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Landran, Mohali, Punjab

B.Tech Subjects List 2024-25			
BRANCH-B.Tech, ECE			
S.No.	**Course Code**	**PTU Code**	**Subject Name**
1	C101	BTPH101-23	Engineering Physics
2	C102*	BTPH102-23	Engineering Physics Lab
3	C103	BTAM101-23	Engineering Mathematics -I
4	C104	BTEE101-18	Basic Electrical Engineering
5	C105*	BTEE102-18	Basic Electrical Engineering Lab
6	C106	BTME101-21	Engineering Graphics & Design
7	C107	BTCH101-23	Chemistry-I
8	C108*	BTCH102-18	Chemistry-I (Lab)
9	C109	BTAM201-23	Engineering Mathematics -II
10	C110	BTPS101-18	Programming for Problem Solving
11	C111*	BTPS102-18	Programming for Problem Solving Lab
12	C112*	BTMP101-18	Workshop/Manufacturing Practices
13	C113	BTHU101-18	English
14	C114*	BTHU102-18	English Lab
15	C115**	BMPD101-18	Mentoring and Professional Development
16	C116**	BMPD201-18	Mentoring and Professional Development
17	C201	BTEC-301-18	Electronic Devices
18	C202	BTEC-302-18	Digital System Design
19	C203	BTEC-303.18	Electromagnetic Waves

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20	C204	BTEC-304-18	Network Theory
21	C205	BTAMXXX23	Mathematics III
22	C206*	BTEC-311-18	Electronic Devices Laboratory
23	C207*	BTEC-312-18	Digital System Design Laboratory
24	C208*	C310	4-Week Institutional Training
25	C209	HSMC10218	Foundational Course in Humanities
26	C210****	BMPD-331-18.6	Mentoring and Professional Development(S/UN)
27	C210****	BMPD-331-18.6	Mentoring and Professional Development(S/UN)
28	C211	BTEC-401-18	Analog Circuits
29	C212	BTEC-402-18	Microprocessors and Microcontrollers
30	C213	BTCS-301-18	Data Structures & Algorithms
31	C214	BTEC-403-18	Signals and Systems
32	C215	HSMC122-18	Universal Human Values – 2: Understanding Harmony
33	C216**	EVS-101-18	Mandatory Course-Environmental Sciences
34	C217*	BTEC-411-18	Analog Circuits Laboratory
35	C218*	BTEC-412-18	Microprocessors and Microcontrollers Laboratory
36	C301	BTEC-501-18	Analog and Digital Communication
37	C302	BTEC-502-18	Digital Signal Processing
38	C303	BTEC-503-18	Linear Integrated Circuits
39	C304	BTEC-504-18	Control Systems
40	C305	BTEC-905D-18	PE-1/JAVA
41	C306	BTEC-505-18	Project Management
42	C307*	BTEC-511-18	Analog and Digital Communication Laboratory
43	C308*	BTEC-512-18	Digital Signal Processing Laboratory
44	C309*	BTEC-513-18	Linear Integrated Circuits Laboratory
45	C310*	Btec-521-18	4-Weeks Industrial Training
46	C311****	BTEC-10X-18	PE-1 LAB(S/UN)
47	C312****	MPD	Mentoring and Professional Development(S/UN)

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48	C312****	BMPD-361-18	Mentoring and Professional Development(S/UN)
49	C313	BTEC-906D-18	PE-2-CSHARP
50	C314	BTCS-402.1-18	OE-1-OS-CS
51	C315****	BTEC-906D-18	PE-2 LAB()
52	C316	BTEC-601-18	Wireless Communication
53	C317	BTCS-504-18	Computer Networks
54	C318	BTEC-602-18	Optical Fibers & Communication
55	C319	BTEC-603-18	Microwave and Antenna Engineering
56	C320*	BTEC-611-18	Optical Fibers & Communication Lab
57	C321*	BTEC-612-18	Microwave and Antenna Engineering Laboratory
58	C322*	BTEC-631-18	PROJECT-1
59	C411	BTEC-908A-18	PE-4 Artificial Intelligence
60	C412	BTES-401-18	Computer Organisation and architecture
61	C413	BTEC-908D- 18	PE-5 Soft Computing
62	C414	BTCS-501-18	Database management system
63	C415****	BTMC-101-18	Constitution of India (Mandatory Course)
64	C416****	BTMC-102-18	Essence of Indian Traditional Knowledge
65	C417****	BTEC-12X-18	PYTHON LAB(S/UN)
66	C418*	BTEC-731--18	Project-II & Report
67	C419	BTEC-907D-18	PE-3 Python Programming
68	C420****	BMPD-371-18	Mentoring and Professional Development
69	C410*	BTEC- 801-18	Semester Software/Industrial Training & Project

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Course Outcomes for B.tech 1st Year (Common for all branches)

After the completion of this course, students will be able to:

Engineering Physics BTPH101-23:C101

Course Code	Course Outcomes
C101.1	relate the origin of bands inside the solids with the help of crystallography.
C101.2	discuss the working, properties and characterization techniques of semiconductor materials and devices.
C101.3	explain the properties of Magnetic materials and Nanomaterials along with its synthesis.
C101.4	develop the knowledge about the Maxwell equation and Electromagnetic spectrum.
C101.5	appraise the need for quantum mechanics, wave particle duality, uncertainty principle etc. and their applications.
C101.6	examine the laser system, optical fibre in industries, laboratories and in communication

Engineering Physics (Lab) BTPH102-23: C102*

Course Code	Course Outcomes
C102.1	demonstrate some of the theoretical concepts learnt in the theory courses.
C102.2	analyzing and applying precise measurements and handling sensitive equipment.
C102.3	propose the methods used for estimating and dealing with experimental uncertainties and systematic "errors."
C102.4	interpret conclusions from data and develop skills in experimental design
C102.5	create technical reports which communicate scientific information in a clear and concise manner.

