

Bhai Gurdas Institute of Engineering & Technology

Department of Information Technology



Course Hand-Book

(Affiliated to IKG Punjab Technical University, Kapurthala)

From 1st to 8th Semester

Bhai Gurdas Institute of Engineering & Technology

Sangrur-148001

PUNJAB

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Vision and Mission of the Institute

Vision of the institute	To impart value based multidisciplinary quality education to the students which can enable them to contribute their knowledge in industrial development, technology revolution and economic growth of the nation with global perspective.	
Mission of the institute	Mission No.	Mission Statements
	M1	To develop technical manpower of quality standards with capabilities of accepting new challenges.
	M2	To provide excellent teaching and research environment.
	M3	To promote collaborative coexistence amongst academic institute and industries for resources sharing.

Vision and Mission of the Department

Vision of the Department	To be a leading the modern technology that provides an innovative education to create leaders and developers, and bring about new knowledge for society and industry.	
Mission of the Department	Mission No.	Mission Statements
	M1	To provide an education that transforms students through work and by providing an understanding of the needs of society and industry.
	M2	To explore the India and the World through greatness in scientific and technical education and research.
	M3	To serve as a valuable resource for industry and society and remain a source of pride for all Indians.
	M4	To make globally qualified graduates having imaginative skills and moral values keeping quickness with ever-changing technological advancements in the Information Technology.



PROGRAM OUTCOME (POs)

PO Number	Program Outcome (PO) Statement
PO1	Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



Program Educational Objectives (PEOs)

PEO No	Program Educational Objectives Statements
PEO1	To provide students with strong fundamentals of basic sciences related to the domain Knowledge of the department of the Information Technology.
PEO2	To develop all-around approach and to enhance their professional capabilities.
PEO3	To enable students to design and analyze system, and evolve solution for real life engineering problems.
PEO4	To include expertness, ethics, communication, teamwork and leadership skills in students to serve for the advancement of the industry.

Program Specific Outcomes (PSOs)

PSO1	To design and implement legitimate solutions by brilliance and revolutions in the field of the Information technology.
PSO2	To use problem solving skills to develop efficient solutions to simplify the real world problems.



Record of Course Outcomes 1st Semester

IK Gujral Punjab Technical University Bachelor of Technology Scheme for B.Tech Syllabus 2018

Course Code	Subject	L-T-P	Credit
BTPH104-18	Semiconductor Physics	3-1-0	4
BTAM104-18	Mathematics-I	3-1-0	4
BTEE101-18	Basic Electrical Engineering	3-1-0	4
BTME101-18	Engineering Graphics & Design	1-0-5	3
BTPH114-18	Physics (Lab)	0-0-3	1.5
BTEE102-18	Basic Electrical Engineering (Lab)	0-0-2	1
BMPD101-18	Mentoring and Professional Development	0-0-2	Satisfactory/ Unsatisfactory



Program: B.Tech (Information Technology)	Semester: 1 st Sem
Course Name: Semiconductor Physics	Course Code: BTPH104-18

Syllabus:

MODULE	DETAILS	HOURS
1	Electronic materials: Free electron theory of metals, Density of states in 1D, 2D, and 3D, Bloch's theorem for particles in a periodic potential, Energy band diagrams, Kronig-Penny model (to introduce origin of band gap), Energy bands in solids, E-k diagram, Direct and indirect bandgaps, Types of electronic materials: metals, semiconductors, and insulators, Occupation probability, Fermi level, Effective mass	10 Hrs
2	Semiconductors: Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Metal-semiconductor junction (Ohmic and Schottky), Semiconductor materials of interest for optoelectronic devices	10 Hrs
3	Light-semiconductor interaction: Optical transitions in bulk semiconductors: absorption, spontaneous emission, and stimulated emission; Einstein coefficients, Population inversion, application in semiconductor Lasers; Joint density of states, Density of states for phonons, Transition rates (Fermi's golden rule), Optical loss and gain; Photovoltaic effect, Exciton, Drude model	10 Hrs
4	Measurement Techniques: Measurement for divergence and wavelength using a semiconductor laser, Measurements for carrier density, resistivity, hall mobility using Four-point probe and van der Pauw method, Hot-point probe measurement, capacitance-voltage measurements, parameter extraction from diode I-V characteristics.	10 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	J. Singh: Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc. (1995).
2	B. E. A. Saleh and M. C. Teich: Fundamentals of Photonics, John Wiley & Sons, Inc., (2007)
3	S. M. Sze: Semiconductor Devices: Physics and Technology, Wiley (2008).
4	A. Yariv and P. Yeh, Photonics: Optical Electronics in Modern Communications, Oxford University Press, New York (2007).
5	P. Bhattacharya: Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).

Course Code: BTPH104-18 (Physics)

	Course Outcomes	BT Level
BTPH104-18.1	State the fundamentals of Solid State, Classical, Quantum and semiconductor Physics.	1
BTES301-18.2	Differentiate between classical and quantum concept and Apply fundamentals of quantum mechanics to problems on bound states.	3
BTPH104-18.3	Understand and describe the interaction of light with semiconductors in terms of Fermi golden rule.	4
BTPH104-18.4	Gain knowledge of electron theory of metals and understand electrical properties, characteristics of metals and their application in electrical appliance.	1
BTPH104-18.5	Understand the design, fabrication, and characterization techniques of Engineered semiconductor materials.	3
BTPH104-18.6	Develop the basic tools with which they can study and test the newly developed devices and other semiconductor applications.	6



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTPH104-18.1	3	2	2	1	2	1						1	3	3
BTES301-18.2	2	2	2	2	2	1						1	1	1
BTPH104-18.3	3	3	3	3	1	1						1	2	2
BTPH104-18.4	2	2	2	2	2	1						1	1	2
BTPH104-18.5	2	2	2		2	2						1	2	2
BTPH104-18.6	1	3	3	2	1	2						1	1	2
AVERAGE	2.17	2.33	2.33	2.00	1.67	1.33						1.00	1.67	2.00

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk.
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 1 st Sem
Course Name: Mathematics-I	Course Code: BTAM104-18

Syllabus:

MODULE	DETAILS	HOURS
1	Calculus: Rolle's theorem, Mean value theorems, Statements of Taylor's and Maclaurin theorems with remainders; Indeterminate forms and L' Hôpital's rule; Maxima and minima.	13 Hrs
2	Matrix Algebra: Matrices, vectors addition and scalar multiplication, matrix multiplication; Linear systems of equations, linear Independence, rank of a matrix, determinants, Cramer's Rule, inverse of a matrix, Gauss elimination and Gauss-Jordan elimination.	12 Hrs
3	Linear Algebra: Vector Space, linear dependence of vectors, basis, dimension; Linear transformations (maps), range and kernel of a linear map, rank and nullity, statement of rank-nullity theorem, Matrix associated with a linear map.	13 Hrs
4	Linear Algebra (Contd.): Eigenvalues, eigenvectors, symmetric, skew-symmetric, and orthogonal Matrices, eigen bases; Similar matrices, diagonalization.	12 Hrs

TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2	Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3	Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
5	V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East-West press, Reprint 2005.

Course Code: BTAM104-18 (Mathematics-I)



	Course Outcomes	BT Level
BTAM104-18.1	Understand the basics of calculus and linear algebra.	2
BTAM104-18.2	Apply the idea of differential and integral calculus to notions of improper integrals and Solve problems using beta and gamma Function.	3
BTAM104-18.3	Analyze the fundamental of Rolle’s Theorem and Mean value theorem in engineering problems.	4
BTAM104-18.4	Construct the essential tools of matrices and linear algebra.	6
BTAM104-18.5	Define the terms span, linear independence, basis, and dimension & apply these concepts to vector spaces, which will be useful in cryptography and computer graphics.	1
BTAM104-18.6	Explain the various types of matrices and compare its properties.	2

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTAM104-18.1	3	2	3	2	1							1	3	3
BTAM104-18.2	3	3	2	3	1							1	3	3
BTAM104-18.3	3	2	3	2	1							1	2	1
BTAM104-18.4	3	2	2	3	1							1	2	2
BTAM104-18.5	3	3	3	2	1							1	2	2
BTAM104-18.6	2	3	2	2	1							1	2	1
AVERAGE	2.83	2.50	2.50	2.33	1.00							1.00	2.33	2.00

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 1 st Sem
Course Name: Basic Electrical Engineering	Course Code: BTEE101-18

Syllabus:

MODULE	DETAILS	HOURS
1	DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff's current and voltage laws, analysis of simple circuits with dc excitation. Superposition, The	9 Hrs
2	AC Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections.	9 Hrs
3	Electrical Machines: Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections. Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators	16 Hrs
4	Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), Miniature Circuit Breaker (MCB), Earth Leakage Circuit Breaker (ELCB), MCCB, Contactors, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.	7 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2	T.K. Nagsarkar and M.S. Sukhija, "Basic Electrical Engineering", Oxford University Press
3	D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
4	L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011
5	E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
6	B. L. Theraja, "Electrical Technology", S Chand Publishing

Course Code: BTEE101-18 (Basic Electrical Engineering)

	Course Outcomes	BT Level
BTEE-101-18.1	Understand & apply Kirchoff's laws, network theorems, time domain analysis for RL & RC series circuit.	2
BTEE-101-18.2	Understand and analyse phasor diagram and waveforms for purely resistive, purely inductive and purely capacitive as well as series and parallel R-L, R-C & R-L-C circuits and also circuit Resonance.	3
BTEE-101-18.3	Understand concepts of Real, Reactive & apparent power and Power factor. Understand 3- phase supply and star and delta connection and their relationships. Power measurement by wattmeter.	4
BTEE-101-18.4	Understand construction & working principle of 1- phase and 3- phase transformers. Understand Ideal and practical transformer and auto-transformer and its applications as well.	4
BTEE-101-18.5	Understand generation of rotating magnetic fields. Understand construction and working of 3-phase induction motor, 1-phase induction motor, DC motors & synchronous generators.	5
BTEE-101-18.6	Understand LT Switchgear such as Switch Fuse Unit (SFU), MCB, ELCB, MCCB. Understand about wires, cables, earthing & its importance. Understand about types of batteries & its important Characteristics. Understand basic calculations for energy consumption & power factor improvement.	5



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTEE101-18.1	3	1	2	1	1							2	1	
BTEE101-18.2	3	3	1	1	2							2		1
BTEE101-18.3	3	2	1	1	1							2		
BTEE101-18.4	1	2	1	2	2							2		
BTEE101-18.5	1	2	1	1	2							1		
BTEE101-18.6	2	2	1	1	2	1						2	1	
AVERAGE	2.17	2.00	1.17	1.17	1.67	1.00						1.83		1.00

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 1 st Sem
Course Name: Engineering Graphics & Design	Course Code: BTME101-18

Syllabus:

MODULE	DETAILS	HOURS
1	INTRODUCTION TO ENGINEERING DRAWING: Principles of engineering drawing / engineering graphics / technical drawing and their significance –Drawing Instruments: their Standard and uses – symbols and conventions in drawing practice – lettering & numbering – BIS conventions. Types of lines and their uses, Drawing Sheets: sizes and layout, methods of folding drawing sheet, Grades of pencils used, Dimensioning: definition, types and methods of dimensioning, geometrical construction, concept of scales in drawing, types of scales, construction of plane and diagonal scales.	18 Hrs
2	ORTHOGRAPHIC PROJECTIONS: Relevance of projection, Types of projections, Principles of orthographic projections in reference to quadrants – conventions – first and third angle projections, illustration through simple problems of projection; Projections of points in quadrants. Projections and trace of a line with different possible orientations in a quadrant. Methods to find true length and inclination of a line with principal planes.	12 Hrs
3	PROJECTIONS OF PLANES AND SOLIDS: Concept of plane and lamina, Projections of a lamina when; parallel to any reference plane, perpendicular to any reference plane, inclined to reference plane. Traces of planes. Definition of solid, types of solids – conventions-different possible orientations of solid in a quadrant. Projections of solid when; axis parallel to reference plane, perpendicular to reference plane, inclined to one and parallel to other reference plane, parallel to both horizontal and vertical planes.	18 Hrs
4	ISOMETRIC PROJECTIONS: Principles of Isometric Projections- Isometric Scale Isometric Views or drawing- Conventions. Isometric drawing / projections of solids such as cube, prisms, pyramids, cylinder, and cone.	12 Hrs



5	Practice using Computer Aided Drafting (CAD) tools: Hands on training on any CAD software to strengthen the understanding of the engineering drawing wherein the students will be introduced to a number of assignments as mentioned in the syllabus.	12 Hrs
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TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	D. M. Kulkarni, A. P. Rastogi, and A. K. Sarkar (2009), Engineering Graphics with AutoCAD, PHI Learning Private Limited, New Delhi.
2	N. D. Bhat (2006), Engineering Drawing, Charotar Publications, New Delhi.
3	P.S Gill, “Engineering Drawing”, S K Kataria and sons, 18th edition, 2017 reprint.
4	Johle (2009), Engineering Drawing, Tata Mc Graw Hill, New Delhi, India.
5	Trymbaka Murthy (2007), Computer Aided Engineering Drawing, I.K. International Publishers, New Delhi.
6	R.B. Choudary (2005), Engineering graphics with Auto CAD, Anuradha Publishers, New Delhi.

Course Code: BTME101-18 (Engineering Graphics & Design)

	Course Outcomes	BT Level
BTME101-18.1	Prepare and understand drawings.	1
BTME101-18.2	Use the principles of orthographic projections.	3
BTME101-18.3	By studying about projections of solids, students will be able to visualize three dimensional objects and that will enable them to design new products.	2
BTME101-18.4	Design and fabricate surfaces of different shapes.	6
BTME101-18.5	Computer-aided design (CAD) software to modeling of parts and assemblies, dimensions, and annotations to drawing.	3
BTME101-18.6	Represent and create the objects in three dimensional appearances.	1



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTME101-18.1	3	2	2	2	2	1	1				2	1	3	2
BTME101-18.2	3	3	2	2	2		1				1	1	2	3
BTME101-18.3	2	3	2	2	2	1	2				1	1	2	2
BTME101-18.4	2	2	2	2	2		1				1	1	2	2
BTME101-18.5	2	2	2	2	2	1	1				1	1	2	2
BTME101-18.6	2	2	2	2	3							1	2	2
AVERAGE	2.33	2.33	2.00	2.00	2.17	1.00	1.20				1.20	1.00	2.17	2.17

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 1 st Sem
Course Name: Semiconductor Physics Lab	Course Code: BTPH114-18

Syllabus: List of Experiments

Task-1: To study the characteristic of different PN junction diode-Ge and Si
Task-2: To analyze the suitability of a given Zener diode as a power regulator.
Task-3: To find out the intensity response of a solar cell/Photo diode.
Task-4: To find out the intensity response of a LED.
Task-5: To determine the band gap of a semiconductor
Task-6: To determine the resistivity of a semiconductor by four probe method
Task-7: To confirm the de Broglie equation for electrons.
Task-8: To study voltage regulation and ripple factor for a half-wave and a full-wave rectifier without and with different filters.
Task-9: To study the magnetic field of a circular coil carrying current.
Task-10: To find out polarizability of a dielectric substance.
Task-11: To study B-H curve of a ferro-magnetic material using CRO
Task-12: To find out the frequency of AC mains using electric-vibrator
Task-13: To find the velocity of ultrasound in liquid.
Task-14: To study the Hall effect for the determination of charge current densities.
Task-15: Distinguish between Diamagnetic material, Paramagnetic and ferromagnetic material
Task-16: Measurement of susceptibility of a liquid or a solution by Quincke's method.



Task-17: To study the sample with the nano-scale objects and measure surface topography with different scales, width and height of nano objects, and force-distance curves using AFM.
Task-18: To study the temperature coefficient of Resistance of copper.
Task-19: To determine the ratio k/e Using a transistor
Task-20: To compare various capacitance and verify the law of addition of capacitance.
Task-21: To determine dipole moment of an organic molecule acetone.
Task-22: To measure the temperature dependence of a ceramic capacitor
Task-23: Verification of the curie Weiss law for the electrical susceptibility of a ferromagnetic material.
Task-24: To study the laser beam characteristics like; wave length using diffraction grating aperture & divergence

Course Code: BTPH114-18 (Semiconductor Physics Lab)

	Course Outcomes	BT Level
BTPH114-18.1	List some of the theoretical concepts learnt in the theory courses	3
BTPH114-18.2	Understand optical phenomenon with a polarization, interference and diffraction in terms of wave model.	4
BTPH114-18.3	Examine the methods used for estimating and dealing with experimental uncertainties and systematic errors.	5
BTPH114-18.4	Distinguish the methods used for estimating and dealing with experimental uncertainties	5
BTPH114-18.5	Evaluate the technical report which communicates scientific information in a clear and concise.	5
BTPH114-18.6	Develop the basic tools with which they can study and test the newly developed devices and other semiconductor applications.	1



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTPH114-18.1	3	2	1	2	2	2			2			1	3	3
BTPH114-18.2	3	1		2	2	1			3			1	2	2
BTPH114-18.3	3	2	1	2	1	1			1			1	1	3
BTPH114-18.4	2	2	1	3	2	2			1			1	2	2
BTPH114-18.5	2	2		2	2	2			2			1	2	2
BTPH114-18.6	3	2	1	2	2	2			2			1	2	2
AVERAGE	2.67	1.83	1.00	2.17	1.83	1.67			1.83			1.00	2.00	2.33



Program: B.Tech (Information Technology)	Semester: 1 st Sem
Course Name: Basic Electrical Engineering Lab	Course Code: BTEE102-18

Syllabus: List of Experiments

Task-1: To verify Ohm's Law and its limitations.
Task-2: To verify Kirchhoff's Laws.
Task-3: To measure the resistance and inductance of a coil by ammeter-voltmeter method
Task-4: To find voltage-current relationship in a R-L series circuit and to determine the power factor of the circuit.
Task-5: To verify the voltage and current relations in star and delta connected systems.
Task-6: To measure power and power factor in a single- phase AC circuit.
Task-7: To verify series and parallel resonance in AC circuits.
Task-8: To observe the B-H loop of ferromagnetic core material on CRO.
Task-9: To use a bridge rectifier for full- wave rectification of AC supply and to determine the relationship between RMS and average values of the rectified voltage.
Task-10: To measure the minimum operating voltage, current drawn, power consumed, and the power factor of a fluorescent tube light, Bulb, Single phase induction motor.
Task-11 To connect measuring analog and digital instruments to measure current, voltage, power and power factor.
Task-12: To perform open- and short circuit tests on a single- phase transformer and calculate its efficiency.
Task-13: To start and reverse the direction of rotation of a (i) DC motor (ii) three phase Induction motor.
Task-14: Study of starters for (i) DC motor (ii) Induction motor
Task-15: Study of Cut section of DC Series motor, DC shunt motor and three phase induction motor
Task-16: Calibration of energy meter.



