Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute under Mumbai University)
Andheri (W), Mumbai – 400058

COURSE CONTENTS

Sem. III

S. Y. B.Tech. (ELECTRICAL) ENGINEERING

Academic Year: 2020-2021

List of Courses

Applied Mathematics III

Course Code	Course Name
BS-BTE301	Applied Mathematics III

Course pre-requisites	

Course Objectives

The objectives of this course are

1. To learn Laplace & Inverse Laplace transforms and its application to solve differential equations.
2. To understand concept of Fourier series, its complex form and enhance problem solving skills.
3. To understand concept of complex variables and conformal mapping.
4. To learn various matrices, operations and important theorems.

Course Outcomes

Upon successful completion of the course, students should be able to

1. Solve problems based on Laplace and inverse Laplace transform. Apply theory of Laplace transforms to evaluate real integrals and solve initial & boundary value problems.
2. Solve problem based on Fourier series expansion.
3. Solve complex variable problems.
4. Find rank of matrices, Eigen values and Eigen vectors of matrices

Course Content

Module No.	*Details*	*Hrs.*
1	**Laplace Transforms** Function of bounded variation (Statement only) Laplace Transforms of $1, e^{at}, \sin at, \cos at, \sinh at, \cosh at, t^n, erf(t), J(t)$, Shifting theorems, change of $f(t)$, $\int_0^t f(t)\,dt$, $d^n f(t)$ scale, $L\{t^n f(t)\}, L\{f(t)/t\}, L\{d^n/dt^n\}, L\{\int_0^t f(u)du\}$ Convolution theorem, Evaluation of real integrals using Laplace transforms.	07
2	**Inverse Laplace Transforms** Evaluation of Inverse Laplace Transforms using partial fractions, convolution theorem, shifting theorems and other properties.	06

	Application of Laplace Transform to solve initial & boundary value problems involving ordinary differential equation with one dependent variables	
3	**Fourier Series & Integrals** Orthogonal & Orthonormal set of functions. Fourier series, Determination of Fourier constants, Dirichlet‟s conditions **Fourier series for** $f(x)$, $x \square\square c, c \square 2\square \square$ and $x \square\square c$, $c \square 2L\square$	05
4	**Fourier Series half range & complex form** Fourier series of Odd and Even functions Half range Fourier Sine & Cosine series, Parseval‟s Identity Complex form of Fourier series.	05
5	**Complex Variables & Mapping** Functions of complex variable, Analytic functions, Cauchy-Riemann equations in Cartesian and polar coordinates. Harmonic functions, Analytic method and Milne Thomson methods to find f(z), orthogonal trajectories. Conformal mapping, Bilinear transformation, cross ratio, fixed points.	07
6	**Matrices** Orthogonal, Symmetric, Skew-symmetric, Hermitian, Skew-Hermitian & Unitary matrices and their elementary properties. Elementary operations and their use in getting the Rank, Normal form of a matrix, PAQ form, Consistency of system of linear homogeneous and non-homogeneous equations.	06
7	**Eigen values & Cayley Hamilton** Eigen-values and Eigenvectors of a matrix, Cayley- Hamilton theorem, Function of a matrix, Diagonalization of a matrix	06
Term Work		
Term work shall comprise of A total of 10 tutorials to be taken batch wise covering the entire syllabus..		

Text Books

1. B S Grewal (2014), "Higher Engineering Mathematics", Khanna Publications, 43rd Edition, ISBN 8174091955, 1315 Pages

Reference Books

1. Erwin Kreyszig (2010), "Advanced Engineering Mathematics" Wiley Eastern Limited, Singapore 10th edition, ISBN 8126554231, 1148 Pages.

