

RCOEM

**Shri Ramdeobaba College of
Engineering and Management, Nagpur**

**SHRI RAMDEOBABA COLLEGE OF
ENGINEERING AND MANAGEMENT
NAGPUR – 440013**

**An Autonomous College affiliated to Rashtrasant Tukadoji Maharaj Nagpur University,
Nagpur, Maharashtra (INDIA)**

PROGRAMME SCHEME

2023-2024

B.TECH. (ELECTRONICS AND COMPUTER SCIENCE)

Teaching Scheme for B. Tech. Electronics and Computer Science

SEMESTER-I											
Sr. No.	Category	Course Code	Course Title	Hours per week			Credits	Maximum Marks			ESE Duration (Hrs)
				L	T	P		Continuous Evaluation	End Sem Exam	Total	
1	BSC	PHT1007	Physics	2	1	0	3	50	50	100	3
2	BSC	PHP1007	Physics Lab	0	0	2	1	50	-	50	-
3	BSC	MAT1001	Applied Mathematics -I	2	1	0	3	50	50	100	3
4	BSC	MAP1001	Computational Mathematics Lab	0	0	2	1	50	-	50	-
5	BSC	CHP1002	Environmental Science Lab	0	0	2	1	50	-	50	-
6	ESC	ECST1001	Programming for Problem Solving	3	0	0	3	50	50	100	3
7	ESC	ECSP1001	Programming for Problem Solving Lab	0	0	2	1	50	-	50	-
8	VSEC	ECST1002	Fundamentals of Computer Engineering	2	0	0	2	50	50	100	2
9	VSEC	ECST1003	Electronics and Computer Workshop	1	0	0	1	50	-	50	-
10	VSEC	ECSP1003	Electronics and Computer Workshop Lab	0	0	2	1	50	-	50	-
11	HSSM - AEC	HUT1002	English for Professional Communication	2	0	0	2	50	50	100	2
12	HSSM-AEC	HUP1002	English for Professional Communication Lab	0	0	2	1	50	-	50	-
13	CCA	HUP0001-1 to HUP0001-10 PEP0001-21 PEP0001-22 CHP0001-31 CHP0001-32	Liberal/ Performing Arts	0	0	2	1	50	-	50	-
14	HSSM-VEC	HUT1004	Foundation course in Universal Human Value	1	0	0	1	50	-	50	-
TOTAL				13	2	14	22				
				29 Hrs.							

Teaching Scheme for B. Tech. Electronics and Computer Science

SEMESTER-II											
Sr. No.	Category	Course Code	Course Title	Hours per week			Credits	Maximum Marks			ESE Duration (Hrs)
				L	T	P		Continuous Evaluation	End Sem Exam	Total	
1	BSC	CHT2006	Chemistry of Smart Materials	2	0	0	2	50	50	100	2
2	BSC	CHP2006	Chemistry of Smart Materials Lab	0	0	2	1	50	-	50	-
3	BSC	MAT2001	Applied Mathematics -II	2	1	0	3	50	50	100	3
4	ESC	ECST2001	Elements of IoT	3	0	0	3	50	50	100	3
5	ESC	ECSP2001	Elements of IoT Lab	0	0	2	1	50	-	50	-
6	ESC	ECST2002	Object Oriented Programming	2	1	0	3	50	50	100	3
7	ESC	ECSP2002	Object Oriented Programming Lab	0	0	2	1	50	-	50	-
8	PCC	ECST2003	Digital Electronics	3	0	0	3	50	50	100	3
9	PCC	ECSP2003	Digital Electronics Lab	0	0	2	1	50	-	50	-
10	HSSM-IKS	HUT2001	Foundational Literature of Indian Civilization	2	0	0	2	50	50	100	2
11	CCA	PET2001	Sports-Yoga-Recreation	1	0	0	1	50	-	50	
12	CCA	PEP2001	Sports-Yoga-Recreation Lab	0	0	2	1	50	-	50	-
TOTAL				15	2	10	22				
				27 Hrs.							

Exit option : Award of UG Certificate with additional 8 credits

Exit Courses

1	IT Support Engineer	Online/Offline Certification Course	8
2	Python		8
3	Web Designer		8

Teaching Scheme for B. Tech. Electronics and Computer Science

SEMESTER-III											
Sr. No.	Category	Course Code	Course Title	Hours per week			Credits	Maximum Marks			ESE Duration (Hrs)
				L	T	P		Continuous Evaluation	End Sem Exam	Total	
1	PCC	ECST3001	Data Structures	2	1	0	3	50	50	100	3
2	PCC	ECSP3001	Data Structures Lab	0	0	2	1	50	-	50	-
3	PCC	ECST3002	Electronic Devices and Circuits	2	1	0	3	50	50	100	3
4	PCC	ECSP3002	Electronic Devices and Circuits Lab	0	0	2	1	50	-	50	-
5	PCC	ECST3003	Digital System Design	2	1	0	3	50	50	100	3
6	PCC	ECSP3003	Digital System Design Lab	0	0	2	1	50	-	50	-
7	MDM	ECST3004	Discrete Mathematics	2	0	0	2	50	50	100	2
8	OE		Open Elective-I/ MOOCs	2	0	0	2	50	50	100	2
9	HSSM	HUT3003	Managerial Economics	2	0	0	2	50	50	100	2
10	HSSM-VEC	ECST3005	Cyber Laws and Ethics in IT	2	0	0	2	50	50	100	2
TOTAL				14	3	6	20				
				23Hrs.							

Teaching Scheme for B. Tech. Electronics and Computer Science

SEMESTER-IV											
Sr. No.	Category	Course Code	Course Title	Hours per week			Credits	Maximum Marks			ESE Duration (Hrs)
				L	T	P		Continuous Evaluation	End Sem Exam	Total	
1	PCC	ECST4001	Computer Architecture and Organization	2	1	0	3	50	50	100	3
2	PCC	ECSP4001	Computer Architecture and Organization Lab	0	0	2	1	50	-	50	-
3	PCC	ECST4002	Design and Analysis of Algorithms	2	1	0	3	50	50	100	3
4	PCC	ECST4003	Software Engineering	2	1	0	3	50	50	100	3
5	PCC	ECSP4003	Software Engineering Lab	0	0	2	1	50	-	50	-
6	MDM	ECST4004	Statistics for Data Analytics	3	1	0	4	50	50	100	3
7	OE		Open Elective-II/MOOCs	3	0	0	3	50	50	100	3
8	VSEC	ECSP4005	Software Laboratory - I	0	0	4	2	50	-	50	-
9	HSSM	MBT	Business Management and Entrepreneurship	2	0	0	2	50	50	100	2
TOTAL				14	4	8	22				
				26 Hrs.							

Exit option : Award of UG Diploma with additional 8 credits			
Exit Course			
1	Application Development (Android)	Online/Offline Certification Course	8
2	Software Engineer (Developer)		8
3	PCB Designer		8

Teaching Scheme for B.Tech. Electronics and Computer Science

SEMESTER-V											
Sr. No.	Category	Course Code	Course Title	Hours per week			Credits	Maximum Marks			ESE Duration (Hrs)
				L	T	P		Continuous Evaluation	End Sem Exam	Total	
1	PCC	ECST5001	Operating System	2	1	0	3	50	50	100	3
2	PCC	ECSP5001	Operating System Lab	0	0	2	1	50	-	50	-
3	PCC	ECST5002	Embedded System Design	2	1	0	3	50	50	100	3
4	PCC	ECSP5002	Embedded System Design Lab	0	0	2	1	50	-	50	-
5	PCC	ECST5003	Digital VLSI Design	2	1	0	3	50	50	100	3
6	PCC	ECSP5003	Digital VLSI Design Lab	0	0	2	1	50	-	50	-
7	MDM	ECST5004	Machine learning	3	0	0	3	50	50	100	3
8	MDM	ECSP5004	Machine learning Lab	0	0	2	1	50	-	50	-
9	PEC	ECST5005	Program Elective-I	3	0	0	3	50	50	100	3
10	PEC	ECSP5005	Program Elective-I Lab	0	0	2	1	50	-	50	-
11	OE		Open elective-III/ MOOCs	3	0	0	3	50	50	100	3
TOTAL				15	3	10	23				
				28 Hrs.							

Teaching Scheme for B. Tech. Electronics and Computer Science

SEMESTER-VI											
Sr. No.	Category	Course Code	Course Title	Hours per week			Credits	Maximum Marks			ESE Duration (Hrs)
				L	T	P		Continuous Evaluation	End Sem Exam	Total	
1	PCC	ECST6001	Database Management System	3	0	0	3	50	50	100	3
2	PCC	ECSP6001	Database Management System Lab	0	0	2	1	50	-	50	-
3	PCC	ECST6002	System Verilog for Verification	3	0	0	3	50	50	100	3
4	PCC	ECSP6002	System Verilog for Verification Lab	0	0	2	1	50	-	50	-
5	PEC	ECST6003	Programme Elective-II	3	0	0	3	50	50	100	3
6	PEC	ECSP6003	Programme Elective-II Lab	0	0	2	1	50	-	50	-
7	PEC	ECST6004	Programme Elective-III	3	0	0	3	50	50	100	3
8	PEC	ECSP6004	Programme Elective-III Lab	0	0	2	1	50	-	50	-
9	MDM	ECST6005	Data Handling and Visualization	2	0	0	2	50	50	100	2
10	VSEC	ECSP6006	Software Laboratory-II	0	0	4	2	50	-	50	
11	FP	ECSP6007	Project-1	0	0	4	2	50	50	100	-
TOTAL				14	0	16	22				
				30 Hrs.							

