

MAHARASHTRA INSTITUTE OF TECHNOLOGY,

AURANGABD

An Autonomous Institute Affiliated to Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Maharashtra (India)

First Year B.Tech. Syllabus (Group-B) 2021-22



			Engineering (A)	and D	ata S	Science	e)	-	_	-				-
Sr. No	Course Category	Course Code	Course Title	L	Т	Р	Contact Hr /Wk	Credits	MSE-I	MSE-II	CIE	TA	ESE/ Oral	Total
			Foundation Program/SIP: 3 Week Duration											
1.1	BSC	BSC101	Calculus and Differential Equations	3	-	-	3	3	15	15	10	10	50	100
1.2	HSMC	HSM101	Engineering Exploration	1	-	4	5	3	25	25	10	10	30	100
1.3	ESC	ESC101	C-Programming	3	-	-	3	3	15	15	10	10	50	100
1.4	ESC	ESC104	Basic Electrical Engineering	3	-	-	3	3	15	15	10	10	50	100
1.5	BSC	BSC102 - BSC104	Open Elective-I	3	-	-	3	3	15	15	10	10	50	100
1.6	ESC	ESC201	Lab-I: C-Programming	-	-	2	2	1	-	-		-	25	25
1.7	ESC	ESC207	Lab-II: Basic Electrical Engineering	-	-	2	2	1	-	-		-	25	25
1.8	BSC	BSC201 - BSC203	Lab-III: Open Elective-I	-	-	2	2	1	-	-		25	-	25
1.9	ESC	ESC204	Lab-IV: Workshop	-	-	2	2	1	-	-		25	-	25
1.10	ESC	ESC208	Lab-V: Simulation Lab	-	-	2	2	1	-	-		-	25	25
1.11	HSMC	HSM201	Lab-VI: Communication Skills	-	-	2	2	1	-	-		25	-	25
1.12	ESC	ESC206	Environmental Studies	-	-	2	2	Non-Credit Mandatory Course						
S1				13	0	18	31	21	85	85	50	125	305	650
Sr. No	Course Category	Course Code	Course Title	L	Т	Р	Contact Hr /Wk	Credits	MSE-I	MSE-II	CIE	TA	ESE/ Oral	Total
2.1	BSC	BSC151	Statistics and Integral Calculus	3	1	-	4	4	15	15	10	10	50	100
2.2	ESC	ESC151	Python Programming	3	-	-	3	3	15	15	10	10	50	100
2.3	ESC	ESC154	Basic Electronics Engineering	3	-	-	3	3	15	15	10	10	50	100
2.4	ESC	ESC155	Mobile Application Development	3	-	-	3	3	15	15	10	10	50	100
2.5	BSC	BSC102 - BSC104	Open Elective-II	3	-	-	3	3	15	15	10	10	50	100
2.6	ESC	ESC251	Lab-I: Python Programming	-	-	2	2	1	-	-		25	-	25
2.7	ESC	ESC254	Lab-II: Basic Electronics Engineering	-	-	2	2	1	-	-		25	25	50
2.8	ESC	ESC255	Lab-III: Mobile Application Development	-	-	2	2	1	-	-		-	25	25
2.9	BSC	BSC201 - BSC203	Lab-IV: Open Elective-II	-	-	2	2	1	-	-		25	-	25
2.10	HSMC	HSM251	Lab-V: Cognitive Aptitude	-	-	2	2	1	-	-		25	-	25
			1	1				Non-Credit Mandatory Course						
2.11	HSMC	HSM252/ HSM253	Language Proficiency-German Language/ Japanese	-	-	2	2		No	on-Cre	dit Ma	ndatory (Course	

F. Y. B. Tech. Syllabus Structure w.e.f. 2021-22 nnuter Science and Engineering, Electrical Engineering, Electronics and Computer Engineering, Comp

Group-B (Computer Science and Engineering, Electrical Engineering, Electronics and Computer Engineering, Computer Science and

Syllabus of First Year B.Tech. 2021-22

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Open Elective-I/II

- BSC102 Engineering Physics
- BSC103 Engineering Chemistry
- BSC104 Biology for Engineers
- BSC201 Lab-III/IV: Engineering Physics
- BSC202 Lab-III/IV: Engineering Chemistry
- BSC203 Lab-III/IV: Biology for Engineers



Faculty of Science & Technology					
	Syllabus of F. Y. B	.Tech. All Branches (Semester I)			
Course Code: B	SC101	Credits: 3-0-0			
Course: Calculu	is and Differential	Mid Semester Examination-I: 15 Marks			
Equations		Mid Semester Examination-II: 15 Marks			
Teaching Scher	ne: Theory: 03 Hrs/week	Continuous Internal Evaluation: 10 Marks			
		Teacher Assessment: 10 Marks			
		End Semester Examination: 50 Marks			
		End Semester Examination (Duration): 2 Hrs			
Prerequisite	Students required the knowledge of all basic concepts related to calculus and				
	differential equations.				
Objectives	1. To develop skills and create interest to use mathematics in Engineering &				
	technology				
	2. To know how the real	l word problems governed by the first order differential			
	equations and calculus				
	3. To understand the imp	ortance of differential calculus and differential equations			
	in Engineering & techr	nology.			
	4. To learn formation and	l solving various types of differential equations.			
Unit-I	Differential Calculus : n th	^h Derivative of Standard functions, Leibnitz's Theorem,			
	Taylor's Series, Maclaur	in's Series, Indeterminate Forms: L' Hospital's Rule			
	(Without Proof), Evaluation	on of Limits. (6 Hrs)			
Unit-II	Infinite Series: Sequence	es, Introduction to Infinite Series, Convergence and			
	Divergence of Infinite Ser	ies: p-Series Test, Comparison Test, D' Alembert's Ratio			
	Test, Cauchy's N th Root T	est. (6 Hrs)			
Unit-III	Differential Equations:	Solution of First Order and First Degree Differential			
	Equation: Exact, Linear an	d Bernoulli's Equation (Reducible to Linear) (6 Hrs)			

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Unit-IV	Appli	Application Of Differential Equations: Application of First Order and First-Degree				
	Differ	Differential Equations: Electrical Circuit, Mechanics and Orthogonal Trajectories.				
		(6 Hrs)				
Unit-V	Parti	al Differentiation: P	artial Derivatives - 1	Introduction, Homogene	ous Functions	
	of Tw	vo Variables - Euler's	Theorem, Implicit I	Functions, Total Derivation	ive, Change of	
	Varia	bles.			(7 Hrs)	
Unit-VI	Appli	ications of Partial D	ifferentiation: Max	ima and Minima of Fun	ctions of Two	
	Varia	bles, Jacobians and It	ts Properties.		(5 Hrs)	
Textbooks/	Sr.	Title	Author	Publication	Edition	
Reference	No.					
Books	1.	Advanced	Louis C. Barrett,	McGraw-Hill	6 th Edition	
		Engineering	C. Ray Wylie	Publishing Company		
		Mathematics		Ltd, New Delhi,		
				2003.		
	2.	Engineering	Venkatraman	National publishing	4 th edition	
		Mathematics-	M.K.	company, Chennai,		
		Volume I		2008.		
	3.	Higher	Dr. Grewal B.S.	Khanna Publications,	40 th Edition	
		Engineering		New Delhi, 2007.		
		Mathematics				
	4.	Advanced	H. K. Dass	S. Chand and Co. Ltd	18 th Edition	
		Engineering				
		Mathematics				
	5.	Advanced	Erwin Kreyszig	Willey Eastern Ltd.	10 th Edition	
		Engineering		Mumbai		
		Mathematics				
	6.	Advanced	M. D. Greenberg	Pearson Publication	2 nd Edition	
		Engineering				
	1		1		1	



	Mathematics			
7.	A Textbook of	Peter O'Neil	Thomson Asia Pvt.	7 th Edition
	Engineering		Ltd., Singapore	
	Mathematics			



Faculty of Science & Technology					
	Syllabus of F. Y. B.Tech. All Branches (Semester I)				
Course Code	: HSM101	Credits: 1-0-2			
Course: Engi	ineering Exploration	Mid Semester Examination-I: 25 Marks			
Teaching Scl	neme:	Mid Semester Examination-II: 25 Marks			
Theory: 01 H	Ir/week	Teacher Assessment: 10 Marks			
Practical: 04	Hrs/week	Continuous Internal Evaluation: 10 Marks			
		End Semester Examination: 30 Marks			
		End Semester Examination (Duration): 2 Hrs			
	1. To make student understand	the role of an Engineer as a problem solver.			
	2. To enable students to build simple systems using engineering design process.				
Objectives	3. To introduce ethical, sustainability perspectives.				
	4. To get students familiar with engineering project management skills.				
	5. To make students explore different aspects of engineering.				
	Engineering and multidisciplinary applications				
	Difference between school and engineering study, difference between science and				
Unit-I	engineering, introduction to industrial revolutions, their key characteristics, related				
	case studies evolution and need of multidisciplinary engineering, job roles, skill set of				
	engineers, engineer and society	y, challenges towards 21 st century (4 Hrs)			
	Project Management				
Unit II	Project, key elements of project, Project management strategies, Introduction to Agile				
01111-11	practices, SCRUM framework	, Significance of teamwork, Project management tools:			
	Checklist, Timeline, Gantt Chart, project libre (61)				
	Engineering Design				
	Engineering Design Process,	problem formulation from need , conceptual design,			
Unit-III	product architecture, relevant t	cools for engineering design steps: pairwise comparison			
	chart, morphological chart, Pu	gh chart, selection criteria for components, Motor and			
	battery sizing concepts	(15 Hrs)			



	Mech	anisms					
Linit_IV	Basic Components of a Mechanism, structure, Degrees of Freedom or Mobility of a						
01111-1 1	Mecha	anism, 4 Bar Chain, Cran	k Rocker Mecha	nism, Slider Crank Mecha	nism, Simple		
	Robot	ic Arm building, introdu	ction to linkage		(10 Hrs)		
	Platfo	Platform Based Development					
	Ardui	no platform, electronic	component over	erview, different variants	of Arduino,		
Unit-V	Devel	opment Environment of	Arduino, develo	ping logic for program, cre	ation of flow		
	charts	, mblock coding, creati	ing sketches, in	terfacing different I/O w	ith Arduino,		
	develo	pping mechatronics syste	em		(15 Hrs)		
	Docu	mentation and softwar	e tools				
Init VI	Impor	Importance of communication in engineering profession, Significance of					
Umi-vi	documentation, introduction to report writing and presentation: types of presentation,						
	presen	ntation making using soft	tware tools		(10 Hrs)		
Textbooks/	Sr.	Title	Author	Dublication	Edition		
Reference	No.	The	Autio	Tubication	Lation		
Books	1.	Engineering Design:	C.L. Dym, P.	Wiley Publication	4 th Edition		
		A Project Based	Little				
		Introduction					
	2.	Project Design &	Karl Ulrich	McGraw Hill	5 th Edition		
		Development		Publication			
	3.	Theory of Machines	S. S. Rattan	McGraw Hill	4 th Edition		
				Publication			
	4.	Getting Started with	Massimo	O'Reilly	1 st Edition		
		Arduino	Banzi				
	5.	Project Management	-	Active.collab	1 st Edition		
		Methodologies and					
		Framework					
	6.	Manuals and datasheet	s of respective s	oftware and hardware tool	S		



