis, R-L, R-C, R-L-C series and parallel circuits, series and parallel resonance.	
	ELECTRICAL NETWORKS ANALYSIS	**(12 Hours)**
	Kirchhoff's Voltage Law, Kirchhoff's Current Law, independent and dependent sources, Mesh current and Nodal Voltage analysis, Super position theorem, Thevenin's theorem, Norton's theorem, Reciprocity theorem, Maximum power transfer theorem	
	POLYPHASE CIRCUITS	**(06 Hours)**
	Balanced three phase systems, star and mesh connections, calculations for balanced and unbalanced three phase networks, polyphase vector diagram, and measurement of power in three phase circuits.	
	SINGLE PHASE TRANSFORMERS	**(04 Hours)**

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	Principle of transformer, construction - shell type, core type, transformer on no-load, with load, phasor diagram for transformer under no-load and loaded condition (with unity, lagging power factor load) equivalent circuit, open circuit and short circuit test, losses in the transformer, efficiency, voltage regulation.	
	THREE-PHASE INDUCTION MOTORS	**(04 Hours)**
	Rotating magnetic field, types of induction motor, Principle of operation, slip, different power stages, efficiency of the induction motor.	
	ELECTRIC WIRING AND ILLUMINATION	**(04 Hours)**
	Circuits in domestic wiring, simple control circuit in domestic installation, Types of lamps, fixtures & reflectors, illumination schemes for domestic, industrial & commercial premises, Lumen requirements for different categories, working principle of tube light (fluorescent tube), LED.	
	Tutorials will be based on the coverage of the above topics separately	**(15 Hours)**
	Practical will be based on the coverage of the above topics separately	**(30 Hours)**
	(Total Contact Time: 45 Hours + 15 Hours + 30 Hours = 90 Hours)	

3.	**Tutorials**
1	Tutorials will be based on the coverage of the topics given in the detailed syllabus separately for 15 hours.

4.	**Practicals**
1	Power measurement in single phase R-L series circuit.
2	Power measurement in single phase R-C series circuit.
3	To study the working principle of tube light and fan.
4	Hysteresis loop on DSO.
5	Study the different types of wiring in electrical engineering.
6	Determination of single-phase transformer equivalent circuit parameters using open-circuit and short circuit test.
7	Load test on single phase transformer.
8	Three phase power measurement using two wattmeter methods.

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9	Star- delta connection of three phase circuit.

5.	**Books Recommended**
1	V. N. Mittle and Arvind Mittal, "Basic Electrical Engineering", 2nd edition, Tata McGraw-Hill Education 2005.
2	Edminister Joseph A., "Electrical circuits", Schaum's outline series, McGraw hill, 2nd edition, 1983.
3	B. L. Theraja and A. K. Theraja, "A text book of Electrical Technology: Volume I: Basic Electrical Engineering", S. Chand, 2013.
4	Kothari Nagrath, "Basic Electrical Engineering", 2nd edition, Tata McGraw-Hill Education 2007.
5	A.Chakrabarti, " Circuit Theory", Dhanpat Rai & Co. , Sixth edition, 2012
6	A. Chakrabarti, M. L. Soni, P.V. Gupta, U. S. Bhatnagar, "Power System Engineering", Dhanpatrai & Co., Second edition, 2013.

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B. Tech. I (EE), Semester I ENGINEERING DRAWING ME110	Scheme	L	T	P	Credits
		2	0	4	04

1.	Course Outcomes (COs): At the end of the course, the students will be able to
CO1	Prepare engineering drawings as per BIS and ISO conventions
CO2	Understand the various engineering curves with their real-life applications
CO3	Analyze the lateral surface of the solids with different sections and with inter-penetration of solids
CO4	Develop the imagination and will be able to represent the shape size and specifications of physical objects using isometric and orthographic projections
CO5	Produce computer-generated drawings using CAD software.

2.	Syllabus	
	INTRODUCTION	**(02 Hours)**
	Importance of Engineering Drawing, Drawing instruments and materials, B.I.S. and ISO Conventions, First angle and third angle projection method	
	ENGINEERING CURVES	**(03 Hours)**
	Classification of engineering curves, construction of conics, cycloidal curves, Involutes and spirals.	
	PROJECTION OF POINTS, LINES AND PLANES	**(04 Hours)**
	Introduction to principal planes of projection, Projections of the points located in same and different quadrant, projection of lines with its inclination to the reference planes, true length of the lines and its inclination with reference planes, projection of planes with its inclination with two reference planes, concept of auxiliary plane method for projection of planes	
	PROJECTION AND SECTION OF SOLIDS	**(03 Hours)**
	Classification of the solids, projections of the solids like cylinder, cone, pyramid and prism with its inclination to two reference planes, Section of such solids and true shape of the section	
	PENETRATION CURVE	**(03 Hours)**
	Classification, line of interaction, line/generator method and section plane method; intersection of two prisms, two cylinders, interaction of cone and cylinder, pyramid with prism	

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	DEVELOPMENT OF THE LATERAL SURFACES	**(04 Hours)**
	Method of development, parallel line development, radial line development, developments of cylinder, cone, prism, pyramid, true length of edges–oblique surface.	
	ORTHOGRAPHIC PROJECTIONS	**(04 Hours)**
	Projections from pictorial view of the object on the principal planes for view from front, top and side using first and third angle of projection method	
	ISOMETRIC PROJECTIONS	**(04 Hours)**
	Terminology, isometric scale, isometric view and isometric projection, isometric axes and lines	
	INTRODUCTION TO COMPUTER AIDED DRAFTING	**(03 Hours)**
	Introduction of the drafting and modelling tools and demonstration of its application in latest machines.	
	Practical will be based on the coverage of the above topics separately	**(60 Hours)**
	(Total Contact Time: 30 Hours + 60 Hours = 90 Hours)	