Exit option : Award of UG Degree with additional 8 credits			
Exit Course			
1	TBI Internship	Online/offline Certification Course	8
2	Centre for Microsystem Internship		8
3	Research Internship		8

Teaching Scheme for B. Tech. Electronics and Computer Science

SEMESTER-VII											
Sr. No.	Category	Course Code	Course Title	Hours per week			Credits	Maximum Marks			ESE Duration(Hrs)
				L	T	P		Continuous Evaluation	End Sem Exam	Total	
1	PCC	ECST7001	Computer Networks	3	0	0	3	50	50	100	3
2	PCC	ECSP7001	Computer Networks Lab	0	0	2	1	50	-	50	-
3	PCC	ECST7002	SOC Design	3	0	0	3	50	50	100	3
4	PCC	ECSP7002	SOC Design Lab	0	0	2	1	50	-	50	-
5	PCC	ECST7003	Information Security and Cryptography	3	0	0	3	50	50	100	3
6	MDM	ECST7004	Digital Signal Processing	3	0	0	3	50	50	100	3
7	PEC	ECST7005	Program Elective-IV	3	0	0	3	50	50	100	3
8	PRJ	ECSP7006	Project-2	0	0	4	2	50	50	100	-
9	FP	ECSP7007	Internship Evaluation	0	0	0	0				
TOTAL				15	0	8	19				
				23 Hrs.							

Teaching Scheme for B. Tech. Electronics and Computer Science

SEMESTER-VIII											
Sr. No.	Category	Course Code	Course Title	Hours per week			Credits	Maximum Marks			ESE Duration (Hrs)
				L	T	P		Continuous Evaluation	End Sem Exam	Total	
1	PEC	ECST8001	Program Elective-V	3	0	0	3	50	50	100	3
2	PEC	ECST8002	Program Elective-VI	3	0	0	3	50	50	100	3
3	PRJ	ECSP8003	Project-3	0	0	12	6	50	50	100	-
TOTAL				6	0	12	12				
				18 Hrs.							
OR											
1	Internship/ OJT	ECSP8006	Industry Internship/ TBI Internship/ Research Internship	0	0	24	12	50	50	100	-
TOTAL				24 Hrs.			12				

Teaching Scheme for B. Tech. Electronics and Computer Science
HONORS Specialization in Electronics and Computer Science (AI for edge computing)

Sr. No.	Semester	Course Code	Course Title	Hours/week			Credits	Maximum Marks			ESE Duration (Hrs.)
				L	T	P		Continuous Evaluation	End Sem Exam	Total	
1	III	ECSTH3100	Edge for AI fundamentals	3	0	0	3	50	50	100	3
2	IV	ECSTH4100	Embedded Machine Learning	3	0	0	3	50	50	100	3
3	V	ECSTH5100	Computer Vision with Embedded Machine Learning	3	1	0	4	50	50	100	3
4	VI	ECSTH6100	Business Considerations for Edge Computing	3	1	0	4	50	50	100	3
5	VII	ECSPH7100	Project	0	0	8	4	50	50	100	-
				12	2	8	18				

MINOR Specialization in Electronics and Computer Science (IoT)

Sr. No.	Semester	Course Code	Course Title	Hours per week			Credits	Maximum Marks			ESE Duration (Hrs)
				L	T	P		Continuous Evaluation	End Sem Exam	Total	
1	III	ECSTM3100	IoT fundamentals	3	0	0	3	50	50	100	3
2	IV	ECSTM4100	Sensor Interfacing with Arduino and ESP 8266	3	0	0	3	50	50	100	3
3	V	ECSTM5100	Cloud Computing Using Raspberry Pi	3	1	0	4	50	50	100	3
4	VI	ECSTM6100	Data Management and Analytics for IoT	3	1	0	4	50	50	100	3
5	VII	ECSPM7100	Project	0	0	8	4	50	50	100	-
Total				12	2	8	18				

HONORS Specialization in Research

1	RM	ECST8004	Research Methodology	4	0	0	4	50	50	100	3
2	PRJ	ECSP8005	Research Internship	0	0	28	14	50	50	100	-
TOTAL				4	0	28	18				
				32 Hrs.							

Programme Electives

Micro Specialization		Semester V	Semester VI		Semester VII	Semester VIII	
		Elective-I	Elective-II	Elective-III	Elective-IV	Elective-V	Elective-VI
AI/ML	Course Code	ECST5005-1/ ECSP5005-1	ECST6003-1/ ECSP6003-1	ECST6004-1/ ECSP6004-1	ECST7005-1	ECST8001-1	ECST8002-1
	Course Name	Deep Learning-I	Image Processing	Deep Learning-II	Natural Language Processing	Generative Adversarial Network	Reinforcement Learning
VLSI	Course Code	ECST5005-2/ ECSP5005-2	ECST6003-2/ ECSP6003-2	ECST6004-2 / ECSP6004-2	ECST7005-2	ECST8001-2	ECST8002-2
	Course Name	VLSI Signal Processing	C Based VLSI Design	Design for Testability	Advanced Computer Architecture	Flexible Electronics and Sensors	Nano Electronics
IoE	Course Code	ECST5005-3/ ECSP5005-3	ECST6003-3/ ECSP6003-3	ECST6004-3 / ECSP6004-3	ECST7005-3	ECST8001-3	ECST8002-3
	Course Name	IoT Sensors and Devices	IoT Networks and Protocols	IoT Programming and Big Data	Cyber Security and Privacy in IoT	Autonomous Vehicle	Capstone Project
General	Course Code	ECST5005-4/ ECSP5005-4	ECST6003-4/ ECSP6003-4	ECST6004-4 / ECSP6004-4	ECST7005-4	ECST8001-4	ECST8002-4
	Course Name	Cloud Computing	Data Mining and Warehousing	Big Data Web Intelligence	System Design	Block Chain	Sales Force

List of Open Electives

Sr.No.	Semester	Course Code	Course Name
1	III	ECST2980	Basics of Linux Operating System
2	IV	ECST2990	Designing with Raspberry Pi
3	V	ECST3980	Programming for Vedic Mathematics Sutras

Syllabus of Semester I B.Tech.

Department of Electronics and Computer Science

Course Code	PHT1007				
Category	Basic Science Course				
Course Title	Physics				
Scheme & Credits	L	T	P	Credits	Semester
	2	1	0	3	I

Course Outcomes

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

1. Outline the difference between intrinsic/extrinsic semiconductors and their carrier transport phenomena in semiconductor.
2. Illustrate the working and design aspects for the various photonic devices like LEDs, solar-cells and LASER diodes.
3. Classify materials on the basis of band theory and its importance for semiconductors.
4. Apply fundamental knowledge of quantum mechanics to examine electrons behaviour in solids at the quantum level.
5. Analyze the process of generation and recombination of excess charge carriers in semiconductors along with working principle of P-N junction and Metal-Semiconductor junction diode

Syllabus

Module 1 Introduction to Quantum Mechanics

Wave-particle duality, Heisenberg uncertainty relations, the quantum state wave function and its probability interpretation, Schrodinger's equation, Particle in an infinite potential well, Quantum tunneling,

Module 2 Electronic Materials

Formation of energy bands in solids, Classification of electronic materials, Kronig-Penny model, E-k diagram, Direct and indirect bandgaps, Valence and conduction bands, Density of states, Fermi-Dirac statistics, Fermi level, Effective mass.

Module 3 Intrinsic and Extrinsic Semiconductors

Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature, Carrier transport: diffusion and drift

Module 4 Non-Equilibrium Semiconductors

Carrier generation and recombination, Continuity equation, Ambipolar transport equation, Quasi-Fermi Energy levels, Excess Carrier Lifetime, Qualitative introduction to recombination mechanisms.

Module 5 Junction Physics

p-n junction diode, Zero-applied bias, forward bias, reverse bias, Application of diode as a rectifier, Zener diode, Special diodes: Tunnel diode, Schottky diode, Ohmic contacts, NPN and PNP transistor and its characteristics, classification

Module 6 Optoelectronic Devices

Optical absorption in semiconductors, Light emitting diodes, Laser diode, Stimulated emission and photon amplification, Einstein Coefficients, Solar Energy Spectrum, Solar Cells

Syllabus of Semester I B.Tech.

Department of Electronics and Computer Science

Text Book(s)

- 1.Semiconductor Physics and Devices (Fourth Edition), Donald A. Neamen, McGraw-Hill 2012.
- 2.Semiconductor Device Physics and Design, Umesh K Mishra and Jasprit Singh, Springer 2008.
- 3.Electronic Devices and Circuits, Jacob Millman, Christos C. Halkias, McGraw Hill 1967.

References

- 1.Optoelectronics and Photonics: Principles and Practices by S. O. Kasap, Prentice Hall2001
- 2.Physics of Semiconductor Devices, Simon M. Sze, Wiley-Interscience (1981)

Syllabus of Semester I B.Tech.
Department of Electronics and Computer Science

Course Code	PHP1007				
Category	Basic Science Course				
Course Title	Physics Lab				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

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

1. Develop skills required for experimentation and verification of physics laws.
2. Analyse the results obtained through proper graph plotting and Error analysis.
3. Conduct experiments to validate physical behaviour of materials/components.
4. Analyse the behaviour and characteristics of P-N Junction, Zener-Diode and other semiconductor devices.
5. Prepare laboratory reports on interpretation of experimental results

List of Experiments

1. Parameter extraction from V-I characteristics of a diode
2. Parameter extraction from V-I characteristics of a transistor
3. Analysis of diode rectifier
4. Resistivity measurement of semiconductor by Four Probe method
5. Performance and analysis of HallEffect in semiconductor to determine the Hall coefficient and carrier concentration of the majority carriers in the given specimen
6. Estimation of energy gap in semiconductor
7. Characteristics and analysis of solar cells
8. Verification of Ohm's law and error analysis of the data using Linear Least Square Fit (LLSF) method
9. Analysis of energy values and wave function using Mathematica software
10. Verification of Planck's constant

Reference: Laboratory manual of the Physics Department, RCOEM.