Course Code: BTEE102-18 (Basic Electrical Engineering Lab)

	Course Outcomes	BT Level
BTEE102-18.1	Apply KCL, KVL and ohms law to Simple circuits.	1
BTEE102-18.2	Determine the self conductance of the coil.	2
BTEE102-18.3	Performing the operation & tests of transformer and rotating machines.	3
BTEE102-18.4	Analyse the differences in operation of different DC machine configurations.	4
BTEE102-18.5	Experimentally verify the basic circuit theorems.	5
BTEE102-18.6	Measure power and power factor in ac circuits.	6

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTEE102-18.1	3	3	2	1	2					1		1	2	2
BTEE102-18.2	2	2	2	2	2	1	1			1		1	1	2
BTEE102-18.3	2	3	2	2	2				2	1		1		1
BTEE102-18.4	2	3	2	2	2	1	1		2	1		1	2	
BTEE102-18.5	2	2	2	1	2	1			2	1		1	2	1
BTEE102-18.6	3	2	2	1	1					1		1	2	
AVERAGE	2.33	2.50	2.00	1.50	1.83	1.00	1.00		2.00	1.00		1.00	1.80	1.50



Record of Course Outcomes 2nd Semester

IK Gujral Punjab Technical University Bachelor of Technology Scheme for B.Tech Syllabus 2018

Course Code	Subject	L-T-P	Credit
BTCH101-18	Chemistry-I	3-1-0	4
BTAM204-18	Mathematics-II	3-1-0	4
BTPS101-18	Programming for Problem Solving	3-0-0	2
BTHU101-18	English	2-0-0	2
BTCH102-18	Chemistry-I (Lab)	0-0-3	1.5
BTPS102-18	Programming for Problem Solving (Lab)	0-0-4	2
BTHU102-18	English (Lab)	0-0-2	1
BTMP101-18	Workshop / Manufacturing Practices	1-0-4	3



Program: B.Tech (Information Technology)	Semester: 2nd Semester
Course Name: Chemistry-I	Course Code: BTCH101-18

Syllabus:

MODULE	DETAILS	HOURS
1	Atomic and molecular structure: Schrodinger equation. Particle in a box solutions and their applications for conjugated molecules and nanoparticles. Forms of the hydrogen atom wave functions and the plots of these functions to explore their spatial variations. Molecular orbitals of diatomic molecules and plots of the multicenter orbitals. Equations for atomic and molecular orbitals. Energy level diagrams of diatomic. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.	12 Hrs
2	Spectroscopic techniques and applications: Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications. Nuclear magnetic resonance and magne	8 Hrs
3	Intermolecular forces and potential energy surfaces: Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena. Potential energy surfaces of H ₃ , H ₂ F and HCN and trajectories on these surfaces.	4 Hrs
4	Use of free energy in chemical equilibria: Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria. Water chemistry. Corrosion. Use of free energy considerations in metallurgy through Ellingham diagrams.	6 Hrs
5	Periodic properties: Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordin	4 Hrs
6	Stereochemistry: Representations of 3 dimensional structures,	4 Hrs



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	structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis. Isomerism in transitional metal compounds	
7	Organic reactions and synthesis of a drug molecule: Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule.	4 Hrs

TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan
2	Chemistry: Principles and Applications, by M. J. Sienko and R.A. Plane
3	Organic Chemistry: Structure and Function by K. P. C. Vollhardt and N. E. Schore, 5th Edition http://bcs.whfreeman.com/vollhardtschore5e/default.asp
4	Fundamentals of Molecular Spectroscopy, by C. N. Banwell

Course Code: BTCH101-18 (Chemistry-I)

	Course Outcomes	BT Level
BTCH101-18.1	Illustrate the structures of diatomic and polyatomic in terms of molecular orbital's and relate intermolecular forces.	2
BTCH101-18.2	Interpret the molecular interactions by choosing suitable spectroscopic methods and interpreting corresponding data.	2
BTCH101-18.3	Make use of free energy in chemical equilibria and relate intermolecular forces.	3
BTCH101-18.4	Analyze periodic properties such as ionization potential, electro negativity, oxidation states and electro negativity	4
BTCH101-18.5	Determine the stereochemistry of organic compounds and major chemical reactions that are used in the synthesis of molecules.	5
BTCH101-18.6	Formulate the reactivity/stability of compound and identification of drug molecule	6



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTCH101-18.1	3	2	2	1	2		3					1	2	2
BTCH101-18.2	2	2	1	2	1		1					1	2	2
BTCH101-18.3	2	1	2	2			1					1	2	2
BTCH101-18.4	2	2	1	1	2		1					1	2	3
BTCH101-18.5	1	1	1		1		1					1	2	2
BTCH101-18.6	2	2	2	2	1		2					1	2	1
AVERAGE	2.00	1.67	1.50	1.60	1.40		1.50					1.00	2.00	2.00

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 2nd Semester
Course Name: Mathematics-II	Course Code: BTAM204-18

Syllabus:

MODULE	DETAILS	HOURS
1	Measures of Central tendency: Moments, skewness and kurtosis, Variance, Correlation coefficient, Probability, conditional probability, independence; Discrete random variables, Independent random variables, expectation of Discrete random variables.	10 Hrs
2	Probability distributions: Binomial, Poisson and Normal, Poisson approximation to the binomial distribution, evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation.	15 Hrs
3	Continuous random variables and their properties, distribution functions and densities, normal and exponential densities. Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas.	10 Hrs
4	Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations. Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.	15 Hrs

TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2	P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint)
3	W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.
4	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
5	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.



Course Code: BTAM204-18 (Mathematics-II)

	Course Outcomes	BT Level
BTAM204-18.1	Remember the basics of Probability and Statistics	1
BTAM204-18.2	Apply the idea of basics of probability and Random variables in solving various engineering problems. This concept will help in computer network, signals and systems and optical communication.	3
BTAM204-18.3	Analyze the fundamental of Probability distribution which will be helpful in various fields like modeling, simulation and inferences on varieties of natural processes and physical phenomenon.	4
BTAM204-18.4	Identify various Measures of Central Tendencies in comprehensive manner, which will be useful in data handling, R and Python.	3
BTAM204-18.5	Categorize the problems based on applied statistics and test of significance which will be useful for data sciences, artificial intelligence and machine learning.	4
BTAM204-18.6	Estimate appropriately interpret results of analysis of variance tests.	5

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTAM204-18.1	3	2	3	2	1							1	3	3
BTAM204-18.2	3	3	3	3	1							1	2	2
BTAM204-18.3	3	2	2	2	1							1	2	2
BTAM204-18.4	3	3	3	3	1							1	2	1
BTAM204-18.5	3	3	2	2	1							1	2	2
BTAM204-18.6	3	2	1	3	1							1	2	2
AVERAGE	3.00	2.50	2.33	2.50	1.00							1.00	2.17	2.00



DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 2nd Semester
Course Name: Programming for Problem Solving	Course Code: BTPS101-18

Syllabus:

MODULE	DETAILS	HOURS
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/Pseudocode with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.	8 Hrs
2	Arithmetic expressions and precedence: Conditional Branching and Loops. Writing and evaluation of conditionals and consequent branching. Iteration and loops	10 Hrs
3	Arrays: Arrays (1-D, 2-D), Character arrays and Strings	6 Hrs
4	Basic Algorithms: Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required) Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference	6 Hrs
5	Function: Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference	5 Hrs
6	Recursion: Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.	4 Hrs
7	Structure: Structures, Defining structures and Array of Structures	4 Hrs
8	Pointers: Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)	2 Hrs
9	File handling (only if time is available, otherwise should be done as part of the lab)	



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
2	Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
3	Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

Course Code: BTPS101-18 (Programming for Problem Solving)

	Course Outcomes	BT Level
BTPS101-18.1	Understand the working of computer system, operating system and compilers.	2
BTPS101-18.2	Use and representation of algorithm, flow chart, Syntax and logical errors in compilation.	3
BTPS101-18.3	Describe the Working of different operators, Statements (Conditional, Branching and Loops) with the help of simple programs, array and its types, Character Array.	1
BTPS101-18.4	Illustrate the use of sorting algorithms (Bubble, Insertion and Selection sort), finds the order of complexity through example programs. use of function and types (Call by value, call by reference), passing array to functions.	3
BTPS101-18.5	Use of Array (1-D array, 2-D array), Pointers, Structure initialization, array of structure, strings, standard library string functions, passing strings to a function.	3
BTPS101-18.6	Use of File handling(Reading, writing a file), file opening modes, structure of the file program, character Input/ Output, string Input/ Output function.	3



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTPS101-18.1	2	2	3	2	2	1				1	1	2	1	2
BTPS101-18.2	2	2	2	3	2	1			1	1		1	2	2
BTPS101-18.3	2	2	2	2	2	1	1		1	1		1	2	2
BTPS101-18.4	3	2	2	2	2	1	1		1	1		2	2	2
BTPS101-18.5	2	3	2	2	2	1			2	1	2	1	1	1
BTPS101-18.6	2	2	1	1	2	1					1	2	1	2
AVERAGE	2.17	2.17	2.00	2.00	2.00	1.00	1.00		1.25	1.00	1.33	1.50	1.50	1.83

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 2nd Semester
Course Name: English	Course Code: BTHU101-18

Syllabus:

MODULE	DETAILS	HOURS
1	Vocabulary Building & Basic Writing Skills: <ul style="list-style-type: none">• The concept of Word Formation • Root words from foreign languages and their use in English • Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.• Synonyms, antonyms, and standard abbreviations. • Sentence Structures • Use of phrases and clauses in sentences • Importance of proper punctuation • Creating coherence • Organizing principles of paragraphs in documents • Techniques for writing precisely	7 Hrs
2	Identifying Common Errors in Writing <ul style="list-style-type: none">• Subject-verb agreement • Noun-pronoun agreement • Misplaced modifiers • Articles • Prepositions • Redundancies • Clichés	6 Hrs
3	Mechanics of Writing <ul style="list-style-type: none">• Writing introduction and conclusion • Describing • Defining • Classifying • Providing examples or evidence	7 Hrs
4	Writing Practices <ul style="list-style-type: none">• Comprehension • Précis Writing • Essay Writing • Business Writing-Business letters, Business Emails, Report Writing, Resume/CV	8 Hrs

TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Practical English Usage. Michael Swan. OUP. 1995.
2	Remedial English Grammar. F.T. Wood. Macmillan.2007
3	Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
4	Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press



Course Code: BTHU101-18 (English)

	Course Outcomes	BT Level
BTHU101-18.1	Choose basic proficiency in listening and speaking skills.	1
BTHU101-18.2	Interpret the independent user of English language.	2
BTHU101-18.3	Make use of communication training.	3
BTHU101-18.4	Discover different strategy of effective communication and select the most appropriate mode of communication for a given situation.	4
BTHU101-18.5	Distinguish effectively and assertively.	4
BTHU101-18.6	Combine effectively through different mode of written communication.	6

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTHU101-18.1	2	1	1	2	2	2	2	3	2	3	1	3	2	2
BTHU101-18.2	3	1	2	1	3	3	3	3	3	3		2	2	2
BTHU101-18.3	2	1	1	2	2	2	2	3	2	3		3	3	2
BTHU101-18.4	3	1	1	1	2	3	3	3	3	3		3	2	3
BTHU101-18.5	3	2	1	1	3	2	3	3	3	2		3	2	2
BTHU101-18.6	3	1	1	2	2	3	2	3	3	2	1	3	3	2
AVERAGE	2.67	1.17	1.17	1.50	2.33	2.50	2.50	3.00	2.67	2.67	1.00	2.83	2.33	2.17

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 2 nd Semester
Course Name: Chemistry-I (Lab)	Course Code: BTCH102-18

Syllabus: List of Experiments

(Choice of 10-12 experiments from the following)

Task-1: Determination of surface tension and viscosity.
Task-2: Thin Layer Chromatography.
Task-3: Ion exchange column for removal of hardness of water.
Task-4: Colligative properties using freezing point depression.
Task-5: Determination of the rate constant of a reaction.
Task-6: Determination of cell constant and conductance of solutions.
Task-7: Potentiometry-determination of redox potentials and emf .
Task-8: Synthesis of a polymer/drug.
Task-9: Saponification/acid value of an oil.
Task-10: Chemical analysis of a salt.
Task-11: Lattice structures and packing of spheres.
Task-12: Models of potential energy surfaces.
Task-13: Chemical oscillations- Iodine clock reaction
Task-14: Determination of the partition coefficient of a substance between two immiscible liquids
Task-15: Adsorption of acetic acid by charcoal
Task-16: Use of the capillary viscometers to demonstrate the isoelectric point as the pH of minimum viscosity for gelatin sols and/or coagulation of the white part of egg.



Course Code: BTCH102-18 (Chemistry-I Lab)

	Course Outcomes	BT Level
BTCH102-18.1	Classify different physical properties such as surface tension and viscosity of unknown liquids.	2
BTCH102-18.2	Build skills in method of creating different chromatographic techniques.	3
BTCH102-18.3	Make use of the rate constants, cell constant, redox potentials and conductance for different chemical solutions.	3
BTCH102-18.4	Survey basic techniques and procedures in laboratory for synthesis and purification of any organic compounds	4
BTCH102-18.5	Inspect acid value of oil and analysis of salt.	4
BTCH102-18.6	Measure the partition coefficient of substance and adsorption of acetic acid by different methods.	5

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTCH102-18.1	3	3	1	1	3		1		2			2	3	3
BTCH102-18.2	2	2		1	3		1		2			1	2	2
BTCH102-18.3	2	3	1		2		1		1			1	2	3
BTCH102-18.4	2	2		1	1		1		2			2	2	2
BTCH102-18.5	2	1	1	1	2		1		1			1	2	1
BTCH102-18.6	3	2		1	3		2		2			1	3	2
AVERAGE	2.33	2.17	1.00	1.00	2.33		1.17		1.67			1.33	2.33	2.17



Program: B.Tech (Information Technology)	Semester: 2 nd Semester
Course Name: Programming for Problem Solving (Lab)	Course Code: BTPS102-18

Syllabus: List of Experiments

Task-1: Familiarization with programming environment
Task-2: Simple computational problems using arithmetic expressions
Task-3: Problems involving if-then-else structures
Task-4: Iterative problems e.g., sum of series
Task-5: 1D Array manipulation
Task-6: Matrix problems, String operations
Task-7: Simple functions
Task-8: Programming for solving Numerical methods problems
Task-9: Recursive functions
Task-10: Pointers and structures
Task-11: Programming for solving Numerical methods problems
Task-12: File operations



Course Code: BTPS102-18 (Programming for Problem Solving Lab)

	Course Outcomes	BT Level
BTPS102-18.1	Familiarization with programming environment	1
BTPS102-18.2	Simple computational problems using arithmetic expressions	2
BTPS102-18.3	Problems involving if-then-else structures, 1D Array manipulation	3
BTPS102-18.4	Matrix problems, String operations	4
BTPS102-18.5	Simple functions	4
BTPS102-18.6	Pointers and structures, File handling	6

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTPS102-18.1	2	2	2	2	2	1			1		1	2	2	2
BTPS102-18.2	2	1	3	1	2					1	1	2	2	1
BTPS102-18.3	2	1	2	2	2	1				1	1		1	2
BTPS102-18.4	3	2	1	1	2					1	1	1	1	2
BTPS102-18.5	2	3	1	2	1					1	2	1	1	1
BTPS102-18.6	2	1	2	1	2					1	1	1	2	2
AVERAGE	2.17	1.67	1.83	1.50	1.83	1.00			1.00	1.00	1.17	1.40	1.50	1.67



Program: B.Tech (Information Technology)	Semester: 2 nd Semester
Course Name: English (Lab)	Course Code: BTHU102-18

Syllabus: List of Experiments

Task-1: Listening Comprehension
Task-2: Self-Introduction, Group Discussion and Role Play
Task-3: Common Everyday Situations: Conversations and Dialogues
Task-4: Communication at Workplace
Task-5: Interviews
Task-6: Formal Presentations

Course Code: BTHU102-18 (English Lab)

	Course Outcomes	BT Level
BTHU102-18.1	Define need of communication skills in personal and professional life.	1
BTHU102-18.2	Understand different medias/channels of communication and select the most appropriate for a given situation.	2
BTHU102-18.3	Speak and present himself/herself professionally and socially effectively through effective talks, resume, interviews etc.	3
BTHU102-18.4	Judge information from outside sources effectively and accurately.	5
BTHU102-18.5	Evaluate him/her abilities as a critical reader and writer	5
BTHU102-18.6	Improve their vocabulary by keeping a vocabulary journal.	6



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTHU102-18.1	2	2	1	2	2	2	2	3	2	3	2	3	2	2
BTHU102-18.2	3	1	2	2	3	3	3	3	3	3		2	3	2
BTHU102-18.3	3	2	1	2	2	2	2	3	3	3		3	3	3
BTHU102-18.4	3	1	2	2	2	3	3	3	3	3		3	2	3
BTHU102-18.5	3	1	1	1	3	3	3	3	3	2		3	2	2
BTHU102-18.6	3	1	1	2	3	3	3	3	3	3	2	3	3	2
AVERAGE	2.83	1.33	1.33	1.83	2.50	2.67	2.67	3.00	2.83	2.83	2.00	2.83	2.50	2.33



Program: B.Tech (Information Technology)	Semester: 2 nd Semester
Course Name: Workshop/ Manufacturing Practices (Theory & Lab.)	Course Code: BTMP101-18

Syllabus:

MODULE	DETAILS	HOURS
1	Theory: Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods, CNC machining, Additive manufacturing, Fitting operations & power tools, Electrical & Electronics, Carpentry, Plastic moulding, glass cutting, Metal casting, Welding (arc welding & gas welding), brazing	10 Hrs
2	Workshop Practice Machine shop, Fitting shop, Carpentry, Electrical & Electronics, Welding shop (Arc welding + gas welding , Casting, Smithy, Plastic moulding & Glass Cutting.	60 Hrs

TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., “ Elements of Workshop Technology” , Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2	Kalpakjian S. And Steven S. Schmid, “ Manufacturing Engineering and Technology” , 4th edition, Pearson Education India Edition, 2002.
3	Gowri P. Hariharan and A. Suresh Babu,” Manufacturing Technology – I” Pearson Education, 2008.
4	Roy A. Lindberg, “ Processes and Materials of Manufacture”, 4 th edition, Prentice Hall India, 1998.
5	Rao P.N., “ Manufacturing Technology” , Vol. I and Vol. II, Tata McGrawHill House, 2017.