2. Text book of Engineering Mathematics , N.P.Bali , Laxmi Publications, 9th edition,ISBN:978-81- 318-0832-0

Sr. No.	Examination	Module
1	T-I	1 , 2 and part of 3
2	T-II	Remaining part of 3, 4 and part of module 5
3	End Sem	1 to 7

Electronic Circuits

Course Code	Course Name
PC-BTE301	Electronic Circuits

Course pre-requisites	P-N junction diode, BJT, FET characteristics (Course Basic Electricity and Electronics)

Course Objectives

The objectives of this course are

1. Introduce Clipping and Clamping Circuits.
2. Discuss various transistors and its biasing techniques.
3. Introduce configurations and applications of Differential amplifier.
4. Discuss Op-amp and its practical applications and basics of analog and digital converter circuits.

Course Outcomes

Upon successful completion of the course, students should be able to

1. Select appropriate electronic devices to design clippers and clampers.
2. Understand various biasing techniques for BJT and FET.
3. Understand differential amplifier, ADCs and DACs.
4. Select appropriate electronic components to design various op-amp circuits depending on application required.

Course Content

Module No.	***Details***	***Hrs.***
1	Application of diodes: Clippers, Clampers	**04**
2	Bipolar Junction Transistor: Different biasing techniques, Introduction to h- parameter equivalent circuit, Introduction to Stability Factors.	**08**
3	Field Effect Transistor: Different biasing techniques, Introduction to ac equivalent circuit. Introduction to MOSFET	**05**
4	Differential Amplifier Circuit Configuration: Introduction to DIBO, DISO, SIBO, SISO. Differential amplifier with swamping resistors, constant current bias and current mirror.	**07**
5	Operational amplifier(Op-amp):Block diagram representation of typical opamp, equivalent circuit	**04**
6	Op-amp applications: (i) Summing, scaling and averaging amplifiers, instrumentation amplifier, V to I converter(with floating load and grounded load) (ii) I to V converter, differentiator, integrator, Precision rectifier - half wave and full wave, comparator, zero crossing detector, Schmitt trigger, clipper, clamper, Peak Detector.	**09**
7	A/D and D/A converters Introduction, Basic A to D conversion techniques, Basic D to A conversion Techniques	**05**

Text Books

1. Robert Boylestad and Louis Nashelsky, „Electronic devices and circuits“, Prentice

HallofIndia, London

2. Donald A. Neamen,"ElectronicCircuitAnalysisandDesign",TataMcGraw-Hill publishing Company Limited.
3. Gayakwad Ramakant,"Op-Amps and Linear Integrated Circuits", PHI publication
4. K.R.Botkar,"IntegratedCircuits",KhannaPublication.
5. David Bell,,,ElectronicDevicesandCircuits",5thEdition,OxfordUniversity Press
6. AllenMottershead,"ElectronicDevicesandCircuitsanintroduction",Prentice Hall of India.

Reference Books

1. Bhargava,Kulshreshtha,Gupta:,,BasicElectronicsandLinearCircuits"TTTI Chandigarh, Tata McGrawHill, New Delhi.
2. D. Roy Choudhari and Shail B. Jain," Linear Integrated Circuits", New age International Publishers.
3. David Bell,,,ElectronicDevicesandCircuits",5thEdition,OxfordUniversity Press
4. AllenMottershead,"ElectronicDevicesandCircuitsanintroduction",Prentice Hall of India

Sr. No.	Examination	Module
1	T-I	**1,2,3**
2	T-II	**4,5**
3	End Sem	**01-07**

Electrical Networks

Course Code	Course Name
PC-BTE302	Electrical Networks

Course pre-requisites	BEE

Course Objectives

The objectives of this course are

1. Analysis of basic electrical circuits using various network theorems.

2. Introduction to the concept of graph theory and network topology.
3. Detailed study of RL, RC and RLC circuits and network analysis using Laplace transform.
4. Overview of network functions and two port network

Course Outcomes

Upon successful completion of the course, students should be able to

1. Apply network theorems for the analysis of electrical circuits.
2. Obtain the transient and steady-state response of electrical circuits.
3. Understand frequency domain analysis of Electrical network.
4. Analyze two port circuit behavior and determine network function of a given electrical network and construct an electrical network for a given driving point network function