3.	**Practical**
1	Orthographic views
2	Isometric views
3	Engineering curves
4	Projection of points and planes
5	Projection of solids
6	Section of solids
7	Penetration curve and surface development

4.	**Books Recommended**
1	Bhatt N. D., Engineering drawing, Charotar publishing house, 2014
2	Shah P. J., Engineering Graphics, S. Chand and Company, 2013
3	Basant Agrawal, C M Agrawal, 2019, Engineering Drawing, McGraw Hill Education (India) Private Limited
4	S.R. Singhal, O. P. Saxena, 2014, Engineering Drawing, Asian Publisher
5	R. K. Dhawan, 2019, A Textbook of Engineering Drawing, S Chand Publishing

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B. Tech. I (EE), Semester I FUNDAMENTALS OF PHYSICS PH109	Scheme	L	T	P	Credit
		3	0	2	04

1.	Course Outcomes (COs): At the end of the course, the students will be able to
CO1	Recall the basic principles of physics related to solid-state physics, quantum mechanics, photonics, and electromagnetism.
CO2	Illustrate the various physical phenomena with interpretation based on the mathematical expressions involved.
CO3	Apply the concepts/principles to solve the problems related to solid-state physics, quantum mechanics, photonics, and electromagnetism.
CO4	Analyze and examine the solution to the problems using physical and mathematical concepts involved.
CO5	Interpret and justify the results obtained from the experiments.

2.	Syllabus	
	SOLID-STATE PHYSICS	**(12 Hours)**
	Crystallography – Crystalline and amorphous solids, Lattice and unit cell, Seven crystal system and Bravais lattices, Symmetry operation, Miller indices, Atomic radius, Coordination number, Packing factor calculation for SC, BCC, FCC, Bragg's law of X-ray diffraction, Rotating crystal method, Laue Method, Powder crystal method. Nanomaterials – Introduction, Synthesis of nano materials, Top down and Bottom up approach, Ball milling, PVD method, Applications. Superconductivity – Meissner effect, Type-I and Type-II superconductors. Semiconductor physics – Introduction, Direct and indirect band gap semiconductors, Intrinsic and extrinsic semiconductors, Law of Mass action, Charge neutrality, Hall effect.	
	QUANTUM MECHANICS	**(09Hours)**
	Inadequacy of classical mechanics (black body radiation, photoelectric effect, bright line optical spectra), Electron diffraction, de Broglie concept of matter waves, Wave and Particle duality of radiation and matter, Heisenberg's uncertainty principle, Interpretation of wavefunction and probability density, Postulates of quantum mechanics, Schrodinger's wave equation, Eigenvalues and eigenfunctions, Superposition principle, Particle confined in one dimensional infinite potential box.	

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	PHOTONICS	**(12 Hours)**
	Einstein's theory of matter radiation interaction and A & B coefficients, Properties of laser, Spontaneous and stimulated emission, Amplification of light by population inversion, Types of lasers: solid-state laser (Neodymium), gas lasers (CO_2), Optical fibre- principle [TIR] - types- material, mode, refractive index-Fibre loss-Expression for acceptance angle and numerical aperture, Application-Communication.	
	ELECTROMAGNETISM	**(12 Hours)**
	Overview of electrostatics and magnetostatics – divergence and curl of electric field, Gauss law and its applications, polarization, Internal field, Clausius-Mossotti relation, Lorentz force, Biot-Savart's law and Ampere's law, Divergence and Curl of Magnetostatic fields, Magnetic materials, Magnetization, Faraday's law, Maxwell's equations, Continuity Equation, Wave solution of Maxwell Equations	
	Practical will be based on the coverage of the above topics separately	**(30 Hours)**
	(Total Contact Time: 45 Hours + 30 Hours = 75 Hours)	

3.	**Practical**
1	Radiation correction
2	Prism Angle
3	Magnetic Field of Circular Coil
4	Malus' Law: Polarization of light
5	Stefan's Law
6	Plank's Constant using Photovoltaic Cell
7	Diffraction Grating
8	Newton's Ring

4.	**Books Recommended**
1	C. Kittel, Introduction to Solid State Physics, John-Wiley 2016.
2	A. Beiser, Concept of the Modern Physics, McGraw-Hill 2008
3	R. Eisberg and R. Resnick, "Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles", John-Wiley, 2nd Edition, 2006
4	D. J. Griffiths, Introduction to electrodynamics, Pearson India.
5	R. Resnick and D. Halliday Physics (Part I & II), Wiley 2007.

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Sardar Vallabhbhai National Institute of Technology (SVNIT) Surat
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B. Tech. I (EE), Semester I MATHEMATICS - I MA113	Scheme	L	T	P	Credits
		3	1	0	04

1.	Course Outcomes (COs): At the end of the course, the students will be able to
CO1	apply the concept of differential calculus to engineering problems
CO2	evaluate the solution of ordinary differential equations of first order.
CO3	analyse the nature of ODE of 2nd order and find its series solution
CO4	develop the mathematical models for real world problems and their solutions
CO5	develop basic concept of the linear algebra to engineering problems

2.	Syllabus	
	DIFFERENTIAL CALCULUS	**(10 Hours)**
	Differentiation of Hyperbolic and Inverse Hyperbolic functions. Successive Differentiation, standard forms, Leibnitz's theorem and applications, Power series, Expansion of functions, Taylor's and Maclaurin's series. Curvature, Radius of curvature for Cartesian curve with application	
	ORDINARY DIFFERENTIAL EQUATION	**(10 Hours)**
	Reorientation of differential equation first order first degree, exact differential equation and Integrating factors, first order higher degree odes, solvable for p, y and x, Solution of homogenous equations higher order, complementary functions, Particular Integrals, Linear differential equation with variable coefficient, Cauchy's Euler and Legendre's equation with variable coefficient, Method of variation of parameters.	
	APPLICATION OF DIFFERENTIAL EQUATION (MATHEMATICAL MODELLING)	**(06 Hours)**
	Modeling of Real world problems particularly Engineering System, Electrical network models (LCR), spread of epidemic (SI, SIS, SIR), Newton's Law of cooling, Single compartment modelling, Bending of beam models.	
	SERIES SOLUTION AND SPECIAL FUNCTIONS	**(06 Hours)**