Course Code: BTMP101-18 (Workshop/ Manufacturing Practices)

	Course Outcomes	BT Level
BTMP101-18.1	Define different manufacturing process commonly employed in the industry to fabricate components using different materials.	1
BTMP101-18.2	Explain the mechanisms of metal cutting and chip formation in machining and distinguish between various process of casting and welding technology.	2
BTMP101-18.3	Understand CNC Machining and different additive manufacturing techniques.	2
BTMP101-18.4	Demonstrate practical knowledge of dimensional accuracies and dimensional tolerances possible with different manufacturing processes.	3
BTMP101-18.5	Apply the skills of basic electrical engineering for house wiring practice and illustrate the working of electronic components and its utilization.	3
BTMP101-18.6	By assembling different components, they will be able to produce small devices of their interest and fabricate components with their own hands.	6

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTMP101-18.1	3	2		2	2	2				1	1		2	
BTMP101-18.2	2		2		1	2				3	1		2	1
BTMP101-18.3			3	1	1	2	2			2	2		1	
BTMP101-18.4	2	3		2	1	1	2			2	2		3	1
BTMP101-18.5	3	2		1	1	2	2			2		1	3	
BTMP101-18.6	1	2	3			3	3			2			1	1
AVERAGE	2.20	2.25	2.67	1.50	1.20	2.00	2.25			2.00	1.50	1.00	1.00	1.00



Record of Course Outcomes 3rd Semester

IK Gujral Punjab Technical University Bachelor of Technology Scheme for B.Tech Syllabus 2018

Course Code	Subject	L-T-P	Credit
BTES301-18	Digital Electronics	3-0-0	3
BTIT301-18	Data structure & Algorithms	3-0-0	3
BTIT302-18	Object Oriented Programming	3-0-0	3
BTAM304-18	Mathematics-III	3-0-0	3
BTES302-18	Computer Architecture	3-0-0	3
BTES303-18	Digital Electronics Lab	0-0-2	1
BTIT303-18	Data structure & Algorithms Lab	0-0-4	2
BTIT304-18	Object Oriented Programming lab.	0-0-4	2
BTIT305-18	IT Workshop*	0-0-2	1
	Summer Institutional Training	0-0-0	Satisfactory/ Unsatisfactory

*Syllabus to be decided by respective institute internally. It may include latest technologies



Program: B.Tech (Information Technology)	Semester: 3 rd Semester
Course Name: Digital Electronics	Course Code: BTES301-18

Syllabus:

MODULE	DETAILS	HOURS
1	NUMBER SYSTEMS: Binary, Octal, Decimal, Hexadecimal. Number base conversions, 1's, 2's complements, signed Binary numbers. Binary Arithmetic, Binary codes: Weighted BCD, Gray code, Excess 3 code, ASCII. LOGIC GATES: AND, OR, NOT, NAND, NOR, Exclusive-OR and Exclusive-NOR. Implementations of Logic Functions using gates, NAND-NOR implementations.	6 Hrs
2	BOOLEAN ALGEBRA: Boolean postulates and laws – De-Morgan's Theorem, Principle of Duality, Boolean expression – Boolean function, Minimization of Boolean expressions – Sum of Products (SOP), Product of Sums (POS), Minterm, Maxterm, Canonical forms, Conversion between canonical forms, Karnaugh map Minimization, Don't care conditions, Quine-McCluskey method.	9 Hrs
3	COMBINATIONAL CIRCUITS: Design procedure – Adders, Subtractors, BCD adder, Magnitude Comparator, Multiplexer/Demultiplexer, encoder/decoder, parity checker, code converters. Implementation of combinational logic using MUX, BCD to 7 segment decoder. SEQUENTIAL CIRCUITS: Flip flops SR, JK, T, D and Master slave, Excitation table, Edge triggering, Level Triggering, Realization of one flip flop using other flip flops. Asynchronous/Ripple counters, Synchronous counters, Modulo-n counter, Ring Counters. Design of Synchronous counters: state diagram, Circuit implementation. Shift registers.	11 Hrs
4	MEMORY DEVICES: Classification of memories, RAM organization, Write operation, Read operation, Memory cycle. ROM organization, PROM, EPROM, EEPROM, Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA). A/D & D/A CONVERTORS : Analog & Digital signals. sample and hold circuit, A/D and D/A conversion techniques (Weighted type, R-2R Ladder type, Counter Type, Dual Slope type, Successive Approximation type).	11 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Morris Mano, Digital Design, Prentice Hall of India Pvt. Ltd
2	Donald P. Leach and Albert Paul Malvino, Digital Principles and Applications, 5 ed., Tata McGraw Hill Publishing Company Limited, New Delhi, 2003.
3	R.P. Jain, Modern Digital Electronics, 3 ed., Tata McGraw–Hill publishing company limited, New Delhi, 2003.
4	Thomas L. Floyd, Digital Fundamentals, Pearson Education, Inc, New Delhi, 2003
5	Ronald J. Tocci, Neal S. Widmer, Gregory L. Moss, Digital System -Principles and Applications, Pearson Education.

Course Code: BTES301-18 (Digital Electronics)

	Course Outcomes	BT Level
BTES301-18.1	Demonstrate the operation of simple digital gates, identify the symbols.	1
BTES301-18.2	Develop the truth table for those gates; combine simple gates into more complex circuits; change binary, hexadecimal, octal numbers to their decimal equivalent and vice versa.	6
BTES301-18.3	Demonstrate the operation of a flip-flop. Design counters and clear the concept of shift registers.	1
BTES301-18.4	Discuss different types of memories and their applications.	6
BTES301-18.5	Compare digital signals and analog signals.	2



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTES301-18.1	3	2	1	3	2	1	1		1	2	1	1	2	2
BTES301-18.2	3	2	2	3	3	1			1	1	1	2	2	2
BTES301-18.3	3	2	3	3	3	1			1	2	1	1	2	2
BTES301-18.4	2	2	2	3	3		1		1	2	1	1	2	1
BTES301-18.5	2	2	2	2	3		1		1	2	1	1	2	2
AVERAGE	2.60	2.00	2.00	2.80	2.80	1.00	1.00		1.00	1.80	1.00	1.20	2.00	1.80

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 3 rd Semester
Course Name: Data Structure & Algorithms	Course Code: BTIT301-18

Syllabus:

MODULE	DETAILS	HOURS
1	Introduction: Basic Terminologies: Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc.; Analysis of an Algorithm, Asymptotic Notations, Time -Space trade off. Searching: Linear Search and Binary Search Techniques and their complexity analysis.	6 Hrs
2	Stacks and Queues: ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms and complexity analysis. ADT queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.	10 Hrs
3	Linked Lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, Doubly linked list: operations on it and algorithmic analysis; Circular Linked Lists: All operations their algorithms and the complexity analysis. Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree; Tree operations on each of the trees and their algorithms with complexity analysis. Applications of Binary Trees. B Tree, B+ Tree: definitions, algorithms and analysis.	10 Hrs
4	Sorting and Hashing: Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort; Performance and Comparison among all the methods, Hashing.	10 Hrs
5	Graph: Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis	6 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	“Classic Data Structures”, Samanta and Debasis, 2nd edition, PHI publishers.
2	“Fundamentals of Data Structures”, Illustrated Edition by Ellis Horowitz, SartajSahni, Computer Science Press
3	“Data Structures with C (Schaum's Outline Series)”, Seymour Lipschutz, 1st edition, McGraw Hill Education.
4	Algorithms, Data Structures, and Problem Solving with C++”, Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company.
5	“How to Solve it by Computer”, 2nd Impression by R. G. Dromey, Pearson Education.

Course Code: BTIT301-18 (Data Structure & Algorithms)

	Course Outcomes	BT Level
BTIT301-18.1	For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.	4
BTIT301-18.2	Student will be able to perform operation like searching, insertion, deletion, traversing on various Data Structures and determine time and computational complexity.	5
BTIT301-18.3	Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.	5
BTIT301-18.4	Students will be able to choose appropriate Data Structure as applied to specific problem definition.	3
BTIT301-18.5	Demonstrate the reusability of Data Structures for implementing complex iterative problems.	2



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT301-18.1	3	2	2	2	3	1	1		1	1	1	1	3	3
BTIT301-18.2	3	2	3	2	3	1				1		1	2	2
BTIT301-18.3	2	2	2	2	2	1	1		1	1	1	1	2	3
BTIT301-18.4	3	2	2	2	3	1	1		1		1	1	2	2
BTIT301-18.5	2	2	2	2	2	1	1		1	1		1	2	1
AVERAGE	2.60	2.00	2.20	2.00	2.60	1.00	1.00		1.00	1.00	1.00	1.00	2.20	2.20

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 3 rd Semester
Course Name: Object Oriented Programming	Course Code: BTIT302-18

Syllabus:

MODULE	DETAILS	HOURS
1	Introduction Overview of C++, Sample C++ program, Different data types, operators, expressions, and statements, arrays and strings, pointers & function components, recursive functions, user -defined types, function overloading, inline functions, Classes & Objects – I: classes, Scope resolution operator, passing objects as arguments, returning objects, and object assignment.	8 Hrs
2	Classes & Objects –II Constructors, Destructors, friend functions, Parameterized constructors, Static data members, Functions, Arrays of objects, Pointers to objects, this pointer, and reference parameter, Dynamic allocation of objects, Copyconstructors, Operator overloading using friend functions, overloading.	8 Hrs
3	Inheritance Base Class, Inheritance and protected members, Protected base class inheritance, Inheriting multiple base classes, Constructors, Destructors and Inheritance, Passing parameters to base class constructors, Granting access, Virtual base classes.	8 Hrs
4	Virtual functions, Polymorphism Virtual function, calling a Virtual function through a base class reference, Virtual attribute is inherited, Virtual functions are hierarchical, pure virtual functions, Abstract classes, Using virtual functions, Early and late binding.	8 Hrs
5	Exception Handling Basics of exception handling, exception handling mechanism, throwing mechanism, catching mechanism, I/O System Basics, File I/O: Exception handling fundamentals, Exception handling options. C++ stream classes, Formatted I/O, fstream and the File classes, Opening and closing a file, Reading and writing text files.	10 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	E. Balagurusamy, Object Oriented Programming with C++, Tata McGraw Hill.
2	Stanley B.Lippmann, JoseeLajoie: C++ Primer, 4th Edition, Addison Wesley, 2012
3	Herbert Schildt: The Complete Reference C++, 4th Edition, Tata McGraw Hill, 2011.

Course Code: BTIT301-18 (Data Structure & Algorithms)

	Course Outcomes	BT Level
BTIT302-18.1	Identify classes, objects, members of a class and the relationships among them needed to solve a specific problem.	3
BTIT302-18.2	Demonstrate the concept of constructors and destructors. And create new definitions for some of the operators.	2
BTIT302-18.3	Create function templates, overload function templates.	6
BTIT302-18.4	Demonstrate the concept of data encapsulation, inheritance, polymorphism with virtual functions.	2
BTIT302-18.5	Classify the concept of file operations, streams in C++ and various I/O manipulators.	2

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT302-18.1	3	2	2	2	3	2	1		1	1	1	1	2	2
BTIT302-18.2	3	1	2	2	3	2	1		1	1	1	1	2	1
BTIT302-18.3	3	2	2	2	3	2	1			1	1	1	2	2
BTIT302-18.4	3	2	2	3	3	1	1			1	1	1	2	2
BTIT302-18.5	2	3	2	2	2	1	1		1		1		2	2
AVERAGE	2.80	2.00	2.00	2.20	2.80	1.60	1.00		1.00	1.00	1.00	1.00	2.00	1.80



DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 3 rd Semester
Course Name: Mathematics-III	Course Code: BTAM304-18

Syllabus:

MODULE	DETAILS	HOURS
1	Limit, continuity for functions with severable variables, partial derivatives, total derivative, Maxima, minima and saddle points; Method of Lagrange multipliers, Multiple Integration: double and triple integrals (Cartesian and polar), Change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications of double and triple integrals to find surface area and volumes.	12 Hrs
2	Sequence and series, Bolzano Weirstrass Theorem, Cauchy convergence criterion for sequence, uniform convergence, convergence of positive term series: comparison test, limit comparison test, D'Alembert's ratio test, Raabe's test, Cauchy root test, p-test, Cauchy integral test, logarithmic test, Alternating series, Leibnitz test, Power series, Taylor's series, Series for exponential, trigonometric and logarithmic functions.	13 Hrs
3	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.	12 Hrs
4	Second and higher order linear differential equations with constant coefficients, method of variation of parameters, Equations reducible to linear equations with constant coefficients: Cauchy and Legendre's equations.	12 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002
2	T. Veerarajan, Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
3	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010
4	Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
5	E.A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995

Course Code: BTAM304-18 (Mathematics-III)

	Course Outcomes	BT Level
BTAM304-18.1	Understand the functions of several variables that are essential in most branches of engineering.	2
BTAM304-18.2	Apply multiple integrals to deal with areas and volumes of various structures which are quite significant in real world.	3
BTAM304-18.3	Solve engineering problems related to convergence, infinite series, power series and Taylor series.	4
BTAM304-18.4	Create, select and utilize the learnt techniques of first degree ordinary differential equations to model real world problems.	6
BTAM304-18.5	Develop knowledge to solve higher order ordinary differential equations.	3



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTAM304-18.1	3	2	2	3	2	1	2		1			1	2	2
BTAM304-18.2	3	3	2	3	2	1	2		1			1	2	2
BTAM304-18.3	3	3	2	3	2	1	2		1			1	2	3
BTAM304-18.4	3	2	2	3	2		1		1			1	2	2
BTAM304-18.5	2	1	2	3	2		1					1	2	1
AVERAGE	2.80	2.20	2.00	3.00	2.00	1.00	1.60		1.00			1.00	2.00	2.00

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 3 rd Semester
Course Name: Computer Architecture	Course Code: BTES302-18

Syllabus:

MODULE	DETAILS	HOURS
1	Functional blocks of a Computer CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU – registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study – instruction set of 8085 processor. Data representation: signed number representation, fixed and floating point representations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication – shift-and-add, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic	10 Hrs
2	Introduction to x86 architecture. CPU control unit design: Hardwired and micro-programmed design approaches, Case study – design of a simple hypothetical CPU. Memory system design: semiconductor memory technologies, memory organization. Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers – program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes –role of interrupts in process state transitions, I/O device interfaces – SCII, USB.	12 Hrs
3	Pipelining Basic concepts of pipelining, throughput and speedup, pipeline hazards. Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency.	10 Hrs
4	Memory Organization Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies.	10 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	“Computer Organization and Architecture”, Moris Mano,
2	“Computer Organization and Design: The Hardware/Software Interface”, 5th Edition by David A. Patterson and John L. Hennessy, Elsevier
3	“Computer Organization and Embedded Systems”, 6th Edition by Carl Hamacher, McGraw Hill Higher Education.
4	“Computer Architecture and Organization”, 3rd Edition by John P. Hayes, WCB/McGraw-Hill
5	“Computer Organization and Architecture: Designing for Performance”, 10th Edition by William Stallings, Pearson Education.

Course Code: BTES302-18 (Computer Architecture)

	Course Outcomes	BT Level
BTES302-18.1	Understand functional block diagram of microprocessor.	2
BTES302-18.2	Apply instruction set for Writing assembly language programs.	3
BTES302-18.3	Design a memory module and analyze its operation by interfacing with the CPU.	6
BTES302-18.4	Classify hardwired and micro programmed control units.	2
BTES302-18.5	Understand the concept of pipelining and its performance metrics.	2



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTES302-18.1	3	3	3	2	2	1	1		1	2	1	1	2	2
BTES302-18.2	3	2	2	2	2	1	1		1	2	1	1	2	2
BTES302-18.3	3	3	2	2	3	1	1		1	2	1	1	2	2
BTES302-18.4	2	1	2	3	3	1	1		1	2	1	1	2	3
BTES302-18.5	2	2	1	2	3	1	1		1	1	1		2	2
AVERAGE	2.60	2.20	2.00	2.20	2.60	1.00	1.00		1.00	1.80	1.00	1.00	2.00	2.20

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 3 rd Semester
Course Name: Digital Electronics Lab	Course Code: BTES303-18

Syllabus: List of Experiments

Task-1: To verify the Truth-tables of all logic gates.
Task-2: To realize and verify the Half & full adder circuits using logic gates.
Task-3: To realize Half & full subtractor circuits using logic gates.
Task-4: To realize Encoder and Decoder circuits.
Task-5: To realize Multiplexer circuits.
Task-6: To realize 4-bit binary-gray & gray-binary converters.
Task-7: To realize comparator circuit for two binary numbers of 2-bit each.
Task-8: To realize Full adder & full subtractor circuits using encoder.
Task-9: To design Full adder & full subtractor circuits using multiplexer.
Task-10: To design and verify the Truth tables of all flip-flops.
Task-11: To design Mod-6/Mod-9 synchronous up-down counter.

Course Code: BTES303-18 (Digital Electronics Lab)

	Course Outcomes	BT Level
BTES303-18.1	Demonstrate the ability to realize combinational circuits using logic gates.	2
BTES303-18.2	Demonstrate the ability to realize sequential circuits using logic gates.	2
BTES303-18.3	Demonstrate the ability to realize various types of Flip-flops and counters.	2
BTES303-18.4	To design and verify the Truth tables of all flip-flops.	5
BTES303-18.5	To design Mod-6/Mod-9 synchronous up-down counter.	5



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTES303-18.1	3	2	2	2	3	1	1		2	1	1	1	2	2
BTES303-18.2	2	2	2	3	3	1	1		2	2	1	1	1	2
BTES303-18.3	3	2	3	3	3	1	1		1	2	2	1	2	2
BTES303-18.4	3	2	2	3	3	1			1	2	1	1	2	2
BTES303-18.5	3	2	1	3	2		1		2	1	2	1	1	2
AVERAGE	2.80	2.00	2.00	2.80	2.80	1.00	1.00		1.60	1.60	1.40	1.00	1.60	2.00



Program: B.Tech (Information Technology)	Semester: 3 rd Semester
Course Name: Data Structure & Algorithms Lab	Course Code: BTIT303-18

Syllabus: List of Experiments

Task-1: Write a program to insert a new element at end as well as at a given position in an array.
Task-2: Write a program to delete an element from a given whose value is given or whose position is given.
Task-3: Write a program to find the location of a given element using Linear Search.
Task-4: Write a program to find the location of a given element using Binary Search.
Task-5: Write a program to implement push and pop operations on a stack using linear array.
Task-6: Write a program to convert an infix expression to a postfix expression using stacks.
Task-7: Write a program to evaluate a postfix expression using stacks.
Task-8: Write a recursive function for Tower of Hanoi problem.
Task-9: Write a program to implement insertion and deletion operations in a queue using linear array.
Task-10: Write a menu driven program to perform following insertion operations in a single linked list: i. Insertion at beginning ii. Insertion at end iii. Insertion after a given node iv. Traversing a linked list
Task-11: Write a menu driven program to perform following deletion operations in a single linked list: i. Deletion at beginning ii. Deletion at end iii. Deletion after a given node
Task-12: Write a program to implement push and pop operations on a stack using linked list.
Task-13: Write a program to implement push and pop operations on a queue using linked list.
Task-14: Program to sort an array of integers in ascending order using bubble sort.
Task-15: Program to sort an array of integers in ascending order using selection sort.



Task-16: Program to sort an array of integers in ascending order using insertion sort.
Task-17: Program to sort an array of integers in ascending order using quick sort.
Task-18: Program to traverse a Binary search tree in Pre-order, In-order and Post-order.
Task-19: Program to traverse graphs using BFS.
Task-20: Program to traverse graphs using DFS.

Course Code: BTIT303-18 (Data Structure & Algorithms Lab)

	Course Outcomes	BT Level
BTIT303-18.1	Improve practical skills in designing and implementing basic linear data structure algorithms	6
BTIT303-18.2	Improve practical skills in designing and implementing Non-linear data structure algorithms	6
BTIT303-18.3	Make Use of Linear and Non-Linear data structures to solve relevant problems	2
BTIT303-18.4	Choose appropriate Data Structure as applied to specific problem definition	1
BTIT303-18.5	Create Various searching algorithms and become familiar with their design methods	1

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT303-18.1	3	2	1	3	3	1	2		2	2	1	2	2	2
BTIT303-18.2	3	3	1	3	3	2	2		2	2	1	1	2	2
BTIT303-18.3	3	2	2	2	3	1	1		2	1	1	2	2	1
BTIT303-18.4	3	2	1	2	2	1	1		2	2	1	2	1	2
BTIT303-18.5	3	2	1	2	2	1	1		2	2	1	1	2	1
AVERAGE	3.00	2.20	1.20	2.40	2.60	1.20	1.40		2.00	1.80	1.00	1.60	1.80	1.60



Program: B.Tech (Information Technology)	Semester: 3 rd Semester
Course Name: Object Oriented Programming Lab	Course Code: BTIT304-18

Syllabus: List of Experiments

Task-1: Write a program that uses a class where the member functions are defined inside a class.
Task-2: Write a program that uses a class where the member functions are defined outside a class.
Task-3: Write a program to demonstrate the use of static data members.
Task-4: Write a program to demonstrate the use of const data members.
Task-5: Write a program to demonstrate the use of zero argument and parameterized constructors.
Task-6: Write a program to demonstrate the use of dynamic constructor..
Task-7: Write a program to demonstrate the use of explicit constructor.
Task-8: Write a program to demonstrate the use of initializer list.
Task-9: Write a program to demonstrate the overloading of increment and decrement operators.
Task-10: Write a program to demonstrate the overloading of memory management operators.
Task-11: Write a program to demonstrate the typecasting of basic type to class type.
Task-12: Write a program to demonstrate the typecasting of class type to basic type.
Task-13: Write a program to demonstrate the typecasting of class type to class type.
Task-14: Write a program to demonstrate the multiple inheritances.
Task-15: Write a program to demonstrate the runtime polymorphism.
Task-16: Write a program to demonstrate the exception handling.
Task-17: Write a program to demonstrate the use of class template.
Task-18: Write a program to demonstrate the reading and writing of mixed type of data.