Course Content

Module No.	***Details***	***Hrs.***
1	Network Theorems for electrical networks excited by DC / AC sources: Networks with Dependent Sources, Mesh and Super-mesh analysis, Nodal and Super node analysis, Superposition theorem, Source transformation, Thevenin‟s theorem , Norton‟s theorem, Maximum Power transfer theorem, reciprocity theorem.	**08**
2	Graph Theory and Network Topology: Concept of Graph of a Network, Tree, co-tree, Incidence, cutest and tie-set matrices, their relation to the Kirchoff‟s Laws and concept of Duality.	**04**
3	RL, RC Circuit Analysis – General and Particular solutions of first order differential equations, Properties of exponential response, Geometrical interpretation of derivatives, Time constant, integrating factor, Initial Conditions in Network elements. Series and parallel RLC Circuit Analysis– Solution of Second order differential equations, Over-damped, critically damped and under- damped RLC circuit, Lossless LC circuits. RL, RC and RLC Networks excited by external Energy Sources like step, ramp, impulse and sinusoidal source. Series Resonance, Parallel Resonance	**10**
4	Electrical Circuit Analysis Using Laplace Transform Review of Laplace Transform, Analysis of electrical circuits using Laplace Transform for standard inputs, convolution integral, inverse Laplace transform, transformed network with initial conditions. Transfer function representation. Poles and Zeros. Frequency response (magnitude and phase plots)	**06**
5	Network Functions: Terminal pairs or ports, network functions for one port and two port networks, calculation of network functions for general networks. Concept of poles & zeros, Restrictions on poles &zeros for driving point function and transfer function, Time domain behavior from pole-zero plots, Stability of active	**06**

	network, Routh – Hurwitz criterion.	
6	Two Port Network: Z and Y parameters, input and output impedance in terms of two port parameters, Relation between Z and Y parameters.	**04**
7	Network synthesis: Properties of positive real function, Driving point synthesis of LC, RC and RL networks, Foster and Cauer forms.	**04**

Text Books
1. M.E. Van Valkenburg: Network Analysis. Prentice-Hall of IndiaPvt. Limited, Eastern Economy Edition. 2. Roy Chaudhary D.: Networks &Systems, New Age International Publisher
Reference Books
1. W. H. Hayt,and J. E. Kemmerly: Engineering Circuits Analysis, Tata-McGraw HILL Publicatio. 2. Chakrabarti A.: Circuit Theory (Analysis &Synthesis), Dhanpat Rai &Co. 3. Schaum‟s Outline Series: Electrical network. 4. M.E. Van Valkenburg: Introduction to Modern Network Synthesis, Wiley Eastern Limited

Sr. No.	**Examination**	**Module**
1	T-I	**1,2**
2	T-II	**3, 4**
3	End Sem	**1-7**

Digital Electronics

Course Code	Course Name
PC-BTE303	Digital Electronics

Course pre-requisites	BEE

Course Objectives

The objectives of this course are

1. Understand the number systems and coding.
2. Discuss the features of combinational circuits.
3. Understand flip flops and their applications.
4. Remember different logic families, their interfacing and memories

Course Outcomes

Upon successful completion of the course, students should be able to

1. Differentiate between number systems and classify different binary codes.
2. Analyze and design combinational circuits.
3. Design of sequential circuits and registers using Flip Flops.
4. Classify different logic families and memories.