Faculty of Science & Technology					
	Syllabus of F. Y. B.Tech. All Branches (Semester I)				
Course Code	:: ESC101	Credits: 3-0-0			
Course: C-Pr	rogramming	Mid Semester Examination-I: 15 Marks			
Teaching Sci	heme:	Mid Semester Examination-II: 15 Marks			
Theory: 03 H	Irs/week	Continuous Internal Evaluation: 10 Marks			
		Teacher Assessment: 10 Marks			
		End Semester Examination: 50 Marks			
		End Semester Examination (Duration): 2 Hrs			
	Course Objectives:				
	1. To introduce students to the	he basic knowledge of programming fundamentals of C			
Objectives	language.				
Objectives	2. To impart writing skill of C programming to the students and solving programming to				
	3. To impart the concepts like decision control structures, looping, array, function				
	pointers, structure.				
	Programming Languages:	Introduction to programming language, Types of			
	programming language- Ma	achine language, Assembly Language, High Level			
∐nit_I	Language, compiler, assembler, interpreter, loader, linker, editor.				
Umt-1	Introduction to C: C Character set, Constants, Variables, Keywords and Operators,				
	Basic data types, Type conve	rsion, Instructions, Algorithm, Flow Chart, C program			
	structure, Simple C program.	(6 Hrs)			
	The Decision control struct	ures: If, if-else, nested if statements, Logical operators,			
Unit-II	conditional operator, relationa	l operator. (6 Hrs)			
	Looping Control Structur	es: While for and do-while Break and continue			
Unit-III	statements Switch -case state	ment (6 Hrs)			
	Arrows: Arrow declaration	Initialization One dimensional and Two dimensional			
Unit-IV	arrays Matrix operations				



	Strings: Introduction, Standard Library Functions - strlen(), strcpy(), strcat(), strcmp(),					
	strrev(strrev(), etc. (6 Hrs)				
Unit-V	Funct Introd Scope Pointe array a Struct	Functions Introduction to function, Uses of functions, Function declaration and definition, Scope rule of functions, Call by value, Recursion. Pointers: Introduction to pointers, Pointer notation, Call by Reference, Passing an array and array elements to a function. (6 Hrs) Structures:				
Unit-VI	Introduction to Structure, Uses of Structures, Declaring a Structure, Accessing structure elements, Array of structures. (6 Hrs)					
Textbooks/ Reference	Sr. No.	Title	Author	Publication	Edition	
Books	1.	Introduction to computers	Peter Norton	Tata McGraw Hill	4 th Edition	
	2.	Let us C	Yeshwanth Kanetkar	BPB	8 th Edition	
	3.	The C Programming language	Kernighan B.W and Ritchie D.M	Pearson Education	2 nd Edition	
	4.	Programming with C	Byron S Gottfried	Tata McGraw- Hill, Schaum's Outlines	2 nd Edition	
	5.	Programming in C	E. Balagurusamy	Tata McGraw Hill	4 th Edition	



Faculty of Science & Technology				
	Syllabus of F. Y. B. Tec	ch. Circuit Branches (Semester I)		
Course Code: H	ESC-104	Credits: 3-0-0		
Course: Basic I	Electrical Engineering	Mid Semester Examination-I: 15 Marks		
Teaching Schen	ne:	Mid Semester Examination-II: 15 Marks		
Theory: 03 Hrs/	week,	Continuous internal Evaluation: 10 Marks		
		Teacher Assessment: 10 Marks		
		End Semester Examination: 50 Marks		
		End Semester Examination (Duration): 2 Hrs		
Prerequisite	Knowledge of Physics and	Mathematics of 12 th Standard		
	1. To introduce fundame	ental concepts, various laws-principles and theorems		
	associated with electrical systems.			
	2. To impart basic knowledge of all electrical quantities such as current, voltage,			
Ohiectives	power, energy, frequency .			
Objectives	3. To impart knowledge about fundamental parameters such as resistance,			
	inductance and capacitance and magnetic circuits, AC and DC circuits.			
	4. To impart knowledge	of the concepts of transformer, different energy		
	conversions techniques			
	Introduction Effect of t	emperature on resistance, Resistance temperature		
Unit-I	coefficient, Work, Power energy and relationship between Thermal, mechanical,			
	and electrical units. (Proble	ems based on above topics) (6 Hrs)		
	D.C. Networks series-para	llel combination of network, Star-delta transformation,		
Unit-II	Kirchhoff's law, Loop and	d nodal analysis, Superposition Theorem, Thevenin's,		
	maximum power transfer th	neorem (6 Hrs)		
	Magnetic Circuits BH Cur	rve, expression for eddy current loss, series magnetic		
Unit-III	circuits, Inductance, self-in	nductance, mutual inductance and emf induced due to		
	self and mutual inductance,	coefficient of coupling energy stores. (6 Hrs)		



	A.C. C	Circuits Sinusoidal voltag	e and current wave	forms, RMS and av	erage value,
Unit-IV	R-L, I	R-C, RLC series parallel	circuits, phaser dia	gram, power and p	ower factor,
	series,	and parallel resonance.			(6 Hrs)
	Three	Phase Balanced System,	Three phase voltag	e generation and wa	aveform star
Unit-V	and de	elta balanced systems, Rel	ationship between j	phase and line quan	tities, phaser
	diagra	m, power in a three-phase	e circuit		(6 Hrs)
	Single	e phase transformer Cor	struction, principl	e of operation, en	nf equation,
Unit-VI	Types	, Ideal Transformer, Vec	tor diagrams at no	load, Turns /Volta	age/ Current
	ratio,	Efficiency and Regulation	n of Transformer, A	pplications in the fi	eld. (6 Hrs)
Textbooks/	Sr.	Title	Author	Publication	Edition
Reference	No.				
Books	1.	Electrical Technology	B. L. Thereja	S. Chand	24 th
		Vol. I & II		Publishing	Edition
	2.	Basic Electrical	J. B. Gupta	Katsons Books,	14 th
		Engineering			Edition
	3.	Basic Electrical	V. K. Mehta	S. Chand	2 nd
		Engineering		Publishing	Edition
	4.	ABC of Electrical	B. L. Thereja	S. Chand	1 st Edition
		Engineering	A. K. Thereja	Publishing	
	5.	Basic Electrical	E. Huges	Mc-Graw Hill	10 th
		Engineering			Edition



Faculty of Science & Technology				
	Syllabus of F. Y. B	B.Tech. All Branches (Semester I)		
Course Code: B	SC102	Credits: 3-0-0		
Course: Open E	lective-I: Engineering	Mid Semester Examination-I: 15 Marks		
Physics		Mid Semester Examination-II: 15 Marks		
Teaching Scher	ne:	Continuous Internal Evaluation: 10 Marks		
Theory: 03 Hrs/	/week	Teacher Assessment: 10 Marks		
		End Semester Examination: 50 Marks		
		End Semester Examination (Duration):2 Hrs		
	1. To let the engineerin	g undergraduates study physical properties, concepts and		
	physical quantities re	quired for the solution of complex engineering problems		
	2. To make the enginee	ring undergraduates learn basic principles of Physics and		
	laws of scientific investigation to identify, formulate and analyse complex			
	engineering problems			
Objectives	3. To equip engineering undergraduates with competencies of scientific meth			
	required in engineering career by upgrading skills on the basis of learning			
	achieved from physic	cal science perspectives.		
	4. To engage engineerin	g undergraduates extensively in scientific investigation for		
	interdisciplinary grad	uate programs and a wide variety of other lifelong learning		
	opportunities.			
	Optics			
	The wave equation, Introduction to electromagnetic waves and electromagnetic			
	spectrum, Newton's ring, Michelson interferometer, Applications of interference			
∐nit-I	Diffraction of light, diffr	action grating, resolving power of grating, Application of		
	diffraction grating in spe	ctroscopic devices.		
	Polarization, Nicol pris	sm, Laurent's half shade polarimeter, applications of		
	polarization.	(6 Hrs)		



	Acoustics				
	Acoustic terminology and definitions, Acoustic Wave Equation and its Basic				
	Physical Measures, Sabine's formula (derivation not necessary) acoustics factor in				
Unit-II	architectural design.				
	Ultrasonics				
	Properties, Production of ultrasonic waves by piezo-electric and magnetostriction				
	generator, engineering applications of ultrasonic waves. (6 Hrs.)				
	Crystal Structure				
	Crystalline and amorphous material, lattice and unit cell, Miller indices, SC, BCC,				
	FCC, diamond structure, NaCl structure, imperfections and defects in solids				
Unit III	X-Rays				
01111-111	Basics of X-Rays, Production and Detection of X-Rays, Continuous and				
	characteristics spectrum, Bragg's law of X-ray diffraction, Bragg's spectrometer,				
	Intensity of diffracted Beams, Particle Size Determination by XRD, Precise Lattice				
	Parameter Determination (6 Hrs)				
	Nuclear Physics				
	Nuclear force, liquid drop model, shell model, Nuclear fission and fusion, Q-value				
	of nuclear reaction, nuclear reactor, P-P cycle, C-N cycle, cyclotron, GM counter,				
	applications of nuclear physics in various fields.				
Unit-IV	Modern Physics				
	Black body radiation, Planck' s law, Photoelectric effect, Wave particle duality, De-				
	Broglie's concept of matter wave, Davisson-Germer experiment, Scanning				
	tunneling microscope, Time-dependent and time-independent Schrodinger				
	equation for wave function, Quantum computing. (6 Hrs)				
	Introduction to solids				
Unit-V	Superconductivity: Superconductivity, effect of temperature and magnetic fields,				
	Meissner effect, type I and II superconductors, BCS theory, Applications.				



	Free electron theory of metals, Fermi level, density of states, Application to white						
	dwarfs and neutron stars, Bloch's theorem for particles in a periodic potential,						
	Kronig-Penney model and origin of energy bands						
	Magnetic Materials: Magnetic susceptibility and diamagnetic materials,						
	paramagnetic, ferromagnetic, and, BH characteristics, applications.						
	Nanomaterials and Nanotechnology : Properties of nanomaterials, 0 D, 1 D, 2 D and 3 D nanoparticle, various carbon allotropes, historical instances and day to day						
	exam	ples, Introduction to	o nanotechnology an	d applications in various	engineering		
	fields	5.			(6 Hrs)		
	Lase	r					
	Einst	ein's theory of matte	er radiation interactio	on and A and B coefficient	s, Properties		
	of las	of laser, spontaneous and stimulated emission, ruby laser, He-Ne laser, CO2 laser					
Unit-VI	and semiconductor Laser, applications of lasers in science, engineering and						
	medicine.						
	Fiber Technology						
	Propagation of light through optical fiber, acceptance angle and cone numerical						
	aperture, Single and Multi-Mode Fibers, applications, sensors. (6 Hrs)						
Textbooks/	Sr.	Title	Author	Publication	Edition		
Reference	No.	Inte	Tution	Tublication	Lutton		
Books	1.	A Textbook of	M N Avadhanulu				
		Engineering	P.G. Kehireagar	S. Chand & Co.	7 th Edition		
		Physics	1. O. Killisagai				
	2.	A Textbook of	R K Gaur				
		Engineering	S L Gunta	Dhanpat Rai	3 rd Edition		
		Physics	S. L. Oupla				
	3.	Fundamentals of	David Halliday,				
		Physics	Jearl Walker, and	Wiley	6 th Edition		
			Robert Resnick				



	4.	Elements of X- ray Diffraction	B. D. Cullity	Addison-Wesley Metallurgy Series	1 st Edition	
	5.	Nuclear Physics	Irving Kaplan	Narosa Publishing house	2 nd Edition	
	6.	Introduction to Solid State Physics	C. Kittel	John Wiley & Sons, Inc	8 th Edition	
	7.	Lasers and Non- Linear Optics	B.B. Laud	New Age International	3 rd Edition	
	1.	http://science.howstuffworks.com/laser1.htm http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html http://nptel.ac.in/courses/122107035/				
	2.					
Websites and	3.					
online	4.	http://nptel.ac.in/ce	http://nptel.ac.in/courses/122104016/			
courses	5.	https://www.coursera.org/learn/intro-to-acoustics				
	6.	https://nptel.ac.in/courses/112/106/112106227/				
	7.	https://nptel.ac.in/courses/113/104/113104081/				
	8.	https://nptel.ac.in/courses/115/102/115102017/				