	Regular point, Singular point, series solution of ODE of 2nd order with variable coefficient with special emphasis to differential equation of Legendre's and Bessel's for different cases of roots of indicial equations.	
	VECTOR SPACE AND SUBSPACES	**(08 Hours)**
	Fields, Vector spaces over a field, subspaces, Linear independence and dependence, coordinates, Bases and dimension, Gram-Schmidt orthonormalization, Orthonormal basis, Orthogonal projection	
	BETA AND GAMMA FUNCTION	**(05 Hours)**
	Beta and Gamma function with their properties and duplications formula without proof.	
	Tutorials will be based on the coverage of the above topics separately	**(15 Hours)**
	(Total Contact Time: 45 Hours + 15 Hours = 60 Hours)	

3.	**Tutorials**
1	Tutorials will be based on the coverage of the topics given in the detailed syllabus separately for 15 hours

4.	**Books Recommended**
1	Kreyszig E., "Advanced Engineering Mathematics", 10th Ed., John Wiley, 2015.
2	Wylie C. R., "Advance Engineering Mathematics", 6th Ed., McGraw-Hill, 1995.
3	James Steward De, "Calculus", Thomson Asia, Singapore, 2003
4	Simmons, G. F. Differential equations with applications and historical notes. CRC Press, 2016.
5	Simmons, G. F. Differential equations with applications and historical notes. CRC Press, 2016.

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B. Tech. I (EE), Semester I ENGLISH AND PROFESSIONAL COMMUNICATION HS110	Scheme	L	T	P	Credits
		3	1	0	04

1.	Course Outcomes (COs): At the end of the course, the students will be able to
CO1	Show enhanced reception towards the use of English language.
CO2	Choose and employ appropriate words for professional communication.
CO3	Develop sentences and text in English coherently and formally.
CO4	Demonstrate overall improvement in oral communication.
CO5	Analyze and infer from written and oral messages.

2.	Syllabus	
	COMMUNICATION	**(05 Hours)**
	Introduction to Communication, Different forms of Communication, Barriers to Communication and some remedies, Non-Verbal Communication – Types, Non-Verbal Communication in Intercultural Context	
	VOCABULARY AND USAGE OF WORDS	**(06 Hours)**
	Common Errors, Synonyms, Antonyms, Homophones, and Homonyms; One Word Substitution; Misappropriations; Indianisms; Redundant Words.	
	LANGUAGE THROUGH LITERATURE	**(08 Hours)**
	Selected short stories, essays, and poems to discuss nuances of English language.	
	LISTENING AND READING SKILLS	**(06 Hours)**
	Types of listening, Modes of Listening-Active and Passive, Listening and note taking practice, Practice and activities Reading Comprehension (unseen passage- literary /scientific / technical) Skimming and scanning, fact vs opinion, Comprehension practice	
	SPEAKING SKILLS	**(10 Hours)**
	Effective Speaking, JAM, Presentation Skills- types, preparation and practice. Interviews- types, preparation and mock interview; Group Discussion- types, preparation and practice	
	WRITING SKILLS	**(10 Hours)**

Subject Code: ##nXX; ##: Department Identity, n: Year, XX: Subject Sequence number XX: last digit 0 (subject offered in both ODD and EVEN semesters, XX: 01 to 30 – last digit ODD and EVEN for ODD and EVEN semesters (Mandatory Core), XX: 31 to 50 (Optional Core), XX: 51 to 99 (Elective), Subjects list for Minor and Honor (M/H#1-4), Subjects list for Specialization track (#1-4) EG: Engineering Subject, SC: Science Subject (offered combinedly by departments) (SVNIT Surat)

	Prerequisites of effective writing, Memo-types, Letter Writing- types, Email etiquette and Netiquette, Résumé-types, Report Writing and its types, Editing.	
	Tutorials will be based on the coverage of the above topics separately	**(15 Hours)**
	(Total Contact Time: 45 Hours + 15 Hours = 60 Hours)	

3.	**Tutorials**
1	Letter and Resume
2	Group Discussion
3	Presentation Skills (Individual)
4	Role Play on Nonverbal communication
5	Group Presentation
6	Debate
7	Body language and intercultural communication
8	Listening Activities
9	Editing
10	Report Writing
11	Mock interviews
12	JAM

4.	**Books Recommended**
1	Kumar, Sanjay and Pushp, Lata. *Communication Skills*, 2nd Edition, OUP, New Delhi, 2015.
2	Raman, Meenakshi& Sharma Sangeeta. *Technical Communication Principles and Practice*, 3rd Edition, OUP, New Delhi, 2015.
3	Raymond V. Lesikar and Marie E Flatley. *Basic Business Communication skills for Empowering the Internet generation.* Tata McGraw Hill publishing company limited. New Delhi 2005.
4	Courtland L. Bovee, John V. Thill, and MukeshChaturvedi. "Business Communication Today." Ninth Edition. Pearson, 2009.
5	Mike Markel. "Practical Strategies for Technical Communication," Bedford/ St. Martin's Second Edition, 2016
6	Laura J. Gurak and John M. Lannon. "Strategies for Technical Communication in the Workplace," Pearson, 2013.