Course Code: BTIT304-18 (Object Oriented Programming Lab)

	Course Outcomes	BT Level
BTIT304-18.1	Develop classes incorporating object-oriented techniques	3
BTIT304-18.2	Design and implement object-oriented concepts of inheritance	6
BTIT304-18.3	Design and implement concepts of encapsulation & polymorphism	6
BTIT304-18.4	Illustrate and implement STL class of containers and need for exceptions to handle errors for object oriented programs	2
BTIT304-18.5	Design and implement any real world based problem involving GUI interface using object-oriented concepts	6

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT304-18.1	3	2	2	3	3	1	1		2	1	1	1	2	2
BTIT304-18.2	3	2	2	2	3	1	1		2	2	1	1	2	2
BTIT304-18.3	3	2	2	2	3	1	2		2	2			2	2
BTIT304-18.4	3	2	2	2	3	1	1		2	1	1	1	1	2
BTIT304-18.5	3	2	2	2	2		2		2	2		1	2	2
AVERAGE	3.00	2.00	2.00	2.20	2.80	1.00	1.40		2.00	1.60	1.00	1.00	1.80	2.00



Program: B.Tech (Information Technology)	Semester: 3 rd Semester
Course Name: IT Workshop	Course Code: BTIT305-18

Course Code: BTIT305-18 (IT Workshop)

	Course Outcomes	BT Level
BTIT305-18.1	Identify various components of a system	3
BTIT305-18.2	Understand the Usage of internet, web browser and email	4
BTIT305-18.3	Practice of assembling the Computer	4
BTIT305-18.4	Solve the Trouble Shooting problems	5
BTIT305-18.5	Apply the looks for preparation of PPT, Documentation and budget Sheet etc	4

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT305-18.1	3	2	3	3	3	1	2		2	1	2	1	3	2
BTIT305-18.2	3	2	2	3	3	1	2		2	2	2	1	3	2
BTIT305-18.3	3	2	1	3	3	1	1		2	2	2	2	1	2
BTIT305-18.4	3	2	2	2	2	1	2		2	2	2	2	2	3
BTIT305-18.5	3	2	1	2	3		2		2	1	2	2	2	2
AVERAGE	3.00	2.00	1.80	2.60	2.80	1.00	1.80		2.00	1.60	2.00	1.60	2.20	2.20



Records of Course Outcomes 4th Semester

IK Gujral Punjab Technical University Bachelor of Technology Scheme for B.Tech Syllabus 2018

Course Code	Subject	L-T-P	Credit
BTCS401-18	Discrete Mathematics	3-1-0	4
BTIT401-18	Computer Networks	3-0-0	3
BTIT402-18	Operating Systems	3-0-0	3
BTIT403-18	Design & Analysis of Algorithms	3-0-0	3
HSMC101-18	Development of Societies	2-1-0	3
EVS101- 18	Environmental Sciences	2-0-0	S/US
BTIT404-18	Computer Networks Lab	0-0-2	1
BTIT405-18	Operating Systems Lab	0-0-4	2
BTIT406-18	Design & Analysis of Algorithms Lab	0-0-2	2



Program: B.Tech (Information Technology)	Semester: 4 th Semester
Course Name: Discrete Mathematics	Course Code: BTCS401-18

Syllabus:

MODULE	DETAILS	HOURS
1	Sets, Relation and Function: Operations and Laws of Sets, Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set, Sum and Product of Functions, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets, Cantor's diagonal argument and The Power Set theorem, Schroeder-Bernstein theorem. Principles of Mathematical Induction: The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic.	8 Hrs
2	Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination.	6 Hrs
3	Propositional Logic: Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers. Proof Techniques: Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency	11 Hrs
4	Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form	11 Hrs
5	Graphs and Trees: Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Colouring Vertices, Colouring Edges, List Colouring, Perfect Graph, definition properties and Example, rooted trees,	9 Hrs



	trees and sorting, weighted trees and prefix codes, Bi-connected component and Articulation Points, Shortest distances	
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TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw – Hill
2	J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and Its Application to Computer Science”, TMG Edition, TataMcgraw-Hill.
3	Discrete Mathematics, Tata McGraw - Hill.
4	Susanna S. Epp, Discrete Mathematics with Applications, 4th edition, Wadsworth Publishing Co. Inc.
5	Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press. Schaum’s Outlines Series, Seymour Lipschutz, Marc Lipson.

Course Code: BTCS401-18 (Discrete Mathematics)

	Course Outcomes	BT Level
BTCS401-18.1	Explain logical sentence in terms of predicates, quantifiers, and logical connectives	3
BTCS401-18.2	To describe the solution for a given problem using deductive logic and prove the solution based on logical inference	3
BTCS401-18.3	For a given a mathematical problem, classify its algebraic structure	4
BTCS401-18.4	To evaluate Boolean functions and simplify expressions using the properties of Boolean algebra	5
BTCS401-18.5	To develop the given problem as graph networks and solve with techniques of graph theory.	3



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTCS401-18.1	3	2	3	2	2	1	2		1	1	1	1	3	2
BTCS401-18.2	2	1	2	3	2	2	2		1	1	1	1	3	2
BTCS401-18.3	3	2	1	3	3	2	1		1	1	1	2	1	2
BTCS401-18.4	3	3	2	3	2	2	2		1	1	1	2	2	3
BTCS401-18.5	3	2	2	3	1	2	2		1	1	1	1	1	1
AVERAGE	2.80	2.00	2.00	2.80	2.00	1.80	1.80		1.00	1.00	1.00	1.40	2.00	2.00

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 4 th Semester
Course Name: Computer Networks	Course Code: BTIT401-18

Syllabus:

MODULE	DETAILS	HOURS
1	Data Communication Components Representation of data and its flow Networks, Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum.	8 Hrs
2	Data Link Layer and Medium Access Sub Layer Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA.	10 Hrs
3	Network Layer Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols.	8 Hrs
4	Transport Layer Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.	8 Hrs
5	Application Layer Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography.	8 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGraw- Hill.
2	Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice Hall India.
3	Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.
4	Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.

Course Code: BTIT 401-18 (Computer Networks)

	Course Outcomes	BT Level
BTIT401-18.1	Explain the functions of the different layer of the OSI Protocol.	2
BTIT401-18.2	Describe the function of each block of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs).	2
BTIT401-18.3	Develop the network programming for a given problem related TCP/IP protocol.	6
BTIT401-18.4	Define Transmission Control Protocol SCTP Congestion Control; Quality of Service, QoS improving techniques.	1
BTIT401-18.5	Explain DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.	2



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT401-18.1	3	2	3	2	2	1	2		1	1	2	1	3	2
BTIT401-18.2	3	2	2	2	2	1	2		1	1	2	1	3	2
BTIT401-18.3	3	2	2	2	3	1	1		1	1	2	2	1	2
BTIT401-18.4	3	2	2	2	3	1	2		1	1	2	2	2	3
BTIT401-18.5	2	2	2	2	3	1	2		1	1	1	2	2	2
AVERAGE	2.80	2.00	2.20	2.00	2.60	1.00	1.80		1.00	1.00	1.80	1.60	2.20	2.20

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 4 th Semester
Course Name: Operating Systems	Course Code: BTIT402-18

Syllabus:

MODULE	DETAILS	HOURS
1	Introduction: Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and WINDOWS Operating System.	8 Hrs
2	Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching. Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads. Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non-pre-emptive, FCFS, SJF, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF.	10 Hrs
3	Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer\ Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dining Philosopher Problem etc.	8 Hrs
4	Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery	8 Hrs
5	Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation –Fixed and variable partition–Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation– Hardware support for paging, Protection and sharing, Disadvantages of paging. Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault, Working Set, Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least	8 Hrs



	Recently used (LRU)	
6	<p>I/O Hardware: I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software, Secondary-Storage Structure: Disk structure, Disk scheduling algorithms File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free Space Management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance. Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks.</p>	

TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition
2	Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India
3	Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
4	Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
5	Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates

Course Code: BTIT 402-18 (Operating Systems)

	Course Outcomes	BT Level
BTIT402-18.1	Explain basic operating system concepts such as overall architecture, system calls, user mode and kernel mode	2
BTIT402-18.2	Distinguish concepts related to processes, threads, process scheduling, race conditions and critical sections	4
BTIT402-18.3	Analyze and apply CPU scheduling algorithms, deadlock detection and prevention algorithms	4
BTIT402-18.4	Examine and categorize various memory management techniques like caching, paging, segmentation, virtual memory, and thrashing	4
BTIT402-18.5	Design and implement file management system	6



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT402-18.1	3	2	3	3	3	1	1			1	2	1	2	2
BTIT402-18.2	3	2	2	2	3	1	1			1	2	2	2	2
BTIT402-18.3	3	2	2	2	3	1	1			1	2	1	2	2
BTIT402-18.4	3	2	2	2	2	1			1	1	2	2	2	2
BTIT402-18.5	3	2	2	2	3	1			1	1	1	1	2	2
AVERAGE	3.00	2.00	2.20	2.20	2.80	1.00	1.00		1.00	1.00	1.80	1.40	2.00	2.00

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 4 th Semester
Course Name: Design and Analysis of Algorithms	Course Code: BTIT403-18

Syllabus:

MODULE	DETAILS	HOURS
1	Introduction: Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behavior; Performance measurements of Algorithm, Time and space trade-offs, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method and Masters' theorem.	8 Hrs
2	Fundamental Algorithmic Strategies: Brute-Force, Greedy, Dynamic Programming, Branch- and-Bound and Backtracking methodologies for the design of algorithms; Illustrations of these techniques for Problem-Solving: Bin Packing, Knap Sack, TSP.	10 Hrs
3	Graph and Tree Algorithms Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sorting, Network Flow Algorithm	10 Hrs
4	Tractable and Intractable Problems: Computability of Algorithms, Computability classes – P, NP, NP-complete and NP-hard. Cook's theorem, Standard NP-complete problems and Reduction techniques	8 Hrs
5	Advanced Topics: Approximation algorithms, Randomized algorithms, Heuristics and their characteristics	6 Hrs

TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald L Rivest and Clifford Stein, MIT Press/McGraw-Hill.
2	Data Structures and Algorithms in C++, Weiss, 4th edition, Pearson.
3	Fundamentals of Computer Algorithms – E. Horowitz, Sartaj Saini, Galgota Publications.
4	Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.
5	Algorithms -- A Creative Approach, 3RD Edition, UdiManber, Addison-Wesley, Reading, MA.



Course Code: BTIT 403-18 (Design and Analysis of Algorithms)

	Course Outcomes	BT Level
BTIT403-18.1	For a given algorithms analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms	4
BTIT403-18.2	Explain when an algorithmic design situation calls for which design paradigm (greedy/ divide and conquer/backtrack etc.)	2
BTIT403-18.3	Explain model for a given engineering problem, using tree or graph, and write the corresponding algorithm to solve the problems	2
BTIT403-18.4	Demonstrate the ways to analyze approximation/randomized algorithms (expected running time, probability of error)	4
BTIT403-18.5	Examine the necessity for NP class based problems and explain the use of heuristic techniques.	4

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT403-18.1	3	2	3	2	2				2	1	2	1	3	2
BTIT403-18.2	3	2	2	2	2	1			2	1	2	2	3	2
BTIT403-18.3	2	2	1	2	3	1			2	1	2	2	1	2
BTIT403-18.4	3	2	2	3	2	1			1	1	1	1	2	3
BTIT403-18.5	3	2	2	3	2	1			2	1	1	1	2	2
AVERAGE	2.80	2.00	2.00	2.40	2.20	1.00			1.80	1.00	1.60	1.40	2.20	2.20

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 4 th Semester
Course Name: Development of Societies	Course Code: HSMC101-18

Syllabus:

MODULE	DETAILS	HOURS
1	Social Development: Concepts behind the origin of Family, Clan and Society. Different Social Systems. Relation between Human being and Society. Comparative studies on different models of Social Structures and their evolution.	5 Hrs
2	Political Development: Ideas of Political Systems as learnt from History. Different models of Governing system and their comparative study.	3 Hrs
3	Economic Development: Birth of Capitalism, Socialism, Marxism. Concept of development in pre-British, British and post British period- Barter, Jajmani. Idea of development in current context. E. F. Schumacher's idea of development, Buddhist economics. Gandhian idea of development. Swaraj and Decentralization PROJECT: Possible projects in this course could be a) Interact with local communities and understand their issues. b) Study local cottage industry and agricultural practices. Role of engineering and specialized knowledge. c) Evaluation of technology in the context of its application. Social impact of technology. Environmental impact of technology. Evaluation from a holistic perspective.	18 Hrs

Course Code: HSMC101-18 (Development of Societies)

	Course Outcomes	BT Level
HSMC101-18.1	To learn the concept of human values and its vitality in the life.	2
HSMC101-18.2	To understand the critical ability to distinguish between essence and form.	2
HSMC101-18.3	To apply the critical ability to differentiate the values and its comprehensiveness in the real life.	3
HSMC101-18.4	To analyze the human value parameters such as sensitiveness, awareness, leading to commitment and courage to act their own belief.	4
HSMC101-18.5	To evaluate the focus on the life orientation in a professional manner.	5



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
HSMC101-18.1	1		2	2	2	3	3	3	2	2	2	3	1	2
HSMC101-18.2	1		2	2	1	3	3	3	2	3	1	3	2	2
HSMC101-18.3	1		2	2	2	2	3	2	2	3	1	2	3	2
HSMC101-18.4	1		1	2	2	2	3	2	2	3	2	2	2	2
HSMC101-18.5	1		2	1	2	2	3	3	2	2	1	1	2	2
AVERAGE	1.00		1.80	1.80	1.80	2.40	3.00	2.60	2.00	2.60	1.40	2.20	2.00	2.00

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 4 th Semester
Course Name: Environmental Science	Course Code: EVS 101-18

Syllabus:

MODULE	DETAILS	HOURS
1	Natural Resources: Renewable and non-renewable resources Natural resources and associated problems. a) Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies. f) Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification. • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles.	10 Hrs
2	Ecosystems: Concept of an ecosystem. Structure and function of an ecosystem. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of following ecosystems: a. Forest ecosystem b. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuarie.	6 Hrs
3	Biodiversity and its conservation: Introduction – Definition: genetic, species and ecosystem diversity. Biodiversity at global, National and local levels. Inida as a mega-diversity nation. Hot-sports of biodiversity. Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India.	6 Hrs
4	Social Issues and the Environment: From Unsustainable to Sustainable development • Resettlement and rehabilitation of people; its problems and concerns. • Environmental ethics : Issues and possible solutions. • Climate change, global warming, acid rain, ozone layer depletion, Nuclear accidents and holocaust. Case Studies. Public awareness.	4 Hrs
5	ACTIVITIES: Nature club (bird watching, recognizing plants at institute/at home, recognizing local animals, appreciating biodiversity. Awareness Activities	4 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2	Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)
3	Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
4	Heywood, V.H &Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p
5	Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
6	Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
7	Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)

Course Code: EVS 101-18 (Environmental Science)

	Course Outcomes	BT Level
EVS101-18.1	Understand the values, threats and conservation of biodiversity and classify various Ecosystems.	2
EVS101-18.2	Identify and implement technological and economical solution to environmental pollution.	2
EVS101-18.3	Develop the knowledge on various natural resources, their causes and their effects.	2
EVS101-18.4	Explain various environmental acts and disaster management.	1
EVS101-18.5	Relate population and environment and the role of IT in environment and human health.	1



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EVS101-18.1	2	1				2	2	2	2	2	1	2	2	2
EVS101-18.2	2	1				3	3	3	1	3	1	2	2	2
EVS101-18.3	2	1				2	3	2	1	2		2	3	2
EVS101-18.4	2	2				3	3	2	1	2		2	2	2
EVS101-18.5	2	1				2	3	2	1	2		2	1	3
AVERAGE	2.00	1.20				2.40	2.80	2.20	1.20	2.20	1.00	2.00	2.00	2.20

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 4 th Semester
Course Name: Computer Network Lab	Course Code: BTIT404-18

Syllabus: List of Experiments

Task-1: To study the different types of Network cables and network topologies
Task-2: Practically implement and test the cross-wired cable and straight through cable using clamping tool and network lab cable tester.
Task-3: Study and familiarization with various network devices.
Task-4: Familiarization with Packet Tracer Simulation tool/any other related tool.
Task-5: Study and Implementation of IP Addressing Schemes
Task-6: Creation of Simple Networking topologies using hubs and switches
Task-7: Simulation of web traffic in Packet Tracer
Task-8: Study and implementation of various router configuration commands
Task-9: Creation of Networks using routers.
Task-10: Configuring networks using the concept of subnetting
Task-11: Practical implementation of basic network command and Network configuration commands like ping, ipconfig, netstat, tracertr etc. for trouble shooting network related problems
Task-12: Configuration of networks using static and default routes.



Course Code: BTIT404-18 (Object Oriented Programming Lab)

	Course Outcomes	BT Level
BTIT404-18.1	Explain about various networking devices, tools and also understand the implementation of network topologies	2
BTIT404-18.2	Create various networking cables and know how to test these cables	6
BTIT404-18.3	Create and configure networks in packet tracer tool using various network devices and topologies	6
BTIT404-18.4	Understand IP addressing and configure networks using the subnetting	2
BTIT404-18.5	Understand routers using various router configuration commands and troubleshoot the networks by using various networking commands	2

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT404-18.1	3	2	2	2	2	1	1		1	1	2	1	2	3
BTIT404-18.2	3	2	2	2	3	1	1		2	1	2	1	2	2
BTIT404-18.3	3	2	2	2	2	1	1		2	2	2	1	2	2
BTIT404-18.4	2	2	2	2	2	1	1		2	1	2	1	2	2
BTIT404-18.5	2	2	2	2	2	1	1		2	1	2	1	2	2
AVERAGE	2.60	2.00	2.00	2.00	2.20	1.00	1.00		1.80	1.20	2.00	1.00	2.00	2.20



Program: B.Tech (Information Technology)	Semester: 4 th Semester
Course Name: Operating Systems Lab	Course Code: BTIT405-18

Syllabus: List of Experiments

Task-1: Installation Process of various operating systems.
Task-2: Implementation of CPU scheduling algorithms to find turnaround time and waiting time. a) FCFS b) SJF c) Round Robin (pre-emptive) d) Priority.
Task-3: Virtualization, Installation of Virtual Machine Software and installation of Operating System on Virtual Machine.
Task-4: Commands for files & directories: cd, ls, cp, md, rm, mkdir, rmdir. Creating and viewing files using cat. File comparisons. Disk related commands: checking disk free spaces. Processes in linux, connecting processes with pipes, background processing, managing multiple processes. Background process: changing process priority, scheduling of processes at command, batch commands, kill, ps, who, sleep. Printing commands, grep, fgrep, find, sort, cal, banner, touch, file. File related commands ws, sat, cut, grep.
Task-5: Shell Programming: Basic of shell programming, various types of shell, Shell Programming in bash, conditional & looping statement, case statements, parameter passing and arguments, shell variables, shell keywords, creating shell programs for automate system tasks, report printing.
Task-6: Implementation of Bankers algorithm for the purpose of deadlock avoidance.