Syllabus of Semester I B.Tech.

Department of Electronics and Computer Science

Course Code	MAT1001				
Category	Basic Science Course				
Course Title	Applied Mathematics-I				
Scheme & Credits	L	T	P	Credits	Semester
	2	1	0	3	I

Course Outcomes

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

1. Recognize first order ordinary differential equations that can be solved by each of the four methods – Linear DE, Exact DE, reducible to linear DE and reducible to exact differential equations and use the appropriate method to solve them.
2. Solve higher order ordinary differential equations with constant and variable coefficients.
3. Find best fit curve by method of least square method and calculate correlation, regressions.
4. Recognize and understand discrete, continuous probability distributions and apply Binomial distribution, Poisson distribution and Normal distribution to appropriate problems.
5. Internalize multivariable calculus and apply it find Jacobians, maxima and minima of function/Solve numerical integrations by Newton coat formulas and Gauss-Legendre Quadrature.

Syllabus

Module 1: First order ordinary differential equations

Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type, Applications of First order Differential Equations.

Module 2: Ordinary differential equations of higher orders

Second order linear differential equations with constant and variable coefficients, method of variation of parameters, Cauchy-Euler equation. Applications of Higher order Differential Equations.

Module 3: Statistics:

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves, correlation and regression – Rank correlation, Multiple regression and correlation and its application in Engineering.

Module 4: Differential Calculus

Taylor's and Maclaurin's series expansions, radius of curvature (Cartesian form), evolutes and involutes, Limit and continuity of functions of several variables and their partial derivatives, Eulers Theorem, chain rule, total derivative, Jacobians, Maxima, minima and saddle points; Method of Lagrange multipliers.

Syllabus of Semester I B.Tech.
Department of Electronics and Computer Science

Module 5: Probability: (For All Branches except Mechanical Branch)

Probability spaces, conditional probability, independence, Bay's Theorem, Discrete random variables, Binomial distribution, Poisson distribution, Normal distribution. Relation between binomial, Poisson and Normal distributions.

OR

Module 5: Numerical Integration (Only for Mechanical Branch)

Simpson's 1/3rd rule, 3/8th rule, Trapezoidal rule, Gauss-Legendre Quadrature.

Textbooks/References:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India, 2009.
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
4. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
5. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
6. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
7. Theory and Problems of probability and statistics : 2nd ed : J. R. Spiegel, Schaum series
8. A text book of Applied Mathematics Volume I & II, by P. N. Wartikar and J. N. Wartikar, Pune Vidhyarthi Griha Prakashan, Pune-411030 (India).
9. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.

Syllabus of Semester I B.Tech.
Department of Electronics and Computer Science

Course Code	MAP1001				
Category	Basic Science Course				
Course Title	Computational Mathematics Lab				
Scheme & Credits	L	T	P	Credit	Semester
	0	0	2	1	I

Course Outcomes

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

1. Download SageMath and use it as an advance calculator.
2. Sketch and analyze function graphs.
3. Apply the concepts of differential calculus to find extreme value of continuous functions and analyze solutions of differential equations
4. Evaluate improper integrals and its applications to find length, area, volume, centre of gravity and mass.
5. Analyze and calculate eigen values, eigen vectors, rank nullity, and solve system of linear equations of a matrix / linear map.
6. Analyze the data to find best fit curve.

List of experiments

1. To use SageMath as advanced calculator
2. 2D Plotting with SageMath
3. 3D Plotting with SageMath
4. Differential Calculus with SageMath
5. Solution of differential equations in SageMath
6. Basics of Linear Algebra
7. Curve Fitting by using SageMath
8. Integral Calculus with SageMath

Syllabus of Semester I B.Tech.
Department of Electronics and Computer Science

Course Code	CHP1002				
Category	Basic Science Course				
Course Title	Environmental Science Lab				
Scheme & Credits	L	T	P	Credit	Semester
	0	0	2	1	I

Course Outcomes

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

1. Estimate different physicochemical parameters of water as well as Air and their analysis methods
2. Explain the uses of greener and sustainable routes for the synthesis of biofuels/nano-materials.
3. Determine nutrients/pollutants in soil sample.

List of Experiments

1. Determination of pH, turbidity and TDS present in given water/ waste water sample
2. Determination of conductivity present in given water/ waste water sample.
3. Determination of Dissolved Oxygen content in various natural sources of water/ waste water sample
4. Determination of Chemical Oxygen Demand (COD) present in various natural sources of water/ waste Water sample.
5. Determination of free residual chlorine in water/waste water sample.
6. Determination of concentration of acid in the beverage
7. Identification of micro plastics in the given water sample
8. Estimation of Copper metal from e-waste
9. Green synthesis of Biodiesel (transesterification of oil)
10. Green synthesis of Metal nanoparticles by using various plant extract
11. Demonstration on measuring ambient air quality by using Air Quality Analyzer
12. Determination of particulate matter in the air using a High Air Volume Sampler.
13. Identification of Alkali/Alkaline earth metal in water/waste water using flame photometer.
14. Determination of Organic Carbon/Total Iron/Total Nitrogen/Phosphorous/Potassium/Sulphur in Soil sample.

Text Books

1. A Textbook on Experiments and Calculations in Engineering Chemistry by S.S. Dara, S.Chand Publications
2. Advanced Practical Physical Chemistry by J.B. Yadav, Krishna's Prakashan Media (P) Limited

Reference Books

1. Collection of Interesting General Chemistry Experiments , A by A.J.Elias Universities Press Publications
2. College Practical Chemistry by V.K.Ahluwalia , S,Dhingra and A. Gulati, Universities Press Publications
3. Standard Methods for the Examination of Water and Wastewater, American Public Health Association, American Water works Association, Water Environment Federation

Syllabus of Semester I B.Tech.
Department of Electronics and Computer Science

Course Code	ECST1001				
Category	Engineering Science Course				
Course Title	Programming for Problem Solving				
Scheme & Credits	L	T	P	Credits	Semester
	3	0	0	3	I

Course Outcomes

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

1. Develop the fundamentals of C programming and choose the loops and decision-making statements to solve and execute the given problem.
2. Formulate simple algorithms for arithmetic and logical problems, translate the algorithms to programs, test and execute the programs and correct syntax and logical errors.
3. Use arrays, pointers, structures and I/O operations for the formulation of algorithms and programs.
4. Apply programming concepts to solve matrix addition, multiplication problems and searching & Sorting problems.
5. Implement iterations and recursions, to decompose a problem into functions and synthesize a complete program using divide and conquer approach.

Syllabus

Module 1 Introduction to Programming

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) Idea of Algorithm: Steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples. Arithmetic expressions and precedence.

Module 2 C Programming Language

Introduction to C language: Keywords, Constant, Variable, Data types, Operators, Types of Statements, Pre-processor Directives, Decision Control Statement-if, if-else, nested if-else statement, switch case, Loops and Writing and evaluation of conditionals and consequent branching.

Module 3 Arrays and Basic Algorithms

Arrays: 1-D, 2-D, Character arrays and Strings. Searching, Basic Sorting Algorithms, Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

Module 4 Functions and Recursion

User defined and Library Functions, Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference. Recursion: As a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series.

Module 5 Pointers and Structures

Structures, Defining structures, Array of Structures, Introduction to pointers, Defining pointers, Pointer arithmetic, pointer operators, Use of Pointers in self-referential structures.

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Module 6 File handling

Streams in C, Types of Files, File Input /Output Operations: Modes of file opening, Reading and writing the file, Closing the files using f flush().

Text Books

1. Programming in ANSIC:E. Balguruswami Mc GrawHill
2. Mastering C: K. R. Venugopal and S.R. Prasad, Tata Mc GrawHill

Reference Books

1. Programming with C:Byron Gottfried,Schaums Outline Series.
2. Let Us C:Yashwant Kanetkar, B P B Publication

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Department of Electronics and Computer Science

Course Code	ECSP1001				
Category	Engineering Science Course				
Course Title	Programming for Problem Solving Lab				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

List of Experiments

1. Using basic data types of C, implement arithmetic expressions.
2. Implement Programs using Decision Control Structures
3. Demonstrate use of Loop Control Structures
4. Implement Programs using Multi-way Decision Control Structures (Switch Case)
5. Apply Functions and Recursion to simple programs.
6. Initialize array and apply it to solve problems of 1D and 2D arrays.
7. Demonstrate use of Structures and Pointers.
8. Apply file handling concepts in C.

Note :- 2/3 Practice Programs will be taken on each of the experiments mentioned above.

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Department of Electronics and Computer Science

Course Code	ECST1002				
Category	Engineering Science Course				
Course Title	Fundamentals of Computer Engineering				
Scheme & Credits	L	T	P	Credits	Semester
	2	0	0	2	I

Course Outcomes

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

1. Understand the basic components of computer systems and its functionality.
2. Understand data representation and the storage of data within a computer system.
3. Understand how computers can be linked together to share information and resources using worldwide network of networks.
4. Describe the functions of operating system and its role as a resource manager to execute any application.
5. Explore use cases and applications of AI, understand AI concepts and terms like machine learning, deep learning and neural networks.

Syllabus

Module 1

Introduction to Computer Science: Role of Algorithms, History of Computing, Science of Algorithms, Abstractions. Basics of data encoding and storage: Bits and their storage, Number system, Main memory, Mass Storage, Representing Information as Bit Patterns. Machine Architecture: CPU Basics, Stored Program concepts, Machine Language Introduction with example, Program Execution with illustrative example.

Module 2

Operating Systems: History of OS, OS Architecture, Coordinating Machine Activities. Networking and the Internet: Network Fundamentals, the Internet, the World Wide Web. Software Engineering: Introduction, Software Life Cycle. Database Systems: Database Fundamentals, Relational Model.