Course Content

Module No.	*Details*	*Hrs.*
1	Number System and Codes: Binary, Octal, Hexadecimal number systems, Conversion from one system to another, Binary Arithmetic, BCD, GRAY, Alphanumeric codes, Error detecting codes-odd and even parity, error detecting and correcting codes-Hamming codes	**06**
2	Combinational circuits: Derive Gates, Max terms, Min terms, SOP and POS implementation, K-Maps and their use in simplifying Boolean expressions, Implementing a logic function using universal	**06**
3	Combination Logic Circuit Design: (i) Adders, Subtractors (Half and Full), carry look ahead adder, serial adder, magnitude comparators (ii) (ii) Arithmetic logic units, multiplexers, demultiplexers parity encoder, code converter, Hazards in Combinational circuits.	**07**
4	Sequential Logic Circuits: Comparison of combinational and sequential circuits, Flip-flops: SR, T, D, JK, Master-slave JK, converting one flip flop to another, de-bounce switch, Counter: Ripple counter, up-down counter, Synchronous counter ,designing of counters, state transition diagram, ring counter, twisted ring counter, Un used states and locked conditions.	**08**

5	Registers: SISO, SIPO, PISO, PIPO registers, pseudorandom sequence generator.	**05**
6	Logic Families: Characteristics of digital logic families, TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-state logic	**05**
7	Semiconductor memories : Memory organization and operation, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory(RAM), content addressable memory (CAM), commonly used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic, complex	**05**

Text Books
1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009. 2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016
Reference Books
1. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016. 2. William I. Fletcher, „An Engineering Approach to Digital Design", PHI.

Sr. No.	**Examination**	**Module**
1	T-I	**1,2,3(i)**
2	T-II	**3(i),4**
3	End Sem	**01-07**

Electrical Network Laboratory

Course Code	Course Name
PC-BTE304	Electrical Network Laboratory

Course pre-requisites	BEE

Course Objectives
The objectives of this course are 1. Introduction to MATLAB / SCILAB/ e-sim/ Pspice software for circuit analysis. 2. To simulate electrical circuits using simulation softwares listed above. 3. Gain practical experience on simulation and working of electrical circuits..
Course Outcomes
Upon successful completion of the course, students should be able to 1. Evaluate response of DC / AC electrical circuits using theorems. 2. Analyze DC/AC electrical circuits through simulation software. 3. Analyze transient & steady state time responses and frequency response of electrical circuits.

Course Content

Module No.	***Details***	***Hrs.***
1	DC network Simulation	**02**
2	AC network Simulation	**02**
3	Transient Response of RL network for step input voltage	**02**
4	Transient Response of RC network for step input voltage	**02**
5	Transient Response of RLC series and parallel network for step input voltage	**02**
6	Transient and steady state Response of RL network for sinusoidal input voltage	**02**
7	Transient and steady state Response of RC network for sinusoidal input voltage	**02**
8	Design and simulation of series resonance network	**02**
9	Plotting frequency response of a given electrical network.	**02**
10	Pole – zero plot of given transfer function	**02**
11	Given Z/Y parameters obtaining Y/Z parameters (using symbolic toolbox)	**02**
12	Network analysis using graph theory	**02**
13	Response of RL / RC network on oscilloscope to square wave voltage signal	**02**

Term Work
Term work shall comprise of **1.** Tutorials* **2.** MCQ examination *Tutorial List

Tut1	DC networks Theorems
Tut2	AC networks Theorems
Tut3	Graph Theory
Tut4	Time domain analysis of RLC circuits
Tut5	Laplace Transform and analysis of RLC circuits
Tut6	Network functions and two port networks
Tut7	Network Synthesis

Text Books

1. M.E. Van Valkenburg: Network Analysis. Prentice-Hall of IndiaPvt. Limited, Eastern Economy Edition.
2. Roy Chaudhary D.: Networks &Systems, New Age International Publisher

Reference Books

1. W. H. Hayt,and J. E. Kemmerly: Engineering Circuits Analysis, Tata-McGraw HILL Publicatio.
2. Chakrabarti A.: Circuit Theory (Analysis &Synthesis), Dhanpat Rai &Co.
3. Schaum‟s Outline Series: Electrical network.
4. M.E. Van Valkenburg: Introduction to Modern Network Synthesis, Wiley Eastern Limited