Course Code: BTIT405-18 (Operating Systems Lab)

	Course Outcomes	BT Level
BTIT405-18.1	Understand and implement basic services and functionalities of the operating system	6
BTIT405-18.2	Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority	2
BTIT405-18.3	Understand and implement the concepts of shell programming	3
BTIT405-18.4	Simulate file allocation and organization techniques	6
BTIT405-18.5	Understand the concepts of deadlock in operating systems and implement them in multiprogramming system	2

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT405-18.1	3	2	3	3	3	1	1		2	1	2	1	3	2
BTIT405-18.2	3	2	2	2	3	1	1		2	1	2	1	3	2
BTIT405-18.3	3	3	1	3	3	1	1		2	1	1	1	1	2
BTIT405-18.4	3	2	1	2	2	1	1		2	1	2	1	2	3
BTIT405-18.5	2	2	1	2	2	1	1		2	2	1	1	1	3
AVERAGE	2.80	2.20	1.60	2.40	2.60	1.00	1.00		2.00	1.20	1.60	1.00	2.00	2.40



Program: B.Tech (Information Technology)	Semester: 4 th Semester
Course Name: Design and Analysis of Algorithms Lab	Course Code: BTIT406-18

Syllabus: List of Experiments

Task-1: Code and analyze solutions to following problem with given strategies: i. Knap Sack using greedy approach ii. Knap Sack using dynamic approach
Task-2: Code and analyze to find an optimal solution to matrix chain multiplication using dynamic programming.
Task-3: Code and analyze to find an optimal solution to TSP using dynamic programming.
Task-4: Implementing an application of DFS such as: i. to find the topological sort of a directed acyclic graph ii. to find a path from source to goal in a maze.
Task-5: Implement an application of BFS such as: i. to find connected components of an undirected graph ii. to check whether a given graph is bipartite.
Task-6: Code and analyze to find shortest paths in a graph with positive edge weights using Dijkstra's algorithm.
Task-7: Code and analyze to find shortest paths in a graph with arbitrary edge weights using Bellman-Ford algorithm.
Task-8: Code and analyze to find shortest paths in a graph with arbitrary edge weights using Flyods' algorithm.
Task-9: Code and analyze to find the minimum spanning tree in a weighted, undirected graph using Prims' algorithm
Task-10: Code and analyze to find the minimum spanning tree in a weighted, undirected graph using Kruskals' algorithm.
Task-11: Coding any real world problem or TSP algorithm using any heuristic technique.



Course Code: BTIT406-18 (Design and Analysis of Algorithms Lab)

	Course Outcomes	BT Level
BTIT406-18.1	Improve practical skills in designing and implementing complex problems with different techniques	6
BTIT406-18.2	Understand comparative performance of strategies and hence choose appropriate, to apply to specific problem definition	2
BTIT406-18.3	Implement Various tree and graph based algorithms and become familiar with their design methods	6
BTIT406-18.4	Design and Implement heuristics for real world problems	6
BTIT406-18.5	Analyze the minimum spanning tree in a weighted, undirected graph using Kruskals' algorithm.	2

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT406-18.1	3	2	1	2	3				2	1	2	1	3	2
BTIT406-18.2	3	2	2	2	3				1	1	2	1	3	2
BTIT406-18.3	3	2	1	2	2	1			2	1	2	2	1	2
BTIT406-18.4	3	2	2	2	3	1			2	1	2	2	2	3
BTIT406-18.5	2	2	1	3	3	1			2	2	1	1	1	2
AVERAGE	2.80	2.00	1.40	2.20	2.80	1.00			1.80	1.20	1.80	1.40	2.00	2.20



Records of Course Outcomes 5th Semester

IK Gujral Punjab Technical University Bachelor of Technology Scheme for B.Tech Syllabus 2018

Course Code	Subject	L-T-P	Credit
BTIT501-18	Formal Language & Automata Theory	3-0-0	3
BTIT502-18	Database Management Systems	3-0-0	3
BTIT503-18	Programming in Java	3-0-0	3
BTIT504-18	Software Engineering	3-0-0	3
HSMC12 2-18	Universal Human values-2	3-0-0	3
BTIT511-18	Artificial Intelligence	3-0-0	3
BTIT505-18	Database Management Systems Lab	0-0-4	2
BTIT506-18	Programming in Java Lab	0-0-2	1
BTIT507-18	Programming in Software Engg.	0-0-2	1
BTIT515-18	Artificial Intelligence lab	0-0-2	1



Program: B.Tech (Information Technology)	Semester: 5 th Semester
Course Name: Formal Language & Automata Theory	Course Code: BTIT501-18

Syllabus:

MODULE	DETAILS	HOURS
1	Introduction: Alphabet, languages and grammars, productions and derivation, Chomsky hierarchy of languages.	3 Hrs
2	Regular languages and finite automata: Regular expressions and languages, deterministic finite automata (DFA) and equivalence with regular expressions, nondeterministic finite automata (NFA) and equivalence with DFA, regular grammars and equivalence with finite automata, properties of regular languages, pumping lemma for regular, languages, minimization of finite automata.	8Hrs
3	Context-free languages and pushdown automata: Context-free grammars (CFG) and languages (CFL), Chomsky and Greibach normal forms, nondeterministic pushdown automata (PDA) and equivalence with CFG, parse trees, ambiguity in CFG, pumping lemma for context-free languages, deterministic pushdown automata, closure properties of CFLs.	8 Hrs
4	Context-sensitive languages: Context-sensitive grammars (CSG) and languages, linear bounded automata and equivalence with CSG.	5 Hrs
5	Turing machines: The basic model for Turing machines (TM), Turing recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, variants of Turing machines, nondeterministic TMs and equivalence with deterministic TMs, unrestricted grammars and equivalence with Turing machines, TMs as enumerators.	8 Hrs
6	Undecidability & Intractability: Church-Turing thesis, universal Turing machine, the universal and diagonalization languages, reduction between languages and Rice's theorem, undecidable problems about languages. Intractability: Notion of tractability/feasibility. The classes NP and co-NP, their importance. Polynomial time many-one reduction. Completeness under this reduction. Cook-Levin theorem: NP-completeness of propositional satisfiability, other variants of satisfiability. NP-complete problems from other domains: graphs (clique, vertex cover, independent sets, Hamiltonian cycle), number problem (partition), set cover.	12 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia.
2	Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Pearson Education Asia.
3	Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, Springer
4	Michael Sipser, Introduction to the Theory of Computation, PWS Publishing
5	John Martin, Introduction to Languages and The Theory of Computation, Tata McGraw Hill.

Course Code: BTIT 501-18 (Formal Language & Automata Theory)

	Course Outcomes	BT Level
BTIT501-18.1	Understand a formal notation for strings, languages and machines.	2
BTIT501-18.2	Design finite automata to accept a set of strings of a language.	6
BTIT501-18.3	Design context free grammars to generate strings of context free language.	6
BTIT501-18.4	Write the hierarchy of formal languages, grammars and machines.	5
BTIT501-18.5	Distinguish between computability and non-computability and Decidability and undecidability.	4



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT501-18.1	3	3	1	3	2	1			2	2	1	1	2	3
BTIT501-18.2	3	2	1	2	3	1			2	2	1	1	2	2
BTIT501-18.3	3	2	1	3	3	1			1	1	2	2	2	1
BTIT501-18.4	3	2	1	2	2	1			1	1	2	1	1	2
BTIT501-18.5	3	2	1	2	2	1			2	1	2	1	1	2
AVERAGE	3.00	2.20	1.00	2.40	2.40	1.00			1.60	1.40	1.60	1.20	1.60	2.00

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 5 th Semester
Course Name: Database Management Systems	Course Code: BTIT502-18

Syllabus:

MODULE	DETAILS	HOURS
1	Database system architecture: Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML). Data models: Entity-relationship model, network model, relational and object oriented Data models, integrity constraints, data manipulation operations.	7 Hrs
2	Relational query languages: Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server. Relational database design: Domain and data dependency, Armstrong's axioms, Normal forms, Dependency preservation, Lossless design. Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms.	10 Hrs
3	Storage strategies, Indices, B-trees, hashing.	3 Hrs
4	Transaction processing: Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.	6 Hrs
5	Database Security: Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.	8 Hrs
6	Advanced Topics: Object oriented and object relational databases, Logical databases, Web databases, Distributed databases.	8 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	“Principles of Database and Knowledge–Base Systems”, Vol1 by J. D. Ullman, Computer Science Press.
2	“Fundamentals of Database Systems”, 5th Edition by R. Elmasri and S. Navathe, Pearson Education.
3	“Foundations of Databases”, Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley.

Course Code: BTIT 502-18 (Database Management Systems)

	Course Outcomes	BT Level
BTIT502-18.1	Write relational algebra expressions for that query and optimize the Developed expressions.	5
BTIT502-18.2	Design the databases using ER method and normalization.	6
BTIT502-18.3	Construct the SQL queries for Open source and Commercial DBMS- MYSQL, ORACLE, and DB2.	6
BTIT502-18.4	Determine the transaction atomicity, consistency, isolation, and durability.	2
BTIT502-18.5	Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.	6



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT502-18.1	3	3	3	3	3	1	1		1	1	2	1	2	2
BTIT502-18.2	3	3	2	3	3	1	1		1	1	2	1	1	3
BTIT502-18.3	3	2	2	2	3	1	1		1	1	2	1	2	3
BTIT502-18.4	3	2	2	2	3	1	1		1	1	2	1	3	2
BTIT502-18.5	3	2	2	2	2	1	1		1	1	2	1	2	2
AVERAGE	3.00	2.40	2.20	2.40	2.80	1.00	1.00		1.00	1.00	2.00	1.00	2.00	2.40

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 5 th Semester
Course Name: Programming in Java	Course Code: BTIT503-18

Syllabus:

MODULE	DETAILS	HOURS
1	Overview: Object oriented programming principles, Java essentials, java virtual machine, program structure in java ,Java class libraries, Data types, Variables and Arrays, Data types and casting, automatic type promotion in expressions, arrays. Operators and Control Statements: Arithmetic operators, bit wise operators, relational operators, Boolean logical operators, the ? Operator, operator precedence, Java's selection statements, iteration statements, jump statements.	12 Hrs
2	Introduction to Classes: Class fundamentals, declaring class, creating objects, Introducing methods: method declaration, overloading, using objects as parameters, recursion, Constructors, this keyword, garbage collection, the finalization.	9 Hrs
3	Inheritance: Inheritance basics, using super and final, method overriding, dynamic method dispatch, Abstract Class, Interface: variables and extending Interfaces, Package: Creating and importing packages, Package access protection, Exception Handling: Exception handling fundamentals, Exception types, Uncaught Exceptions Using try and catch, multiple catch clauses, nested try statements, throw, Java's built-in exceptions	12 Hrs
4	Multithreaded Programming: The Java thread model, the main thread, creating thread, creating multiple threads, using isAlive () and join (), Thread priorities, synchronization, Inter thread communications, suspending resuming and stopping threads.	4 Hrs
5	I/O: I/O Basics, Reading Console Input, Writing Console Output, Reading and Writing Files , Applets: Applet Fundamentals, Applet Architecture, The HTML Applet tag, Passing parameters to Applets., Networking: Networking basics, Java and the Net, TCP/IP Client Sockets URL, URL Connection, TCP/IP Server Sockets, Database connectivity.	6 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Herbert Schildt, The Complete Reference Java2, McGraw-Hill.
2	Joyce Farrell, Java for Beginners, Cengage Learning.
3	Deitel and Deitel, Java: How to Program, 6th Edition, Pearson Education.
4	James Edward Keogh, Jim Keogh, J2EE: The complete Reference, McGrawHill.
5	Shirish Chavan, Java for Beginners, 2nd Edition, Shroff Publishers.

Course Code: BTIT 503-18 (Programming in Java)

	Course Outcomes	BT Level
BTIT503-18.1	Understand the features of Java such as operators, classes, objects, inheritance, packages and exception handling.	2
BTIT503-18.2	Learn latest features of Java like garbage collection, Console class, Network interface, APIs.	2
BTIT503-18.3	Acquire competence in Java through the use of multithreading, applets.	4
BTIT503-18.4	Understand Applet fundamentals, Applet Architecture.	2
BTIT503-18.5	Get exposure to advance concepts like socket and database connectivity.	2



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT503-18.1	2	3	2	2	2	1			2	2	2	1	2	2
BTIT503-18.2	3	2	2	3	3	1			1	1	1	2	1	2
BTIT503-18.3	3	2	2	3	3	1			1	2	1	1	1	2
BTIT503-18.4	2	2	2	3	3	1			1	1	2	2	2	2
BTIT503-18.5	3	2	2	2	2	1			1	1	1	2	2	2
AVERAGE	2.60	2.20	2.00	2.60	2.6	1.00			1.20	1.40	1.40	1.60	1.60	2.00

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 5 th Semester
Course Name: Software Engineering	Course Code: BTIT504-18

Syllabus:

MODULE	DETAILS	HOURS
1	Evolution and impact of Software engineering, software life cycle models: Waterfall, prototyping, Evolutionary, and Spiral models. Feasibility study, Functional and Non-functional requirements, Requirements gathering, Requirements analysis and specification	10 Hrs
2	Basic issues in software design, modularity, cohesion, coupling and layering, function-oriented software design: DFD and Structure chart, object modeling using UML, Object-oriented software development, user interface design. Coding standards and Code review techniques	8 Hrs
3	Fundamentals of testing, White-box, and black-box testing, Test coverage analysis and test case design techniques, mutation testing, Static and dynamic analysis, Software reliability metrics, reliability growth modeling.	10 Hrs
4	Software project management, Project planning and control, cost estimation, project scheduling using PERT and GANTT charts, cost-time relations: Rayleigh-Norden results, quality management	8 Hrs
5	ISO and SEI CMMI, PSP and Six Sigma. Computer aided software engineering, software maintenance, software reuse, Component-based software development.	6 Hrs

TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Roger Pressman, "Software Engineering: A Practitioners Approach,(6th Edition), McGraw Hill, 1997
2	Sommerville, "Software Engineering, 7th edition", Adison Wesley, 1996
3	Watts Humphrey, "Managing software process", Pearson education, 2003
4	James F. Peters and Witold Pedrycz, " Software Engineering – An Engineering Approach", Wiley.
5	Pankaj Jalote, "An integrated approach to Software Engineering", Springer/Narosa.



Course Code: BTIT 504-18 (Software Engineering)

	Course Outcomes	BT Level
BTIT504-18.1	Understanding of Software process models such as the waterfall, prototyping and spiral models	2
BTIT504-18.2	Understanding of the role of project management including planning, scheduling, risk management, etc.	2
BTIT504-18.3	Understanding of object models, data models, context models and behavioral models.	2
BTIT504-18.4	Describe implementation issues such as modularity and coding standards	3
BTIT504-18.5	Understanding of software testing approaches such as unit testing, integration testing and system testing	2

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT504-18.1	3	2	1	2	2	1			1	1	2	1	2	2
BTIT504-18.2	3	2	1	2	3	1			2	2	1	1	2	1
BTIT504-18.3	3	2	2	2	3	1			1	1	2	1	2	2
BTIT504-18.4	3	2	2	2	2	1			1	1	1	2	2	2
BTIT504-18.5	3	2	1	2	2	1			2	1	1	2	2	2
AVERAGE	3.00	2.00	1.40	2.00	2.40	1.00			1.40	1.20	1.40	1.40	2.00	1.80

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 5 th Semester
Course Name: Universal Human Values 2	Course Code: HSMC122-18

Syllabus:

MODULE	DETAILS	HOURS
1	Course Introduction: Need, Basic Guidelines, Content and Process for Value Education 1. Purpose and motivation for the course, recapitulation from Universal Human Values-I 2. Self-Exploration– what is it? - Its content and process; ‘Natural Acceptance’ and Experiential Validation- as the process for self-exploration. 3. Continuous Happiness and Prosperity- A look at basic Human Aspirations 4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority 5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. 6. Method to fulfil the above human aspirations: understanding and living in harmony at various levels. Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and coexistence) rather than as arbitrariness in choice based on liking-disliking.	7 Hrs
2	Understanding Harmony in the Human Being - Harmony in Myself! 7. Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’ 8. Understanding the needs of Self (‘I’) and ‘Body’ - happiness and physical facility 9. Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer) 10. Understanding the characteristics and activities of ‘I’ and harmony in ‘I’ 11. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail 12. Programs to ensure Sanyam and Health. Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one’s own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease.	8 Hrs
3	Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship 13. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual	5 Hrs



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	<p>happiness; Trust and Respect as the foundational values of relationship. 14. Understanding the meaning of Trust; Difference between intention and competence 15. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship. 16. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals. 17. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family. Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives.</p>	
4	<p>Understanding Harmony in the Nature and Existence - Whole existence as Coexistence 18. Understanding the harmony in the Nature 19. Interconnectedness and mutual fulfilment among the four orders of nature - recyclability and self-regulation in nature 20. Understanding Existence as Co-existence of mutually interacting units in all pervasive space 21. Holistic perception of harmony at all levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc</p>	3 Hrs
5	<p>Implications of the above Holistic Understanding of Harmony on Professional Ethics 22. Natural acceptance of human values 23. Definitiveness of Ethical Human Conduct 24. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order 25. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco -friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems. 26. Case studies of typical holistic technologies, management models and production systems. 27. Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations. 28. Sum up. Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. to discuss the conduct as an engineer or scientist etc.</p>	5 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010.
2	Jeevan Vidya: EkParichaya, A. Nagaraj, Jeevan VidyaPrakashan, Amarkantak, 1999.
3	Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.

Course Code HSMC122-18 (Universal Human Values 2)

	Course Outcomes	BT Level
HSMC122-18.1	To learn the concept of human values and its vitality in the life.	2
HSMC122-18.2	To understand the critical ability to distinguish between essence and form.	2
HSMC122-18.3	To apply the critical ability to differentiate the values and its comprehensiveness in the real life.	3
HSMC122-18.4	To analyze the human value parameters such as sensitiveness, awareness, leading to commitment and courage to act their own belief.	4
HSMC122-18.5	To evaluate the focus on the life orientation in a professional manner.	5



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
HSMC122-18.1	1			1		3	3	3	3	3	2	1	2	3
HSMC122-18.2	1					3	1	3	3	3	2	1	2	3
HSMC122-18.3	1			1		3	2	3	3	3	3	1	2	2
HSMC122-18.4				1		3	2	3	3	3	2	1	2	3
HSMC122-18.5						3	2	3	3	2	1	1	2	2
AVERAGE	1.00			1.00		3.00	2.00	3.00	3.00	2.80	2.00	1.00	2.00	2.60

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 5 th Semester
Course Name: Artificial Intelligence	Course Code: BTIT511-18

Syllabus:

MODULE	DETAILS	HOURS
1	Introduction Concept of AI, history, current status, scope, agents, environments, Problem Formulations, Review of tree and graph structures, State space representation, Search graph and Search tree.	6 Hrs
2	Search Algorithms Random search, Search with closed and open list, Depth first and Breadth first search, Heuristic search, Best first search, A* algorithm, Game Search.	9 Hrs
3	Probabilistic Reasoning: Probability, conditional probability, Bayes Rule, Bayesian Networks- representation, construction and inference, temporal model, hidden Markov model.	10 Hrs
4	Markov Decision process MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs.	10 Hrs
5	Reinforcement Learning Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning.	6 Hrs

TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", 3rd Edition, Prentice Hall.
2	Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill.
3	Trivedi, M.C., "A Classical Approach to Artificial Intelligence", Khanna Publishing House, Delhi.
4	Saroj Kaushik, "Artificial Intelligence", Cengage Learning India, 2011.