Module 3

Introduction to Artificial Intelligence: Intelligence and Machines, Perception, Reasoning, Machine Learning, Artificial Neural Networks, Deep Learning. Computer Graphics: Scope of Computer Graphics.

Text Books

1. Brookshear J. G., "Computer science: an overview", Eleventh Edition, Addison-Wesley Publishing Company; 2011.

Reference Books

1. Silberschatz A., Gagne G, Galvin P. B., "Operating system concepts", Ninth Edition, Wiley, 2012.
2. Cobbaut P., "Linux Fundamentals", Samurai Media Limited, 2016.
3. Silberschatz A, Korth HF, Sudarshan S., "Database system concepts", Sixth Edition, McGraw Hill, 2010.
4. Kurose J. F., Ross K. W., "Computer networking: a top-down approach", Sixth Edition, Pearson, 2013.
5. Peter Norvig and Stuart J. Russell, "Artificial Intelligence: A Modern Approach", Pearson, Third edition, 2010.

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Department of Electronics and Computer Science

Course Code	ECST1003				
Category	Programme Core Course				
Course Title	Electronics and Computer Workshop				
Scheme & Credits	L	T	P	Credits	Semester
	1	0	0	1	I

Course Outcomes

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

1. Inspect techniques to identify and test different Electronic components and Integrated Circuits.
2. Comprehend different EDA tools required for designing of Electronic and computer related circuits.
3. Classify mounting and troubleshooting practices and OS installation
4. Understand data visualization and business intelligence tools

Syllabus

Module 1 Basic Electronic Components Testing and Measurement

Basic electronic components, data sheets, electronic test and measurement equipments: multi meter, Cathode Ray Oscilloscope (CRO), Digital storage oscilloscope(DSO), function generator, power supply, spectrum analyzer etc.

Module 2 Switches (Electronic and Network)

Types of Switches – Construction, Working, Characteristics & Applications

Module 3 Internet of Things (IoT) Sensors and Actuators

Types, Characteristics & Applications

Module 4 Computer Hardware and Software

Assembling and disassembling CPU and identification of peripherals, Processor mounting and troubleshooting practices, USB, Ethernet, HDMI, thunderbolt port variants (peripherals), Types of OS and OS installation, OS imaging.

Module 5 Data visualization and business intelligence tools: Power BI and Tableau

Features, Architecture, Data Modeling, Dashboard Design, Data Sources

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Department of Electronics and Computer Science

Course Code	ECSP1003				
Category	Programme Core Course				
Course Title	Electronics and Computer Workshop Lab				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

1. Identification and testing of Resistors with the help of Color-Bands & by use of Multimeter and verify difference in the values.
2. Identify the various types of Capacitances and Find out the values using Color Code/written values on them.
3. Identify the terminals of a Diode and its Polarity, Identify the terminals of a Transistor and its Type (NPN or PNP)
4. Identify the various tools & write down their uses. Material required: various tools -Wire Cutter, Wire Stripper -Various types of Pliers-Vice.- Crimping Tools (RJ-11/RJ-45) -Screw-Driver
5. Identify the various type of connectors used in various Gadgets & Instruments/Equipments.
6. Solder the joint connection of wires and check it. De-soldering and Re-soldering
7. Familiarization of function generator & Power Supply and perform measurements using it.
8. Learn cathode ray oscilloscope, DSO and perform measurements.
9. Assembling of electronic circuits using SMT (Surface Mount Technology) stations
10. Study of peripherals of a computer and its functions.
11. Assembling and disassembling of PC
12. Installation of Operating Systems – Windows 30 4 Installation of Operating Systems –LINUX 36
13. Hardware Troubleshooting and Software Troubleshooting
14. Understand modern application development A • HTML B • Wordpress C • Drupal
15. Familiarization and application of data visualization and business intelligence tools: Power BI and Tableau
16. Project

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Text Books

- 1.K. A. Navas; Electronics lab Manual; Fifth Edition; PHIlearning;2015
- 2.N. Kumar, T. H. Sheikh;PC Assembly and Installation; Books clinic Publishing; 2020

Reference books

- 1.C.Bhargava ;Digital Electronics :A Comprehensive Lab Manual;B S Publication; 2019
- 2.C. Zacker; PC Hardware: The Complete Reference; First Edition; McGraw HillEducation; 2017

Syllabus of Semester I B.Tech.
Department of Electronics and Computer Science

Course Code	HUT1002				
Category	HSSM-AEC				
Course Title	English for Professional Communication				
Scheme & Credits	L	T	P	Credits	Semester
	2	0	0	2	I

Course Outcomes

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

1. Demonstrate effective use of word power in written as well as oral communication.
2. Understand the techniques of listening and apply the techniques of reading comprehension used in professional communication.
3. Apply the principles of functional grammar in everyday as well as professional communication.
4. Effectively implement the comprehensive principles of written communication by applying various writing styles.
5. Create precise and accurate written communication products.

Syllabus

Module 1 Vocabulary Building

Importance of using appropriate vocabulary

Techniques of vocabulary development

Commonly used power verbs, power adjectives and power adverbs.

Synonyms, antonyms, phrases & idioms, one-word substitutions and standard abbreviations

Module 2 Listening and Reading Comprehension

Listening Comprehension: active listening, reasons for poor listening, traits of a good listener, and barriers to effective listening

Reading Comprehension: types and strategies.

Module 3 Functional Grammar and Usage

Identifying Common Errors in use of: articles, prepositions, modifiers, modal auxiliaries, redundancies, and clichés

Tenses

Subject-verb agreement, noun-pronoun agreement

Voice

Module 4 Writing Skills

Sentence Structures

Sentence Types

Paragraph Writing: Principles, Techniques, and Styles

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Module 5 Writing Practices

Art of Condensation: Précis, Summary, and Note Making
Correspondence writing techniques and etiquettes – academic writing
Essay Writing

Reference Books

1. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
2. Practical English Usage. Michael Swan. OUP. 1995.
3. Remedial English Grammar .F.T Wood Macmillan 2007
4. On Writing Well. William Zinsser. Harper Resource Book. 2001
5. Study Writing . Liz Hamp-Lyons and Ben Heasley. Cambridge University Press 2006
6. Exercises in Spoken English. Parts. I-II .CIEFL, Hyderabad. Oxford University Press

Syllabus of Semester I B.Tech.
Department of Electronics and Computer Science

Course Code	HUP1002				
Category	HSSM-AEC				
Course Title	English for Professional Communication Lab				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

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

1. Apply effective listening and speaking skills in professional and everyday conversations.
2. Demonstrate the techniques of effective Presentation Skills
3. Evaluate and apply the effective strategies for Group Discussions
4. Analyse and apply the effective strategies for Personal Interviews
5. Implement essential language skills- listening, speaking, reading, and writing

Syllabus

List of practicals

Computer Assisted and Activity Based Language Learning

1. Everyday Situations: Conversations and Dialogues – Speaking Skills
2. Pronunciation, Intonation, Stress, and Rhythm
3. Everyday Situations: Conversations and Dialogues – Listening Skills

Activity Based Language Learning

4. Presentation Skills: Orientation & Mock Session
5. Presentation Skills: Practice
6. Group Discussions: Orientation & Mock Session
7. Group Discussions: Practice
8. Personal Interviews: Orientation & Mock Session
9. Personal Interviews: Practice

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Course Title: Liberal / Performing Arts

Course Code	Course Name	Se m.	Hours/ week	Credit s	Continuous Evaluation Max. marks
HUP0001-1	Fundamentals of Indian Classical Dance: Bharatnatayam	I	2	1	50
HUP0001-2	Fundamentals of Indian Classical Dance: Kathak	I	2	1	50
HUP0001-3	Introduction to Digital Photography	I	2	1	50
HUP0001-4	Introduction to Japanese Language and Culture	I	2	1	50
HUP0001-5	Art of Theatre	I	2	1	50
HUP0001-6	Introduction to French Language	I	2	1	50
HUP0001-7	Introduction to Spanish Language	I	2	1	50
HUP0001-8	Art of Painting	I	2	1	50
HUP0001-9	Art of Drawing	I	2	1	50
HUP0001-10	Nature camp	I	2	1	50
PEP0001-21	Disaster Management through Adventure Sports	I	2	1	50
PEP0001-22	Self-defense Essentials and Basics Knowledge of Defense forces	I	2	1	50
CHP0001-31	Art of Indian traditional cuisine	I	2	1	50
CHP0001-32	Remedies by Ayurveda	I	2	1	50

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Course Code	HUP0001-1				
Category	Co-Curricular Activity				
Course Title	Fundamentals of Indian Classical Dance: Bharatnatayam				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

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

1. Understand the importance of dance and Bharatnatayam as an Indian dance form
2. Develop skills to perform the dance form at its basic level.
3. Evaluate their strengths and interest to take bridge course to give Pratham (1st level formal exam of Bharatnatayam).

Syllabus

1. Orientation in Bharatnatayam
2. Tattu Adavu till 8, NaattaAdavu 4 Steps, PakkaAdavu 1 step, Metta Adavu 1 Step, Kuditta Metta Adavu 4 Steps
3. Practice sessions
4. Tatta Kuditta Adavu (Metta), Tatta Kuditta Adavu (Metta) 2 Steps, Tirmanam Adavu 3 Steps, Kattu Adav - 3 Steps, Kattu Adav - 3 Steps
5. Practice sessions
6. Tiramanam (front) 3 Steps, Repeat of Tiramanam (Overhead) 3 Steps
7. Practice sessions
8. Final practice sessions and performances.

Recommended reading

1. Introduction to Bharata's Natyasastra, Adya Rangacharya, 2011
2. The Natyasastra and the Body in Performance: Essays on the Ancient Text, edited by Sreenath Nair, 2015
3. Bharatanatyam How to ... : A Step-by-step Approach to Learn the Classical Form, Eshwar Jayalakshmi, 2011

Syllabus of Semester I B.Tech.
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Course Code	HUP0001-2				
Category	Co-Curricular Activity				
Course Title	Fundamentals of Indian Classical Dance: Kathak				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

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

1. Understand the importance of dance and Kathak as an Indian dance form
2. Develop skills to perform the dance form at its basic level.
3. Evaluate their strengths and interest to take bridge course to give Parambhik (1st level formal exam of Kathak).