Faculty of Science & Technology				
	Syllabus of F. Y. B.Tech. All Branches (Semester I)			
Course Code:	BSC103	Credits: 3-0-0		
Course: Oper	Elective-I: Engineering	Mid Semester Examination-I: 15 Marks		
Chemistry		Mid Semester Examination-II: 15 Marks		
Teaching Sch	eme:	Continuous Internal Evaluation: 10 Marks		
Theory: 03 H	rs/week	Teacher Assessment: 10 Marks		
		End Semester Examination: 50 Marks		
		End Semester Examination (Duration):2 Hrs		
	1. To relate the concepts of C	Chemistry in all Engineering Disciplines.		
	2. To make the engineering undergraduates acquainted with modern techniques in			
	engineering and industrial	Chemistry.		
Objectives	3. To equip engineering undergraduates with the knowledge of advanced and			
	existing Engineering Materials.			
	4. To develop the awareness about powering the future using advanced energy			
	Storage Systems.			
	Advanced Engineering Mate	erials		
	Industrial Polymers: Thermoplastics (PVC) & Thermosetting polymers (Bakelite),			
	Biodegradable polymers (PVa), Properties, Applications			
Unit-I	Nanomaterials: Preparation	of nano materials by Laser method, properties and		
	applications of CNTs.			
	Composite Materials: Ceramic matrix composites, carbon- carbon composites			
	Reinforcements : Silicon carb	ide, Fiber glass. (6 Hrs)		
	Water Technology:			
Unit-II	Water Parameters: Total Disso	lved Solids (TDS), Dissolved Oxygen (DO), Chemical		
	Oxygen Demand (COD), pH	, Hardness of water: types and units, Estimation of		
	hardness by EDTA method, n	umerical on hardness; Boiler troubles: scale, sludge,		



	priming, foaming and caustic embrittlement; Water treatment: Ion exchange process,					
	Ultra filtration, Nano filtration (6 Hrs					
	Fuels	s and Energy Storage Sy	ystems:			
	Fuels	: Gross and net calorif	ic value, Solid fuels	: proximate analysis	s of coal &	
Unit-III	impo	rtance, gaseous fuels: con	mposition properties	and application of na	atural gases-	
	CNG	, LNG.				
	Energ	gy Storage Systems: Bio	electrochemical batte	ries, lithium-ion batte	ery, alkaline	
	fuel c	cell (AFC)			(6 Hrs)	
	Lubr	ricants and Coolants				
	Lubr	icants: Introduction, Pro	perties of liquid lub	pricants: viscosity an	nd viscosity	
Unit-IV	index	x, flash point and fire	point, acid value.	Numerical on visco	osity index.	
	Coolants: Introduction, properties and uses of water and ethylene glycol as coolant.					
		(6 Hrs)				
	Corrosion and its prevention					
	Definition, types, mechanism of dry and wet corrosion, Corrosion testing methods:					
Unit-V	ultrasonic testing, computed digital radiography, Prevention of corrosion: Methods-					
	sacrificial anodic protection, Electroplating, Powder coating					
	(6 Hrs)					
	Meta	llurgical processes				
	Calcination, smelting, ore dressing, roasting, refining of metals, Metalworking					
Unit-VI	processes: casting, forging, rolling, machining, sintering, Laser cladding, 3D printing					
					(6 Hrs)	
Textbooks/	Sr.					
Reference	No.	Title	Author	Publication	Edition	
Books	1.	Engineering		Mc Graw	3 rd	
		Chemistry	B. Siva Shankar	Hills Publications	Edition	
	2.	Engineering	Shelly, Oberi and	Cingage	1 st	



	3.	Principles of		John Wiley	4 th	
		Polymerization	Odian, G.G	& Sons, Inc	Edition	
	4.	Engineering Chemistry	Jain & Jain	Dhanpat Rai Publishing	16 th Edition	
	5.	Polymer Chemistry	Malcolm P.	Oxford	3 rd	
		Stevens	University Press	Edition		
	6.	A Textbook of	Shashi Chawla	Dhanpat Rai &	10 th	
		Chemistry	Shashi Chawla	СО	Edition	
	7.	Material Science &	William Callister	Wiley	9 th Edition	
		Engineering	and V. Raghavan	Whey	> Lantion	
Websites	1	Unit- I –				
and online		https://onlinecourses.nptel.ac.in/noc21_ch49/preview				
courses		https://www.explainthatstuff.com/composites.html				
	2	Unit- II –				
		https://nptel.ac.in/content/storage2/courses/116104045/lecture8.pdf https://nptel.ac.in/content/storage2/courses/116104045/lecture6.pdf Unit- III – https://nptel.ac.in/content/storage2/courses/121106014/Week12/lecture38.pdf https://www.sciencedirect.com/topics/engineering/proximate-analysis				
	3					
	4	Unit- IV –				
		https://nptel.ac.in/course	es/112/102/112102014	L		
		https://nptel.ac.in/content/storage2/courses/112105127/pdf/LM-12.pdf				
	5	Unit- V - <u>https://nptel.ac</u>	.in/courses/113/108/1	<u>13108051/</u>		
	6	Unit- VI - <u>https://nptel.ac</u>	Unit- VI -https://nptel.ac.in/courses/112/107/112107144/			



Faculty of Science & Technology			
	Syllabus of F. Y. B.T	Tech. All Branches (Semester I)	
Course Code	: BSC104	Credits: 3-0-0	
Course: Oper	n Elective-I: Biology for	Mid Semester Examination-I: 15 Marks	
Engineers		Mid Semester Examination-II: 15 Marks	
Teaching Sch	neme:	Continuous Internal Evaluation: 10 Marks	
Theory: 03 H	lrs/week	Teacher Assessment: 10 Marks	
		End Semester Examination: 50 Marks	
		End Semester Examination (Duration):2 Hrs	
	To introduce students to mode	em biology with an emphasis on evolution of biology as	
Objectives	a multi-disciplinary field, to make them aware of application of engineering principles		
	in biology, and engineering ro	bust solutions inspired by biological examples.	
	Introduction to Molecular	Biology, Central Dogma of life, DNA replication,	
Unit-I	Translation and transcription, Introduction to Genetics, Phylogenetic analysis,		
	Introduction to developmental biology, structure and functions of cell. (8 Hrs)		
	Introduction to immunology, components of the immune system, antigens and		
Unit-II	antibodies, B-cells and T- cells development, proliferation and differentiation, MHC		
	Restriction, Complement syst	em. (6 Hrs)	
Unit III	Infectious diseases, TB, HIV,	Flue, COVID-19, response of host to infectious diseases.	
01111-111	Vaccines, cancer biology.	(4 Hrs)	
	Introduction to bioinformatic	s, tools of bioinformatics, primary and secondary data	
Unit-IV	bases, sequence alignments,	methods of structure prediction of proteins, homology	
	modeling	(6 Hrs)	
	Introduction to Analytic	cal Instrumentation, Electrophoresis techniques,	
Unit-V	Chromatography types and te	chniques, Isoelectric focusing, PCR and ELISA	
		(6 Hrs)	
Init VI	Environmental biosafety, bio	presources, biodiversity, bioreactors, ethical aspects of	
	plant and animal biotechnolog	gy, Engineering designs inspired by examples in biology,	



	Engin	Engineering aspects of some Nobel Prizes in Physiology and Medicine & Chemistry /				
	recent	recent advances in Biology (6 He				
Textbooks/	Sr.	Title	Author	Publication	Edition	
Reference	No.	THE	Tuthor	Tublication	Eution	
Books	1.	Essentials of Genetics.	Miko, I. &	Cambridge, MA:	2009	
			Lejeune, L., eds.	NPG Education		
	2.	Essentials of Cell	O'Connor, C. M.	Cambridge, MA:	2010	
		Biology	& Adams, J. U.	NPG Education		
	3.	Molecular Biology of	Warson JD,	Pearson	2004	
		the Gene	Baker, TA, Bell	Education		
			SP, Gann A,			
			Levin M, Losick			
			R,			
	4.	The Greatest Show on	Dawkins, R	Bantam Press,	2009	
		Earth: The Evidence		Transworld		
		For Evolution		Publishers		
	5.	The Blind	Dawkins, R	W. W. Norton &	1996	
		Watchmaker		Со		
	6.	The Double Helix: A	Watson, J. D.	Simon & Schuster	2011	
		Personal Account of		Inc.		
		the Discovery of the				
		Structure of DNA				



	Faculty of Science & Technology					
	Syllabus of F. Y. B.Tech. All Branches (Semester I)					
Course Code: 1	ESC201	Credits: 0-0-1				
Course: Lab-I:	C Programming	End Semester Examination/Oral: 25 Marks				
Teaching Sche	me: Practical: 02 Hrs/week					
	1. Understand the syntax and construction of C code.					
	2. Know the steps involved in comp	biling, linking and debugging C code.				
Objectives	3. Understand how to use header fil	es, library functions, user defined functions.				
	4. To impart the use of different da	ata-structures like arrays, pointers, structures				
	and files.					
	1. If the marks obtained by a student in five different subjects are input through					
	the keyboard, find out the aggregate marks and percentage marks obtained b					
	the student. Assume that the maximum marks that can be obtained by a stude					
	in each subject is 100.					
	2. If the ages of Ram, Shyam and	Ajay are input through the keyboard, write a				
	program to determine the younge	est of the three.				
	3. Any year is entered through th	e keyboard. Write a program to determine				
	whether the year is leap or not us	ing the logical operators.				
	4. Write a program to print the mul	tiplication table of the number entered by the				
List of	user. The table should get display	ved in the following form.				
Practical	5* 1 =5					
	5 *2 = 10					
	5. Write a menu driven program wh	ich has the following options:				
	i) Addition of two integers in) Subtraction iii) Multiplication iv) Exit.				
	Make use of switch statement.					
	6. Write a function power (a, b), to	calculate the value of a raised to b.				



7.	Twenty-five numbers are entered from the keyboard into an array. The number
	to be searched is entered through the keyboard by the user. Write a program to
	find if the number to be searched is present in the array and if it is present,
	display the number of times it appears in the array.
8.	Write a program to demonstrate the following string handling functions strlen(),
	<pre>strcpy(), strcmp(), strcat(), strrev().</pre>
9.	Write a program to swap two numbers using call by reference method.
10.	Create a structure to specify data of customers in a bank.
	The data to be stored is: Account number, Name, Balance in account. Assume
	maximum of 200 customers in the bank. Write a function to print the Account
	number and name of each customer with balance below Rs. 100.
	7. 3. 9.

- Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and term work mentioned above.



Faculty of Science & Technology					
Syllabus of F. Y. B.Tech. Circuit Branches (Semester I)					
Course Code	: ESC207	Credits: 0-0-1			
Course: Lab-	II: Basic Electrical Engineering	End Semester Examination/Oral: 25 Marks			
Teaching Sch	neme:				
Practical: 02	Hrs/week				
List of	Any 10 practical to be conducted	d			
Practical	1. To Study of the accessories to be used in household wirings and awareness of				
	electric safety.				
	2. i) To understand the Concept of Phase, Neutral & Earthling in Electrical				
	Installation.				
	ii) Single Lamp controlled by single switch circuit.				
	3. To Study & Demonstrate circuit of Fluorescent Tube Light.				
	4. To Study & Demonstrate Stai	rcase Wiring.			
	To study & understand the importance of Series Lamp.				
	5. To Verify Ohm's Law.				
	6. To verify Superposition Theo	orem.			
	7. To verify Thevenin's Theorem	n.			
	8. To study the R-L-C series cire	cuit.			
	9. To verify the Voltage Ratio	of single-phase Transformer.			
	10. To verify power in Star/Delt	a Circuits (resistive load) by measuring voltage			
	and current byammeter and	voltmeter is same in both the case.			
	11. To calculate Efficiency & R	egulation of single-phase Transformer.			

- Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and term work mentioned above.



Faculty of Science & Technology						
	Syllabus of F. Y. B.Tech. All Branches (Semester I)					
Course Code:	BSC201	Credits: 0-0-1				
Course: Lab-	III Open Elective-I: Engineering	Teacher Assessment: 25 Marks				
Physics						
Teaching Sch	eme: Practical: 02 Hrs/week					
	Any 10 practical to be conducted	d				
	 Newton's ring: To determine wavelength of monochromatic light G. M. Counter: dead time calculation Grating: To determine wavelength of LASER light. Polarimeter: To determine concentration of solution. 					
	5. Reverberation time: To determine Reverberation time of a hall.					
	6. Characteristics of solar cell					
List of	7. Ultrasonic interferometer					
Practical	8. Zener diode: To study charac	cteristics of zener diode & to determine zener voltage.				
	9. Dielectric constant: to determ	nine dielectric constant.				
	10. Forbidden gap: To determin	e forbidden gap of semiconductors.				
	11. Transistor Characteristics in	CE Configuration.				
	12. To determine the Hall coefficient of a semiconductor material and then evaluated					
	carrier type and its density of charge carrier.					
	13. Planck's Constant					
	14.To measure the divergence of the laser beam					

- Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and term work mentioned above.



Faculty of Science & Technology						
	Syllabus of F. Y. B.Tech. All Branches (Semester I)					
Course Code:	BSC202	Credits: 0-0-1				
Course: Lab-I	II Open Elective-I:	Teacher Assessment: 25 Marks				
Engineering C	Chemistry					
Teaching Sch	eme: Practical: 02 Hrs/week					
	Any 10 practical to be condu	ıcted				
	1. Lab safety experiment					
	2. Preparation and standardization of analytical reagents					
	3. Analysis of Chemical parameters of water					
	4. Analysis of physical parameters of water					
	5. Determination of percentage of moisture and ash in given coal sample.					
	6. Determination of Acid value/ saponification value of lubricating oil.					
List of	7. Determination of visco	7. Determination of viscosity of chemical compound				
Practical	8. Preparation of polyme	r				
	9. Electro gravimetric Es	timation of Metals (Virtual experiment)				
	10. Determination of chlor	ride content of water by Mohr's method (Virtual				
	experiment)					
	11. Determination of melting or boiling point of organic compound. (Virtual					
	experiment)					
	12. Determination of rate of corrosion in different pH media. (Virtual experiment					
	13. Preparation of nano ma	aterials				
	14. Determination of mole	ecular weight of polymer using Ostwald's viscometer				

- Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and term work mentioned above.



Faculty of Science & Technology						
Syllabus of F. Y. B.Tech. All Branches (Semester I)						
Course Code:	Course Code: BSC203 Credits: 0-0-1					
Course: Lab-I	II Open Elective-I: Biology for	Teacher Assessment: 25 Marks				
Engineers						
Teaching Sche	eme: Practical: 02 Hrs/week					
	1. Biosafety laboratory practices and biological waste disposal					
	2. Buffers in biology, buffer	Buffers in biology, buffering capacity and pKa				
	3. Observing cell surface and	Observing cell surface and intracellular contents using light and/or				
	fluorescence microscopy	fluorescence microscopy				
	4. Measuring mechanical stru	. Measuring mechanical strength of cells - osmolarity and elasticity of				
	biological membranes					
	5. Protein and DNA isolation	Protein and DNA isolation from plant cells, visualization of proteins and				
List of	DNA	DNA				
Practical	6. Microbial culture - growth	Microbial culture - growth curve and enumeration methods				
	7. Basic molecular biology to	Basic molecular biology techniques - including isolation of bacterial				
	plasmids demos on Polym	plasmids demos on Polymerase Chain Reaction and Restriction Fragment				
	Length Polymorphism					
	8. Mammalian and plant cell	culture methods				

- Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and term work mentioned above.



Faculty of Science & Technology						
Syllabus of F. Y. B.Tech. All Branches (Semester I)						
Course Code:	ESC204	Credits: 0-0-1				
Course: Lab I	V: Workshop	Teacher's Assessment: 25 Marks				
Teaching Sch	eme: Practical: 2 Hrs/week					
	1. To have hands on practice a	and understanding of various manufacturing processes				
	like Fitting, Turning, mach	ining, Carpentry, Sheet metal work and welding.				
Course	2. To have understanding a	and practice of various measurement devices and				
Objectives	Techniques.					
	3. To have hands understandi	ng and practice of various cutting tools and machines				
	used in manufacturing wor	k.				
	1. Wood sizing exercises in planning, marking, sawing, chiseling, and grooving					
	to makehalf lap joint and cross lap joint.					
	2. A job involving cutting, filing to saw cut, filing all sides and faces, corner					
	rounding, drilling, and tapping on M. S. plates.					
	3. A job on use of plumbing tools and preparation of plumbing line involving					
	fixing of water tap and use of elbow, tee, union and coupling, etc.					
	4. Making a small parts using	GI sheet involving development, marking, cutting,				
	bending, brazing, and sold	ering operations- i) Tray ii) Funnel and similar				
	articles.					
	5. Exercise in Arc welding (M	MAW) to make a square butt joint.				
List of	6. A job on turning of a Mild S	Steel cylindrical job using center lathe.				
Practical	7. A job on turning of Mild ste	el on CNC turning machine.				
(Any	Contents:					
Four)	a) Carpentry: Technical T	erms related to wood working, Types of wood,				
	Joining materials, Types (of joints - Mortise and Tenon, Dovetail, Half Lap,				
	etc., Methods of preparat	ion and applications, wood working lathe, safety				
	precautions.					



b) Welding: Arc welding - welding joints, edge preparation, welding tools and
equipment, Gas welding - types of flames, tools and equipment, Resistance
welding - Spot welding, joint preparation, tools and equipment, safety
precautions.
c) Fitting and Plumbing: Fitting operation like chipping, filing, right angle,
marking, drilling, tapping etc., Fitting hand tools like vices, cold chisel, etc.
Drilling machine and its operation, Different types of pipes, joints, taps,
fixtures and accessories used in plumbing, safety precautions.
d) Sheet Metal Work: Simple development and cutting, bending, Beading,
Flanging, Lancing and shearing of sheet metal, Sheet metal machines -
Bending Machine, Guillotine shear, Sheet metal joints, Fluxes and their use.
e) Machine shop: Lathe machine, types of lathes, major parts, cutting tool,
turning operations, safety precautions
f) CNC machines. Turning center and Vertical milling machines. Operating
principals, major parts and various operations.
The assessment of term work shall be done on the basis of the following.
Continuous assessment
• Performing the experiments in the laboratory
• Oral examination conducted on the syllabus and term work mentioned above
Instruction to Students:
Each student is required to maintain a "workshop diary" consisting of drawing \slash
sketches of the job sand a brief description of tools, equipment, and procedure used
for doing the job.
Reference/Textbooks:
1. K. C. John, Mechanical Workshop Practice, Prentice Hall Publication, New
Delhi,2010.
2. Hazra and Chaudhary, Workshop Technology-I, Media promoters & Publisher
private limited.



Faculty of Science & Technology							
	Syllabus of F. Y. B. Tech. Circuit Branches (Semester I)						
Course	Code: ESC208	Credits: 0-0-1					
Course:	Lab V: Simulation Lab	End Semester Examination/Oral: 25 Marks					
Teachin	g Scheme: Practical: 02 Hrs/week						
1	Introduction to Simulation, Need of	Simulation, Types of Simulation, Applications of					
	Simulation. Execute a simulation of	Dice Game between two players using Microsoft					
	Excel.						
	Hint:						
	Step 1: Open Excel						
	Step 2: use function rand() to generate	ate a random number for player 1					
	Step 3: use function rand() to generate	ate a random number for player 2					
	Step 4 : Declare the winner by finding highest number						
	Tip: You can also use rand(x) to declare x random numbers and then make addition for						
	each player.						
2	To study the steps for building Simu	ulation Model, Formulating the problem, developing a					
	logical model, specifying probabilis	tic assumptions, Implementing the model					
	Create a Forecast worksheet using N	Aicrosoft Excel to predict stock value of a share.					
	Hint:						
	Step 1: Open Excel						
	Step 2: Type date series in one colu	mn					
	Step 3: Type current share value for	each date					
	Step 4: Go to Data-> Forecast Sheet						
	Step 5: Select the Date of Forecast						
	Step 6: Note down Forecast, Lower	Confidence Bound, Upper Confidence Bound.					
3	To study the applications of sim	ulation in Basic Sciences, Mathematics, Computer					
	Engineering, Electronics & Electric	al Engineering and Artificial Intelligence.					



	Create different 3D animation models using Windows.10 built in 3D Viewer software for
	a Bee.
4	To study the application of simulation in Civil Engineering/ Architecture/ Home interior
	design modeling. Explore various methods to change texture/style/design and materials in
	simulation.
	Download and install any 2 Interior Designing freeware. Use given tools and menus for
	SweetHome3D-6.6-windows or similar software and design a room.
5	To create a graphical simulation model using Microsoft Windows tool Paint- 3D. Draw a
	real-world scenario using various objects and shapes.
6	To implement simulation of an electric circuit using Circuit Simulation Software.
	Hint:
	Step 1: go to <u>https://www.circuitlab.com/editor/#</u>
	Step 2: Drag and drop various components from the menu.
	Step 3: Design any simple circuit such as LED indicator or Switch alarm
	Step 4: Simulate the circuit
	Step 5: Export the designed circuit in .pdf format
7	Case Study : MATLAB 2021a SIMULINK
	Write in details the details of MATLAB Simulink including various features, functions,
	simulations and tools.
8	Case Study: GNU Octave. Write in details the details of GNU Octave including various
	features, functions, simulations and tools.
9	Case Study: Fusion 360.
	Write description of Fusion 360 simulator for electronics and CAD/CAM along with
	various features.
10	Mini-project: Plan, Design, Model and Simulate any one of the above tools to show
	simulation of any real life problem related to Electronics Engineering /Computer
	Engineering/ Mechanical Engineering/ Artificial Intelligence/ Civil Engineering/ Art
	Design and Graphics etc.



- Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and term work mentioned above.



	Faculty of Science & Technology						
		Syllab	us of F. Y. B.Teo	ch. All	Branches (Ser	nester I)	
Course Code:	HSM20)1			Credits: 0-0-1		
Course: Lab-	VI: Com	municati	ion Skills		Teacher Assess	sment: 25 Marks	
Teaching Sch	eme: Pra	actical: 0	2 Hrs/week				
Course	1. T	o apply l	English Gramma	r in day	to day commu	inication.	
Objectives	2. T	o pronou	nce and articulat	te Engl	ish words and s	entences accurat	ely
	3. T	o commi	inicate in English	h effect	ively by using	updated vocabul	ary.
	4. T	o apply S	Soft Skills from c	campus	to corporate.		
	5. T	o exhibit	etiquettes throug	gh thei	behavior from	campus to corpo	orate.
Sr. No.	Sec	tion			Conter	nts	
Unit-I			Parts of Speech				
Unit-II	Grammar		Tenses and the Concept of Time				
Unit-III			Transformation of sentences and Conditional Clauses				
	Vocabulary Enhancement		Types of Vocabulary				
Unit-IV			Basic techniques to Enhance Vocabulary				
			Vocabulary Enhancing Activities				
	Phonetics and problems in learning and using pronunciation,						eiation,
TT \$4 \$7	Introd	luction	• Vowel sounds & Consonant Sounds,				
Unit-V	to Pho	onetics	Articulation of Sounds				
		Word accer			t		
	a b	~	Importance of Soft Skills in general,				
Unit-VI	Soft	Skills	• Campus to	Corpor	ate Etiquettes:	(Grooming, Mob	ile, Classroom)
Textbooks/	Sr.				A /7		
Reference	No.		Title		Author	Publication	Edition
Books		The Essence of Ac		Adria	n Budday,	Prentice Hall	1992
	1.	Effectiv	ve	Ron I	Ludlow and	of India-	
		Communication		Fergu	s' Panton	Private Ltd.	