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Mathematics -I BTAM101-23: C103

Course Code	Course Outcomes
C103.1	examine the convergence and divergence of sequences and series.
C103.2	apply the concept of Proper integral to find length , surface area and volume of revolution of the curves and to deal with discontinuous functions using Improper integral.
C103.3	use the concepts of partial differentiation to expand , estimate and find the extreme values of Multivariable Functions .
C103.4	evaluate area and volume of the surfaces using the concept of double and triple integration

Basic Electrical Engineering BTEE101-18: C104

Course Code	Course Outcomes
C104.1	categorize circuit elements, sources and mathematical analysis of DC circuits
C104.2	analyze the behavior of AC circuits.
C104.3	interpret the basic magnetic circuits and apply it to the working of electrical machines.
C104.4	classify the components of low voltage electrical installations.

Basic Electrical Engineering (Lab) BTEE102-18: C105*

Course Code	Course Outcomes
C105.1	make use of common electrical measuring instruments and interpret the fundamentals of electrical engineering.
C105.2	construct electrical connections and measure power, power factor using appropriate equipment.
C105.3	utilize the knowledge of basic magnetism to understand working of transformers.
C105.4	demonstrate operation of electrical machines, components and their ratings.

Engineering Graphics & Design BTME 101-21: C106

Course Code	Course Outcomes
C106.1	illustrate and prepare drawings.
C106.2	apply the principles of orthographic projections
C106.3	analyze and visualize of two and three dimensional planes and solids respectively.
C106.4	design and fabricate surfaces of different shapes.
C106.5	construct the objects in three dimensional appearances.

Chemistry-I BTCH101-23: C107

Course Code	Course Outcomes
C107.1	interpret concepts related to atomic and molecular structure at orbital level as well as categorize various intermolecular forces.
C107.2	infer about thermodynamic functions, chemical equilibria, water chemistry and corrosion.
C107.3	interpretation of data by using different spectroscopic techniques and its daily life applications.
C107.4	explain and distinguish different periodic properties of elements such as ionization energy, electron affinity, electronegativity, oxidation state and polarizability.
C107.5	classify major organic chemical reactions used for the synthesis of molecules as well as drugs.
C107.6	Illustrate three dimensional arrangements and isomers possible for a molecule and their properties.

Chemistry-I (Lab) BTCH102-18: C108*

Course Code	Course Outcomes
C108.1	rephrase interactions among molecules on the basis of surface tension, viscosity and Partition Coefficient.
C108.2	develop Polymer and drug molecule as well as analyze salt samples.
C108.3	estimate rate constants of chemical reactions as a function of time.

C108.4	discover acidity and chloride content present in water/oil sample.
C108.5	evaluate adsorption isotherm and extent of adsorption using TLC

Mathematics -II BTAM201-23: C109

Course Code	Course Outcomes
C109.1	determine the existence and uniqueness of the solution of system of linear equations using matrix algebra
C109.2	relate the concepts of Basis and Dimension of a vector space in linear transformation..
C109.3	utilize the acquired knowledge of eigen values and eigen vectors to diagonalize the matrix.
C109.4	solve ODE using different methods
C109.5	apply the concepts of ODE in RLC circuit, Deflection of beams, Simple harmonic motion, Simple population decay model, Orthogonal trajectories of a given family of curves.
C109.6	solve Partial Differential Equations using Lagrange's and Charpit's method

Programming for Problem Solving BTPS101-18: C110

Course Code	Course Outcomes
C110.1	demonstrate the knowledge and working of a computer with its parts.
C110.2	formulate simple algorithms and translate the algorithms to programs (in C language).
C110.3	evaluate conditional branching, iteration statements and recursion process.
C110.4	develop coding using arrays and implement various operations using 1D and 2D array (Matrix arithmetic operations).
C110.5	interpret the identified problems using functions and implementing searching and sorting algorithms on the given list as well as construct recursive functions.
C110.6	apply programming to design pointers, structures and file handling.

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Programming for Problem Solving (Lab) BTPS102-18: C111*	
Course Code	**Course Outcomes**
C111.1	evaluate given algorithms for the development of correct program.
C111.2	identify syntax errors and logical errors at compile and run time for correction.
C111.3	develop iterative as well as recursive programs.
C111.4	formulate data in arrays, strings and structures and manipulate them through a program.
C111.5	create pointers of different types and implement them in defining self-referential structures.
C111.6	design coding to create, read and write to and from simple text files.

Workshop/Manufacturing Practices BTMP101-18: C112*	
Course Code	**Course Outcomes**
C112.1	interpret the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials
C112.2	apply knowledge to construct different jobs with their own hands.
C112.3	interpret the dimensional accuracies and tolerances possible with different manufacturing processes.
C112.4	develop small devices of their interest.