Syllabus

1. Orientation in Kathak. Correct posture of kathak, Basic Movements and exercise Stepping, Chakkar of 5 count (Bhramari),
2. practice sessions of practical 1
3. Hastaks, Hastaks and Steppings, Reciting asamyukta Mudra shloka, Hastak and steppings
4. practice sessions of practical 3
5. Todas and Asamyukta hasta mudra shlok, Vandana of Shlok, 2 Todas and Vandana, Ghante Ki Tihai,
6. practice sessions of practical 5
- 7.2 1 Chakkardar Toda and Ginnti Ki Tihai, 2 Todas and 1 Chakkardar Toda, practice sessions
8. Final performances.

Recommended reading

1. Kathak Volume1 A "Theoretical & Practical Guide" (Kathak Dance Book), Marami Medhi & Debasish Talukdar, 2022, Anshika Publication (13 September 2022)

Syllabus of Semester I B.Tech.
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Course Code	HUP0001-3				
Category	Co-Curricular Activity				
Course Title	Introduction to Digital Photography				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

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

1. Develop an understanding of the technical aspects and aesthetics of Photography.
2. Apply the rules of digital photography for creating photographs.
3. Develop skills to enhance photographs through post processing.
4. Create a portfolio of their photographs in selected genre.

Syllabus

1. Orientation in digital photography: Genres, camera handling and settings
2. Rules of Composition
3. Rules of Composition: practice sessions
4. Understanding Exposure and Art of Pre-Visualization
5. Rules of Composition and Art of Pre-Visualization: practice sessions
6. Post Processing Photographs and Portfolio creation
7. Post Processing Photographs: practice sessions
8. Portfolio finalization and presentation in selected genre.

Reference material

1. Scott Kelby (2020) The Digital Photography Book: The Step-by-Step Secrets for how to Make Your Photos Look Like the Pros, Rocky Nook, USA
2. Larry Hall (2014) Digital Photography Guide: From Beginner to Intermediate: A Compilation of Important Information in Digital Photography, Speedy Publishing LLC, Newark
3. J Miotke (2010) BetterPhoto Basics: The Absolute Beginner's Guide to Taking Photos Like a Pro, AMPHOTO Books, Crown Publishing Group, USA

Syllabus of Semester I B.Tech.
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Course Code	HUP0001-4				
Category	Co-Curricular Activity				
Course Title	Introduction to Japanese Language and Culture				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

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

1. Gain a brief understanding about Japan as a country and Japanese culture.
2. Develop ability to use vocabulary required for basic level communication in Japanese language.
3. Write and read the first script in Japanese language.
4. Frame simple sentences in Japanese in order to handle everyday conversations
5. Write in basic Japanese about the topics closely related to the learner.

Syllabus

1. Orientation about Japan, its language, and its culture
2. Communication Skills 1: Vocabulary for basic Japanese language
3. Practice sessions
4. Writing Skills 1: Reading and writing first script in Japanese
5. Practice sessions
6. Communication Skills 2: framing sentences
7. Practice sessions
8. Writing Skills 2: Write basic Japanese and practice

Recommended reading

1. Marugoto Starter (A1) Rikai - Course Book for Communicative Language Competences, by The Japan Foundation, Goyal Publishers & Distributors Pvt. Ltd (ISBN: 9788183078047)
2. Japanese Kana Script Practice Book – Vol. 1 Hiragana, by AmeyaPatki, Daiichi Japanese Language Solutions (ISBN: 9788194562900)

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Course Code	HUP0001-5				
Category	Co-Curricular Activity				
Course Title	Art of Theatre				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

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

1. Understand and synthesize the working of the prominent genres of theatre across the world.
2. Apply the skill of voice and speech in theatre and public speaking
3. Apply the art of acting and also develop generic skills such as confidence, communication skills, self-responsibility, motivation, commitment, interpersonal skills, problem solving, and self-discipline.
4. Apply the skills, acquired related to technical/production aspects of theatre and also develop problem solving and interpersonal skills.

Syllabus

1. Orientation in theatre
2. Voice and Speech training
3. Voice and Speech training: practice sessions
4. Art of acting
5. Art of acting: practice sessions
6. Art of script writing
7. Art of script writing: practice sessions
8. Final performances

Reference books

1. Boleslavsky, R. (2022). Acting: The First Six Lessons (1st ed., pp. 1-92). Delhi Open Books.
2. Shakthi, C. (2017). No Drama Just Theatre (1st ed., pp. 1-171). Partridge.
3. Bruder, M., Cohn, L. M., Olnek, M., Pollack, N., Previto, R., & Zigler, S. (1986). A Practical Handbook for the Actor (1st ed.). Vinatge Books New York.

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Course Code	HUP1003-6				
Category	Co-Curricular Activity				
Course Title	Introduction to French Language				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

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

1. Demonstrate basic knowledge about France, the culture and similarities/differences between India and France
2. Learn to use simple language structures in everyday communication.
3. Develop ability to write in basic French about themselves and others.
4. Develop ability to understand beginner level texts in French

Syllabus

List of Practicals

1. Orientation about France, the language, and culture
2. Communication Skills 1: Vocabulary building for everyday conversations
3. Practice sessions
4. Reading and writing Skills : Reading and writing simple text in French
5. Practice sessions
6. Communication Skills 2: listening comprehension
7. Practice sessions
8. Writing Skills: Write basic French and practice

Recommended reading

1. 15-minute French by Caroline Lemoine
2. Cours de Langue et de Civilisation Françaises by G. Mauger Vol. 1.1
3. Cosmopolite I by Natalie Hirschsprung, Tony Tricot

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Course Code					
Course Code	HUP0001-7				
Category	Co-Curricular Activity				
Course Title	Introduction to Spanish Language				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

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

1. Demonstrate basic knowledge about Spain, the culture and similarities/differences between India and France
2. Learn to use simple language structures in everyday communication.
3. Develop ability to write in basic Spanish about themselves and others.
4. Develop ability to read and understand beginner level texts in Spanish

Syllabus

List of Practicals

1. Orientation about Spain, the language, and culture
2. Communication Skills 1: Vocabulary building for everyday conversations
3. Practice sessions
4. Reading and writing Skills : Reading and writing simple text in Spanish
6. Communication Skills 2: listening comprehension
7. Practice sessions
8. Writing Skills: Write basic Spanish and practice

Recommended reading

1. 15-Minute Spanish by Ana Bremon
2. Aula Internacional 1 by Jaime Corpas ,Eva Garcia, Agustin Garmendia.
3. Chicos Chicas Libro del Alumno by María Ángeles Palomino

Syllabus of Semester I B.Tech.
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Course Code	HUP0001-8				
Category	Co-Curricular Activity				
Course Title	Art of Painting				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

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

1. Become familiar with the basic methods, techniques & tools of painting.
2. Train the eye and hand to develop sense of balance, proportion and rhythm.
3. Develop the ability to observe and render simple natural forms.
4. Enjoy the challenging and nuanced process of painting.

Syllabus

1. Orientation in Painting tools & basics of lines, shapes, light, shadows and textures
2. The art of observation how to see shapes in drawing
3. Introduction Water color how to handle water paints
4. Introduction to acrylic color how to handle acrylic paints
5. Explore layering paint and capturing the quality of light with paint.
6. Create landscape painting
7. Create Abstract painting
8. Paint on Canvas (try to recreate any famous painting)

Reference material

1. Drawing made easy by Navneet Gala; 2015th edition
2. Alla Prima II Everything I Know about Painting--And More by Richard Schmid with Katie Swatland
3. Daily Painting: Paint Small and Often To Become a More Creative, Productive, and Successful Artist by Carol Marine

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Course Code	HUP0001-9				
Category	Co-Curricular Activity				
Course Title	Art of Drawing				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

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

1. Become familiar with the basic methods, techniques & tools of drawing.
2. Train the eye and hand to develop sense of balance, proportion and rhythm.
3. Develop the ability to observe and render simple natural forms.
4. Enjoy the challenging and nuanced process of drawing.

Syllabus

1. Orientation in Drawing tools & basics of lines, shapes, light, shadows and textures
2. The art of observation how to see shapes in drawing
3. One/two-point basic linear perspective
4. Nature drawing and landscapes
5. Gestalt principles of visual composition
6. Figure drawing: structure and proportions of human body
7. Gesture drawing: expression and compositions of human figures
8. Memory drawing: an exercise to combine the techniques learnt

Reference material

1. Drawing made easy by Navneet Gala; 2015th edition
2. Perspective Made Easy (Dover Art Instruction) by Ernest R. Norling

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Course Code	HUP0001-10				
Category	Co-Curricular Activity				
Course Title	Nature Camp				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

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

1. Develop an affinity with nature by observing and understanding its marvels with guidance from experts
2. Develop an understanding of the challenges and solutions associated with nature and its conservation.

Course content

In collaboration with the Forest Department and/or a local NGO working in the field of environment conservation, this course would be conducted in 24 hours. Students will be taken to a tiger reserve in Vidarbha region or Forest fringe villages or work with an NGO from Vidarbha region working on natural resource management. The camps (for 2 days) will cover any one of the following topics as decided by the course coordinator:

1. Awareness about each element of biodiversity (camps on moths, butterflies, birds, other wildlife etc)
2. Environment management (water, forest, wildlife) – practices of Forest Department in managing a tiger reserve, and other aspects of water and forest conservation.
3. Sustainable natural resource management - initiatives by rural communities and local NGOs
4. Man-animal conflict and solutions (socio-economic and technical) – role of local communities and Forest Department
5. Traditional practices in environment conservation – role of local communities and local NGOs

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Course Code	PEP0001-21				
Category	Co-Curricular Activity				
Course Title	Disaster Management Through Adventure Sports				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

On completion of the course, students will be able to

1. Understand the meaning and importance of Adventure sports.
2. Learn the various types of adventure sports, the equipment and resources required to practicedisaster Management activities.
3. Learn the safety measures about different risk and their management.
4. To apply Disaster management theory to institutional & Societal problems and situations.