Sardar Vallabhbhai National Institute of Technology (SVNIT) Surat
Department of Electrical Engineering
B.Tech. Electrical Engineering

B. Tech. I (EE), Semester II ELECTRICAL CIRCUITS EE102	Scheme	L	T	P	Credits
		3	1	0	04

1.	Course Outcomes (COs): At the end of the course, the students will be able to
CO1	apply concept of graph theory for solution of AC and DC circuits.
CO2	develop a mathematical model (differential equations) of a given electric circuit and solve it using technique of domain transformation.
CO3	construct a given waveform by using set of standard functions.
CO4	calculate various parameters of two port network and inter relationship between them.
CO5	design filter circuits for given specifications.

2.	Syllabus	
	GRAPH THEORY AND ITS APPLICATIONS	**(10 Hours)**
	Fundamental concepts, definitions of a graph and various related terms, cut sets and tie sets, matrices of oriented graphs, properties and inter relationships of incidence, tie set and cut set matrices, complete circuit analysis using tie set and cut set techniques	
	LAPLACE TRANSFORMATION	**(08 Hours)**
	Laplace transform properties and theorems, Laplace transform of standard functions, Laplace transforms for periodic functions, initial and final value theorems, Inverse Laplace transform using partial fraction expansion and convolution integral methods. Waveform synthesis.	
	NETWORK FUNCTIONS AND TWO PORT PARAMETERS	**(08Hours)**
	Poles and zeros of a function, physical and analytical concepts, terminals and terminal pairs, driving point immittances, transfer functions, restrictions on locations of poles and zeros in S-plane. time domain behavior from pole zero locations in the S plane, procedure for finding network functions for general two terminal pair network, transfer immittances, two port and N-port networks, Ladder, Lattice, Pie, and Tee networks. Definitions, calculations and interrelationships of impedance, admittance, hybrid, and transmission line parameters for two port networks and their interrelations	
	ONE TERMINAL PAIR NETWORKS	**(05 Hours)**

Subject Code: ##nXX; ##: Department Identity, n: Year, XX: Subject Sequence number XX: last digit 0 (subject offered in both ODD and EVEN semesters, XX: 01 to 30 – last digit ODD and EVEN for ODD and EVEN semesters (Mandatory Core), XX: 31 to 50 (Optional Core), XX: 51 to 99 (Elective), Subjects list for Minor and Honor (M/H#1-4), Subjects list for Specialization track (#1-4) EG: Engineering Subject, SC: Science Subject (offered combinedly by departments) (SVNIT Surat)

	Reactive networks and their properties, external and internal critical frequencies, separation property for reactive functions and its proof	
	TWO TERMINAL PAIR REACTIVE NETWORKS (FILTERS)	**(07 Hours)**
	Ladder network and its decomposition into tee, pie, and L sections, image impedance, image transfer function and applications to LC networks, attenuation and phase shift in symmetrical Tee and Pie networks, constant K-filters, m-derived filters, composite filters, lattice filters, Bartlett's bisection theorem. Introduction to the active filters	
	AC AND DC TRANSIENTS	**(07 Hours)**
	Initial and final conditions of networks and their S-domain equivalent circuits, R-L, R-C and R-L-C DC transients, two mesh transients, R-L, R-C and R-L-C sinusoidal transient analysis using Laplace transform methods, two mesh AC transients, complete response of RL, RC and RLC circuits to step, sinusoidal, exponential, ramp, impulse and the combinations of these excitations.	
	Tutorials will be based on the coverage of the above topics separately	**(15 Hours)**
	(Total Contact Time: 45 Hours + 15 Hours = 60 Hours)	

3.	**Tutorials**
1	Tutorials will be based on the coverage of the topics given in the detailed syllabus separately for 15 hours

4.	**Books Recommended**
1	W. H. Hayt, J. E. Kemmerly, and Durbin S. M., Engineering Circuit Analysis, Tata McGraw Hill, 6th Edition, 2006.
2	M.E. Van Valkenburg, Network Analysis, Prentice Hall, India, 3rd Edition, 2002.
3	A. Chakrabarti, Circuit Theory, Dhanpat Rai & Co., 6th Edition, 2012.
4	A. Edminister Joseph, Electrical circuits, Schaum's outline series, McGraw hill, 2nd Edition, 1983.
5	Charles K. Alaxander and Matthew N.O. Sadiku, Fundamentals of electric circuits, Tata McGraw Hill, 5th Edition, 2013.

Sardar Vallabhbhai National Institute of Technology (SVNIT) Surat
Department of Electrical Engineering
B.Tech. Electrical Engineering

B. Tech. I (EE), Semester II ELECTRONIC DEVICES AND CIRCUITS EC108	Scheme	L	T	P	Credits
		3	0	2	04

1.	Course Outcomes (COs): At the end of the course, the students will be able to
CO1	Understand the construction and working of different semiconductor devices
CO2	Apply semiconductor devices in the design of rectifiers, voltage regulators in DC power supply, and other power electronics applications.
CO3	Analyse DC and AC circuits of semiconductor devices
CO4	Analyse the small signal models of diodes, BJT and FET.
CO5	Design, Implement and Evaluate different biasing techniques.

2.	Syllabus	
	SEMICONDUCTOR DIODES AND APPLICATIONS	**(10 Hours)**
	Quantitative theory of PN diode, volt-ampere characteristics, and its temperature dependence, narrow-base diode, transition and diffusion capacitance of p-n junction diodes, breakdown of junctions on the reverse bias, small signal models of the diode, PN diode Application as Rectifier, Half Wave Rectifier, Centre Tap and Bridge Rectifier, Filter circuits, C, LC and pie filter with circuit Diagram and waveforms. Zener Diode theory, Construction, Operation with forward and reverse VI characteristics, Zener Voltage Regulator, construction and application of Schottky and Varactor Diodes.	
	BIPOLAR JUNCTION TRANSISTOR ANALYSIS AND DESIGN	**(09 Hours)**
	Introduction to BJT, IV characteristics, Analysis of CE Configuration: Current Amplification in the Transistor Circuits, Power Calculations, Bypass Capacitor, Coupling Capacitors, the concept of AC and DC Load Lines, Different DC Biasing Methods, Fixed Bias, Emitter Stabilized Bias, Potential Divider Bias, DC Bias with voltage Feedback, Common Base Configuration Analysis, Emitter follower, Charge Storage, and transient response, small signal models of BJT, Ebers-Moll Model of BJT.	
	FIELD EFFECT TRANSISTOR CIRCUITS	**(09 Hours)**