English BTHU101-18: C113	
Course Code	**Course Outcomes**
C113.1	improve their vocabulary to use different words and phrases in formulating meaningful sentences.
C113.2	identify and ascertain knowledge about the basic grammatical aspects and sentence structures for developing effective communication.
C113.3	interpret the given text and employ effective writing techniques for organizing and producing clear and coherent forms of expression.
C113.4	identify and interpret the literal and contextual meaning of the given text to Compose their responses accordingly.

C113.5	apply their point of view effectively for developing and generating their ideas in creative written form.
C113.6	compose varied forms of business correspondence and professional documents for the purpose of informing, recognizing, analyzing and official reporting.

English (Lab) BTHU102-18: C114*

Course Code	Course Outcomes
C114.1	build their listening and speaking skills by acquiring new forms of expressions for lucid communications.
C114.2	formulate structured conversation and put forth their point of view fluently on a variety of topics.
C114.3	overcome their inhibition and feel confident while demonstrating their language skills to make the transitions clear.
C114.4	interpret, analyze and use correct language in general, academic and professional environment.
C114.5	understand and function as per the expectations of the industry to prepare themselves for future interviews.
C114.6	design presentation on a given topic, learn to modulate their voice along with exhibiting the right body language.

Mentoring & Professional Development MPD101-18: C115**

Course Code	Course Outcomes
C115.1	improve themselves by setting and working towards individual goals.
C115.2	demonstrate the importance of moral & ethical values that exemplify professionalism.
C115.3	develop physical fitness, wellness & sports to promote a healthy lifestyle.
C115.4	construct various analytical & training methods for their development.
C115.5	utilize physical activity as a tool to manage stress, pressure & work in life.

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Mentoring & Professional Development MPD201-18: C116**

Course Code	Course Outcomes
C116.1	improve themselves by setting and working towards individual goals.
C116.2	demonstrate the importance of moral & ethical values that exemplify professionalism.
C116.3	develop physical fitness, wellness & sports to promote a healthy lifestyle.
C116.4	construct various analytical & training methods for their development.
C116.5	utilize physical activity as a tool to manage stress, pressure & work in life.

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3rd Semester	Course Outcomes
Mathematics III(BTAMXXX 23):C205	
C205.1	Apply Laplace transform for solving certain differential equations arising in mathematical modelling of various real world phenomenon.
C205.2	Create Fourier series expansions of periodic functions, study of their properties and applications. Also to apply Fourier transforms to deal with non-periodic functions.
C205.3	Illustrate Z transform for solving differential equations.
C205.4	Realize randomness phenomenon occurring in the real world.
C205.5	Utilize theory of probability, discrete and continuous distribution.
C205.6	Apply the method of least squares in fitting of curves.
Electronic Devices(BTEC- 301 -18) :C201	
C201.1	Explain physics of semiconductors and behavior of charge carriers within semiconductors
C201.2	Demonstrate the working of semiconductor diodes supported with mathematical explanation.
C201.3	Compare the working of BJT and MOSFET with their equivalent small signal models.
C201.4	Summarise the chemical processes used in fabrication of integrated circuits.
Digital System Design(BTEC- 302 -18):C202	
C202.1	Apply concepts of Boolean algebra for handling logical expressions.
C202.2	Illustrate working and realization of combinational logical expressions.
C202.3	Realize working of flip-flops and use them in designing sequential circuits.
C202.4	Demonstrate fundamental concepts of logic families and architecture of programmable devices.
C202.5	Use HDL programming tool for simulation of combinational and sequential circuits
Electromagnetic Waves(BTEC- 303 -18):C203	
C203.1	Demonstrate characteristics & wave propagation through transmission lines.
C203.2	Interpret Maxwell's equations for electromagnetic waves.

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C203.3	Characterize uniform plane wave and understanding the concept of wave Propagation in different types of mediums.
C203.4	Calculate reflection and transmission of waves at media interface.
C203.5	Evaluate propagation of wave in rectangular as well as parallel plane waveguide.
Network Theory(BTEC- 304 -18):C204	
C204.1	Analyze linear networks using network theorems.
C204.2	Use Laplace transform to analyze transient & steady state response of linear networks.
C204.3	Comprehend network parameters to analyze two port networks.
C204.4	Design one port networks using Foster's and Cauer's methods.
C204.5	Apply computer mathematical and simulation programs to solve various real life multi- disciplinary topics through circuit solution.
Electronic Devices Laboratory (BTEC-311-18):C206*	
C206*.1	Realize use of diodes in circuits with proper understanding to their working.
C206*.2	Demonstrate characteristics & working of BJT in different configurations.
C206*.3	Demonstrate characteristics & working of MOSFET in circuits.
C206*.4	Design working circuits based on diodes, BJTs and MOSFETs.
Digital System Design Laboratory:BTEC-312-18:C207*	
C207*.1	Design combinational circuits using logic gates.
C207*.2	Design sequential circuits using logic gates.
C207*.3	Construct VHDL programs for combinational & sequential circuits.
C207*.4	Create working projects using digital 74XX ICs.
Foundational Course in humanities :HSMC102-18:C209	
C209.1	Recognize the relationship of philosophy with literature, culture, society and lived experience
C209.2	Apply already available philosophical systems. to train students in humanities.
C209.3	Prepare students to bridge the gap between theory and practice.
C209.4	Examine strong natural familiarity with humanities among students.
C209.5	Executing the knowledge of humanities in a systematic manner.