Syllabus

1. Basic adventure
2. First AID
3. various types of knots
4. Shelter making
5. Disaster management
6. Team building and goal setting
7. Realization of fear, risk and their roles and analysing safety Management Plan

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Course Code	PEP0001-22				
Category	Co-Curricular Activity				
Course Title	Self-defense Essentials and Basics Knowledge of Defense forces				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

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

- Understand the meaning, need and fitness requirements to implement self-defense
- Learn the basic techniques of selected combative sports.
- Learn to prepare basic Physical Training for Defense forces.
- Implement survival techniques during emergencies.

Syllabus

- General conditioning and self-defense specific conditioning
- Applications of techniques of combative sports for self-defense.
- Self-defense techniques for specific situations: chain snatching, knife or stick attack, holding fromback or front etc.
- Basic Military Knowledge and exposure making students Confident, bold, disciplined and trains themto join Armed Forces.

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Course Code	CHP0001-31				
Category	Co-Curricular Activity				
Course Title	Art of Indian traditional cuisine				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

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

1. Understand the factors that affect regional eating habits and the unique ingredients found in various states of India
2. Get insight to prepare popular dishes from various regions of India. .

Module 1. Indian Regional foods and snacks - factors effecting eating habits.

Module 2. Indian gravies – ingredients, their importance

Module 3. Indian Sweets - ingredients, their importance

Module 4. Presentation of Indian Meals, Menu Planning, Food Costing

Module 5. Food Preservatives and Safety

List of experiments

- 1) Introduction to cookery : does and don'ts
- 2) Introduction to Indian cuisine, philosophy and classification.
- 3) Regional influence on Indian Food- factors affecting eating habits
- 4) Preparation of Garam masala and or Chat masala with ingredients and their importance
- 5) Preparation of different gravies such as white, yellow or brown gravies with ingredients and their importance
- 6) Preparation of Indian sweets like Besan ke laddu with ingredients and their importance
- 7) Presentation of meal, Menu planning and Food costing
- 8) Common chemical food preservatives and their safety standards.

Syllabus of Semester I B.Tech.
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Reference books

1. Arora, K.,; Theory of cookery; First Edition, Frank Brothers Company (Pub) Pvt. Ltd., 2008 ISBN:9788184095036, 8184095031
2. Philip, Thangam . E.,; Modern Cookery: Vol. 1; Sixth Edition, Orient BlackSwan., 2008 ISBN:9788125040446, 8125040447ali
3. Parvinder S;Quantity Food Production Operations and Indian Cuisine (Oxford Higher Education); FirstEdition; Oxford University Press, 2011 ISBN 10: 0198068492 ISBN 13: 9780198068495
4. Singh, Yogesh; A Culinary Tour of India; First Edition I.K. International Publishing House Pvt. Ltd. ISBN 978-93-84588-48-9
5. Singh Shakesh;Simplifying Indian Cuisine;First Edition, Aman Publications, ISBN81-8204-054X
6. Dubey Krishna Gopal; The Indian Cuisine;PHI Learning Pvt. Ltd.ISBN978-81 203-4170-8

Syllabus of Semester I B.Tech.
Department of Electronics and Computer Science

Course Code	CHP0001-32				
Category	Co-Curricular Activity				
Course Title	Introduction to Remedies by Ayurveda				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

Course Outcomes

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

1. Know basic principle of Ayurvedic formulations.
2. Different types of Natural Remedies.
3. Basic idea about their Characterization

Module 1. Introduction to Ayurveda

Module 2. Different types of Ayurvedic formulations: Churn, Bhasma, Vati, Tailum

Module 3. Introduction to Methods of preparation

Module 4. Characterization, applications

Practicals based on above syllabus

1. Preparations of some medicinal oils like Bramhi tel, Bramhi Awala, Vatnashak Tel, Bhurngraj Tel etc.
2. Preparation of Churn, like Trifala Churn, Hingastak Churn, Trikut Churn etc.
3. Preparation of some Bhasmas and vati

Books

1. Chemistry and Pharmacology of Ayurvedic Medicinal Plants by Mukund Sabnis, Chaukhambha Amarbharati Prakashan.
2. Everyday Ayurveda by Shailesh Rathod
3. A text Book of Rasashastra by Vikas Dhole and Prakash Paranjpe
4. A text Book of Bhajajya Kalpana Vijñana

Syllabus of Semester I B.Tech.
Department of Electronics and Computer Science

Course Code	HUT1004				
Category	HSSM-VEC				
Course Title	Foundation Course In Universal Human Value				
Scheme & Credits	L	T	P	Credits	Semester
	1	0	0	1	I

Course Outcomes

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

1. Develop a holistic perspective of life
2. Better understanding of inter-personal relationships and relationship with society and nature.
3. An ability to strengthen self-reflection

Syllabus

Module 1 Aspirations and concerns

Need for Value Education: Guidelines and content of value education.

Exploring our aspirations and concerns: Knowing yourself, Basic human aspirations Need for a holistic perspective, Role of UHV; Self-Management: harmony in human being

Module 2 Health

Harmony of the Self and Body, Mental and physical health; Health for family, friends and society.

Module 3 Relationships and Society

Harmony in relationships, Foundational values: Trust, Respect, Reverence for excellence, Gratitude and love; harmony in society; harmony with nature.

Reference Material

The primary resource material for teaching this course consists of

1. Text book: R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2

Reference books

1. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.
2. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
4. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
5. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, limits to Growth, Club of Rome's Report, Universe Books.
6. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
7. A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
8. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.

Syllabus of Semester I B.Tech.
Department of Electronics and Computer Science

9.A.N.Tripathy, 2003, Human Values, New Age International Publishers.

Syllabus of Semester II B.Tech.
Department of Electronics and Computer Science

Course Code	CHT2006				
Category	Basic Science Course				
Course Title	Chemistry of Smart Materials				
Scheme & Credits	L	T	P	Credits	Semester
	2	0	0	2	II

Course Outcomes

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

1. Classify and explain the different types of sensors for various applications.
2. Discuss unique properties of nano-materials to solve challenges in our life and applications in computational world.
3. Discuss how spectroscopic methods are used for qualitative and quantitative analysis.
4. Analyze the utilization of green computing technology for environmental issues

Syllabus

Module 1 Smart Sensors and Materials

RFID and IONT materials: Synthesis, properties and applications in logistic information, intelligent packaging systems (Graphene oxide, carbon nanotubes (CNTs) and polyaniline).

Sensors: Introduction, types of sensors (Piezoelectric and electrochemical), nanomaterials for sensing applications (Strain sensors, gas sensor, biomolecules and volatile organic compounds).

Module 2 Nanomaterials

Introduction, classification, size dependent properties, surface area, optical and catalytic properties, Synthesis methods of nanomaterials- Top down and bottom-up approach.

Carbon nanomaterials: Types, properties and applications of CNT and graphene.

Applications of nano materials.

Module 3 Characterization Techniques and computational tools

Fundamentals of spectroscopy, Electronic Spectroscopy, Nuclear Magnetic Resonance

Spectroscopy. Basics of Nuclear magnetic resonance quantum computer

Synthesis of drugs, basic soft-wares for bio-chemical assessment of drugs.

Module 4 Green Computing and Chemistry

E-wastes- Types, environmental and health risks, segregation and recycling (Hydrometallurgical, pyrometallurgical and direct recycling), Extraction of precious metals from e-wastes, Twelve principles of Green Chemistry. Green Computing, Role of Green Computing in Environment and Research, Green devices and Green data Servers.

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Department of Electronics and Computer Science

Text Books

1. Shikha Agrawal, Engineering Chemistry : Fundamentals and Applications, Cambridge University Press.
2. Dr. Rajshree Khare, A Textbook of Engineering Chemistry(AICTE), S.K. Kataria & Sons.
3. S. S. Dara, A Textbook of Engineering Chemistry, S. Chand Publications.
4. A.K.Das and M. Das, An introduction to nanomaterials and nanoscience, CBS Publishers and Distributors
5. M Afshar Alam, Sapna Jain, Hena Parveen, Green Computing Approach Towards Sustainable Development, Wiley Interscience Publications.
6. Sensor & transducers, D. Patranabis, 2nd edition, PHI

Reference Books

1. E-waste recycling and management: present scenarios and environmental issues, Khan, Anish, and Abdullah M. Asiri. 2019, Springer, Vol. 33. ISBN: 978-3-030-14186-8.
2. Hans-Eckhardt Schaefer, Nanoscience: The Science of the Small in Physics, Engineering, Chemistry, Biology and Medicine, Springer-Verlag Berlin Heidelberg.

Syllabus of Semester II B.Tech.
Department of Electronics and Computer Science

Course Code	CHP2006				
Category	Basic Science Course				
Course Title	Chemistry of Smart Materials Lab				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	II

Course Outcomes

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

1. Apply the fundamental principles of measurement and skills in preparation and handling of hazardous chemicals and interpret the statistical data related to measurements.
2. Estimate the rate constants of reactions and order of the reaction and/or to validate adsorption isotherms.
3. Use of various computational tools for analysis of different spectral properties and bio-activities.