Electronic Circuit Laboratory

Course Code	Course Name
PC-BTE305	Electronic Circuit Laboratory

Course pre-requisites	

Course Objectives

The objectives of this course are

1. Understand diode as a Clipper and Clamper.
2. Analysis of transistors, practical applications of Op-amp.
3. Understand working of Differential amplifier, instrumentation amplifier
4. Learn to develop application based on electronics circuits

Course Outcomes

Upon successful completion of the course, students should be able to

1. Design clippers and clampers, Calculate parameters of transistors from characteristics.
2. Calculate CMRR of differential amplifier, Understand and use instrumentation amplifier
3. Select appropriate electronic components to design various op-amp circuits depending on application required.
4. Develop managerial skills

Course Content

Module No.	*Details*	*Hrs.*
1	Diode as clipper	**02**
2	Diode as clamper	**02**
3	Differential Amplifier	**02**
4	Transfer Characteristics of op-amo	**02**
5	V to I converter	**02**
6	Integrator	**02**
7	Differentiator	**02**
8	Schmitt Trigger	**02**
9	Instrumentation Amplifier	**02**

Term Work

Term work shall comprise of

1. Practical examination/ MCQ Examination
2. Mini Project*

*Mini Project: There will be a course mini project where the students will be able to apply and integrate the knowledge gained during the course. The projects will be developed by teams of Four to Five students. The group has to present the project and submit the project report

Text Books

1. Robert Boylestad and Louis Nashelsky, „Electronic devices and circuits", Prentice HallofIndia, London
2. Donald A. Neamen,"ElectronicCircuitAnalysisandDesign",TataMcGraw-Hill publishing Company Limited.
3. Gayakwad Ramakant,"Op-Amps and Linear Integrated Circuits", PHI publication
4. K.R.Botkar,"IntegratedCircuits",KhannaPublication.
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1. Bhargava,Kulshreshtha,Gupta:,,BasicElectronicsandLinearCircuits‟‟TTTI Chandigarh,Tata McGrawHill, New Delhi.
2. D. Roy Choudhari and Shail B. Jain,” Linear Integrated Circuits”, New age International Publishers.
3. David Bell,,,ElectronicDevicesandCircuits‟‟,5thEdition,OxfordUniversity Press
4. AllenMottershead,“ElectronicDevicesandCircuitsanintroduction”,Prentice Hall of India

Digital Electronics Laboratory

Course Code	Course Name
PC-BTE306	Digital Electronics Laboratory

Course pre-requisites	

Course Objectives
The objectives of this course are 1. Understand the basics of circuit making on bread board 2. Test the working of the circuit 3. Introduce simulation using software 4. Learn to develop application based on digital electronics circuits.

Course Outcomes
Upon successful completion of the course, students should be able to 1. Design given circuits using discrete components 2. Understand the basics of simulation. 3. Test the designed circuit to get required output. 4. Develop managerial skills

Course Content

Module No.	*Details*	*Hrs.*
1	Logic Expressions simplification and implementation.	**02**
2	Half Adder and Half subtractor using gate IC‟s	**02**
3	Code Converter: Binary to Gray, BCD to XS-3.	**02**
4	IC7483 as 4bit adder and subtractor	**02**
5	Multiplexer 4:1 using gates.	**02**
6	De-multiplexer1:16usingTINAsoftware.	**02**
7	Flip-Flops: S-R,J-K,D, T using only NAND gates.	**02**
8	BCD Counter	**02**
9	Ring Counter, Twisted Ring Counter.	**02**
10	PLD Simulation	**02**

Term Work

Term work shall comprise of

1. Practical examination/ MCQ Examination
2. Mini Project*

*Mini Project: There will be a course mini project where the students will be able to apply and integrate the knowledge gained during the course. The projects will be developed by teams of Four to Five students. The group has to present the project and submit the project report

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1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016

Reference Books

1. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.
2. William I. Fletcher, „An Engineering Approach to Digital Design‟, PHI.