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4-Week Institutional Training:C208*	
C208*.1	Summarize basics of electronic fundamentals to enhance their skills for project design.
C208*.2	Identify different work areas of electronic Industry through e- journals, magazines etc.
C208*.3	Inculcate team work spirit and decision making through practical lab sessions during the training.
C208*.4	Inculcate awareness about diverse culture, Identities and society.
C208*.5	Design an application based minor project.
C208*.6	Enhance the presentation skills and report writing skills through project demonstration and viva- voce.
Mentoring and Professional Development(BMPD-371-18) :C210**	
C210****.1	Assess themselves by setting and working towards individual goals.
C210****.2	Inculcate the importance of moral & ethical values that examplify professionalism.
C210****.3	Inspect physical fitness, wellness & sports to promote healthy lifestyle.
C210****.4	Apply various analytical & training methods for their development.
C210****.5	Inspect physical activity as a tool to manage stress, pressure & work in life.

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4th Semester	Course Outcomes
Analog Circuits(BTEC- 401 -18):C211	
C211.1	Explain the biasing of transistors and analyze BJT/FET amplifiers.
C211.2	Investigate various feedback amplifiers and their characteristics.
C211.3	Analyze various rectifier and amplifier circuits.
C211.4	Analyze sinusoidal and non-sinusoidal oscillators.
C211.5	Illustrate various types of Power Amplifiers.
Microprocessors and Microcontrollers(BTEC- 402 -18):C212	
C212.1	Describe architecture & functionalities of different building block of 8085 microprocessors.
C212.2	Illustrate the working of different building blocks of 8051 microcontroller.
C212.3	Comprehend and apply programming aspects of 8051 microcontroller.
C212.4	Design and Interface 8051 with different peripherals and devices.
Data Structures & Algorithms(BTCS-301 -18):C213	
C213.1	Classify operations like searching, insertion, deletion, traversing on linear Data Structures and to determine their computational complexities
C213.2	Classify operations like searching, insertion, deletion, traversing on various nonlinear Data Structures and to determine their computational complexities
C213.3	Illustrate algorithms for Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
C213.4	Apply appropriate Data Structure as per specific problem definition

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Signals and Systems (BTEC- 403 -18):C214	
C214.1	Demonstrate different types of signals and systems.
C214.2	Analyze the behavior of linear-shift invariant systems.
C214.3	Apply concepts of Fourier and Laplace Transforms to analyze continuous-time signals and systems.
C214.4	Investigate discrete-time signals and systems using Discrete-Time Fourier and Z-Transforms.
C214.5	Analyze Probability concepts
Universal Human Values – 2: Understanding Harmony(HSMC122-18):C215	
C215.1	Identifying the essentials of human values and skills to ensure student's sustained happiness
C215.2	Recognize between Self and Body to expedite happiness and harmony inside I.
C215.3	Inculcate practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.
C215.4	Develop appropriate technologies and management patterns to create harmony in personal life.
C215.5	Develop holistic understanding via management models to create harmony in professional life.
Environmental Sciences(EVS-101-18):C216**	
C216**.1	List environmental problems at local and national level through literature and general awareness.
C216**.2	Apply practical knowledge by visiting wildlife areas, environmental institutes and various personalities who have done practical work on various environmental Issues.
C216**.3	Analyze the key environmental issues and to explore the possibilities to mitigate these problems
C216**.4	Explain the dynamic processes and features of earth's interior and surface
C216**.5	Identify roles and identities as citizens, consumers and environmental actors in a complex, interconnected world
AC Lab(BTEC-411-18):C217*	
C217*.1	Verify the characteristics of diodes/BJTs in circuits.
C217*.2	Analyze the working of various types of Oscillators and verify their Frequency response.
C217*.3	Investigate the working of Power amplifiers with their characteristics.

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C217*.4	Analyze performance of analog circuits based on based on diodes, BJTs and MOSFETs .
C217*.5	Think and design of working circuits.
MPMC Lab(BTEC-412-18):C218*	
C218*.1	Examine programs for common arithmetic operations with 8-bit/16-bit numbers using 8085.
C218*.2	Illustrate programs for transfer, sort block of data with 8085 processor.
C218*.3	Design programs for controlling stepper and DC motors using Microprocessor(s).
C218*.4	Construct programs to generate waveforms and interface ADC and DAC using of 8051 Microcontroller.
C218*.5	Create a Program to interface Peripherals like LED, LCD circuits with 8051 microcontroller.
Mentoring and Professional Development(BMPD-371-18) :C210**	
C210****.1	Assess themselves by setting and working towards individual goals.
C210****.2	Inculcate the importance of moral & ethical values that examplify professionalism.
C210****.3	Inspect physical fitness, wellness & sports to promote healthy lifestyle.
C210****.4	Apply various analytical & training methods for their development.
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5th Semester	Course Outcomes
Analog and Digital Communication(BTEC-501-18):C301	
C301.1	Analyze and compare different analog modulation schemes for their efficiency and bandwidth
C301.2	Analyze and compare different digital schemes for transmitting analog data
C301.3	Illustrate the behavior of a communication system in presence of noise
C301.4	Investigate pulsed modulation system and analyze their system performance
C301.5	Compare different digital modulation schemes and can compute the bit error performance
Digital Signal Processing (BTEC-502-18):C302	
C302.1	Analyze the different types of signals and systems.
C302.2	Summarising the fundamental concepts of convolution and sampling.
C302.3	Interpret the concepts of Z transform, DFT and FFT techniques.
C302.4	Classify designing methods and realization concepts of FIR filters.
C302.5	Classify designing methods and realization concepts of IIR filters.
C302.6	Demonstrate various DSP processors along with their architectures.
Linear Integrated Circuits(BTEC-503-18):C303	
C303.1	Compare Differential and Cascade Amplifiers.
C303.2	Explain the basics, working and characteristics of Op-Amps.
C303.3	Investigate various applications of Op-amps.
C303.4	Classify some specialized Op-Amps.
C303.5	Interpretation of Data Sheets and their Applications thereof.
Control Systems (BTEC-504-18):C304	
C304.1	Explain the fundamental concepts of control system and obtain models of dynamic systems in transfer function form.
C304.2	Classify the common control schemes.
C304.3	Analyze the system response and stability in both time-domain and frequency domain.