		Professional	A. K. Jain, Pravin,	S. Chand &	2018		
	2.	Communication Skills	S. R. Bhatia, A. M.	Company			
			Sheikh	Ltd.			
		Business	Urmila Rai, S. M.	Himalya	9 th Edition		
	3.	Communication	Rai	Publishing			
				House			
		Technical	Meenakshi Raman	Oxford	2 nd Edition		
	1	Communication-	& Sangeeta	University			
	4.	Principles and	Sharma	Press			
		Practice					
	5	A course in Phonetics	J. Sethi,	PHI	2 nd Edition		
	5.	& Spoken English	P.V. Dharmatma	Publication			
	6	Communication Skills	Sunita Mishra, C.	Pearson	2 nd Edition		
	0.	for Engineers	Murli Krishna	Education			
	7	Grammar of Spoken	Dauglas Biber,	Longman	1 st Edition		
	7.	and Written English	Geoffrey Leech				
0	English Grammar and	Wren and Martin,	S. Chand	1 st Edition			
0.		Composition		Publications			
Mode of	Use of	audio video sessions, de	emonstrations, group a	activities and gar	nes, simulation		
Conduct	activities						

Classroom Activities:

- 1. Self- Introduction Use of Audio, video sessions, demonstrations, group activities and games, scene enactments.
- 2. Review a film clipping
- 3. Guess the word, Telephonic Conversations
- 4. Dumb Charades
- 5. Dialogues, Situational conversation, Relay conversation.



- 6. Analyse a newspaper article
- 7. Spot the error, clues.
- 8. Newspaper articles, Reports, Editorials.
- 9. Picture Composition
- 10. Paragraph Writing
- 11. Group Activity-follow instructions, enacting.
- 12. Crossword Puzzles, Scramble
- 13. Memory Games.
- 14. Chinese Whispers, Follow Instructions

- Continuous assessment
- Performing the experiments in the laboratory
- Online Examination conducted on the syllabus and term work mentioned above.



Faculty of Science & Technology								
	Syllabus of F. Y. B.Tech. All Branches (Semester I)							
Course Code	Course Code: ESC206							
Course: Non	Course: Non-Credits Mandatory course (Environmental Studies)							
Teaching Scl	neme: 02 Hrs./week							
Objectives	1. To raise the awareness, about the emerging environmental issues.							
	2. To study the implementation of environmental policies and practices.							
	3. To study environment as a whole with all the basic concepts related to it.							
Unit-I	Multidisciplinary nature of Environment:							
	Components of Environment, Structure of Atmosphere, Environmental Degradation,							
	Sustainable development, Environmental ethics (4 Hrs)							
Unit-II	Natural Resources:							
	Conventional (Exhaustive) Resources - Forest, Water resources, Alternative							
	(Inexhaustive) Resources i.e., Solar energy, Wind energy, Tidal energy etc. Role of							
	individual in conservation of natural resources. (4 Hrs)							
Unit-III	Environment & Human health:							
	Water quality & health, Air quality & health, Industry and health, Energy & Health.							
	Government organizations in the field of Environment, Institutions working in							
	Environment and conservation, Environmentalists in Environment, and conservation.							
	(4 Hrs)							
Unit-IV	Biodiversity and its conservation:							
	A. Conservation of wildlife, Forest conservation, Soil, Water and Energy							
	Conservation.							
	B. Solid waste management, Plastic waste management, E- waste management.							
	(4 Hrs)							
Unit-V	Environmental Audit and legislations:							
	A. EIA in India, MoEF, ISO environmental standards, Environmental Management							
	System (EMS)							



	B. Pov	B. Power/ Functions of State Pollution Control Board and Central Pollution Control						
	Board. (4 Hrs)							
Unit-VI	Social	Issues and Environmental law	s:					
	Enviro	onmental Protection Act (1986)	, Air Act(1981)	, Water Act(19	74), Forest			
	Act(19	980), Wildlife Protection Act.			(4 Hrs)			
References	Sr.	Title	Author	Publication	Edition			
	No.							
	1.	Handbook of Environmental	Dr. R. K.	Enviro Media	3 rd Edition			
		Laws, Rules guidelines,	Trivedy					
		compliances and standards						
		Volume I and II						
	2.	Textbook of environmental	Erach	University	1 st Edition			
			Bharucha	Press				
	3.	Environmental chemistry and	Dr. S. S Dara	S. Chand	7 th Edition			
		pollution control	& Dr. D. D.					
	Mishra							
	4.	Environmental Biotechnology	S. N. Jogdand	Himalaya	1 st Edition			
				Publishing				

- Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and term work mentioned above.



Faculty of Science & Technology						
	Syllabus of F. Y. B.Tech. All Branches (Semester II)					
Course Code:	BSC151	Credits: 3-1-0				
Course: Statis	tics and Integral Calculus	Mid Semester Examination-I: 15 Marks				
Teaching Sch	eme:	Mid Semester Examination-II: 15 Marks				
Theory: 03 H	rs/week	Teacher Assessment: 10 Marks				
Tutorial: 01 H	Ir/week	Continuous Internal Evaluation: 10 Marks				
		End Semester Examination: 50 Marks				
		End Semester Examination (Duration): 2 Hrs				
Prerequisite	Students requires sufficient am	nount of knowledge of certain topics related to	Statistics			
	and Integral Calculus.					
Objectives	1. To provide basic ideas of statistics including measures of central tendency and					
	dispersion.					
	2. To develop mathematical skills and logical understanding of the subject.					
	3. To analyze and find solutions of problems in engineering.					
	4. To apply knowledge of mathematics in engineering and technology.					
Unit-I	Statistics-I					
	Introduction to Statistics, Measures of central tendency: Mean, Median and Mode.					
	(5 Hrs)					
Unit-II	Statistics-II					
	Measures of dispersion: Quarti	lles, Quartile deviation, Coefficient of Quartile				
	deviation, Mean deviation, Coe	efficient of Mean deviation, Standard deviation	l,			
	Variance, Coefficient of variation, Skewness, Measures of Skewness: Karl Pearson's					
	coefficient of skewness, Bowley's coefficient of skewness. (7 Hrs)					
Unit-III	Curve Tracing and Rectificat	tion				
	Tracing of curves in Cartesian	form, Tracing of curves in Polar form, Rectific	ation of			
	plane curves (Cartesian and Po	ılar)	(6 Hrs)			
Unit-IV	Integral Calculus					



	Reduction Formulae, Beta Function, Gamma Function, Relation between Beta and								
	Gamma Function (without proofs) (6 Hrs)								
Unit-V	Multiple Integrals								
	Double	Integration in Cartesian	n and Polar co-ordinate	es, Change of order of	f Integration,				
	Change	to polar co-ordinates,	Triple integral.		(6 Hrs)				
Unit-VI	Applica	ations of Multiple Inte	egrals						
	Applica	ation to areas, volumes,	surfaces areas and vol	ume of revolutions	(6 Hrs)				
Textbooks/	Sr.	Title	Author	Publication	Edition				
Reference	No.								
Books	1.	A Text Book of	P. N. Wartikar	Pune Vidyarthi	9 th				
		Applied	J. N. Wartikar	Griha Prakashan,	Edition				
		Mathematics		Pune					
		Volume-I							
	2.	Advanced	H. K. Dass.	S.Chand And	18 th				
		Engineering		Co.Ltd	Edition				
		Mathematics							
	3.	Higher Engineering	Dr. B. S. Grewal	Khanna	46 th				
		Mathematics		Publishers	Edition				
	4.	Higher Engineering	B.V. Ramana	Tata McGraw-	1 st Edition				
		Mathematics		Hill Publishing					
	Co.Ltd.								
	5.	Advanced	Erwin Kreyszig	Wiley eastern	10 th				
		Engineering		Ltd. Mumbai	Edition				
	Mathematics								
	6.	A Text Book of	Peter O'Neil	Thomson Asia	7 th Edition				
		Engineering		Pvt. Ltd.,					
		Mathematics		Singapore					



7.	Advanced	C. R. Wylie &	Mc Graw Hill	6 th Edition
	Engineering	Barrett	Publishing	
	Mathematics		Company Ltd	
8.	Advanced	M. D.	Pearson	2 nd Edition
	Engineering	Greenberg	Education	
	Mathematics			



Faculty of Science & Technology					
	Syllabus of F. Y. B. Tech.	All Branches (Semester II)			
Course Code: ES	Course Code: ESC151 Credits: 3-0-0				
Course: Python I	Programming	Mid Semester Examination-I: 15 Marks			
Teaching Schem	e:	Mid Semester Examination-II: 15 Marks			
Theory: 03 Hrs /	week	Teacher Assessment: 10 Marks			
		Continuous Internal Evaluation: 10 Marks			
		End Semester Examination: 50 Marks			
		End Semester Examination (Duration): 2 Hrs			
Prerequisite	Basic Mathematics				
Objectives	1. To introduce basic construct	s of python programming language.			
Objectives	2. To make Engineering graduate	ates learn python data types and their operations.			
	Introduction to Python Programming				
	Python Language- history, features, advantages, Applications of Python,				
Init I	Comparison with other programming languages				
Omt-1	Installing python, installing Pycharm IDE. Getting python help online. Structure of				
	Python Program, data types, simple arithmetic operations, Comments, Type				
	Conversions, Flowchart, Algorit	thm (6 Hrs)			
	Flow Control and Loops				
Unit-II	Decision Making : if statement,	ifelse statement, ifelifelse statement, Nested			
	if statement, The Get construct	(6 Hrs)			
	Loops				
Unit-III	While loop, for loop, nested loo	ops, range() function, continue and break statement			
		(6 Hrs)			
	Functions				
Unit-IV	Built-In Functions, Commonly	Used Modules, Function Definition and Calling the			
	Function, The return Statement	(6 Hrs)			



	Lists &	Sets							
	Python List- syntax: add-remove item, access, modify, slice, loop through list;								
Unit-V	predefin	ed list methods with exa	ample, application						
	Python Set- syntax: add-remove, item access, modify, predefined list methods								
	Compare list and set (6 Hrs)								
	Tuples a	& Dictionary							
	Python	Tuple- syntax: add-ren	nove, access, chang	e value, loop t	hrough tuple,				
T T •4 T 7 T	predefin	ed tuple methods							
Unit-VI	Python I	Dictionary- syntax: add-	remove, access, chan	ge value, loop th	rough values,				
	levels of	dictionary, predefined	dictionary methods,	applications of d	ictionary				
					(6 Hrs)				
Textbooks/	Sr. No.	Title	Author	Publication	Edition				
Reference	1.	Think Python	Allen B. Downey	O'Really	2 nd Edition				
Books	2.	Dive into Python 3	Mark Pilgrim	Apress	2 nd Edition				
				D (1					
	3.	Learning with	Allen B. Downey	Dreamtech	1 st Edition				
		Python							
	4.	The Complete	Martin C. Brown	Mc Graw Hill	4 th Edition				
		Reference Python							
	5.	Head First Python	Paul Barry	O'Really	2 nd Edition				