Course Code : BTIT 511-18 (Artificial Intelligence)

	Course Outcomes	BT Level
BTIT 511-18.1	Build intelligent agents for search and games.	6
BTIT 511-18.2	Solve AI problems by learning various algorithms and strategies.	5
BTIT 511-18.3	Understand probability as a tool to handle uncertainty.	2
BTIT 511-18.4	Learning optimization and inference algorithms for model learning.	2
BTIT 511-18.5	Design and develop programs for an reinforcement agent to learn and act in a structured environment.	6

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
BTIT511-18.1	3	2	2	3	2	1	1		2	2	1	1	2	2
BTIT511-18.2	3	3	2	3	2	1	1		3	2	1	1	2	3
BTIT511-18.3	3	2	1	3	2	1	1		2	2	1	1	2	2
BTIT511-18.4	2	2	2	3	2	1	1		1	2	1	1	2	2
BTIT511-18.5	3	2	2	2	2	1	1		2	2	1	1	3	2
AVERAGE	2.80	2.20	1.80	2.80	2.00	1.00	1.00		2.00	2.00	1.00	1.00	2.20	2.20

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 5 th Semester
Course Name: Database Management Systems Lab	Course Code: BTIT505-18

Syllabus: List of Experiments

Task-1: Introduction to SQL and installation of SQL Server / Oracle.
Task-2: Data Types, Creating Tables, Retrieval of Rows using Select Statement, Conditional Retrieval of Rows, Alter and Drop Statements.
Task-3: Working with Null Values, Matching a Pattern from a Table, Ordering the Result of a Query, Aggregate Functions, Grouping the Result of a Query, Update and Delete Statements
Task-4: Set Operators, Nested Queries, Joins, Sequences.
Task-5: Views, Indexes, Database Security and Privileges: Grant and Revoke Commands, Commit and Rollback Commands.
Task-6: PL/SQL Architecture, Assignments and Expressions, Writing PL/SQL Code, Referencing Non-SQL parameters
Task-7: Stored Procedures and Exception Handling.
Task-8: Triggers and Cursor Management in PL/SQL.



Course Code: BTIT505-18 (Database Management Systems Lab)

	Course Outcomes	BT Level
BTIT505-18.1	This practical will enable students to retrieve data from relational databases using SQL.	1
BTIT505-18.2	Students will be able to implement generation of tables using datatypes.	6
BTIT505-18.3	Students will be able to design and execute the various data manipulation queries.	6
BTIT505-18.4	Students will also learn to execute triggers, cursors, stored procedures etc.	2
BTIT505-18.5	Students will be able to learn Stored Procedures and Exception Handling.	2

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT505-18.1	3	2	3	2	3	1	1		2	1	1	2	2	2
BTIT505-18.2	3	2	2	3	2	1	1		2	1	2	1	2	2
BTIT505-18.3	3	2	2	2	2	1	1		2	1	2	1	2	1
BTIT505-18.4	3	2	1	2	2		1		2	1	1	1	2	3
BTIT505-18.5	3	3	2	3	2	1	1		2	1	1	1	2	2
AVERAGE	3.00	2.20	2.00	2.40	2.20	1.00	1.00		2.00	1.00	1.40	1.20	2.00	2.00



Program: B.Tech (Information Technology)	Semester: 5 th Semester
Course Name: Programming in Java Lab	Course Code: BTIT506-18

Syllabus: List of Experiments

Task-1: WAP in Java to show implementation of classes
Task-2: WAP in Java to show implementation of inheritance.
Task-3: WAP in Java to show Implementation of packages and interfaces.
Task-4: WAP in Java to show Implementation of threads.
Task-5: WAP in Java Using exception handling mechanisms
Task-6: WAP in Java to show Implementation of Applets.
Task-7: WAP in Java to show Implementation of mouse events, and keyboard events.
Task-8: WAP in Java to show Implementing basic file reading and writing methods.
Task-9: Using basic networking features, WAP in Java
Task-10: WAP in Java to show Connecting to Database using JDBC.



Course Code: BTIT506-18 (Programming in Java Lab)

	Course Outcomes	BT Level
BTIT506-18.1	Implement the features of Java such as operators, classes, objects, inheritance, packages and exception handling	6
BTIT506-18.2	Design problems using latest features of Java like garbage collection, Console class, Network interface, APIs	6
BTIT506-18.3	Develop competence in Java through the use of multithreading, Applets etc	6
BTIT506-18.4	Apply advance concepts like socket and database connectivity, and develop project based on industry orientation.	3
BTIT506-18.5	WAP in Java Using exception handling mechanisms.	6

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT506-18.1	3	2	2	3	3	1	1		2	1	1	1	3	2
BTIT506-18.2	3	2	2	2	3	1	1		2	1	1	2	1	3
BTIT506-18.3	3	2	2	2	3	1	2		2	1	2	1	2	2
BTIT506-18.4	3	2	2	3	2	1	2		2	1	2	2	2	2
BTIT506-18.5	2	2	2	3	2	1	1		2		1	1	2	1
AVERAGE	2.80	2.00	2.00	2.60	2.60	1.00	1.40		2.00	1.00	1.40	1.40	2.00	2.00



Program: B.Tech (Information Technology)	Semester: 5 th Semester
Course Name: Programming in Software Engg.	Course Code: BTIT507-18

Syllabus: List of Experiments

Task-1: Study and usage of OpenProj or similar software to draft a project plan.
Task-2: Study and usage of OpenProj or similar software to track the progress of a project.
Task-3: Preparation of Software Requirement Specification Document, Design Documents and Testing Phase.
Task-4: related documents for some problems.
Task-5: Preparation of Software Configuration Management and Risk Management related documents.
Task-6: Study and usage of any Design phase CASE tool.
Task-7: To perform unit testing and integration testing.
Task-8: To perform various white box and black box testing techniques.
Task-9: Testing of a web site.



Course Code: BTIT506-18 (Programming in Java Lab)

	Course Outcomes	BT Level
BTIT507-18.1	Select a software engineering process life cycle model.	1
BTIT507-18.2	Define the requirements of the software.	1
BTIT507-18.3	Analyze the given specification into a design	4
BTIT507-18.4	Contrast the various testing and quality assurance techniques.	4
BTIT507-18.5	Apply modern engineering tools for specification, design, implementation, and testing	3

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT507-18.1	3	2	1	3	2	1	1		2	1	2	2	2	2
BTIT507-18.2	3	2	1	3	2	1	1		2	1	1	1	2	2
BTIT507-18.3	3	2	2	3	2	1	1		2		2	1	2	2
BTIT507-18.4	3	3	2	2	3	1	1		2		1	2	2	3
BTIT507-18.5	2	2	2	2	3	1	1		2	1	1	1	2	2
AVERAGE	2.80	2.20	1.60	2.60	2.40	1.00	1.00		2.00	1.00	1.40	1.40	2.00	2.20



Program: B.Tech (Information Technology)	Semester: 5 th Semester
Course Name: Artificial Intelligence Lab	Course Code: BTIT515-18

Syllabus: List of Experiments

Task-1: Write a programme to conduct uninformed and informed search.
Task-2: Write a programme to conduct game search.
Task-3: Write a programme to construct a Bayesian network from given data.
Task-4: Write a programme to infer from the Bayesian network.
Task-5: Write a programme to run value and policy iteration in a grid world.
Task-6: Write a programme to do reinforcement learning in a grid world.
Task-7: Mini Project work.



Course Code: BTIT515-18 (Artificial Intelligence Lab)

	Course Outcomes	BT Level
BTIT515-18	To learn and analyze the program of several AI techniques with different categories.	1
BTIT515-19	Apply the searching and gaming algorithms for different AI problems.	3
BTIT515-20	To acquire skill to identify the given problem and design the rule based systems.	5
BTIT515-21	Understand and apply Utility functions and reinforcement Learning for different AI Problems.	3
BTIT515-22	To develop better understanding to represent various real life problem domains using logic based techniques	6

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT515-18	3	2	2	3	3	1	1		2	1	1	1	2	2
BTIT515-19	3	2	2	2	2	1	1		2	2	2	1	2	1
BTIT515-20	3	3	2	3	2	1	1		2	2	2	2	1	2
BTIT515-21	3	2	1	3	2	1	1		2	2	2	1	2	1
BTIT515-22	2	2	2	3	2	1	1		2	2	2	1	3	2
AVERAGE	2.80	2.20	1.80	2.80	2.20	1.00	1.00		2.00	1.80	1.80	1.20	2.00	1.60



Records of Course Outcomes 6th Semester

IK Gujral Punjab Technical University Bachelor of Technology Scheme for B.Tech Syllabus 2018

Course Code	Subject	L-T-P	Credit
BTIT601-18	Big Data	3-0-0	3
BTIT602-18	Web Technologies	3-0-0	3
BTIT607-18	Distributed Systems	3-0-0	3
BTIT610-18	Cryptography and Network Security	3-0-0	3
BTEC401-18	Analog Circuits	3-0-0	3
BTIT603-18	Project-1	0-0-6	3
BTIT604-18	Big Data Lab	0-0-2	1
BTIT605-18	Web Technologies Lab	0-0-2	1
BTIT615-18	Distributed Systems Lab	0-0-2	1
BTIT618-18	Cryptography and Network Security	0-0-2	1



Program: B.Tech (Information Technology)	Semester: 6 th Semester
Course Name: Big Data	Course Code: BTIT601-18

Syllabus:

MODULE	DETAILS	HOURS
1	Introduction to Big Data: Types of Digital Data-Characteristics of Data – Evolution of Big Data - Definition of Big Data - Challenges with Big Data - 3Vs of Big Data - Non Definitional traits of Big Data - Business Intelligence vs. Big Data - Data warehouse and Hadoop environment - Coexistence. Big Data Analytics: Classification of analytics - Data Science - Terminologies in Big Data - CAP Theorem - BASE Concept. NoSQL: Types of Databases – Advantages – NewSQL - SQL vs. NOSQL vs NewSQL. Introduction to Hadoop: Features – Advantages – Versions - Overview of Hadoop Eco systems - Hadoop distributions - Hadoop vs. SQL – RDBMS vs. Hadoop - Hadoop Components – Architecture – HDFS - Map Reduce: Mapper – Reducer – Combiner – Partitioner – Searching – Sorting - Compression. Hadoop 2 (YARN): Architecture - Interacting with Hadoop Eco systems.	10 Hrs
2	No SQL databases: Mongo DB: Introduction – Features - Data types - Mongo DB Query language - CRUD operations – Arrays - Functions: Count – Sort – Limit – Skip – Aggregate - Map Reduce. Cursors – Indexes - Mongo Import – Mongo Export. Cassandra: Introduction – Features - Data types – CQLSH - Key spaces - CRUD operations – Collections – Counter – TTL - Alter commands - Import and Export - Querying System tables.	8 Hrs
3	Hadoop Eco systems: Hive – Architecture - data type - File format – HQL – SerDe - User defined functions - Pig: Features – Anatomy - Pig on Hadoop - Pig Philosophy - Pig Latin overview - Data types - Running pig - Execution modes of Pig - HDFS commands - Relational operators - Eval Functions - Complex data type - Piggy Bank - User defined Functions - Parameter substitution - Diagnostic operator. Jasper Report: Introduction - Connecting to Mongo DB - Connecting to Cassandra	8 Hrs
4	Analytical Approaches, Introducing to various Analytical Tools, Installing R, Handling Basic Expressions in R, Variables in R, working with Vectors, Storing and Calculating Values in R, Creating and Using Objects, interacting with Users, Handling Data in R Workspace, Executing Scripts, Reading Datasets and Exporting Data from R, Manipulating and Processing Data in R, working with Functions and Packages in R, Performing Graphical Analysis in R, Techniques Used for Visual Data Representation, Types of Data Visualization.	10 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Seema Acharya, Subhashini Chellappan, “Big Data and Analytics”, Wiley Publication, 2015
2	Big Data, Black Book by DT Editorial Services, Dreamtech Press.
3	Judith Hurwitz, Alan Nugent, Dr. Fern Halper, Marcia Kaufman, “Big Data for Dummies”, John Wiley & Sons, Inc., 2013.
4	Tom White, “Hadoop: The Definitive Guide”, O’Reilly Publications, 2011
5	Russell Bradberry, Eric Blow, “Practical Cassandra A developers Approach“, Pearson Education, 2014.

Course Code : BTIT601-18 (Big Data)

	Course Outcomes	BT Level
BTIT 601-18.1	Understand fundamental concepts of Big Data and its technologies.	2
BTIT 601-18.2	Apply concepts of Map Reduce framework for optimization.	3
BTIT 601-18.3	Analyze appropriate NoSQL database techniques for storing and processing large volumes of structured and unstructured data.	4
BTIT 601-18.4	Understand various components of Hadoop ecosystems.	2
BTIT 601-18.5	Explore modern tools and packages for data visualization.	4



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTI 601-18.1	3	2	2	3	2	1			1	1	1	1	3	3
BTIT601-18.2	3	2	2	3	3	1			1	1	1	1	2	2
BTIT601-18.3	3	2	1	3	3	1			1	1	1	1	2	2
BTIT601-18.4	3	2	2	3	3	1			1	1	2	2	2	2
BTIT601-18.5	2	3	2	2	2	2			1	1	1	2	1	2
AVERAGE	2.80	2.20	1.80	2.80	2.60	1.20			1.00	1.00	1.20	1.40	2.00	2.20

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 6 th Semester
Course Name: Web Technologies	Course Code: BTIT602-18

Syllabus:

MODULE	DETAILS	HOURS
1	Introduction: History and evolution of Internet protocols, Internet addressing, Internet Service Provider (ISP), Introduction to WWW, DNS, URL, HTTP, HTTPS, SSL, Web browsers, Cookies, Web servers, Proxy servers, Web applications. Website design principles, planning the site and navigation.	6 Hrs
2	HTML and DHTML: Introduction to HTML and DHTML, History of HTML, Structure of HTML Document: Text Basics, Structure of HTML Document: Images, Multimedia, Links, Audio, Video, Table and Forms, Document Layout, HTML vs. DHTML, Meta tags, Browser architecture and Website structure. Overview and features of HTML5.	7 Hrs
3	Style Sheets: Need for CSS, Introduction to CSS, Basic syntax and structure, Types of CSS – Inline, Internal and External CSS style sheets. CSS Properties - Background images, Colors and properties, Text Formatting, Margin, Padding, Positioning etc., Overview and features of CSS3	7 Hrs
4	Java Script: Introduction, JavaScript's history and versions, Basic syntax, Variables, Data types, Statements, Operators, Functions, Arrays, Objects, dialog boxes, JavaScript DOM.	7 Hrs
5	PHP and MySQL: Introduction and basic syntax of PHP, Data types, Variables, Decision and looping with examples, String, Functions, Array, Form processing, Cookies and Sessions, E-mail, PHP-MySQL: Connection to server.	7 Hrs
6	Ajax and JSON: AJAX Introduction, AJAX Components, Handling Dynamic HTML with Ajax, Advantages & disadvantages, HTTP request, XMLHttpRequest Server Response. JSON– Syntax, Schema, Data types, Objects, Reading and writing JSON on client and server. Using JSON in AJAX applications.	8 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Jeffrey C. Jackson, “Web Technologies: A Computer Science Perspective”, Pearson Education
2	Rajkamal, “Internet and Web Technology”, Tata McGraw Hill
3	Ray Rischpater, “JavaScript JSON Cookbook”, Packt Publishing.
4	Ivan Bayross, “Web Enabled Commercial Application Development using HTML, DHTML JavaScript, Perl, CGI”, BPB Publications
5	Peter Moulding, “PHP Black Book”, Coriolis.

Course Code: BTIT602-18 (Web Technologies)

	Course Outcomes	BT Level
BTIT602-18.1	Understand and apply the knowledge of web technology stack to deploy various web services.	2
BTIT602-18.2	Analyze and evaluate web technology components for formulating web related problems	4
BTIT602-18.3	Design and develop interactive client server internet application that accommodates user specific requirements and constraint analysis.	6
BTIT602-18.4	Program latest web technologies and tools by creating dynamic pages with an understanding of functions and objects.	6
BTIT602-18.5	Apply advance concepts of web interface and database to build web projects in multidisciplinary environments	3



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT602-18.1	3	2	2	3	2	1	1		1	1	1	1	2	3
BTIT602-18.2	3	2	3	3	2	1	1		2	2	1	1	2	2
BTIT602-18.3	3	2	2	3	2	1	1		2	1	1	2	2	3
BTIT602-18.4	3	2	1	3	3	1	1		1	1	1	2	2	2
BTIT602-18.5	3	2	1	2	3	1	1		1	1	1	1	2	2
AVERAGE	3.00	2.00	1.80	2.80	2.40	1.00	1.00		1.40	1.20	1.00	1.40	2.00	2.40

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 6 th Semester
Course Name: Distributed Systems	Course Code: BTIT607-18

Syllabus:

MODULE	DETAILS	HOURS
1	Introduction to Distributed systems, Operating Systems, Types of distributed systems, Concurrent Programming, Characteristics & Properties of Distributed Systems – Taxonomy - Design goals – Transparency Issues. System architectures; Centralized, Decentralized and Hybrid architectures, Architectures versus middleware, Self-management in distributed systems, feedback control model.	7 Hrs
2	Processes and communication: Introduction to threads, Threads in distributed systems, role of virtualization in distributed systems, Clients, Servers, Code migration and approaches to code migration. Types of communication, Layered protocols and its types, Remote procedure call, Basic RPC operation, Parameter passing, Asynchronous RPC, Message-oriented transient and persistent communication.	7 Hrs
3	Naming and Synchronization: Names, identifiers, and addresses, concept of flat naming, Structured naming and attribute based naming. Coordination and clock synchronization, Logical clocks, Mutual exclusion, distributed mutual exclusion, Global positioning of nodes and election algorithms.	7 Hrs
4	Consistency and replication: Introduction, reasons for replication, Data-centric consistency models; Continuous consistency, Sequential consistency, Causal consistency, Client-centric consistency, Eventual consistency, Monotonic reads and writes. Replica management; Replica-server placement, Content replication and placement and Content distribution.	7 Hrs
5	Security and Fault tolerance: Security threats, policies, and mechanisms, Design issues, Cryptography, Access control and Security management. Introduction to fault tolerance, Process resilience, Reliable group communication, Recovery	7 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	A S Tanenbaum, Martin Steen, "Distributed Systems: Principles and Paradigms", 2/E, PHI
2	Colouris, Dollimore, Kindberg, "Distributed Systems Concepts & Design", 4/E, Pearson Ed

Course Code: BTIT607-18 (Distributed Systems)

	Course Outcomes	BT Level
BTIT 607-18.1	Basic principles of distributed systems, its types, properties and architecture.	1
BTIT 607-18.2	Define threats in Distributed systems and types of communications	1
BTIT 607-18.3	Describe Coordination and synchronization principles in distributed systems	2
BTIT 607-18.4	Explain Fundamentals of various types of consistency and replica management techniques.	2
BTIT 607-18.5	Define Concepts related to fault tolerance, recovery and security mechanisms.	1

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT607-18.1	3	3	2	2	2	1	1		2	1	1	1	2	3
BTIT607-18.2	3	3	2	3	2	1	1		1	1	1	2	2	3
BTIT607-18.3	3	2	1	3	3	1	1		1	1	1	2	2	2
BTIT607-18.4	2	1	2	3	3		1		1	1	1	1	3	2
BTIT607-18.5	2	1	1	3	2		2		1	1	1	2	2	2
AVERAGE	2.60	2.00	1.60	2.80	2.40	1.00	1.20		1.20	1.00	1.00	1.60	2.20	2.40

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 6 th Semester
Course Name: Cryptography and Network Security	Course Code: BTIT610-18

Syllabus:

MODULE	DETAILS	HOURS
1	Introduction to Cryptography, Security Threats, Vulnerability, Active and Passive attacks, Security services and mechanism, Conventional Encryption Model, CIA model	5 Hrs
2	Math Background, Modular Arithmetic, Euclidean and Extended Euclidean algorithm, Prime numbers, Fermat and Euler's Theorem	5 Hrs
3	Cryptography Dimensions of Cryptography, Classical Cryptographic Techniques Block Ciphers (DES, AES) : Feistel Cipher Structure, Simplified DES, DES, Double and Triple DES, Block Cipher design Principles, AES, Modes of Operations Public-Key Cryptography : Principles Of PublicKey Cryptography, RSA Algorithm, Key Management, Diffie- Hellman Key Exchange, Elgamal Algorithm, Elliptic Curve Cryptography	12 Hrs
4	Hash and MAC Algorithms Authentication Requirement, Functions, Message Authentication Code, Hash Functions, Security Of Hash Functions And Macs, MD5 Message Digest Algorithm, Secure Hash Algorithm, Digital Signatures, Key Management : Key Distribution Techniques, Kerberos	6 Hrs
5	Security in Networks Threats in networks, Network Security Controls – Architecture, Encryption, Content Integrity, Strong Authentication, Access Controls, Wireless Security, Honeypots, Traffic flow security, Firewalls – Design and Types of Firewalls, Personal Firewalls, IDS, Email Security – PGP, S/MIME	7 Hrs

TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Cryptography And Network Security Principles And Practice Fourth Edition, William Stallings, Pearson Education
2	Modern Cryptography: Theory and Practice, by Wenbo Mao, Prentice Hall PTR
3	Network Security Essentials: Applications and Standards, by William Stallings. Prentice Hall.
4	Cryptography: Theory and Practice by Douglas R. Stinson, CRC press.