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C304.4	Understand the features of different types of compensators and to design compensators.
C304.5	Analyze the system response and stability of systems represented in state space form.
C304.6	Acquire the knowledge of optimal and non-linear control.
Programming in JAVA(BTEC-905D-18):C305	
C305.1	Apply the concepts and basics of JAVA
C305.2	Demonstrate the knowledge of operators and control statements
C305.3	Examine concepts of Inheritance, Interface, Applets.
C305.4	Describe about JAVA database connectivity
Project management (BTEC-505-18):C306	
C306.1	Identify the basic concepts of Project Management.
C306.2	Interpret selection and organization of project
C306.3	Demonstrate Project planning and scheduling.
C306.4	Interpret about Project Monitoring, control and its performance.
C306.5	Analyze various project management techniques For time bound completion of project
Analog and Digital Communication Laboratory(BTEC-511-18):C307*	
C307*.1	Inspect the characteristics and output waveforms of AM, FM, PCM
C307*.2	Compare noise in AM and FM systems
C307*.3	Investigate the output responses of PAM, PCM, PSK, FSK, MSK.
Digital Signal Processing Laboratory(BTEC-512-18):C308*	
C308*.1	Develop standard sequences and perform mathematical operations on them.
C308*.2	Examine the frequency and impulse response of discrete time LTI system.
C308*.3	Interpret discrete time signal using DFT and FFT.
C308*.4	Design of IIR and FIR Digital filters.
C308*.5	Demonstrate DSP Processor based applications.

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Linear Integrated Laboratory(BTEC-513-18):C309*	
C309*.1	Investigate the configurations of Differential amplifiers.
C309*.2	Calculate the performance parameters of am OP-Amp.
C309*.3	Inspect Op-Amps for various applications.
C309*.4	Demonstrate programs to design various filters.
4-Week Industrial Training(BTEC-521-18):C310*	
C310*.1	Summarize basics of electronic fundamentals to enhance their skills for project design.
C310*.2	Identify different work areas of electronic Industry through e- journals, magazines etc.
C310*.3	Inculcate team work spirit and decision making through practical lab sessions during the training.
C310*.4	Inculcate awareness about diverse culture, Identites and society.
C310*.5	Design an application based minor project.
C310*.6	Enhance the presentation skills and report writing skills through project demonstration and viva- voce.
Programming in JAVA lab(BTEC-10X-18):C311**	
C311.1	Demonstrate the basics of object oriented JAVA.
C311.2	Apply the concept of classes,JAVA,JDK components and develop simple JAVA programs.
C311.3	Demonstrate the knowledge of operators and control statements.
C311.4	Develop simple java programs using inheritance and exceptional handling.
Mentoring and Professional Development(BMPD-351-18) :C312***	
C312***.1	Assess themselves by setting and working towards individual goals.
C312****.2	Inculcate the importance of moral & ethical values that examplify professionalism.
C312****.3	Inspect physical fitness, wellness & sports to promote healthy lifestyle.
C312****.4	Apply various analytical & training methods for their development.
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6th Semester	Course Outcomes
PE-I C Sharp(BTEC-906D-18):C313	
C313.1	Demonstrate various applications using C# Language in the .NET Framework.
C313.2	Develop distributed applications using .NET Framework.
C313.3	Create mobile applications using .NET compact Framework.
C313.4	Discuss other concepts of .NET approach towards problem solving
Operating System(BTCS-402-1-18) :C314	
C314.1	Explain basic operating system concepts such as overall architecture, system calls, user mode and kernel mode;
C314.2	Distinguish concepts related to processes, threads, process scheduling, race conditions and critical sections;
C314.3	Analyze and apply CPU scheduling algorithms, deadlock detection and prevention algorithms.
C314.4	Examine and categorize various memory management techniques like caching, paging, segmentation, virtual memory, and thrashing.
C314.5	Design and implement file management system.
C314.6	Evaluate high-level operating systems concepts such as file systems, disk-scheduling algorithms and various file systems.
PE-I C Sharp LaB(BTEC-906D-18):C315****	
C315.1	Examine C# syntax and semantics and be fluent in the use of C# flow control and functions.
C315.2	Demonstrate proficiency in handling Strings and File Systems.
C315.3	Create, run and manipulate C# Programs using core data structures like class , objects and use Regular Expressions.
C315.4	Interpret the concepts of Object-Oriented Programming as used in C#.
Wireless communication System(BTEC-601-18):C316	
C316.1	Identify the basic elements of Cellular Radio Systems and its design
C316.2	Relate the concepts of Digital communication through fading multipath channels
C316.3	Interpret various Multiple Access techniques for Wireless communication.