Subject Code: ##nXX; ##: Department Identity, n: Year, XX: Subject Sequence number XX: last digit 0 (subject offered in both ODD and EVEN semesters, XX: 01 to 30 – last digit ODD and EVEN for ODD and EVEN semesters (Mandatory Core), XX: 31 to 50 (Optional Core), XX: 51 to 99 (Elective), Subjects list for Minor and Honor (M/H#1-4), Subjects list for Specialization track (#1-4) EG: Engineering Subject, SC: Science Subject (offered combinedly by departments) (SVNIT Surat)

	Introduction to FET, Bias stability in FET, Different FET Configuration, Analysis of CS, CG and CD Configuration, Voltage Biasing Techniques, Common Source Amplifier, MOS Capacitor, Depletion Mode and Inversion, MOSFET Operation and Enhancement Mode of MOSFET, and Transfer Characteristics.	
	SMALL-SIGNAL LOW-FREQUENCY ANALYSIS AND DESIGN	**(09 Hours)**
	Hybrid Parameters, CE Configurations, CB Configurations, CS Configurations, CD Configuration, Impedance Reflections, Phase Splitter	
	DEVICES USED FOR POWER ELECTRONICS	**(08 Hours)**
	Diac, UJT, SCR, Triac, Power MOSFET, and IGBT.	
	Practical will be based on the coverage of the above topics separately	**(30 Hours)**
	(Total Contact Time: 45Hours +30 Hours = 75 Hours)	

3.	**Practical**
1	Diode Characteristic
2	Rectifiers and Filters
3	Zener as a Voltage Regulator
4	BJT Characteristics
5	BJT Biasing Methods
6	FET Characteristics
7	FET Biasing Methods
8	MOSFET Inverter
9	Common Emitter Amplifier
10	Common Source Amplifier
11	UJT Characteristics
12	SCR or TRIAC Characteristics
13	SPICE Modelling of Diode, BJT and MOSFET
14	MINI-PROJECT Work

Subject Code: ##nXX; ##: Department Identity, n: Year, XX: Subject Sequence number XX: last digit 0 (subject offered in both ODD and EVEN semesters, XX: 01 to 30 – last digit ODD and EVEN for ODD and EVEN semesters (Mandatory Core), XX: 31 to 50 (Optional Core), XX: 51 to 99 (Elective), Subjects list for Minor and Honor (M/H#1-4), Subjects list for Specialization track (#1-4) EG: Engineering Subject, SC: Science Subject (offered combinedly by departments) (SVNIT Surat)

4.	**Books Recommended**
1	Schilling Donald L. and Belove E., "Electronics Circuits- Discrete and Integrated", McGrawHill Education, 3rd Edition, 200
2	Boylestad Robert L. and Nashelsky Louis, "Electronics Device & Circuits Theory", Pearson Education India, 11th Edition, 2015
3	Millman Jacob, Halkias Christos C., and Parikh C., "Integrated Electronics", McGraw-Hill Education, 2 nd Edition, 2017.
4	D. A. Neamen and Dhrubesh Biswas "Semiconductor Physics and Devices (SIE) ", McGraw Hill Education, 4th Edition, 2017.
5	J. Milman and A. Grabel, "Microelectronics", McGraw Hill Education, 2 nd Edition, 2017.
6	A. S. Sedra, K. C. Smith, and Arun N. Chandorkar, "Microelectronic Circuits: Theory & Applications", Oxford University Press, 7th Edition, 2017.

Sardar Vallabhbhai National Institute of Technology (SVNIT) Surat
Department of Electrical Engineering
B.Tech. Electrical Engineering

B. Tech. I (EE), Semester I FUNDAMENTALS OF COMPUTER AND PROGRAMMING CS110	Scheme	L	T	P	Credit
		3	0	2	04

1.	Course Outcomes (COs): At the end of the course, the students will be able to
CO1	acquire knowledge about computer architecture, network and software development.
CO2	install an operating system and configure the network along with programming skills to solve the given problem.
CO3	debug network and operating system related issues and analyse the given problem.
CO4	evaluate programming solutions with different aspects.
CO5	design and develop solution for given problems.

2.	Syllabus	
	INTRODUCTION TO COMPUTER AND ITS ARCHITECTURE	**(02 Hours)**
	Introduction and Characteristics, Computer Architecture, Generations, Classifications, Applications, Central Processing Unit and Memory, Communication between various Units, Processor Speed, Multiprocessor System, Peripheral Buses, Motherboard Demonstration.	
	MEMORY AND VARIOUS INPUT AND OUTPUT DEVICES	**(02 Hours)**
	Introduction to Memory, Input and Output Devices, Memory Hierarchy, Primary Memory and its Types, Secondary Memory, Classification of Secondary Memory, Various Secondary Storage Devices and their Functioning.	
	NUMBER SYSTEMS	**(01 Hours)**
	Introduction and type of Number System, Conversion between Number System, Arithmetic Operations in different Number System, Signed and Unsigned Number System.	
	INTRODUCTION TO SYSTEM SOFTWARES AND PROGRAMMING LANGUAGES	**(05 Hours)**
	Classification of Computer Languages, Introduction of Operating System, Evolution, Type and Function of OS, Unix Commands, Evolution and Classification of programming Language, Feature and Selection of good Programming Language, Development of Program, Algorithm and Flowchart, Program Testing and Debugging, Program Documentation and Paradigms, Characteristics of good Program.	