Course Code: BTIT610-18 (Cryptography and Network Security)

	Course Outcomes	BT Level
BTIT610-18.1	Understand the fundamental principles of access control models and techniques, authentication and secure system design.	2
BTIT610-18.2	Have a strong understanding of different cryptographic protocols and techniques and be able to use them.	2
BTIT610-18.3	Apply methods for authentication, access control, intrusion detection and prevention.	3
BTIT610-18.4	Identify and mitigate software security vulnerabilities in existing systems.	4
BTIT610-18.5	Understand about design and types of firewalls.	2

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT610-18.1	3	2	1	3	2	1	1		2	1	1	2	3	2
BTI 610-18.2	3	3	1	2	3	1	1		2	1	2	1	2	2
BTIT610-18.3	3	3	2	3	3	1	1		2	1	2	2	2	1
BTIT610-18.4	2	2	1	3	3	1	1		2	1	1	1	2	2
BTIT610-18.5	3	1	1	3	2	1	1		2	1	1	1	1	1
AVERAGE	2.80	2.20	1.20	2.80	2.60	1.00	1.00		2.00	1.00	1.40	1.40	2.00	1.60

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 6 th Semester
Course Name: Analog Circuit	Course Code: BTEC401-18

Syllabus:

MODULE	DETAILS	HOURS
1	Diode and Transistor Amplifier Circuits Diode Circuits, Amplifiers types: Voltage amplifier, current amplifier, trans-conductance amplifier and trans-resistance amplifier; biasing schemes for BJT and FET amplifiers; bias stability; transistor configurations: CE/CS, CB/CG, CC/CD and their features; small-signal analysis; low-frequency transistor models; amplifier analysis: current gain, voltage gain, input resistance and output resistance; amplifier design procedure; low frequency analysis of multistage amplifiers. High frequency transistor models.	12 Hrs
2	Feedback Amplifiers Feedback topologies: Voltage series, current series, voltage shunt and current shunt feedback; effect of feedback on gain, bandwidth, input & output impedances; concept of stability, gain margin and phase margin.	10 Hrs
3	Oscillators Introduction, Types of Oscillators, Barkhausen criterion, RC-phase shift, Wien bridge, Hartley, Colpitts, Clapp oscillators and Non-sinusoidal oscillators	10 Hrs
4	Power Amplifiers Class A, B, AB and C power amplifiers, their efficiency and distortions; frequency response: single stage, multistage amplifiers and cascade amplifier	9 Hrs

TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	J Millman & A Grabel, Microelectronics, McGraw Hill
2	J Millman & C Halkias, Integrated Electronics, Tata McGraw Hill
3	A Ramakant, Gayakwad, Op-Amps And Linear Integrated Circuits, PHI
4	P Horowitz & W Hill, The Art of Electronics, Cambridge University Press
5	AS Sedra & KC Smith, Microelectronic Circuits, Saunder's College Publishing



Course Code: BTEC401-18 (Analog Circuit)

	Course Outcomes	BT Level
BTEC401-18.1	Understand the biasing of transistors and analyze BJT/FET amplifiers.	2
BTEC401-18.2	Analyze various rectifier and amplifier circuits.	4
BTEC401-18.3	Analyze sinusoidal and non-sinusoidal oscillators.	4
BTEC401-18.4	Understand various types of Power Amplifiers.	2
BTEC401-18.5	Understand various feedback topologies.	2

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTEC401-18.1	3	2	1	3	3	1	1		1	1	1	2	2	3
BTEC401-18.2	2	2	1	3	3	1	1		1	2	1	2	3	2
BTEC401-18.3	3	3	1	3	2	1	1		1	1	1	1	2	2
BTEC401-18.4	3	3	1	2	2	1	1		1	1	1	1	2	2
BTEC401-18.5	3	2	1	3	3	1	1		1	1	1	1	2	1
AVERAGE	2.80	2.40	1.00	2.80	2.60	1.00	1.00		1.00	1.20	1.00	1.40	2.20	2.00

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 6 th Semester
Course Name: Project-I	Course Code: BTIT603-18

Course Code: BTIT603-18 (Project-I)

	Course Outcomes	BT Level
BTIT 603-18.1	Understand programming language concepts, particularly Java and object-oriented concepts or go through research activities.	2
BTIT 603-18.2	Undertake problem identification, formulation and solution.	2
BTIT 603-18.3	Communicate with engineers and the community at large in written and oral forms.	3
BTIT 603-18.4	Demonstrate the knowledge, skills and attitudes of a professional engineer.	3
BTIT 603-18.5	Design engineering solutions to complex problems utilizing a systems approach.	6

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT603-18.1	3	2	2	2	3	1	1		2	1	1	1	2	1
BTIT603-18.2	3	2	2	3	2	1	1		2	1	2	1	2	2
BTIT603-18.3	3	2	2	3	3	1	2		2	1	2	2	2	2
BTI 603-18.4	3	2	1	3	2		2		2		2	2	2	2
BTIT603-18.5	3	2	2	3	1		1		2		1	2	2	2
AVERAGE	3.00	2.00	1.80	2.80	2.20	1.00	1.40		2.00	1.00	1.60	1.60	2.00	1.80

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations.



Program: B.Tech (Information Technology)	Semester: 6 th Semester
Course Name: Big Data Lab	Course Code: BTIT604-18

Syllabus: List of Experiments

Task-1: (i) Perform setting up and Installing Hadoop in its two operating modes: <ul style="list-style-type: none">• Pseudo distributed• Fully distributed.
Task-2: Use web based tools to monitor your Hadoop setup.
Task-3: Implement the following file management tasks in Hadoop: <ul style="list-style-type: none">• Adding files and directories• Retrieving files• Deleting files
Task-4: Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm. <ul style="list-style-type: none">• Find the number of occurrence of each word appearing in the input file(s)• Performing a MapReduce Job for word search count (look for specific keywords in a file)
Task-5: Stop word elimination problem: <ul style="list-style-type: none">• Input: A large textual file containing one sentence per line• A small file containing a set of stop words (One stop word per line)• Output: o A textual file containing the same sentences of the large input file without the words appearing in the small file.
Task-6: Using various mathematical functions on console in R
Task-7: Write an R script, to create R objects for calculator application and save in a specified location in disk.
Task-8: Write an R script to find basic descriptive statistics using summary, str, quartile function on mtcars & cars datasets
Task-9: Write an R script to find subset of dataset by using subset (), aggregate () functions on iris dataset. • Reading different types of data sets (.txt, .csv) from web and disk and writing in file in specific disk location. • Reading Excel data sheet in R. • Reading XML dataset in R.
Task-10: Visualizations using R packages <ul style="list-style-type: none">• Find the data distributions using box and scatter plot.• Find the outliers using plot.



Course Code: BTIT604-18 (Big Data Lab)

	Course Outcomes	BT Level
BTIT604-18.1	Understand and implement the basics of data structures like Linked list, stack, queue, set and map in Java	2
BTIT604-18.2	Demonstrate the knowledge of big data analytics and implement different file management task in Hadoop.	3
BTIT604-18.3	Understand Map Reduce Paradigm and develop data applications using variety of systems.	2
BTIT604-18.4	Analyze and perform different operations on data using Pig Latin scripts.	4
BTIT604-18.5	Illustrate and apply different operations on relations and databases using Hive.	1

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT604-18.1	3	3	3	3	2	1	1		2	2	1	1	3	3
BTIT604-18.2	3	2	2	3	3	1	1		2	2	1	1	2	2
BTIT604-18.3	3	2	1	3	3	1	1		1	2	1	1	2	3
BTIT604-18.4	3	1	1	3	2	1	1		2	2	1	1	2	2
BTIT604-18.5	2	2	1	2	3	1	1		2	2	2	1	3	2
AVERAGE	2.80	2.00	1.60	2.80	2.60	1.00	1.00		1.80	2.00	1.20	1.00	2.40	2.40



Program: B.Tech (Information Technology)	Semester: 6 th Semester
Course Name: Web Technologies Lab	Course Code: BTIT605-18

Syllabus: List of Experiments

Task-1: Configuration and administration Apache Web Server.
Task-2: Develop an HTML page to demonstrate the use of basic HTML tags, Link to different HTML page and also link within a page, insertion of images and creation of tables.
Task-3: Develop a registration form by using various form elements like input box, text area, radio buttons, check boxes etc
Task-4: Design an HTML page by using the concept of internal, inline, external style sheets.
Task-5: Create an HTML file to implement the styles related to text, fonts, links using cascading style sheets
Task-6: Create an HTML file to implement the concept of document object model using JavaScript
Task-7: Create an HTML page including JavaScript that takes a given set of integer numbers and shows them after sorting in descending order.
Task-8: Write an HTML page including any required JavaScript that takes a number from one text field in the range of 0 to 999 and shows it in another text field in words. If the number is out of range, it should show “out of range” and if it is not a number, it should show “not a number” message in the result box.
Task-9: Create a PHP file to print any text using variable.
Task-10: Demonstrate the use of Loops and arrays in PHP
Task-11: Create a PHP file using GET and POST methods.
Task-12: A simple calculator web application that takes two numbers and an operator (+, -, /, * and %) from an HTML page and returns the result page with the operation performed on the operands.



Task-13: Implement login page contains the user name and the password of the user to authenticate with Session using PHP and MySQL, also implement this with the help of PHP-Ajax.

Task-14: . A web application for implementation: a. The user is first served a login page which takes user's name and password. After submitting the details the server checks these values against the data from a database and takes the following decisions. b. If name and password matches, serves a welcome page with user's full name. c. If name matches and password doesn't match, then serves "password mismatch" page d. If name is not found in the database, serves a registration page, where user's full name is asked and on submitting the full name, it stores, the login name, password and full name in the database (hint: use session for storing the submitted login name and password).

Task-15: Demonstrate the use of Ajax and JSON Technologies in programming examples.

Task-16: Demonstrate the use of web site designing tools such as Joomla, WordPress.

Task-17: Implement at least one minor project using different technologies mentioned in theory of the subject.

Course Code: BTIT605-18 (Web Technologies Lab)

	Course Outcomes	BT Level
BTIT605-18.1	Demonstrate the use of Loops and arrays in PHP	1
BTIT605-18.2	Create a PHP file using GET and POST methods.	6
BTIT605-18.3	Demonstrate the use of Ajax and JSON Technologies in programming examples.	1
BTIT605-18.4	Demonstrate the use of web site designing tools such as Joomla, WordPress.	1
BTIT605-18.5	Implement at least one minor project using different technologies mentioned in theory of the subject.	6



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT605-18.1	3	2	1	2	3	1			2	1	1	1	2	3
BTIT605-18.2	2	2	1	3	3	1			1	1	1	2	2	2
BTIT605-18.3	3	2	1	3	2	1			2	1	1	2	2	2
BTIT605-18.4	3	2	1	3	2	1			2	1	1	2	3	2
BTIT605-18.5	3	2	1	3	2	1			1	1	2	1	2	2
AVERAGE	2.80	2.00	1.00	2.80	2.40	1.00			1.60	1.00	1.20	1.60	2.20	2.20



Program: B.Tech (Information Technology)	Semester: 6 th Semester
Course Name: Distributed Systems Lab	Course Code: BTIT615-18

Course Code: BTIT615-18 (Distributed Systems Lab)

	Course Outcomes	BT Level
BTIT618-18.1	Understand computer security principles.	2
BTIT618-18.2	Discuss ethical issues for theft of information. Identify threat models and common computer network security goals.	1
BTIT618-18.3	Explain various encryption algorithms, hashing functions, one-way authentication and public key cryptology.	1
BTIT618-18.4	Analyze firewalls, DOS attacks and defense types. Dramatize example scenarios in DNS and IPSec applications.	4
BTIT618-18.5	Apply methods for authentication, access control, intrusion detection and prevention.	4

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT615-18.1	3	2	1	2	2	1	1		1	1	1	2	2	3
BTIT615-18.2	3	2	1	3	3	1	1		1	2	2	1	2	2
BTIT615-18.3	3	2	1	3	3	1	1		1	1	2	1	2	1
BTIT615-18.4	3	2	1	3	3	1	1		2	1	1	1	3	2
BTIT615-18.5	3	2	1	3	2	1	2		1	1	1	1	3	1
AVERAGE	3.00	2.00	1.00	2.80	2.60	1.00	1.20		1.20	1.20	1.40	1.20	2.40	1.80



Program: B.Tech (Information Technology)	Semester: 6 th Semester
Course Name: Cryptography and Network Security Lab	Course Code: BTIT618-18

Syllabus: List of Experiments

Task-1: W.A.P. to implement Ceaser Cipher.
Task-2: W.A.P. to implement Affine Cipher with equation $c=3x+12$.
Task-3: W.A.P. to implement Playfair Cipher with key ldrp.
Task-4: W.A.P. to implement polyalphabetic Cipher.
Task-5: W.A.P. to implement AutoKey Cipher.
Task-6: W.A.P. to implement Hill Cipher. (Use any matrix but find the inverse yourself).
Task-7: W.A.P. to implement Rail fence technique.
Task-8: W.A.P. to implement Simple Columner Transposition technique.
Task-9: W.A.P. to implement Advanced Columner Transposition technique.
Task-10: W.A.P. to implement Euclidean Algorithm.
Task-11: W.A.P. to implement Advanced Euclidean Algorithm.
Task-12: W.A.P. to implement Simple RSA Algorithm with small numbers.



Course Code: BTIT618-18 (Cryptography and Network Security Lab)

	Course Outcomes	BT Level
BTIT 618-18.1	Understand computer security principles.	2
BTIT 618-18.2	Discuss ethical issues for theft of information. Identify threat models and common computer network security goals.	1
BTIT 618-18.3	Explain various encryption algorithms, hashing functions, one-way authentication and public key cryptography.	1
BTIT 618-18.4	Analyze firewalls, DOS attacks and defense types. Dramatize example scenarios in DNS and IPSec applications.	4
BTIT 618-18.5	Apply methods for authentication, access control, intrusion detection and prevention.	4

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT618-18.1	3	3	1	3	3	1	1		1	1	1	1	2	2
BTIT618-18.2	2	2	1	3	3	1	1		1	1	1	1	2	2
BTIT618-18.3	3	2	1	2	2	1	1		1	1	1	1	2	2
BTIT618-18.4	3	2	1	3	2	1	2		1	1	1	2	2	2
BTIT618-18.5	3	2	1	3	2	1	2		1	1	1	2	2	2
AVERAGE	2.80	2.20	1.00	2.80	2.40	1.00	1.40		1.00	1.00	1.00	1.40	2.00	2.00



Records of Course Outcomes 7th Semester

IK Gujral Punjab Technical University Bachelor of Technology Scheme for B.Tech Syllabus 2018

Course Code	Subject	L-T-P	Credit
BTIT702-18	Software Project Management	3-0-0	3
BTIT709-18	Network Programming	3-0-0	3
BTEC301-18	Electronic Devices	3-0-0	3
BTIT 701-18	Software Testing and Quality Assurance	3-0-0	3
BTIT702-18	Project-II	0-0-4	4
BTEC905A-18	Routing and Switching	3-0-0	3
BTIT710-18	Software Project Management Lab	0-0-2	1
BTIT717-18	Network Programming lab	0-0-2	1



Program: B.Tech (Information Technology)	Semester: 7 th Semester
Course Name: Software Project Management	Course Code: BTIT702-18

Syllabus:

MODULE	DETAILS	HOURS
1	Introduction Project Evaluation and Planning - Activities in Software Project Management, Overview of Project Planning, Stepwise planning, contract management, Software processes and process models.	5 Hrs
2	Cost Benefit Analysis Cost Benefit Analysis, Cash Flow Forecasting, Cost-Benefit Evaluation Techniques, Risk Evaluation. Project costing, COCOMO 2, Staffing pattern, Effect of schedule compression, Putnam's equation, Capers Jones estimating rules of thumb	6 Hrs
3	Project Scheduling Project Sequencing and Scheduling Activities, Scheduling resources, Critical path analysis, Network Planning, Risk Management, Nature and Types of Risks, Managing Risks, Hazard Identification, Hazard Analysis, Risk Planning and Control, PERT and Monte Carlo Simulation techniques.	8 Hrs
4	Monitoring & Control Monitoring and Control- Collecting Data, Visualizing Progress, Cost Monitoring, review techniques, project termination review, Earned Value analysis, Change Control, Software Configuration Management (SCM), Managing Contracts, Types of Contracts, Stages in Contract Placement, Typical Terms of a Contract, Contract Management and Acceptance.	8 Hrs
5	Quality Management Quality Management and People Management- Introduction, Understanding Behavior, Organizational Behavior, Selecting the Right Person for The Job, Motivation, The Oldman – Hackman Job Characteristics Model, Working in Groups, Organization and team structures, Decision Making, Leadership, Organizational Structures, Stress, Health and Safety. ISO and CMMI models, Testing, and Software reliability, test automation, Overview of project management tools.	9 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Bob Hughes, Mike Cotterell, “Software Project Management”, Tata McGraw Hill. (2009)
2	Royce, “Software Project Management”, Pearson Education. (2005).
3	Robert K. Wysocki, “Effective Software Project Management”, Wiley. (2006)
4	Ian Sommerville, Software Engineering, Seventh Edition, Pearson Education.
5	R.S. Pressman, Software Engineering: A Practitioner's Approach, Sixth Edition, Tata McGraw-Hill.