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C316.4	Summarize the benefits and utility of evolved Wireless standards and systems.
Computer Network (BTCS-504-18):C317	
C317.1	Explain the functions of the different layer of the OSI Protocol.
C317.2	Describe the function of each block o f wide - area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs).
C317.3	Develop the network programming for a given problem related TCP/IP protocol.
C317.4	Relate about DNSD DNS, TELNET, EMAIL, File Transfer Protocol, WWW,HTTP,SNMP, Bluetooth using open source available tools and software.
Optical Fibre Communication (BTEC-602-18):C318	
C318.1	Analyze the basics of Optical Communication and Optical fibres.
C318.2	Illustrate about the Optical Transmitters and Receivers.
C318.3	Explain the Light wave Architecture and systems.
C318.4	Inspect about the manufacturing, modulation and wave mixing in Optical Communication
Microwave and Antenna Engineering(BTEC-603-18):C319	
C319.1	Explain the working and operation of various Microwave Tubes and Microwave Solid-state devices.
C319.2	Inspect about various important Microwave Components and the Microwave measurements that can be carried out.
C319.3	Explain the basic concepts and types of Antennas and its regions.
C319.4	Describe the important concepts of Antenna Arrays and Antenna Aperture.
Optical Fibres and Communication Lab (BTEC-611-18):C320*	
C320*.1	Experiment based on optical communication in order to understand in depth concepts of the latest communication system.
C320*.2	Identify various types of optical sources and light detectors
C320*.3	Recognize methods of slicing and connecting techniques of optical fibres
C320*.4	Illustrate different types of losses in optical fibres.
C320*.5	Examine different types of multiplexing technique
C320*.6	Propose different applications of optical fibres.
Microwave and Antenna lab(BTEC-612-18):C321*	

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C321*.1	Recall about general Microwave components and Microwave bench.
C321*.2	Demonstrate common parameters related to Microwave Oscillator(s).
C321*.3	Calculate frequency and wavelength of waveguides.
C321*.4	Inspect and plot radiation patterns of various types of Antennas.
C321*.5	Formulate the coupling factor and Isolation of couplers.
Project-I (BTEC-631-18):C322*	
C322*.1	Identify the needs of the society and undertake projects for the benefit of society.
C322*.2	Form a team and apply engineering and basic scienctific concepts to design Quality Projects.
C322*.3	Design Projects taking into consideration recent technological advances.
C322*.4	Analyze and develop core skills that give students the ability to successfully complete Hardware and Software related problems during project development.
C322*.5	Propose a cost effective project as per market demand.
C322*.6	Prepare an effective report that includes a detialed theory of project development from problem formulation to implementation part.
Mentoring and Professional Development(BMPD-361-18):C312****	
C312***.1	Assess themselves by setting and working towards individual goals.
C312****.2	Inculcate the importance of moral & ethical values that examplify professionalism.
C312****.3	Inspect physical fitness, wellness & sports to promote healthy lifestyle.
C312****.4	Apply various analytical & training methods for their development.
C312****.5	Inspect physical activity as a tool to manage stress, pressure & work in life.
7th Semester Course Outcomes	
Artificial Intellegence (BTEC-908A-18):C411	
C411.1	Explain the difference between optimal reasoning Vs human like reasoning
C411.2	Classify the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities
C411.3	Examine different knowledge representation techniques
C411.4	Illustrate the concept of Expert System and Fuzzy logic

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C411.5	Interpret the applications of AI namely, Game Playing, Theorem Proving, Machine Learning and Natural Language Processing
COA(BTES-401-18):C412	
C412.1	Demonstrate functional block diagram of microprocessor.
C412.2	Apply instruction set for Writing assembly language programs.
C412.3	Design a memory module and analyze its operation by interfacing with the CPU.
C412.4	Classify hardwired and microprogrammed control units.
C412.5	Interpret the concept of pipelining and its performance metrics.
Soft Computing (BTEC-908D-18):C413	
C413.1	Interpret the concepts of Soft Computing and Algorithms involved there-in.
C413.2	Demonstrate Genetic Algorithms with its operators and applications.
C413.3	Design about the Neural Network models and its applications.
C413.4	Describe the Fuzzy systems and Neuro Fuzzy Modeling.
C413.5	Apply Swarm Intelligence techniques for optimization .
DBMS (BTCS-501-18):C414	
C414.1	Interpret relational algebra expression for the query and optimize the developed expression.
C414.2	Design the database using ER method and normalisation.
C414.3	Construct the SQL queries for open source and commercial DBMS-MYSQL, ORACLE and DB2.
C414.4	Describe the transaction atomicity, consistency, isolation and durability.
C414.5	Implement the isolation property, including locking, time stamping based on concurrency control and serializability of scheduling.
Indian Constitution (BTMC-101-18):C415**	
C415.1	Explain the importance of Indian constitution.
C415.2	Demonstrate philosophy of fundamental rights and duties.