Faculty of Science & Technology					
	Syllabus of F. Y. B. Tech.	Circuit Branches (Semester II)			
Course Code:	ESC154	Credits: 3-0-0			
Course: Basic	Electronics Engineering	Mid Semester Examination-I: 15 Marks			
Teaching Sch	eme:	Mid Semester Examination-II: 15 Marks			
Theory: 03 H	rs / week	Continuous Internal Evaluation: 10 Marks			
		Teacher Assessment: 10 Marks			
		End Semester Examination: 50 Marks			
		End Semester Examination (Duration): 2 Hrs			
Prerequisite	Basic Sciences				
Objectives	1. To give knowledge of some	Electronic devices and Rectifier circuits.			
	2. To understand configuration	of operational amplifier and know its applications.			
	3. To study Logic gates and the	eir usage in digital circuits.			
	4. To expose the students to we	orking of transducers and their applications.			
	5. To introduce basic aspects of	f Electronic Communication Systems.			
Unit-I	Semiconductor Diodes and i	ts Applications: Semiconductor and its types, PN			
	Junction Diode, Zener Diode, Ll	ED			
	Rectifiers-Types Half wave, Ful	l wave, Bridge rectifiers, Ripple factor, Efficiency and			
	PIV, Comparison, Uses of filter	s in rectifier circuit, Basic blocks of Regulated Power			
	Supply	(6 Hrs)			
Unit-II	Semiconductor devices and its applications:				
	BJT:-Types, Configurations, characteristics and Applications as an amplifier and as a				
	switch.				
	FET- Types, characteristics, and applications				
	MOSFET- Types, characteristics. (6 Hrs)				
Unit-III	Introduction to Operational A	mplifier:			
	Block diagram of Operational A	mplifier, Inverting and Non-Inverting			



	Config	Configuration and parameters, Ideal Characteristics, Op-Amp as Summing amplifier,						
	Difference amplifier, Integrator, Differentiator and Comparator (6 Hrs)							
Unit-IV	Digital	Circuit:						
	Basic	logic gates, Universal	logic gates, B	oolean algebra, In	troduction to			
	Combi	national and Sequential	Circuits, working	ng of Half Adder,	Full Adder,			
	Multip	lexer, De-multiplexer & b	asic memory elem	ent-SR-Flip-Flop.	(6 Hrs)			
Unit-V	Transo	lucers:						
	Definit	ion, Classification of Tr	ansducers, Operat	tion of Transducers	-Temperature			
	Measur	rement -RTD, Thermocou	ple, Thermistor, P	ressure measurement	-Strain Gauge,			
	Displac	cement measurement - LV	DT		(6 Hrs)			
Unit-VI	Basics	of Communication syste	em:					
	The ele	ements of a Communication	on System, Transn	nission Media, Need	of Modulation			
	& its ty	pes, Introduction to Mobi	le Communication	1	(6 Hrs)			
Textbooks/	Sr.	Title	Author	Publication	Edition			
Reference	No.							
Books	1.	Principles of	V.K. Mehta	S. Chand	12 th			
		Electronics		Publishing	Edition			
	2.	Modern Digital	R. P. Jain	Tata Mc-Graw	2rd Edition			
		Electronics		Hill	5 Euluoli			
	3.	Electronics	H. S. Kalasi	Tata Mc-Graw	2 nd			
		Instrumentation		Hill	Edition			
	4.	Linear Integrated	Ramakant	Pearson				
		Circuit and	Gaikwad	Education	4 th			
		operational			Edition.			
		amplifier						
	5.	Electronics	George	Tata Mc-Graw	⊿th			
		Communication	Kenedy	Hill	4 Edition			
		System			Euluon.			



	Faculty of Science & Technology					
	Syllabus of F. Y. B. Tech (Circuit Branches (Semester II)				
Course Code	Course Code: ESC155 Credits: 3-0-0					
Course: Mob	ile Application Development	Mid Semester Examination-I: 15 Marks				
Teaching Scl	heme: Theory: 03 Hrs/week	Mid Semester Examination-II: 15 Marks				
		Continuous Internal Evaluation: 10 Marks				
		Teacher Assessment: 10 Marks				
End Semester Examination: 50 Marks						
		End Semester Examination (Duration): 2 Hrs				
Objectives	1.Student should be able to underst	and the basic concepts of Android Operating System.				
Objectives	2. Students should be able to devel	op App Developing Skills for mobiles, tablets				
	Introduction to Android Operating	System, Open Handset Alliance, Android Ecosystem.				
Unit-I	Need and features of Android, too	ls and software required for developing an Android				
	Application. Android Architecture	(6 Hrs)				
Unit II	Java SDK, Android Development Tools, Android Virtual Devices, Emulators, Dalv					
0111-11	Virtual Machines, Steps to install A	Android Studio and SDK (6 Hrs)				
Unit III	Control Flow, Directory Structure, components of a screen, fundamental UI Design,					
01111-111	Linear Layout, Relative Layout	(6 Hrs)				
Init_IV	Text View, Edit Text, Button, Ima	ge Button, Radio Button and Radio Group, Progress				
0111-1 V	Bar, Image View	(6 Hrs)				
Unit-V	Activity Lifecycle, Android System	n Architecture, Content Provider. Service: lifecycle.				
Cint-V	(6 Hrs)					
	Declaring and using Permissions, U	Jsing Custom Permissions. Application Deployment:				
Unit-VI	Signing of an Application, Deployi	ing app on Google Playstore, Developer Console.				
		(6 Hrs)				



Textbooks/	Sr.	Title	Author	Publication	Edition		
Kererence	190.						
Books	1.	Composing Mobile Apps	Anubhav Pradhan,	Wiley	1^{st}		
			Anil V Deshpande	Wiley	Edition		
	2.	Android App Development	Michael Burton	X 7:1	3 rd		
		for Dummies		wiley	Edition		
	3.	Head First Android			2 nd		
		Development: A Brain-	Dawn Griffiths	O'Reilly	2		
		Friendly Guide			Edition		
Websites	1.	https://developer.android.com/					
and online	2.	https://www.coursera.org/learn/java-for-android					
courses	3.	https://www.youtube.com/ch	annel/UCkCaPptq2BUjl	kAfnmaY8Nw			



Faculty of Science & Technology						
	Syllabus of F. Y. B.1	Tech. All Branches (Semester II)				
Course Code	ourse Code: BSC102 Credits: 3-0-0					
Course: Oper	n Elective-I: Engineering	Mid Semester Examination-I: 15 Marks				
Physics		Mid Semester Examination-II: 15 Marks				
Teaching Scl	neme: Theory: 03 Hrs/week	Continuous Internal Evaluation: 10 Marks				
	Teacher Assessment: 10 Marks					
	End Semester Examination: 50 Marks					
		End Semester Examination (Duration):2 Hrs				
	1. To let the engineering u	ndergraduates study physical properties, concepts and				
	physical quantities requir	red for the solution of complex engineering problems				
	2. To make the engineering undergraduates learn basic principles of Physics					
	laws of scientific inves	tigation to identify, formulate and analyse complex				
	engineering problems.					
Objectives	3. To equip engineering undergraduates with competencies of scientific method					
	required in engineering career by upgrading skills on the basis of learning					
	achieved from physical science perspectives.					
	4. To engage engineering u	ndergraduates extensively in scientific investigation for				
	interdisciplinary graduate	e programs and a wide variety of other lifelong learning				
	opportunities.					
	Optics					
	The wave equation, Introc	luction to electromagnetic waves and electromagnetic				
	spectrum, Newton's ring, Mi	ichelson interferometer, Applications of interference				
Unit-I	Diffraction of light, diffracti	on grating, resolving power of grating, Application of				
	diffraction grating in spectro	scopic devices.				
	Polarization, Nicol prism,	Laurent's half shade polarimeter, applications of				
	polarization. (6 Hrs)					



	Acoustics
	Acoustic terminology and definitions, Acoustic Wave Equation and its Basic
	Physical Measures, Sabine's formula (derivation not necessary) acoustics factor in
Unit-II	architectural design.
	Ultrasonics
	Properties, Production of ultrasonic waves by piezo-electric and magnetostriction
	generator, engineering applications of ultrasonic waves. (6 Hrs)
	Crystal Structure
	Crystalline and amorphous material, lattice and unit cell, Miller indices, SC, BCC,
	FCC, diamond structure, NaCl structure, imperfections and defects in solids
In:t III	X-Rays
01111-111	Basics of X-Rays, Production and Detection of X-Rays, Continuous and
	characteristics spectrum, Bragg's law of X-ray diffraction, Bragg's spectrometer,
	Intensity of diffracted Beams, Particle Size Determination by XRD, Precise Lattice
	Parameter Determination (6 Hrs)
	Nuclear Physics
	Nuclear force, liquid drop model, shell model, Nuclear fission and fusion, Q-value
	of nuclear reaction, nuclear reactor, P-P cycle, C-N cycle, cyclotron, GM counter,
	applications of nuclear physics in various fields.
Unit-IV	Modern Physics
	Black body radiation, Planck' s law, Photoelectric effect, Wave particle duality, De-
	Broglie's concept of matter wave, Davisson-Germer experiment, Scanning tunneling
	microscope, Time-dependent and time-independent Schrodinger equation for
	wave function, Quantum computing. (6 Hrs)
	Introduction to solids
Unit-V	Superconductivity: Superconductivity, effect of temperature and magnetic fields,
	Meissner effect, type I and II superconductors, BCS theory, Applications.



	Free electron theory of metals, Fermi level, density of states, Application to white							
	dwar	dwarfs and neutron stars, Bloch's theorem for particles in a periodic potential,						
	Kronig-Penney model and origin of energy bands							
	Magnetic Materials: Magnetic susceptibility and diamagnetic materials,							
	paramagnetic, ferromagnetic, and, BH characteristics, applications.							
	Nanomaterials and Nanotechnology: Properties of nanomaterials, 0 D, 1 D, 2 D and							
	3 D	3 D nanoparticle, various carbon allotropes, historical instances and day to day						
	exam	ples, Introduction to nanote	echnology and applica	tions in various e	ngineering			
	fields	5.			(6 Hrs)			
	Lase	r						
	Einst	ein's theory of matter radiat	ion interaction and A a	nd B coefficients,	Properties			
Unit VI	of la	ser, spontaneous and stimul	ated emission, ruby la	ser, He-Ne laser,	CO ₂ laser			
	and semiconductor Laser, applications of lasers in science, engineering and							
Unit- v I	medi	medicine.						
	Fiber Technology							
	Propagation of light through optical fiber, acceptance angle and cone numerical							
	apert	ure, Single and Multi-Mode	Fibers, applications, se	ensors.	(6 Hrs)			
	Sr.	Title	Author	Publication	Edition			
	No.	The	Aution	Tublication	Lution			
	1	A Text book of	M N Avadhanulu	S. Chand &	7 th			
		Engineering	P G Kshirsagar	Co	' Edition			
References		Physics	1. O. Kshirsagar		Latton			
Kererences	2	A Text book of	R K Gaur		3rd			
		Engineering Physics	S. I. Gunta	Dhanpat Rai	Edition			
			5. L. Oupla		Latton			
	3	Fundamentals of Physics	David Halliday,		6 th			
		i undamentais of i flysles	Jearl Walker, and	Wiley	Fdition			
			Robert Resnick		Lunion			



					r		
	4			Addison-			
		Elements of X-ray	B. D. Cullity	Wesley	1 st		
		Diffraction		Metallurgy	Edition		
				Series			
	5			Narosa	2 nd		
		Nuclear Physics	Irving Kaplan	Publishing	2 Edition		
				house	Eultion		
	6	Introduction to Solid		John Wiley &	8 th		
		State Physics	C. Kittel	Sons Inc	Edition		
				50h5, hic	Luition		
	7	Lasers and Non-Linear	D.D. Loud	New age	3 rd		
		Optics	D.D. Lauu	international	Edition		
	1	http://science.howstuffwor	ks.com/laser1.htm		·		
	2	http://hyperphysics.phy-ast	tr.gsu.edu/hbase/hfram	e.html			
Websites	3	http://nptel.ac.in/courses/12	22107035/				
and online	4	http://nptel.ac.in/courses/122104016/					
courses	5	https://www.coursera.org/learn/intro-to-acoustics					
	6	https://nptel.ac.in/courses/2	nttps://nptel.ac.in/courses/112/106/112106227/				
	7	https://nptel.ac.in/courses/2	113/104/113104081/				
	8	https://nptel.ac.in/courses/2	115/102/115102017/				