Course Code : BTIT702-18 (Software Project Management)

	Course Outcomes	BT Level
BTIT 702-18.1	Explain project management in terms of the software development process	1
BTIT 702-18.2	Estimate project cost and perform cost-benefit evaluation among projects	5
BTIT 702-18.3	Apply the concepts of project scheduling and risk management.	3
BTIT 702-18.4	Explain Software configuration management and the concepts of contract management.	1
BTIT 702-18.5	Apply quality models in software projects for maintaining software quality and reliability	3



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT702-18.1	3	2	1	3	3	1	2		1	1	2	2	2	2
BTIT702-18.2	3	2	1	3	3	1	2		1	1	1	1	2	3
BTIT702-18.3	2	2	1	2	2	1	2		2	1	1	1	2	2
BTIT702-18.4	3	2	1	3	3	1	1		2	1	1	2	2	2
BTIT702-18.5	3	3	1	3	3	1	2		2	1	1	2	2	2
AVERAGE	2.80	2.20	1.00	2.80	2.80	1.00	1.80		1.60	1.00	1.20	1.60	2.00	2.20

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 7 th Semester
Course Name: Network Programming	Course Code: BTIT709-18

Syllabus:

MODULE	DETAILS	HOURS
1	Networking & TCP/IP: Communication protocols, Network architecture, UUCP, XNS, IPX/SPX for LANs, TCP & IP headers, IPv4 & v6 address structures, Programming Applications: Time & date routines, Internet protocols: Application layer, Transport lay.	5 Hrs
2	Socket Programming: Creating sockets, Posix data type, Socket addresses, Assigning address to a socket, Java socket programming, Thread programming, Berkeley Sockets: Overview, socket address structures, byte manipulation & address conversion functions, elementary socket system calls – socket, connect, bind, listen, accept, fork, exec, close, TCP ports (ephemeral, reserved), Berkeley Sockets: I/O asynchronous & multiplexing models, select & poll functions, signal & fcntl functions, socket implementation (client & server programs), UNIX domain protocols.	6 Hrs
3	APIs & Winsock Programming: Windows socket API, window socket & blocking I/O model, blocking sockets, blocking functions, timeouts for blocking I/O, API overview, Different APIs & their programming technique, DLL & new API's, DLL issues, Java Beans.	8 Hrs
4	Web Programming & Security: Java network programming, packages, RMI, Overview of Javascript, WAP architecture & WAP services, Web databases, Component technology, CORBA concept, CORBA architecture, CGI programming, Firewall & security technique, Cryptography, Digital Signature.	8 Hrs
5	Client Server Programming: Client side programming: Creating sockets, implementing generic network client, Parsing data using string Tokenizer, Retrieving file from an HTTP server, Retrieving web documents by using the URL class. Server side programming: Steps for creating server, Accepting connection from browsers, creating an HTTP server, Adding multithreading to an HTTP server.	9 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	UNIX Network Programming, by W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, Pearson Education.
2	UNIX Network Programming, 1st Edition, - W. Richard Stevens. PHI.
3	UNIX Systems Programming using C++ T CHAN, PHI.
4	UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education.

Course Code : BTIT709-18 (Network Programming)

	Course Outcomes	BT Level
BTIT 709-18.1	Understand the OSI reference model and a variety of network protocols.	2
BTIT 709-18.2	Implement specific network programming constructs on Unix platforms to create robust real world sockets-based applications.	3
BTIT 709-18.3	Design and implement client/server programs using a variety of protocols and platforms.	6
BTIT 709-18.4	Understand web programming and Security	2
BTIT 709-18.5	Apply the concepts of the C programming language to the construction of moderately complex software implementation problems.	3



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT709-18.1	3	2	2	3	2	1	1		2	1	2	2	2	2
BTIT709-18.2	3	2	2	3	3	1	1		2	1	1	1	2	2
BTIT709-18.3	3	2	2	2	3	1	1		2	1	1	1	2	2
BTIT709-18.4	3	2	2	3	3	1	1		2	1	1	1	2	2
BTIT709-18.5	3	3	2	3	2	1	2		2	1	1	1	2	3
AVERAGE	3.00	2.20	2.00	2.80	2.60	1.00	1.20		2.00	1.00	1.20	1.20	2.00	2.20

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 7 th Semester
Course Name: Electronic Devices	Course Code: BTEC301-18

Syllabus:

MODULE	DETAILS	HOURS
1	Semiconductor Physics: Review of quantum mechanics; electrons in periodic lattices; e-k diagrams; energy bands in intrinsic and extrinsic silicon; diffusion current; drift current; mobility and resistivity; sheet resistance; design of resistors.	7 Hrs
2	Diodes: Generation and recombination of carriers; Poisson and continuity equation p-n junction characteristics; V-I characteristics; small signal switching models; avalanche breakdown; Zener diode; Schottky diode; light emitting diode; tunnel diode; varactor diode, solar cell, Rectifier & Regulator circuits.	8 Hrs
3	Transistors: Bipolar junction transistor; V-I characteristics; Ebers-Moll model; Transistor Configurations - CE, CB, CC; MOS capacitor; MOSFET - Construction and Working; I-V characteristics; Depletion-type and Enhancement-type MOS.	8 Hrs
4	Fabrication Processes: Oxidation; diffusion; ion-implantation; Annealing; photolithography; etching; chemical vapour deposition (CVD); sputtering; twin-tub CMOS process.	10 Hrs

TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	G. Streetman, and S. K. Banerjee, Solid State Electronic Devices, Pearson.
2	D. Neamen, D. Biswas, Semiconductor Physics and Devices, McGraw-Hill Education
3	S. M. Sze and K. N. Kwok, Physics of Semiconductor Devices, John Wiley & Sons
4	C. T. Sah, Fundamentals of solid state electronics, World Scientific Publishing Co. Inc.



Course Code : BTEC301-18 (Electronic Devices)

	Course Outcomes	BT Level
BTEC301-18.1	Understand physics of semiconductors and behavior of charge carriers within semiconductors.	2
BTEC301-18.2	Understand the working of semiconductor diodes supported with mathematical explanation.	2
BTEC301-18.3	Understand the working of BJT and MOSFET with their equivalent small signal models.	2
BTEC301-18.4	Understand the chemical processes used in fabrication of integrated circuits.	2
BTEC301-18.5	Understand the chemical vapour deposition (CVD).	2

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTEC301-18.1	3	1	1	3	2	1	1		1	1	2	1	2	3
BTEC301-18.2	3	2	1	3	2	1	1		1	2	1	1	2	2
BTEC301-18.3	3	3	2	2	2	1	1		2	1	1	1	2	2
BTEC301-18.4	2	2	2	3	2	1	1		2	1	1	2	2	2
BTEC301-18.5	3	2	1	3	2	1	1		2	1	1	1	2	2
AVERAGE	2.80	2.00	1.40	2.80	2.00	1.00	1.00		1.60	1.20	1.20	1.20	2.00	2.20

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 7 th Semester
Course Name: Software Testing and Quality Assurance	Course Code: BTIT701-18

Syllabus:

MODULE	DETAILS	HOURS
1	Testing as an engineering activity, Role of process in software quality, Testing as a process, Basic definitions, Software testing principles, The tester's role in a software development organization, Origins of defects, Defect classes, The defect repository and test design, Defect examples, Developer / Tester support for developing a defect repository	7 Hrs
2	Testing techniques and levels of testing: Using White Box Approach to Test design - Static Testing Vs. Structural Testing, Code Functional Testing, Coverage and Control Flow Graphs, Using Black Box Approaches to Test Case Design, Random Testing, Requirements based testing, Decision tables, State-based testing, Cause-effect graphing, Error guessing, Compatibility testing, Levels of Testing -Unit Testing, Integration Testing, Defect Bash Elimination. System Testing - Usability and Accessibility Testing, Configuration Testing, Compatibility Testing	10 Hrs
3	Automation and Quality Metrics: Software Test Automation, Skills needed for Automation, Scope of Automation, Design and Architecture for Automation, Requirements for a Test Tool, Challenges in Automation Tracking the Bug, Debugging. Testing Software System Security - Six-Sigma, TQM - Complexity Metrics and Models, Quality Management Metrics, Availability Metrics, Defect Removal Effectiveness, FMEA, Quality Function Deployment, Taguchi Quality Loss Function, Cost of Quality.	8 Hrs
4	Quality Assurance tools and Models: SQA basics, Components of the Software Quality Assurance System, software quality in business context, planning for software quality assurance, product quality and process quality, software process models, 7 QC Tools and Modern Tools. Models for Quality Assurance, ISO-9000 series, CMM, CMMI, Test Maturity Models, SPICE, Malcolm Baldrige Model- P-CMM	8 Hrs
5	Quality Assurance trends: Software Process- PSP and TSP, OO Methodology, Clean-room software engineering, Defect Injection and prevention, Internal Auditing and Assessments, Inspections & Walkthroughs, Case Tools and their Affect on Software Quality.	6 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Srinivasan Desikan, Gopaldaswamy Ramesh, Software Testing: Principles and Practices Pearson.
2	Daniel Galin, Software Quality Assurance: From Theory to Implementation, Pearson Addison Wesley.
3	Aditya P. Mathur, Foundations of Software Testing, Pearson.
4	Paul Ammann, Jeff Offutt, Introduction to Software Testing, Cambridge University Press.
5	Paul C. Jorgensen, Software Testing: A Craftsman's Approach, Auerbach Publications.
6	Renu Rajani, Pradeep Oak, Software Testing – Effective Methods, Tools and Techniques, Tata McGraw Hill.

Course Code : BTIT701-18 (Software Testing and Quality Assurance)

	Course Outcomes	BT Level
BTIT701-18.1	Test the software by applying testing techniques to deliver a product free from bugs.	5
BTIT701-18.2	Investigate the scenario and to select the proper testing technique	4
BTIT701-18.3	Explore the test automation concepts and tools and estimation of cost, schedule based on standard metrics	1
BTIT701-18.4	Understand how to detect, classify, prevent and remove defects.	2
BTIT701-18.5	Choose appropriate quality assurance models and develop quality.	3



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT701-18.1	3	2	2	3	2	1	1		2	1	1	1	2	2
BTIT701-18.2	3	3	2	3	3	1	1		2	1	1	1	2	2
BTIT701-18.3	3	2	2	2	3	1	1		2	2	2	1	2	2
BTIT701-18.4	3	2	1	3	2	1	1		2	2	1	1	2	3
BTIT701-18.5	3	3	2	3	2	1	1		2	1	2	2	2	2
AVERAGE	3.00	2.40	1.80	2.80	2.40	1.00	1.00		2.00	1.40	1.40	1.20	2.00	2.20

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 7 th Semester
Course Name: Project-II	Course Code: BTIT702-18

Course Code : BTIT702-18 (Project-II)

	Course Outcomes	BT Level
BTIT702-18.1	Identify and Finalize problem statement by surveying variety of domains.	1
BTIT702-18.2	Learn to work as a team and to focus on getting a working project done on time.	1
BTIT702-18.3	Perform requirement analysis and identify design methodologies.	2
BTIT702-18.4	Prepare technical report by applying different visualization tools and Evaluation metrics.	3
BTIT702-18.5	Outline the software development cycle with emphasis on different processes - requirements, design, and implementation phases.	4

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT702-18.1	3	2	1	3	2	1	1		2	1	2	1	2	2
BTIT702-18.2	3	2	1	3	2	1	1		2	2	1	2	2	2
BTIT702-18.3	2	2	1	2	2	1	1		2	1	2	1	2	1
BTIT702-18.4	3	2	1	3	3	1	1		2	2	1	2	2	2
BTIT702-18.5	3	2	2	3	3	1			2	1	1	2	2	2
AVERAGE	2.80	2.00	1.20	2.80	2.40	1.00			2.00	1.40	1.40	1.60	2.00	1.80



Program: B.Tech (Information Technology)	Semester: 7 th Semester
Course Name: Routing and Switching	Course Code: BTEC905A-18

Syllabus:

MODULE	DETAILS	HOURS
1	Network Fundamentals: Basics of network architecture, enterprise network constructs, Ethernet framing, IP addressing, Internet Control Message Protocol, Address Resolution Protocol, Transport Layer Protocols, Data Forwarding Scenario. Expanding the Enterprise Network, Navigating the CLI, File System Navigation and Management, VRP Operating System Image Management.	10 Hrs
2	Network Connections: Establishing a Single Switched Network, Spanning Tree Protocol, Rapid Spanning Tree Protocol, Segmenting the IP Network, IP Static Routes, Distance Vector Routing with RIP, Link State Routing with OSPF, DHCP, FTP and Telnet Protocols, Simple Network Management Protocol, Introducing IPv6 Networks, IPv6 Routing Technologies, IPv6 Application Services.	12 Hrs
3	Network Construction: Link Aggregation, VLAN Principles, GARP and GVRP, VLAN Routing, Wireless LAN Overview, Bridging Enterprise Networks with Serial WAN Technology, Frame Relay Principles, Establishing DSL/ADSL Networks with PPPoE, Network Address Translation, Establishing Enterprise Radio Access Network Solutions.	10 Hrs
4	Network Security: Access Control Lists, Authentication, Authorization and Accounting (AAA), Securing Data with IPsec and VPN, Generic Routing Encapsulation.	6 Hrs



TEXT/REFERENCE BOOKS:

S. No	BOOK TITLE/AUTHORS/PUBLICATION
1	Computer Networks by Andrew S. Tanenbaum, David J. Wetherall, Pearson
2	https://ilearningx.huawei.com/portal/#/courses/coursev1:HuaweiX+EBGTC00000030+2018.7/about

Course Code : BTEC905A-18 (Routing and Switching)

	Course Outcomes	BT Level
BTEC905A-18.1	Demonstrate a basic understanding of small and medium-sized networks, including general network technologies.	2
BTEC905A-18.2	Ability to assist the design of small and medium-sized networks, and implement the designs.	6
BTEC905A-18.3	Ability to construct simple networks and integrate voice, wireless, cloud and security.	6
BTEC905A-18.4	Understand storage technologies into their networks in order to support a variety of applications.	2
BTEC905A-18.5	Learn about network security parameters.	1



CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTEC905A-18.1	3	2	2	3	2	1	1		2	2	1	1	3	3
BTEC905A-18.2	3	2	2	3	3	1	2		2	1	2	2	2	3
BTEC905A-18.3	3	2	2	2	3	1	2		2	1	2	2	2	2
BTEC905A-18.4	2	2	2	3	2	1	2		2	2	2	2	2	2
BTEC905A-18.5	3	2	2	3	2	1	2		2	2	2	1	2	2
AVERAGE	2.80	2.00	2.00	2.80	2.40	1.00	1.80		2.00	1.60	1.80	1.60	2.20	2.40

DELIVERY/INSTRUCTIONAL METHODOLOGIES/ TEACHING PEDAGOGY:

- Chalk & Talk
- Small Group Instruction.
- Making real world connections
- Presentations



Program: B.Tech (Information Technology)	Semester: 7 th Semester
Course Name: Software Project Management Lab	Course Code: BTIT710-18

Syllabus: List of Experiments

Task-1: Introduction to MS Project.
Task-2: Create a Project Plan <ul style="list-style-type: none">• Specify project name and start (or finish) date.• Define duration for each project task.• Define dependency between tasks• Identify and define project tasks.• Define milestones in the plan
Task-3: Create Project Plan contd. <ul style="list-style-type: none">• Define project calendar.• Specify resource type and resource rates• Baseline the project plan• Define project resources.• Assign resources against each task
Task-4: Execute and Monitor the Project Plan <ul style="list-style-type: none">• Update % Complete with current task status.• Compare Planned vs Actual Status• Review resources assignation status• Review the status of each task.• Review the status of Critical Path
Task-5: Generate Dashboard and Reports <ul style="list-style-type: none">• Dashboard• Cost Reports• Resource Reports• Progress Reports



Course Code: BTIT710-18 (Software Project Management Lab)

	Course Outcomes	BT Level
BTIT710-18.1	Plan and manage projects.	3
BTIT710-18.2	Consolidate and communicate information about their project.	1
BTIT710-18.3	Create Gantt charts and PERT (Project Evaluation Review Technique) chart of their project	6
BTIT710-18.4	Explain methods to manage resources, assignments, work allocation and generate reports to assess project status, project cost status and resource utilization.	1
BTIT710-18.5	Identify factors affecting the critical path of their project.	5

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT710-18.1	3	2	2	3	3	1	1		2	2	2	1	2	3
BTIT710-18.2	3	2	1	3	3	1	1		2	1	1	2	2	2
BTIT710-18.3	3	2	1	2	2	1	1		2	1	1	2	2	2
BTIT710-18.4	3	3	1	3	3	1	2		2	1	1	1	2	3
BTIT710-18.5	3	3	1	3	3	1	2		2	1	2	1	2	2
AVERAGE	3.00	2.40	1.20	2.80	2.80	1.00	1.40		2.00	1.20	1.40	1.40	2.00	2.40



Program: B.Tech (Information Technology)	Semester: 7 th Semester
Course Name: Network Programming Lab	Course Code: BTIT717-18

Syllabus: List of Experiments

Task-1: Write an echo program with client and iterative server using TCP.
Task-2: Write an echo program with client and concurrent server using TCP.
Task-3: Write an echo program with client and concurrent server using UDP.
Task-4: Write a client and server program for chatting.
Task-5: Write a program to retrieve date and time using TCP.
Task-6: Write a program to retrieve date and time using UDP.
Task-7: Write a client and server routines showing Blocking I/O.
Task-8: Write a client and server routines showing I/O multiplexing.
Task-9: Write an echo client and server program using Unix domain stream socket.
Task-10: Write an echo client and server program using Unix domain Datagram socket
Task-11: Write a client and server program to implement file transfer.
Task-12: Write a client and server program to implement the remote command execution.
Task-13: Write a client program that gets a number from the user and sends the number to server for conversion into hexadecimal and gets the result from the server.



Course Code: BTIT717-18 (Network Programming Lab)

	Course Outcomes	BT Level
BTIT717-18 .1	Create an echo program with client, iterative server and concurrent server using TCP.	6
BTIT717-18 .2	Write a client and server program for chatting.	6
BTIT717-18 .3	Write a program to retrieve date and time using TCP and UDP.	6
BTIT717-18 .4	Write an echo client and server program using Unix domain stream socket.	6
BTIT717-18 .5	Write a client and server program to implement the remote command execution.	6

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTIT717-18 .1	3	2	3	3	3	1	1		2	1	2	1	2	3
BTIT717-18 .2	3	2	1	3	3	1	1		3	2	2	1	2	3
BTIT717-18 .3	3	2	2	2	3	1	1		2	1	1	1	2	2
BTIT717-18 .4	2	3	2	3	2	1	1		2	1	1	1	2	2
BTIT717-18 .5	3	2	2	3	2	1	1		2	1	1	1	2	2
AVERAGE	2.80	2.20	2.00	2.80	2.60	1.00	1.00		2.20	1.20	1.40	1.00	2.00	2.40



Records of Course Outcomes 8th Semester

IK Gujral Punjab Technical University Bachelor of Technology Scheme for B.Tech Syllabus 2018

Course Code	Subject	Credit
BTCT801-18	Semester Training	16



Program: B.Tech (Information Technology)	Semester: 8 th Semester
Course Name: Semester Training	Course Code: BTCS801-18

Course Code: BTCS801-18 (Semester Training)

	Course Outcomes	BT Level
BTCS 801-18.1	Learn project management skills.	1
BTCS 801-18.2	Identify areas for future learning and skill development.	4
BTCS 801-18.3	Understand career options in IT industry.	2
BTCS 801-18.4	Enhance soft skills required for the industry.	2
BTCS 801-18.5	Apply knowledge and skills learned in the classroom to solve real life problems.	3

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BTCS801-18.1	3	3	2	3	3	1	1		2	2	2	1	3	2
BTCS801-18.2	3	2	2	3	2	1	1		2	1	2	1	3	2
BTCS801-18.3	3	2	2	2	2	1	1		2	1	2	1	2	2
BTCS801-18.4	3	2	2	3	2	1	1		2	1	2	1	2	2
BTCS801-18.5	3	2	2	3	2	1	1		2	1	2	1	2	2
AVERAGE	3.00	2.20	2.00	2.80	2.20	1.00	1.00		2.00	1.20	2.00	1.00	2.40	2.00