List of Experiments

1. Preparation of different Solutions: Molar solution, Normal solution and percent solution and Determination of concentration.
2. Demonstration of Handling of hazardous chemicals, MSDS (material safety data sheet), waste minimization strategies and chemical waste disposal.
3. Basic statistical analysis of results of neutralization of acid against the base and preparing acceptable graphs using software.
4. Prediction of infrared/NMR spectral and analytical data of organic molecules using Computational Software.
5. Spectroscopic/Colorimetric determine of wavelength of maximum absorption of chemical/biological compound in solution and determination of concentration using Lambert-Beer's Law.
6. To study chemical kinetics of peroxydisulphate and iodide ions reactions and to find out order of the reaction and analysis of experimental data using Computational Software.
7. Molecular docking of drugs using open computational software. (Demonstration experiment)
8. Determination of rate of the reaction at room temperature and analysis of experimental data using Computational Software
9. Use of open access software for the interpretation of various parameters of materials including drugs
10. Estimation of Copper from PCB

Reference Books

- 1.S. S. Dara, A Textbook on Experiments and Calculations in Engineering Chemistry, S. Chand Publications.
- 2.J. B. Yadav, Advanced Practical Physical Chemistry, Krishna's Prakashan Media (P) Limited.
- 3.A. J. Elias, Collection of Interesting General Chemistry Experiments, Universities Press Publications.
- 4.V. K. Ahluwalia, S. Dhingra and A. Gulati, College Practical Chemistry, Universities Press Publications.
- 5.Ashutosh Kar , Advanced Practical Medicinal Chemistry, New Age International Publisher.

Syllabus of Semester II B.Tech.
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Reference Books

1. David Young, Computational Chemistry: A Practical Guide for Applying Techniques to Real World Problems, Wiley Interscience Publications

Syllabus of Semester II B.Tech.

Department of Electronics and Computer Science

Course Code	MAT2001				
Category	Basic Science Course				
Course Title	Applied Mathematics-II				
Scheme & Credits	L	T	P	Credits	Semester
	2	1	0	3	II

Course Outcomes

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

1. Interpret the solutions of system of linear equations and use the concepts of Eigen values, Eigen vectors to find diagonalization of matrices, reduction of quadratic form to canonical form.
2. Evaluate definite and improper integrals using Beta, Gamma functions. Also trace cartesian curves.
3. Solve multiple integration by change of order, change of variable methods and apply it to find area, volume, mass and centre of gravity.
4. Understand geometric meaning of gradient, curl, divergence
5. Perform line, surface and volume integrals of vector-valued functions/ Analyze and compare different sets of data and classify the data by means of diagrams and graph.

Syllabus

Module 1: Matrices:

Algebra of matrices, Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Eigen values and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, Orthogonal transformation and quadratic to canonical forms, Introduction to n-dimensional space.

Module 2: Integral Calculus:

Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Tracing of curves(Cartesian form)

Module 3: Multiple Integrals

Multiple Integration: Double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: area, mass and volume by double integration, Center of mass and Gravity (basic concepts).

Module 4 : Vector Calculus (Differentiation)

Scalar point function, Vector point function, vector differentiation, gradient, divergence and curl, directional derivatives with their physical interpretations, solenoidal and irrotational motions, Scalar potential function.

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Department of Electronics and Computer Science

Module 5 : Vector Calculus (Integration)(All Branches except Biomedical Engineering)

Vector integration: Line integrals, work done, conservative fields, surface integrals and volume integrals, Stoke's theorem, Gauss divergence theorem, Green's theorem and their simple applications.

OR

Module 5 : : Descriptive Statistics (Only for Bio-Medical Engineering)

Types of statistical data: categorical, ranked, discrete, and continuous. Distinction between univariate, bi-variate, and multivariate statistics, Visualization techniques such as joint contingency tables, scatter plots, 2D histograms and line graphs , Measures of central tendency and Dispersion .

Topics for self learning

Rolle's theorem, Mean value theorems, Indeterminate forms, Applications of definite integrals to evaluate perimeter, area, surface areas and volumes of revolutions.

Textbooks/References:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. P. N. Wartikar and J. N. Wartikar, A text book of Applied Mathematics Volume I & II, Pune VidhyarthiGrihaPrakashan, Pune-411030 (India).
6. Biomedical Statistics -Shantikumar Yadav , Sompal Singh, Ruchika Gupta
7. Theory and Problems of Probability and Statistics - M.R. Spiegel (Mc Graw Hill) Schaum Series

Syllabus of Semester II B.Tech.

Department of Electronics and Computer Science

Course Code	ECST2001				
Category	Engineering Science Course				
Course Title	Elements of IoT				
Scheme & Credits	L	T	P	Credits	Semester
	3	0	0	3	II

Course Outcomes

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

1. Wire Raspberry Pi and create a fully functional computer
2. Use Python-based IDE and trace and debug Python code on the device
3. Measure physical parameter using sensors
4. Implement various communication protocols for wired and wireless communication
5. Interfaces different motors and create robots

Syllabus

Module 1

Basic functionality of the Raspberry Pi and Arduino and its Processor, setting and configuring the board, differentiating Raspberry Pi from other platform like arduino, begal, asus thinker etc. Overclocking, Component overview.

Module 2

Introduction to Linux: Implications of an operating system on the behavior of the Raspberry Pi, Overview of Linux and its terminal command, apt-get-update, apt-get-upgrade, navigating the file system and managing processes, text-based user interface through the shell, overview of graphic user interface.

Module 3

Programming the Raspberry Pi: Python: Introducing to Python programming language; Python Programming Environment, Python Expressions, Strings, Functions, Function Arguments, Lists, List Methods, Control Flow, Numpy, PIP (Python Installation Package) and customized libraries. C++ programming: Basic C++ programming approach, header file structure and library organization, Cross Compiler and its configuration.

Module 4

Exploring Electronics with the Raspberry Pi: Communication facilities on raspberry Pi (I2C, SPI, UART), working with RPi. GPIO library, Interfacing of Sensors and Actuators.

Project 2: Set UP a Pi motion detector

Project 3: Set UP a Pi ADC/DAC

Project 4: CONSTRUCT a digital weather station

Project 5: CONSTRUCT a Traffic Light Controller

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Department of Electronics and Computer Science

Module 5

Communication using Raspberry Pi: Wired and Wireless communication, TCP, IP configurations, SSH, Putty terminal usage.

Project 6: Set UP file server

Project 7: Network YOUR keyboard and MOUSE

Project 8: Create a portable wireless access point

Project 9: COMMUNICATE with ARDUINO

Project 10: CONSTRUCT a digital server based weather station

Module 6

Robotic Motion PI: DC, Servo, Stepper, Motor Drivers, Motor Shields, Camera Interfacing, remote data logging.

Project 11: Keyboard Control Robot

Project 12: Wireless Robot

Text Books

1. Raspberry Pi 3: An introduction to using with Python Scratch, Javascript and more, Gary Mitnick, Create Space Independent Publishing Platform, 2017.
2. Raspberry Pi for Python Programmers Cookbook, Tim Cox, Packt Publishing Limited; 2nd Revised edition, 2016.
3. Raspberry Pi User Guide, EbenUpton and Gareth Halfacree, John Wiley & Sons, 2016.

Syllabus of Semester II B.Tech.

Department of Electronics and Computer Science

Course Code	ECSP2001				
Category	Engineering Science Course				
Course Title	Elements of IoT Lab				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	II

Course Outcomes

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

1. Wire Raspberry Pi and create a fully functional computer
2. Use Python-based IDE and trace and debug Python code on the device
3. Measure physical parameter using sensors
4. Implement various communication protocols for wired and wireless communication
5. Interfaces different motors and create robots

List of Experiments

1. LED control on Esp8266 programmed via Arduino IDE.
2. User identification using rfid chip RC522
3. Motor interfacing with Raspberry Pi.
4. Send SMS alert from RPi if obstacle detected.
5. To check door status on intialstate.com usng Rpi via internet
6. To send DHT11 temperature to thingspeak using raspberry pi
7. Image tweeted when camera detects motion using Raspberry Pi.
8. Send data of various sensor to Thingspeak using Nodemcu
9. Display DHT11 sensor data on OLED screen using Nodemcu.
10. ESP8266 GPIO Control via Web Server programmed via Arduino IDE.

Syllabus of Semester II B.Tech.

Department of Electronics and Computer Science

Course Code	ECST2002				
Category	Engineering Science Course				
Course Title	Object Oriented Programming				
Scheme & Credits	L	T	P	Credits	Semester
	2	1	0	3	II

Course Outcomes

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

1. Understand the principles of object-oriented programming; create classes, instantiate objects and invoke methods.
2. Apply the concepts of generics and implement collection classes and develop reusable programs using the concepts of OOP.
3. Apply the concepts of Multithreading and Exception handling to develop efficient and error free Codes for solving classic synchronization problems.
4. Utilize modern design tools and collection framework to solve real world problems

Syllabus

Module 1

Features of Object Oriented Programming languages, Abstraction, Encapsulation, Inheritance, polymorphism and late binding. Concept of a class, Access control of members of a class, instantiating a class, constructor and method overloading and overriding.

Module 2

Concept of inheritance, methods of derivation, use of super keyword and final keyword in inheritance, run time polymorphism, abstract classes and methods, Interface, implementation of interface.

Module 3

Creating packages, importing packages, static and non-static members, Lambda Expressions Introduction, Block, Passing Lambda expression as Argument.

Module 4

Exceptions, types of exception, use of try catch block, handling multiple exceptions, using finally, throw and throws clause, user defined exceptions, file handling in Java, Serialization.

Module 5

Generics, generic class with two type parameter, bounded generics. Collection classes: Array list, Linked List, Hash set, Tree set, Hash Map.

Module 6

Multithreading: Java Thread models, creating thread using runnable interface and extending Thread, thread priorities, Thread Synchronization, Inter Thread communications. Introduction to Design Patterns, Need of Design Pattern, Classification of Design Patterns.