Subject Code: ##nXX; ##: Department Identity, n: Year, XX: Subject Sequence number XX: last digit 0 (subject offered in both ODD and EVEN semesters, XX: 01 to 30 – last digit ODD and EVEN for ODD and EVEN semesters (Mandatory Core), XX: 31 to 50 (Optional Core), XX: 51 to 99 (Elective), Subjects list for Minor and Honor (M/H#1-4), Subjects list for Specialization track (#1-4) EG: Engineering Subject, SC: Science Subject (offered combinedly by departments) (SVNIT Surat)

	WINDOWS OPERATING SYSTEM AND ITS ENVIRONMENT	**(02 Hours)**
	Introduction to GUI based OS, Configuration, Setup, Services, Network Configuration.	
	LINUX OPERATING SYSTEM AND ITS ENVIRONMENT	**(03 Hours)**
	Introduction to Unix based OS, Configuration, Setup, Services, Scripting, Network Configuration.	
	DEBUGGING TOOLS AND COMPILER OPTION	**(04 Hours)**
	Different Debugging tools, Commands, Memory dump, Register and Variable Tracking, Instruction and Function level debugging, Compiler Options, Profile Generation.	
	DATA COMMUNICATION, COMPUTER NETWORK AND INTERNET BASICS	**(02 Hours)**
	Data Communication and Transmission media, Multiplexing and Switching, Computer Network and Network Topology, Communication Protocols and Network Devices, Evolution and Basic Internet Term, Getting Connected to Internet and Internet Application, Email and its working, Searching the Web, Languages of Internet, Internet and Viruses.	
	PROGRAMMING USING 'C' LANGUAGE – INTRODUCTION	**(06 Hours)**
	Characteristics of C Language, Identifiers and Keywords, Data Types Constants and Variables, Declarations and Statements, Representation of Expressions, Classification of Operators and Library Functions for Data Input and Output Statements, Formatted Input and Output Statements.	
	PROGRAMMING USING 'C' LANGUAGE – CONTROL STATEMENT, DATA STRUCTURES, POINTERS	**(06 Hours)**
	Conditional Control Statements, Loop Control Statements, One Dimensional Array of Numbers and Characters, Two-Dijmensional Array, Introduction and Development of User Defined Functions, Different Types of Variables and Parameters, Structure and Union, Introduction to Pointers, Pointer Arithmetic, Array of Pointers, Pointers and Functions, Pointers and structures, File Handling Operations.	
	PROGRAMMING USING 'C' LANGUAGE – FUNCTIONS	**(06 Hours)**
	Functions, Passing the arguments, return values from functions, Recursion, Header Files Design, File handling operations, Read and Write to Secondary Devices, Read and Write to Input and Output Ports.	
	PROGRAMMING USING 'C' LANGUAGE – GRAPHICS, DEBUGGING	**(06 Hours)**
	Include Graphics Library, Debugging, Linking, Compilation Option for Optimization, Make file.	

Subject Code: ##nXX; ##: Department Identity, n: Year, XX: Subject Sequence number XX: last digit 0 (subject offered in both ODD and EVEN semesters, XX: 01 to 30 – last digit ODD and EVEN for ODD and EVEN semesters (Mandatory Core), XX: 31 to 50 (Optional Core), XX: 51 to 99 (Elective), Subjects list for Minor and Honor (M/H#1-4), Subjects list for Specialization track (#1-4) EG: Engineering Subject, SC: Science Subject (offered combinedly by departments) (SVNIT Surat)

	Practical will be based on the coverage of the above topics separately	**(30 Hours)**
	(Total Contact Time: 45 Hours + 30 Hours = 75 Hours)	

3.	**Practical**
1	Basic commands of Windows and Linux
2	Installing and configuring using Windows and Linux
3	Flow chart drawing and writing pseudo steps or algorithms steps
4	Programming using different data structures
5	Solving complex problems

4.	**Books Recommended**
1	"Introduction to Computer Science", Fourth Impression, Pearson Education, ITL Education Solutions Limited, 2009.
2	Gottfried B.S., "Programming with C Schaum's outline Series", Outline Series, 2/E, Tata McGraw-Hill, 2006.
3	Brian W. Kernighan, Dennis M. Ritchie, "The C Programming language", 2/E, Prentice Hall PTR publication, 1988.
4	E. Balagurusamy, "Programming in ANSI C", 6/E, Tata Mc-Graw Hill, 2012.
5	PradipDey, "Programming in C", 2/E, Oxford University Press, 2012.

Sardar Vallabhbhai National Institute of Technology (SVNIT) Surat
Department of Electrical Engineering
B.Tech. Electrical Engineering

B. Tech. I Year, Semester II APPLIED THERMAL ENGINEERING ME108	Scheme	L	T	P	Credits
		3	0	2	04

1.	Course Outcomes (COs): At the end of the course, the students will be able to
CO1	Relate the thermodynamic laws to engineering systems and processes.
CO2	Analyze the performance of various steam power cycles in the context to the power plant.
CO3	Classify various steam generators
CO4	Illustrate the selection and application of various hydraulic and steam turbines, and water pumps
CO5	Describe the working principles of steam power cycles

2.	Syllabus	
	THERMODYNAMICS	**(09Hours)**
	Thermodynamics & statistical thermodynamics, Thermodynamic system, properties, states, processes, cycle, equilibrium, Zeroth law of thermodynamics, Definition of work & heat and their evaluation for various thermodynamics processes, First law of thermodynamics for flow and non-flow processes, SFEE, Application of first law of thermodynamics to boilers, engines, turbines, and compressors, Equation of state for ideal gas, Change in entropy, internal energy, enthalpy of gas in various thermodynamics processes.	
	PROPERTIES OF PURE SUBSTANCES	**(07Hours)**
	Definition of pure substance, Phases of a pure substance, P-V-T behavior of a pure substance, Critical & triple point of a pure substance, Mollier diagram, steam table & dryness fraction of steam, Measurement of dryness fraction of steam.	
	THERMAL POWER PLANT	**(08 Hours)**
	Review of Thermodynamic cycle for Power Plants. Simple steam power cycle, Rankine cycle, Rankine cycle efficiency, Comparison of Rankine & Carnot cycles. Reheat cycle, Regenerative cycle, Reheat -regenerative cycle	
	STEAM TURBINES	**(07Hours)**
	Steam Nozzles: Introduction, Types of nozzles, Flow of steam through nozzles, Expansion of steam considering friction, Nozzle efficiency, Super-saturated flow through nozzle, Examples.	