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C415.3	Compare the structure of executive, legislature and judiciary of Union government, controller and auditor general of India and election commission of India.
C415.4	Compare the structure of executive, legislature, judiciary and autonomous nature of constitutional bodies of State like high court, Local Self Government etc.
C415.5	Classify the various challenges and amendments of the Constitutional Powers.
Essence of Indian Traditional Knowledge (BTMC-102-18):C416**	
C416.1	Explain the basics of Indian traditional Knowledge in Modern scientific perspective.
C416.2	Relate the basics of Yoga in Modern scientific perspective.
C416.3	Explain the basics of holistic health care in modern scientific perspective.
C416.4	Demonstrate the basics of Indian traditional Knowledge in Modern scientific perspective Focuses on Indian philosophical traditions. Focuses on Indian philosophical traditions.
C416.5	Summarize Indian linguistic Tradition, and Indian artistic tradition.
Python Lab (BTEC-12X-18):C417******	
C417****.1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
C417****.2	Demonstrate proficiency in handling Strings and File Systems
C417****.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
C417****.4	Interpret the concepts of Object-Oriented Programming as used in Python.
C417****.5	Implement exemplary applications related to Network Programming, Web Services and Databases in Python.
Project-II (BTEC-731-18):C418*	
C418*.1	Identify the needs of the society and undertake projects for the benefit of society.
C418*.2	Form a team and apply engineering and basic scienctific concepts to design Quality Projects.
C418*.3	Design Projects taking into consideration recent technological advances.
C418*.4	Analyze and develop core skills that give students the ability to successfully complete Hardware and Software related problems during project development.
C418*.5	Propose a cost effective project as per market demand.
C418*.6	Prepare an effective report that includes a detialed theory of project development from problem formulation to implementation part.

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Python Programming (BTEC-907D-18):C419	
C419.1	Practice simple Python programs.
C419.2	Develop Python programs with conditionals and loops.
C419.3	Define Python functions and to use Python data structures–lists, tuples, dictionaries.
C419.4	Inspect input/output operations with files in Python.
C419.5	Examine searching, sorting and merging in Python.
Mentoring and Professional Development (BMPD-371-18) :C420****	
C420****.1	Assess themselves by setting and working towards individual goals.
C420****.2	Inculcate the importance of moral & ethical values that examplify professionalism.
C420****.3	Inspect physical fitness, wellness & sports to promote healthy lifestyle.
C420****.4	Apply various analytical & training methods for their development.
C420****.5	Inspect physical activity as a tool to manage stress, pressure & work in life.

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8th Semester	Course Outcomes
Software/Industry Oriented Training:C410*	
C410*.1	Summarize different professional engineering practices.
C410*.2	Inculcate various professional tools and languages employed in industry
C410*.3	Identify industrial etiquette like punctuality and target oriented working where deadlines have to be met, even by working for stretched hours.
C410*.4	Develop themselves therefore require less training later, when students are hired and are assumed to be able to handle more responsibilities.
C410*.5	Practice specialized skills of the field; also learn soft skills like communication and interpersonal skills along with computer proficiency and team work, resulting in overall personality development of the student.
C410*.6	Analyze their concepts that students learned in the classroom to fill the gap between industry and academics.

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Subject List M.Tech

Sr. No.	Code	PTU code	Subject Name
1	C101	MTEC-101-18	Advanced Communication Networks
2	C102	MTEC-102-18	Wireless and Mobile Communication
3	C103	MTEC-PE1B-18	Optical Networks
4	C104	MTEC-PE2C-18	Information Theory and Coding
5	C105	MTEC-111-18	Advanced Communication Networks Lab
6	C106	MTEC-112-18	Wireless and Mobile Communication Lab
7	C107	MTRM-101-18	Research Methodology and IPR
8	C108	MTAXX-18	Audit Course
9	C201	MTEC-103-18	Antennas and Radiating Systems
10	C202	MTEC-104-18	Advanced Digital Signal Processing
11	C203	MTEC-PE3X-18	Satellite Communication
12	C204	MTEC-PE4Y-18	Nano-Electronics
13	C205	MTEC-113-18	Antennas and Radiating Systems lab
14	C206	MTEC-114-18	Advanced Digital Signal Processing lab
15	C207	MTEC-MP1-18	Mini Project
16	C208	MTEC-MP1-18	Mini Project
17	C209	MTA104-18	AC-II
18	C301	MTEC-PE5X-18	Subject Name Remote Sensing
19	C302	MTOE-O301X-18	Waste to Energy
20	C302	MTOE O301X-18	Name Waste to Energy -
21	C303	(MTEC-DS1-18 & MTEC-DS2-18	Subject Name Dissertation Phase –I & Dissertation Phase - II

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1st Semester	Course Outcomes
Advanced Communication Networks(MTEC-101-18):C101	
C101.1	Classify advanced concepts in Communication Networking.
C101.2	Design and develop protocols for Communication Networks.
C101.3	Illustrate the mechanisms in Quality of Service in networking.
C101.4	Demonstrate the Network Design.
C101.5	Summarize MPLS network and engineering issues.
Wireless and Mobile Communication(MTEC-102-18):C102	
C102.1	Design appropriate mobile communication systems. Apply frequency-reuse concept in mobile communications, and to analyze its effects on interference, system capacity, handoff techniques
C102.2	Distinguish various multiple-access techniques for mobile communications e.g. FDMA, TDMA, CDMA, and their advantages and disadvantages
C102.3	Analyze path loss and interference for wireless telephony and their influences on a mobile communication system's performance.
C102.4	Analyze and design CDMA system functioning with knowledge of forward and reverse channel details, advantages and disadvantages of using the technology
C102.5	Explore upcoming technologies like 3G, 4G etc.
Optical Networks(MTEC-PE1B-18):C103	
C103.1	Summarize the basic concepts of optical networks
C103.2	Describe about the SONET/SDH and architecture of optical networks
C103.3	Contribute in the areas of optical network and WDM network design.
C103.4	Recognize the network survivability by various protection schemes
C103.5	Implement simple optical network and understand further technology developments for future enhanced network