Text Books

1. Herbert Schildt; JAVA, the Complete Reference; Ninth Edition, Tata McGraw- Hill Publishing Company Limited.
2. Design Patterns by Erich Gamma, Pearson Education.

Syllabus of Semester II B.Tech.
Department of Electronics and Computer Science

Course Code	ECSP2002				
Category	Engineering Science Course				
Course Title	Object Oriented Programming Lab				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	II

List of Experiments

1. Implement the Classes and Objects in Java.
2. Implement a program in java with Constructors and destructors. Also implement the concept of overloading.
3. Demonstrate use of Inheritance.
4. Implement a concept of Interface in Java.
5. Demonstrate use of Multi Thread.
6. Implement Packages and import that package in programe.
7. Demonstrate use of Exception handling mechanism.
8. Apply concept of generics class and method.
9. Demonstrate collection framework and perform some basic operations on the Array List and Hashset.
10. Apply file handling concepts in Java.

Syllabus of Semester II B.Tech.
Department of Electronics and Computer Science

Course Code	ECST2003				
Category	Programme Core Course				
Course Title	Digital Electronics				
Scheme & Credits	L	T	P	Credits	Semester
	3	0	0	3	II

Course Outcomes

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

1. Apply various optimization techniques to minimize digital circuits.
2. Design combinational logic circuits.
3. Analyze and design asynchronous and synchronous sequential circuits.
4. Discuss x86 architecture

Syllabus

Module 1

Basics of Digital Electronics: Motivation for digital systems: Number Systems and arithmetic's, Logic and Boolean algebra, logic gates & truth tables, SOP, POS, Minimization of combinational circuits using Karnaugh-maps.

Module 2

Combinational Circuit Design: Multiplexers, De-multiplexers, Encoders, Decoders, Code Converters, Adders, Subtractor (Half, Full), BCD Adder/ Subtractor, ripple and carry look-ahead addition, Unsigned Multiplier.

Module 3

Sequential circuit Design-I: Storage elements, Flip-flops and latches: D, T, J/K, S/R flip-flops: level triggered, edge triggered, Master Slave flip-flop, flip flop conversion, timing analysis.

Module 4

Sequential circuit Design-II: Design of asynchronous and synchronous counters, Registers & Shift registers, Application of shift register: ring counter, Johnson counter, sequence generator and detector, serial adder; Linear feedback shift register (LFSR)

Module 5

Design of synchronous sequential circuit using Mealy model and Moore model: state transition diagram, algorithm state machine (ASM) chart

Module 6

Introduction to X86 architecture.

Syllabus of Semester II B.Tech.
Department of Electronics and Computer Science

Text Books

1. Donald P. Leach, Albert P. Malvino and Goutam Saha, “Digital Principles & Applications 8e”, McGraw Hill
2. Douglas V. Hall “Microprocessors and Interfacing” Tata McGraw Hill Education Private Limited, 2005

Reference Books

1. Thomas L Floyd, “Digital Fundamentals 9e”, Pearson
2. M. Morris Mano and Michael D. Ciletti, “Digital Design 5e”, Pearson
3. Taub and Shilling, “Digital Integrated Electronics”, McGraw Hill
4. A Anand Kumar, “Fundamentals of Digital Circuits” Fourth Edition, PHI
5. Kip R. Irvine, “Assembly Language for x86 Processors” Seventh Edition, Pearson Education

Syllabus of Semester II B.Tech.
Department of Electronics and Computer Science

Course Code	ECSP2003				
Category	Programme Core Course				
Course Title	Digital Electronics Lab				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	II

List of Experiments

1. To verify truth table of different logic gates.
2. Design basic logic gates using universal gate and verify its truth table.
3. To verify following Boolean expressions using gates and Multisim software.
 - a) $A+AB+AB$
 - b) $AB(C+AC)$
4. To implement the following arithmetic circuits using (a) logic gates IC's and (b) using Multisim software.
 - a) Full adder
 - b) Half subtractor
5. Implement the function $F = \sum m (1,3,5,7,8,9,11,13,15)$ using 16:1 and 8:1 multiplexer.
6. Verify the truth table of SR, JK, JKMS, T and D flip flop.
7. To study the following functions of Shift register using IC 7495
 - a) SIPO
 - b) PIPO
 - c) PISO
 - d) SISO
8. Design and verify 2 bit synchronous down counter using S-R flip-flop.
9. Design and verify the functionality of a sequence detector to detect the sequence 1101 using Melay and Moore model and use J-K flop-flop to implement the design.
10. To study architecture, memory segmentation and pipeline of 8086 microprocessor.

Syllabus of Semester II B.Tech.
Department of Electronics and Computer Science

Course Code	HUT2001				
Category	Engineering Science Course				
Course Title	Foundational Literature of Indian Civilization				
Scheme & Credits	L	T	P	Credits	Semester
	2	0	0	2	II

Course Outcomes

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

1. Understand the Indian knowledge system and its scientific approach
2. Get introduced to the Vedic corpus and recognize the multi-faceted nature of the knowledge contained in the Vedic corpus
3. Understand the salient features of the philosophical systems of the Vedic and non-Vedic schools
4. Develop a basic understanding of the ancient wisdom recorded in various Indian literary work

Syllabus

Module 1 Overview of Indian Knowledge System

Importance of ancient knowledge, defining IKS, IKS classification framework, Historicity of IKS, Some unique aspects of IKS.

Module 2 The Vedic corpus

Introduction of Vedas, four Vedas, divisions of four Vedas, six Vedangas, Distinct features of Vedic life.

Module 3 Indian Philosophical systems

Development and unique features, Vedic schools of philosophy, Samkhya and Yoga School of philosophy, Nayay and Vaisesika school of philosophy, Purva-mimamsa and Vedanta schools of Philosophy, Non-vedic philosophies: Jainism, Buddhism, and other approaches

Module 4 Indian wisdom through ages

Panchtantras, **Purans**: contents and issues of interests, **Itihasa**: uniqueness of the two epics (Ramayan and Mahabharata), Key issues and messages from Ramayana, Mahabharata – a source of worldly wisdom; **Indian ancient Sanskrit literature**: Kalidas, Vishakadutta, Bhavbhuti, Shudraka* *any one text as decided by the course teacher

Reference material

1. B. Mahadevan, Vinayak Rajat Bhar, Nagendra Pavana R. N., “Introduction to Indian Knowledge System: Concepts and Applications” PHI, 2022
2. S.C. Chatterjee and D.M. Datta, An introduction to Indian Philosophy, University of Calcutta, 1984

Syllabus of Semester II B.Tech.
Department of Electronics and Computer Science

Course Code	PET2001				
Category	Basic Science Course				
Course Title	Sports-Yoga-Recreation				
Scheme & Credits	L	T	P	Credits	Semester
	1	0	0	1	II

Course Outcomes

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

1. Understand fundamental skills, basic principle and practices of sports and Yoga.
2. Practically learn the principles of implementing general and specific conditioning of physical exercises and yoga.
3. Develop Health-related fitness and Body-mind co-ordination through various fitness activities, sports, recreational games and yoga.
4. Practice Healthy & active living with reducing Sedentary Life style.

Syllabus

Module 1 Theory: Introduction

- Meaning, Definition and Importance of Health & Wellness
- Dimensions of Health and Wellness
- Factors influencing Health and Wellness
- Physical Fitness, Nutrition, Habits, Age, Gender, Lifestyle, Body Types
- Health & Wellness through Physical Activities, Sports, Games, Yoga and Recreation activities
- Causes of Stress & Stress relief through Exercise and Yoga
- Safety in Sport

References

1. Russell, R.P. (1994). Health and Fitness Through Physical Education. USA: Human Kinetics.
2. Uppal, A.K. (1992). Physical Fitness. New Delhi: Friends Publication.
3. AAPHERD "Health related Physical Fitness Test Manual." 1980 Published by Association drive Reston Virginia
4. Kumar, Ajith. (1984) Yoga Pravesha. Bengaluru: Rashthrothanna Prakashana.
5. Dr. Devinder K. Kansal, A Textbook of Test Evaluation, Accreditation, Measurements and Standards (TEAMS 'Science)

Syllabus of Semester II B.Tech.
Department of Electronics and Computer Science

Course Code	PEP2001				
Category	Basic Science Course				
Course Title	Sports-Yoga-Recreation Lab				
Scheme & Credits	L	T	P	Credit	Semester
	0	0	2	1	II

Course Outcomes:

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

1. Understand fundamental skills, basic principle and practices of sports and Yoga.
2. Practically learn the principles of implementing general and specific conditioning of physical exercises and yoga.
3. Develop Health-related fitness and Body-mind co-ordination through various fitness activities, sports, recreational games and yoga.
4. practice Healthy & active living with reducing Sedentary Life style.

Module 1: - Practical- Exercises for Health and Wellness

- Warm-Up and Cool Down - General & Specific Exercises
- Physical Fitness Activities
- Stretching Exercises
- General & Specific Exercises for Strength, Speed, Agility, Flexibility, coordinative abilities
- Cardiovascular Exercises
- Assessment of BMI
- Relaxation techniques
- Physical Efficiency Tests

Module 2: - Yoga

- Shukshma Vyayam
- Suryanamaskar
- Basic Set of Yogasanas – Sitting, standing, supine and prone position
- Basic Set of Pranayama & Meditation

References:

1. Russell, R.P. (1994). Health and Fitness Through Physical Education. USA: Human Kinetics.
2. Uppal, A.K. (1992). Physical Fitness. New Delhi: Friends Publication.
3. AAPHERD “Health related Physical Fitness Test Manual.”1980 Published by Association drive Reston Virginia
4. Kumar, Ajith. (1984) Yoga Pravesha. Bengaluru: Rashtrothanna Prakashana.
5. Dr. Devinder K. Kansal, A Textbook of Test Evaluation, Accreditation, Measurements and Standards (TEAMS ‘Science)