Subject Code: ##nXX; ##: Department Identity, n: Year, XX: Subject Sequence number XX: last digit 0 (subject offered in both ODD and EVEN semesters, XX: 01 to 30 – last digit ODD and EVEN for ODD and EVEN semesters (Mandatory Core), XX: 31 to 50 (Optional Core), XX: 51 to 99 (Elective), Subjects list for Minor and Honor (M/H#1-4), Subjects list for Specialization track (#1-4) EG: Engineering Subject, SC: Science Subject (offered combinedly by departments) (SVNIT Surat)

	Steam Turbines, Impulse Turbine: Working principle, Forces on blades, Velocity diagrams, efficiency of multi stage turbine, Specific speed and performance, characteristic curves for impulse turbine. Impulse Reaction Turbine: Working principle, Degree of reaction, Compounding of pressure and velocity.	
	HYDRAULIC TURBINES	**(06 Hours)**
	Working principle of impulse and reaction turbines, construction details and working of Pelton, Francis and Kaplan turbine, draft tube, velocity triangles, degree of reaction, losses, power and efficiency calculations, cavitation in reaction turbines,	
	HYDRAULIC PUMPS	**(08Hours)**
	Principle of dynamic action & positive displacement type of pump, classification, main components of centrifugal pump and function, priming, velocity triangle, work done and energy transfer in the centrifugal pump, losses, heads, and various efficiencies of the pump	
	Practical will be based on the coverage of the above topics separately	**(30 Hours)**
	(Total Contact Time: 45 Hours + 30 Hours = 75 Hours)	

3.	**Practical**
1	Performance test on gearpump.
2	Performance test on a centrifugal pump.
3	Study and performance of conventional water turbines.
4	Performance study of unconventional low turbines
5	Performance study of unconventional hydrokinetic turbines
6	Estimation of power output & efficiency of a steam turbine.
7	Study of the condenser and cooling tower

4.	**Books Recommended**
1	P K Nag, Engineering Thermodynamics, McGraw Hill Education Private Limited, 2013.
2	Y.A. Cengel and M.A. Boles, Thermodynamics, Tata McGraw Hill, 2004
3	P.L. Ballaney, Thermal Engineering, Khanna Publishers, 2000
4	P.K. Nag, Power Plant Engineering, Tata McGraw Hill Publications, 2017
5	R. K. Bansal, Fluid Mechanics and Hydraulic Machines, Laxmi Publications, 2019
6.	R. K. Rajput, Fluid Mechanics and Hydraulic Machines, S Chand &Compan, 2016

Subject Code: ##nXX; ##: Department Identity, n: Year, XX: Subject Sequence number XX: last digit 0 (subject offered in both ODD and EVEN semesters, XX: 01 to 30 – last digit ODD and EVEN for ODD and EVEN semesters (Mandatory Core), XX: 31 to 50 (Optional Core), XX: 51 to 99 (Elective), Subjects list for Minor and Honor (M/H#1-4), Subjects list for Specialization track (#1-4) EG: Engineering Subject, SC: Science Subject (offered combinedly by departments) (SVNIT Surat)

Sardar Vallabhbhai National Institute of Technology (SVNIT) Surat
Department of Electrical Engineering
B.Tech. Electrical Engineering

B. Tech. I Year, Semester II MATHEMATICS II MA114	Scheme	L	T	P	Credits
		3	1	0	04

1.	Course Outcomes (COs): At the end of the course, the students will be able to
CO1	Apply the concept of partial differentiation to engineering problems.
CO2	Evaluate the solution of partial differential equations of first order
CO3	Evaluate the double and triple integrals
CO4	Apply the concept of vector calculus to engineering problems
CO5	Describe the convergence and divergence of infinite series.

2.	Syllabus	
	PARTIAL DIFFERENTIATION	**(10 Hours)**
	Partial differentiation, Euler's theorem for homogeneous function, Modified Euler's theorem, Taylor's and Maclaurin's series for two variables. Tangent plane and Normal line, Error and Approximation, Jacobians with properties, Extreme values of function of two variables, Lagrange's methods of undetermined multipliers	
	INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATION	**(09 Hours)**
	Introduction to Partial differential equation, Formation of partial differential Equation, Partial differential Equation of first order, Linear partial differential equation of first order (Pp + Qq=R) and method of obtaining its general solution, Non-linear partial differential equation of first order f(p, q)=0, f(z, p, q)=0, f(x, p)= g(y, q), z= px + qy + f(p, q).	
	DOUBLE AND TRIPLE INTEGRALS	**(10 Hours)**
	Reorientation of concepts of integrals and Double integrals, evaluation techniques, change of order of Integration, change of variable, Application of double integrals for evaluation of area and volume. Triple integrals, evaluation techniques, Application of triple integrals for evaluation of volume	
	VECTOR CALCULUS	**(08 Hours)**