Faculty of Science & Technology					
	Syllabus of F. Y. B. Tech	n. All Branches (Semester II)			
Course Code:	BSC103	Credits: 3-0-0			
Course: Open	Elective-II: Engineering	Mid Semester Examination-I: 15 Marks			
Chemistry		Mid Semester Examination-II: 15 Marks			
Teaching Sche	me:	Continuous Internal Evaluation: 10 Marks			
Theory: 03 Hrs	s/week	Teacher Assessment: 10 Marks			
		End Semester Examination: 50 Marks			
		End Semester Examination (Duration):2 Hrs			
	1. To relate the concepts of C	hemistry in all Engineering Disciplines.			
	2. To make the engineering undergraduates acquainted with modern techniques in				
	engineering and industrial Chemistry.				
Objectives	3. To equip engineering undergraduates with the knowledge of advanced and				
	existing Engineering Materials.				
	4. To develop the awareness about powering the future using advanced energy				
	Storage Systems.				
	Advanced Engineering Mate	rials			
	Industrial Polymers: Thermo	plastics (PVC) & Thermosetting polymers			
	(Bakelite), Biodegradable poly	mers (PVa), Properties, Applications			
Unit-I	Nanomaterials: Preparation of nano materials by Laser method, properties and				
	applications of CNTs.				
	Composite Materials: Cerami	ic matrix composites, carbon- carbon composites			
	Reinforcements: Silicon carbide, Fiber glass.				
	Water Technology:				
Unit_II	Water Parameters: Total Di	ssolved Solids (TDS), Dissolved Oxygen (DO),			
	Chemical Oxygen Demand ((COD), pH, Hardness of water: types and units,			
	Estimation of hardness by ED	TA method, numerical on hardness; Boiler troubles:			



	scale, sludge, priming, foaming and caustic embrittlement; Water treatment: Ion						
	exchange process, Ultra filtration, Nano filtration (6 Hrs)						
	Fuels and Energy Storage Systems:						
	Fuels	: Gross and net calor	ific value, Solid fu	els: proximate ana	alysis of coal		
Unit_III	& in	nportance, gaseous f	uels: composition	properties and a	oplication of		
	natur	al gases- CNG, LNG					
	Energ	gy Storage Systems:	Bio electrochemica	l batteries, lithiun	n-ion battery,		
	alkal	ine fuel cell (AFC)			(6 Hrs)		
	Lubricants and Coolants						
	Lubr	icants: Introduction,	Properties of liqu	uid lubricants: v	iscosity and		
Unit IV	visco	sity index, flash point	t and fire point, acid	l value. Numerica	l on viscosity		
UIIIt-IV	index.						
	Coolants: Introduction, properties and uses of water and ethylene glycol as						
	coolant. (6 Hrs)						
	Corr	osion and its Preventio	on				
Unit-V	Definition, types, mechanism of dry and wet corrosion, Corrosion testing methods:						
Cint- v	ultrasonic testing, computed digital radiography, Prevention of corrosion: Methods-						
	sacrificial anodic protection, Electroplating, Powder coating (6 Hrs)						
	Meta	llurgical Processes					
Unit-VI	Calcination, smelting, ore dressing, roasting, refining of metals, Metalworking						
	processes: casting, forging, rolling, machining, sintering, Laser cladding, 3D						
	printi	ng	Γ	Ι	(6 Hrs)		
Textbooks/	Sr.	Title	Author	Publication	Edition		
Reference	No.			N. C			
BOOKS	1.	Engineering		Mc Graw			
		Chemistry	B. Siva Shankar	Hills Publicat	3 rd Edition		
				ions			



	•		<u> </u>	C:	
	2.	Engineering	Shelly, Oberi and	Cingage	1 st Edition
		Chemistry	Malik	Publication	1 Luttion
	3.	Principles of	Odion C C	John Wiley	4th Edition
		Polymerization	Odian, G.G	& Sons, Inc	4 Edition
	4.	Engineering	Lain & Lain	Dhanpat Rai	16 th Edition
		Chemistry	Jain & Jain	Publishing	
	5.	Dolymor Chamistry	Malcolm P.	Oxford	2 rd Edition
		Polymer Chemistry	Stevens	University Press	5 Edition
	6.	A Textbook of	Shachi Chawla	Dhanpat Rai &	10 th Edition
		Engineering Chemistry	Shashi Chawla	СО	10 Edition
	7.	Material Science &	William Callister	Wiley	O th Edition
		Engineering	and V. Raghavan	whey	9 Edition
	1.	Unit-I-			
		https://onlinecourses.n	ptel.ac.in/noc21_cn49 atstuff.com/composite	<u>/preview</u> s.html	
	2.	Unit- II –	·····		
Wabaitaa		https://nptel.ac.in/cont	ent/storage2/courses/	/116104045/lecture8	.pdf
websites		https://nptel.ac.in/cont	<u>ent/storage2/courses/</u>	<u>/116104045/lecture6</u>	<u>.pdf</u>
and online	3.	Unit- III –			
COURSES		https://nptel.ac.in/cont	ent/storage2/courses/	<u>/121106014/Week12</u>	/lecture38.pdf
courses	4	https://www.sciencedir	rect.com/topics/engine	ering/proximate-ana	<u>alysis</u>
	4.	Unit-IV –	roc/112/102/1121020	14/	
		https://nptel.ac.in/cour	ses/112/102/1121020	<u>14/</u> /112105127/ndf/LM_	12 ndf
	5			///////////////////////////////////////	12.001
	5.	Unit- V - <u>https://nptel.</u>	ac.in/courses/113/108	/113108051/	
	6.	Unit- VI - <u>https://nptel.</u>	ac.in/courses/112/107	/112107144/	



Faculty of Science & Technology				
	Syllabus of F. Y. B.Tech. All Branches (Semester II)			
Course Code	BSC104	Credits: 3-0-0		
Course: Oper	Elective-I: Biology for	Mid Semester Examination-I: 15 Marks		
Engineers		Mid Semester Examination-II: 15 Marks		
Teaching Sch	eme: Theory: 03 Hrs/week	Continuous Internal Evaluation: 10 Marks		
		Teacher Assessment: 10 Marks		
		End Semester Examination: 50 Marks		
		End Semester Examination (Duration):2 Hrs		
	To introduce students to modem	biology with an emphasis on evolution of biology as		
Objectives	a multi-disciplinary field, to mak	e them aware of application of engineering principles		
	in biology, and engineering robu	st solutions inspired by biological examples.		
	Introduction to Molecular Bio	ology, Central Dogma of life, DNA replication,		
Unit-I	Translation and transcription, Introduction to Genetics, Phylogenetic analysis,			
	Introduction to developmental biology, structure and functions of cell. (8 Hrs)			
	Introduction to immunology, o	components of the immune system, antigens and		
Unit-II	antibodies, B-cells and T- cells development, proliferation and differentiation, MHC			
	Restriction, Complement system	. (6 Hrs)		
Unit_III	Infectious diseases, TB, HIV, Flu	e, COVID-19, response of host to infectious diseases.		
01111-111	Vaccines, cancer biology.	(4 Hrs)		
	Introduction to bioinformatics,	tools of bioinformatics, primary and secondary data		
Unit-IV	bases, sequence alignments, me	thods of structure prediction of proteins, homology		
	modeling	(6 Hrs)		
	Introduction to Analytical	Instrumentation, Electrophoresis techniques,		
Unit-V	Chromatography types and techn	iques, Isoelectric focusing, PCR and ELISA		
		(6 Hrs)		
IInit_VI	Environmental biosafety, biores	sources, biodiversity, bioreactors, ethical aspects of		
	plant and animal biotechnology,	Engineering designs inspired by examples in biology,		



	Engine	Engineering aspects of some Nobel Prizes in Physiology and Medicine & Chemistry /				
	recent a	recent advances in Biology (6 Hr				
Textbooks/ Reference	Sr. No.	Title	Author	Publication	Edition	
Books	1.	Essentials of Genetics.	Miko, I. & Lejeune, L., eds.	Cambridge, MA: NPG Education	2009	
	2.	Essentials of Cell Biology	O'Connor, C. M. & Adams, J. U.	Cambridge, MA: NPG Education	2010	
	3.	Molecular Biology of the Gene	Warson JD, Baker, TA, Bell SP, Gann A, Levin M, Losick R,	Pearson Education	2004	
	4.	The Greatest Show on Earth: The Evidence For Evolution	Dawkins, R	Bantam Press, Transworld Publishers	2009	
	5.	Watchmaker	Dawkins, R	W. W. Norton & Co	1996	
	6.	The Double Helix: A Personal Account of the Discovery of the Structure of DNA	Watson, J. D.	Simon & Schuster Inc.	2011	



	Faculty of Science & Technology				
	Syllabus of F. Y. B.Tech. All Branches (Semester II)				
Course Code:	Course Code: ESC251 Credits: 0-0-1				
Course: Lab-	I: Pyt	hon Programming	End Semester Examination/Oral: 25 Marks		
Teaching Sch	eme:	Practical: 02 Hrs/week			
	Cou	urse will enable students to de	evelop programs in python programming language		
Objectives	and	identify use of various datas	structures available in python.		
	Any	v 10 practical to be conducted	ed		
	1.	Installation of Python and II	DE for Python Programming – Pycharm		
	2.	Using flowchart and algorith	hm for problem solving		
	3.	Develop program using arith	hmetic operations in python		
	4.	Develop program using conditional statements (if-else) and logical operators			
List of		in python			
Practical	5.	Develop program using conditional statements (if-elif-else) and relational			
		operators in python			
	6.	Develop program using con-	ditional statements (nested-if) in python		
	7.	Develop program using loop	os in python		
	8.	Develop program using nest	ted loops in python		
	9. Develop program using function in python.				
	10.	. Develop program to demonstrate operations on python lists			
	11.	Develop program to demons	strate operations on python sets		
	12.	Develop program to demon	strate operations on python tuple		
	13.	Develop program to demons	strate operations on python dictionary		

- Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and term work mentioned above.



Faculty of Science & Technology					
	Syllabus of F. Y. B. Tech. Circuit Branches (Semester II)				
Course Code	: ESC254	Credits: 0-0-1			
Course: Lab-	II: Basic Electronics	Teacher Assessment: 25 Marks			
Engineering		End Semester Examination/Oral: 25 Marks			
Teaching Scl	heme: Practical: 02 Hrs/week				
	Any 10 practical to be conduct	ted			
	1. To study characteristics of Semiconductor diode.				
	2. To study Halfwave and Full Wave Rectifier.				
	3. To Plot the characteristics of BJT in CE configuration.				
	4. To study Application of Opamp as an adder.				
L ist of	5. To study Application of Opamp as a subtractor				
Draatical	6. To study Use of opamp as an integrator and differentiator.				
Fractical	7. To study logic gate application as a Half adder.				
	8. To study logic gate application as a Full adder				
	9. To study Multiplexer.				
	10. To study application of Strain gauge as a weighing machine.				
	11. To study use of LVDT for d	isplacement measurement			
	12. Implementation and testing	of circuits like amplifier, Power supply on bread			
	board.				

- Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and term work mentioned above.