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Information Theory and Coding (MTEC)PE2C-18(3)):C104	
C104.1	Characterize and apply probabilistic techniques in modern digital communication systems, such as information systems, receivers, filtering and statistical operations
C104.2	Demonstrate mathematical modelling and problem solving using such models.
C104.3	Comparatively evolve key results developed for applications to signal processing and communications systems
C104.4	List various digital modulation techniques
C104.5	Develop framework based in different error coding techniques.
Advanced Communication Networks Lab(MTEC-111-18):	
C105.1	Identify the different types of network devices and their functions within a network.
C105.2	Explain and build the skills of sub-netting and routing mechanisms.
C105.3	Examine basic protocols of computer networks, and how they can be used to assist in network design and implementation
Wireless and Mobile Communication Lab(MTEC-112-18):C106	
C106.1	Analyze Cellular concepts, GSM and CDMA networks
C106.2	Illustrate GSM handset by experimentation and fault insertion techniques
C106.3	Outline 3G communication system by means of various AT commands usage in GSM
C106.4	Examine CDMA concept using DSSS kit
C106.5	Determine and develop concepts of Software Radio in real time environment
Research Methodology and IPR(MTRM-101-18):C107	
C107.1	Examine research problem formulation.
C107.2	Analyze research related information
C107.3	Follow research ethics
C107.4	Simplify that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
C107.5	Explore that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.

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C107.6	Show that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
Audit Course I(MTAXX-18):C108	
C108.1	Model how to improve your writing skills and level of readability
C108.2	Illustrate about what to write in each section
C108.3	list the skills needed when writing a Title
C108.4	Learn about reviewing tjhe literature
C108.5	Analyze the skills required to write the results and conclusion of a reserach paper
Antennas and Radiating Systems(MTEC-103-18):C201	
C201.1	Compute the far field distance, radiation pattern and gain of an antenna for given current distribution.
C201.2	Estimate the input impedance, efficiency and ease of match for antennas.
C201.3	Compute the array factor for an array of identical antennas.
C201.4	Design antennas and antenna arrays for various desired radiation pattern characteristics.
Advanced Digital Signal Processing(MTEC-104-18):C202	
C202.1	Summarize theory of different filters and algorithms.
C202.2	Illustrate theory of multirate DSP, solve numerical problems and write algorithms.
C202.3	Illustrate theory of prediction and solution of normal equations.
C202.4	Explain the principles of adaptive filters and estimation of PSD
C202.5	Examine applications of DSP at block level.
2nd Semester	**Course Outcomes**
Satellite Communication(MTEC-PE3X-18):C203	
C203.1	Visualize the architecture of satellite systems as a means of high speed, high range communication system.
C203.2	State various aspects related to satellite systems such as orbital equations, sub-systems in a satellite, link budget, modulation and multiple access schemes.
C203.3	Solve numerical problems related to orbital motion and design of link budget for the given parameters and conditions.

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C203.4	Study of various modulations and multiple access techniques used in satellite communication
Nano-Electronics(MTEC-PE4Y-18):C204	
C204.1	Basic concepts of Nano sciences and scale of Nano technology
C204.2	Analyze formation of Nano tubes applications & properties
C204.3	Summarize Nano –electronics advance instruments and their characteristics
C204.4	Compare connectivity of Nano devices with electronics
Antennas and Radiating Systems lab(MTEC-113-18):C205	
C205.1	Determine specifications, design, construct and test antenna.
C205.2	Explore and use tools for designing, analyzing and testing antennas. These tools include
C205.3	Antenna design and analysis software, network analyzers, spectrum analyzers, and antenna pattern measurement techniques.
Advanced Digital Signal Processing lab(MTEC-114-18):C206	
C206.1	Design different digital filters in software.
C206.2	Apply various transforms in time and frequency.
C206.3	Perform decimation and interpolation.
Mini Project(MTEC-MP1-18):C207	
C207.1	Design different circuits/ networks in Hardware/software
C207.2	Apply various transforms in time and frequency
C207.3	Perform decimation and interpolation
C207.4	May apply various optimisation techniques
AC-II(MTA104-18) :C208	
C208.1	Illustrate the premises informing the twin themes of liberty and freedom from a civil rights perspective.
C208.2	To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.

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C209.4	~~This course is~~ expected to develop strong natural familiarity with humanities among students.
C209.5	~~This course is~~ expected to enable students to have the knowledge of humanities in systematic manner.
4-Week Institutional Training:C208*	
C208*.1	Summarize basics of electronic fundamentals to enhance their skills for project design.
C208*.2	Identify different work areas of electronic Industry through e- journals, magazines etc.
C208*.3	Inculcate team work spirit and decision making through practical lab sessions during the training.
C208*.4	Inculcate awareness about diverse culture, Identities and society.
C208*.5	Design an application based minor project.
C208*.6	Enhance the presentation skills and report writing skills through project demonstration and viva- voce.
Mentoring and Professional Development(BMPD-371-18) :C210**	
C210****.1	Empower themselves by setting and working towards individual goals.
C210****.2	Inculcate the importance of moral & ethical values that examplify professionalism.
C210****.3	Accesses physical fitness, wellness & sports to promote healthy lifestyle.
C210****.4	Apply various analytical & training methods for their development.
C210****.5	Utilize physical activity as a tool to manage stress, pressure & work in life.

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