Subject Code: ##nXX; ##: Department Identity, n: Year, XX: Subject Sequence number XX: last digit 0 (subject offered in both ODD and EVEN semesters, XX: 01 to 30 – last digit ODD and EVEN for ODD and EVEN semesters (Mandatory Core), XX: 31 to 50 (Optional Core), XX: 51 to 99 (Elective), Subjects list for Minor and Honor (M/H#1-4), Subjects list for Specialization track (#1-4) EG: Engineering Subject, SC: Science Subject (offered combinedly by departments) (SVNIT Surat)

	Scalar and vector point function, differential operator, gradient, directional derivative, divergence, curl and Laplacian operator with their properties, Line integral, Surface Integral, Volume integral, Green's, Gauss and Stokes theorem (Only statement) & application.	
	INFINITE SERIES	**(08 Hours)**
	Introduction, Positive term series, Comparison test, Cauchy's root test, D'Alembert's test, Raabe's test, Logarithmic test, Integral test, Gauss's test, Series with arbitrary terms, Rearrangement of terms	
	Tutorials will be based on the coverage of the above topics separately	**(15 Hours)**
	(Total Contact Time: 45 Hours + 15 Hours = 60 Hours)	

3.	**Tutorials**
1	Tutorials will be based on the coverage of the topics given in the detailed syllabus separately for 15 hours.

4.	**Books Recommended**
1	Malik S.C., and Arora S., "Mathematical Analysis", 5th Ed., Wiley Eastern Ltd., New Age International Publishers, 2017.
2	Raisinghania M. D., "Ordinary and Partial Differential Equations", 18th Ed., S. Chand Publication, 2016
3	Kreyszig E., "Advanced Engineering Mathematics", 10th Ed., John Wiley, 2015
4	Wylie C. R., "Advance Engineering Mathematics", 6th Ed., McGraw-Hill, 1995
5	James Steward De, "Calculus", Thomson Asia, Singapore, 2003

Sardar Vallabhbhai National Institute of Technology (SVNIT) Surat
Department of Electrical Engineering
B.Tech. Electrical Engineering

B.Tech.1 /M.Sc. 1 Semester I/ II INDIAN VALUE SYSTEM AND SOCIAL CONSCIOUSNESS HS120	Scheme	L	T	P	Credit
		2	0	0	02

1.	Course Outcomes (COs): At the end of the course, the students will be able to
CO1	interpret the important values that need to be cultivated
CO2	analyse the cultures depicted in Ramayana, Mahabharata, Jainism and Buddhism
CO3	review the structure of Indian knowledge system
CO4	discuss the significance of constitution of India
CO5	demonstrate social responsibility

2.	Syllabus	
	HUMAN VALUES AND CONSCIOUSNESS	**(08 Hours)**
	Human Values Definition and Classification of Values; The Problem of Hierarchy of Values and their Choice; Self-Exploration; 'Basic Human Aspirations; Right understanding, Relationship and Physical Facility; fulfilment of aspirations; Understanding Happiness and Prosperity, Harmony at various levels. What Is Consciousness? ; Can We Build A Conscious Machine?; Levels Of Consciousness; Mind, Matter And Beyond; Holistic Lifestyle; Dealing With Anxiety; Connecting Mind To Brain; Minds, Brains, And Programs.	
	INDIAN CULTURE AND HERITAGE	**(07 Hours)**
	Culture and its salient features: The Vedic – Upanishadic Culture and society, Human aspirations in those societies; Culture in Ramayana and Mahabharata: The Ideal Man and Woman, Concepts Maitri, Karuna, Seela, Vinaya, Kshama, Santi, Anuraga – as exemplified in the stories and anecdotes of the Epics; The Culture of Jainism: Jaina conception of Soul, Karma and liberation, Buddhism as a Humanistic culture; The four Noble truths of Buddhism; Vedanta and Indian Culture;	
	INDIAN KNOWLEDGE SYSTEM	**(08 Hours)**
	Indian knowledge as a unique system, Place of Indian knowledge in mankind's evolution, Relevance of Indian knowledge to present day and future of mankind, Nature of Indian Knowledge; Structure of Indian Knowledge: Types of knowledge (para, apara), The scientific and the unscientific, Instruments for gaining and verifying knowledge, Knowledge traditions: Lineages, Instruments - debate, epistemology and pedagogy, The inverted tree – axiomatic, deductive, empirical knowledge, and evolution of knowledge; Disciplines of Study: A brief outline of the subjects, the major contributions and theories along with timelines where	

	relevant: Mathematics; Astronomy; Physical Sciences; Cosmogony; Language studies; Astrology; Moral studies/righteousness; Statecraft and political philosophy	
	INDIAN CONSTITUTION	**(04 hours)**
	History of Making of the Indian Constitution; Philosophy of the Indian Constitution: Preamble; Salient Features; Contours of Constitutional Rights & Duties; Organs of Governance: Parliament; Composition; Qualifications and Disqualifications; Powers and Functions	
	SOCIAL RESPONSIBILITY	**(03 Hours)**
	Social Responsibility: Meaning and Importance, Different Approaches of Social Responsibility. Social Responsibility of Business towards different Stakeholders. Evolution and Legislation of CSR in India.	
	(Total Contact Time: 30 Hours)	

3.	**Books Recommended**
1	D. K. Chaturvedi, Professional Ethics Values and Consciousness, Ane Books Pvt. Ltd., 2023.
2	R.R. Gaur, R Sangal, G. P. Bagaria, Human Values and Professional Ethics, Excel Books, New Delhi, 2010.
3	A.N. Tripathi, Human Values, New Age Intl. Publishers, New Delhi, 2004.
4	P R Rao, Indian Heritage and Culture, Sterling Publishers Pvt. Ltd, 1988.
5	D. Singh, Indian Heritage and Culture, APH Publishing Corporation, 1998.
6	Sri Prashant Pole, Treasure Trove of Indian knowledge, Prabhat Prakashan, 2021.
7	Sri Suresh Soni, Sources of our cultural heritage, Prabhat Prakashan, 2018.
8	D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.