	Faculty of Science & Technology				
	Syllabus of F. Y. B. Tech Circuit Branches (Semester II)				
Course Co	de: ESC255 Credits: 0-0-1				
Course: La	ab-III: Mobile Application Development End Semester Examination/Oral: 25 Marks				
Teaching S	Scheme: 02 Hrs/week				
	Any 10 practical to be conducted				
	1. Compare various Operating System with Android Operating System				
	2. Install Java Development Kit (JDK), Android Studio and Android SDK				
	3. Develop an application to display HelloWorld				
	4. Develop an application to implement Text View, Button and Edit Text				
	5. Develop an application to implement Radio Button & Progress Bar				
List of	6. Develop an application to implement Linear Layout and Relative Layout				
Practical	7. Develop an application to implement Date and Time Picker				
	8. Develop an application to implement custom Toast Alert				
	9. Develop an application to implement Calculator				
	10. Develop an application to implement Content Provider				
	11. Develop an application to Send SMS				
	12. Develop an application with login module to check username and password.				
	On successful login open another activity with welcome message otherwise				
	show invalid login.				



Faculty of Science & Technology					
	Syllabus of F. Y. B.Tech. All Branches (Semester II)				
Course Code:	Credits: 0-0-1				
Course: Lab-I	V Open Elective-II: Engineering Physics	Teacher Assessment: 25 Marks			
Teaching Sche	eme: Practical: 02 Hrs/week				
	Any 10 practical to be conducted				
	1. Newton's ring: To determine waveler	ngth of monochromatic light			
	2. G. M. Counter: dead time calculation				
	3. Grating: To determine wavelength of	LASER light.			
	4. Polarimeter: To determine concentrat	ion of solution.			
	5. Reverberation time: To determine Reverberation time of a hall.				
	6. Characteristics of solar cell				
List of	7. Ultrasonic interferometer				
Practical	8. Zener diode: To study characteristics of zener diode & to determine zener				
	voltage.				
	9. Dielectric constant: to determine diele	ectric constant.			
	10. Forbidden gap: To determine forbidde	en gap of semiconductors.			
	11. Transistor Characteristics in CE Conf	iguration.			
	12. To determine the Hall coefficient of a semiconductor material and the				
	evaluate carrier type and its density of	f charge carrier.			
	13. Planck's Constant				
	14.To measure the divergence of the laser	r beam			



Faculty of Science & Technology				
	Syllabus of F. Y. B.Tech. All B	ranches (Semester II)		
Course Code:	BSC202	Credits: 0-0-1		
Course: Lab-I	V Open Elective-II: Engineering	Teacher Assessment: 25 Marks		
Chemistry				
Teaching Sch	eme: Practical: 02 Hrs/week			
	Any 10 practical to be conducted	L		
	1. Lab safety experiment			
	2. Preparation and standardization	n of analytical reagents		
	3. Analysis of Chemical parameter	ers of water		
	4. Analysis of physical parameter	s of water		
	5. Determination of percentage of moisture and ash in given coal sample.			
	6. Determination of Acid value/ saponification value of lubricating oil.			
List of	7. Determination of viscosity of chemical compound			
Practical	8. Preparation of polymer			
	9. Electro gravimetric Estimation of Metals (Virtual experiment)			
	10. Determination of chloride con	tent of water by Mohr's method (Virtual		
	experiment)			
	11. Determination of melting or bo	biling point of organic compound. (Virtual		
	experiment)			
	12. Determination of rate of corrosion in different pH media. (Virtual			
	experiment)			
	13. Preparation of nano materials			
	14. Determination of molecular	weight of polymer using Ostwald's		
	viscometer			

- Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and term work mentioned above.



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Syllabus of F. Y. B.Tech. All Branches (Semester II)				
Course Code:	BSC203	Credits: 0-0-1		
Course: Lab-I	V Open Elective-II: Biology for	Teacher Assessment: 25 Marks		
Engineers				
Teaching Sche	eme: Practical: 02 Hrs/week			
	1. Biosafety laboratory practi	ices and biological waste disposal		
	2. Buffers in biology, bufferi	Buffers in biology, buffering capacity and pKa		
	3. Observing cell surface	Observing cell surface and intracellular contents using light and/or		
	fluorescence microscopy	fluorescence microscopy		
	4. Measuring mechanical st	Measuring mechanical strength of cells - osmolarity and elasticity of		
	biological membranes	biological membranes		
	5. Protein and DNA isolation	Protein and DNA isolation from plant cells, visualization of proteins and DNA		
List of	6. Microbial culture - growth	curve and enumeration methods		
Practical	7. Basic molecular biology te	chniques - including isolation of bacterial plasmids		
	demos on Polymerase C	demos on Polymerase Chain Reaction and Restriction Fragment Length		
	Polymorphism			
	8. Mammalian and plant cell	culture methods		

- Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and term work mentioned above.



Faculty of Science & Technology			
	Syllabus of F. Y. B.Te	ch. All Branches (Semester II)	
Course Code: HS	SM251	Credits: 0-0-1	
Course: Lab-V:	Cognitive Aptitude	Teacher Assessment: 25 Marks	
Teaching Schem	e: Practical: 02 Hrs/week		
Objectives	1. To improve cognitive ap	titude skills.	
Objectives	2. To improve thinking abi	lity of students	
	Introduction to aptitude as	ssessment, Classification, Numbers, Applications of	
I Init_I	HCF and LCM Variation,	Linear Equations, Number Systems, Ages, Averages,	
Cint-1	Percentage, Ratio and	Proportion, Simple Interest, Compound Interest,	
	Mensuration.	(4 Hrs)	
	Divisibility Rules, Time	& Work, Pipes and Cisterns, Boats and Streams,	
Unit-II	Partnerships, Problems on Trains, Working with different efficiencies, Work		
	equivalence, Division of wa	ages. (4 Hrs)	
	Relative Speed, Problems b	ased on Races, Percentages as Fractions and Decimals,	
Unit-III	Fundamental Counting pr	rinciple, Basics of Permutation and Combination,	
	Probability.	(4 Hrs)	
	Coding Decoding, Direction Sense, Blood Relations, Analogy (word, letter,		
Unit-IV	number, mixed), Rankin	g and Ordering, Eligibility Testing, Syllogism,	
	Inequaliies.	(4 Hrs)	
	Sitting Arrangements, Cloc	k and Calendar, Statements & Arguments, Statements	
Unit-V	& Course of Action, Cause	e and Effect, Cubes and Dice, Image Analysis (mirror	
	& water images)	(4 Hrs)	
	Cubes and Cuboid, Error	Detection, Grammar, Cloze Test, Comprehension,	
Unit-VI	Double Fillers, Para jumble	ed sentences, One-word substitution	
		(4 Hrs)	



Textbooks/	Sr.	Title	Author	Dublication	Edition
Reference	No.	The	Aumor	Fublication	Edition
Books	1.	Quantitative Aptitude for Competitive Examinations	Dr. R. S. Aggarwal	S. Chand Publications	2017
	2.	A Modern Approach to Logical Reasoning	Dr. R. S. Aggarwal	S. Chand Publications	2018
	3.	The Hands-on Guide to Analytical Reasoning and Logical Reasoning	Peeyush Bhardwaj	Arihant Publication	2015
	4.	Quantitative Aptitude for Campus Interview Vol I	Dinesh Khattar	Pearson	4 th Edition
	5.	How to Prepare for Logical Reasoning	Arun Sharma	McGraw Hill Publication	5 th Edition
	6.	Logical Reasoning and DI	Nishit Sinha	Pearson Publication	7 th Edition
	7.	Critical Thinking	Moore, Parker	McGraw Hill Publication	13 th Edition
	8.	How to Prepare for Quantitative Aptitude	Arun Sharma	Tata McGraw Hill	5 th Edition

- Continuous assessment
- Examination conducted on the syllabus.



Faculty of Science & Technology				
	Syllabus of F. Y. B.Tech. All Branches (Semester II)			
Course Code: 1	HSM2	.52		
Course: Non-C	Credit 1	Mandatory Course (German Language)		
Teaching Sche	me: P	ractical: 02 Hrs./week		
Objectives	• \$	Students will be able to apply communicative German Grammar i	in	
	c	communication.		
	• 5	Students will be able to enhance the level of German vocabulary.		
	• 5	Students will be able to pronounce and articulate words as well as sentence	es	
	a	accurately.		
	• 5	Students will be able to understand and apply German language eventually.		
	• 5	Students will be able to develop German language skills.		
	• 5	Students will be able to manage situational communication in German.		
Unit-I	:	Introduction		
		- Self –Introduction		
		- Nos. up to 10,000		
		- Weekdays, Months		
		- Date and Time		
		- Greetings (6 Hrs	s)	
Unit-II	:	Vocabulary		
		- My house		
		- My family		
		- Daily routine		
		- Hobbies		
		- Food (6 Hrs	3)	
Unit-III	:	Grammar		
		- Verb forms (Present Tense)		
		- Articles		

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		- Possessive pronouns					
		- Auxiliary verbs					
		- Wh-Questions / Yes-No Questions					
		- Past-Tense of haben and sein (12 Hrs)					
Textbooks/	Sr.	Title	Edition				
Reference	No.						
Books	1.	German Made Simple: Learn	Arnold Leitner	Crown	2006		
		to speak and understand					
		German quickly and easily					
	2.	The Everything Learning		Adams Media	2 nd Edition		
		German Book: Speak, write,	Edward Swick				
		and understand basic German					
		in no time					
	3.	Langenscheidt German in 30	Von Angelika	Langenscheidt	2007		
		Days	G. Beck				
	4.	Complete German Beginner	Heiner	The McGraw	1 st Edition		
		to Intermediate Book and	Schenke	Hill			
		Audio Course: Learn to read,					
		write, speak and understand a					
		new language with Teach					
		Yourself					
	5.	German: How to Speak and	Joseph	BN	2011		
		Write It (Beginners' Guides)	Rosenberg	Publishing			
	6.	Collins Easy Learning –	Collins	Collins	2016		
		Collins Easy Learning					
		German Grammar and					
		Practice					



Faculty of Science & Technology							
Syllabus of F. Y. B. Tech. All Branches (Semester II)							
Code No.: HSM253							
Course: Nor	Course: Non-Credit Mandatory Course (Japanese Language)						
Teaching Scheme: Practical: 02 Hrs./ week							
Objectives	1. 5	Students will be able to apply communicative Japanese Grammar in					
	с	communication.					
	2. 8	tudents will be able to enhance the level of Japanese vocabulary.					
	3. 5	Students will be able to pronounce and articulate words as well as sentences					
	a	accurately.					
	4. 5	Students will be able to understand and apply Japanese language eventually.					
	5. S	Students will be able to develop Japanese language skills.					
	6. Students will be able to manage situational communication in Japanese.						
Unit-I	:	Introduction					
		- Introduction					
		- Numbers					
		- Days, Montl	ns, Dates		(8 Hrs)		
Unit-II	:	Grammar					
		- Verb and verb forms					
		- Present and Past Tense (8 Hrs)					
Unit-III	:	Communication					
		- Introduction of Japanese script					
		- Dialogues (Shopping, in the restaurant)					
		- Themes: Family, my city, my country, my friend (8 Hrs)					
List of	Sr.	Title Author P		Publication	Edition		
Reference	No.						
Books	1	Japanese Kanji for	Timothy G. Stout	Tuttle	2017		
		Beginners	and Kaori Hakone	Publishing			

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2	Essential Japanese	Masahiro	Tuttle	2012
	Grammar: A	Tanimori and Eriko	Publishing	
	Comprehensive Guide to	Sato Ph.D.		
	Contemporary Usage			
3	15-Minute Japanese:	D.K. Goel	DK	2019
	Learn in Just 12 Weeks	and Rajesh Goel		
4	Oxford Japanese	Bunt Jonathan	Oxford	2003
	Grammar and Verbs		University	
	(Dictionary)		Press	
5	Read and write Japanese	Helen Gilhooly	Teach Yourself	1 st
	scripts: Teach yourself			Edition
6	Complete Japanese	Helen Gilhooly	Teach Yourself	3 rd
	Beginner to Intermediate			Edition
	Book and Audio Course:			
	Learn to read, write, speak			
	and understand a new			
	language with Teach			
	Yourself			