Organizational Communication and Interpersonal Skills

Course Code	Course Name
HSM-BTE301	Organizational Communication and Interpersonal Skills

Course pre-requisites	Communication Skills Semester II

Course Objectives

The objectives of this course are

1. To enhance effective corporate communication through professional writing
2. To prepare students for successful career that meets the corporate, industrial and global requirement.
3. To enable students to communicate in professional environment and social context with knowledge of professional etiquette, and understand social responsibilities with multi-disciplinary approach, in all tasks of life.
4. To discern and develop effective organizational writing.
5. To inculcate in students professional and ethical attitude at the workplace and develop an ability to imbibe effective interpersonal skills.

Course Outcomes

Upon successful completion of the course, students should be able to

1. Develop professional communication using precise language and formats.
2. Apply the traits of a suitable candidate for a job/ higher education, through training and participation in group discussions, facing interviews and writing resume/ SOP.
3. Demonstrate awareness of corporate etiquette and knowledge of professional responsibilities.
4. Design technical documents using precise and objective language, apt for organizational communication.
5. Deliver formal presentations effectively and develop life skills/ interpersonal skills to progress professionally by building stronger relationships in the society.

Course Content

Module No.	*Details*	*Hrs.*
1	Business writing • Types of meetings, Notice, Agenda, Minutes of the meetings, Strategies for conducting effective meetings.	03
2	Employment Skills: • Group Discussion • SWOT Analysis • Resume Writing / Curriculum Vitae • Interview Skills • Statement of Purpose	10
3	Introduction to Corporate Etiquette and Core Values: • Etiquettes and rules of behavior • Professional Conduct, • Etiquette in Meetings (Netiquette) • Dining Etiquettes. • Core Values of an organization	04
4	Report writing: • Objectives of report writing,	08

	• Language and style in a report, • Types of reports. • Formats of reports: Memo, Letter, and Project report Survey based. ***(A Computer- aided presentation of the Project report)*** Proposal Writing: • Format and style. Technical Proposals: • Objectives of technical proposals, • Parts of proposals.	
5	Interpersonal Communication and Soft Skills: • Creating and delivering effective presentations • Working and communication in teams • Leadership skills • Time management • Conflict resolution and negotiation skills	07

Term Work

Term work shall comprise of

1. . Meeting documentation: Role play and written assignment
2. Practical sessions on Group Discussion topics
3. Mock Interviews, Job application and resume writing.
4. Etiquettes case study and role play. MCQ's
5. Three assignments on report-writing.

(A Bound report to be submitted on research topic to be submitted in partial fulfillment of the syllabus Report Writing in a group of 8 to 10 students with a PowerPoint presentation, , Report content will be graded and counted during presentation, a printed copy of the presentation and a soft copy in the form of CD to be attached with the report).

6. Technical Proposal (Group activity, document of the proposals, A proposal to be prepared by students in a Group of 5)
7. Interpersonal Skills: Case Studies, Group Activity and assignments
8. Presentations and seminar on module no. 4, 5 with Power point
9. Role play and videos taken by students.

Text Books

Sr. No	Text Book Titles	Author/s	Publisher	Edition	Module Nos.
1	Report Writing for Business	Lesiker and Petit	Mc Graw Hill	10	1
2	Technical Writing for Professional Communication	Huckin and Olsen	Mc Graw Hill	2	1, 2
3	Personal development for Life and Work	Wallace and Masters	Thomson Learning	12	3,4,5,6
4	Effective Business Communication	Herta Murphy	Mc Graw Hill	7	1,2,3, 4,6

5	Organizational Behaviour	Fred Luthans	Mc Graw Hill	12	3,5
6	Business Correspondence and Report Writing	R.C. Sharma and Krishna Mohan	Tata McGraw Hill	2	1,2,4,6
7	Soft skills	Dr. K.Alex	S. Chand and company	3	3,5,6
8	Professional Ethics	R.Subramaniam	OUP		5
9	Organizational Behaviour	Robbins Stephens	Pearson Education	12	3

Reference Books

Sr. No	Reference Book Titles	Author/s	Publisher	Edition	Module Nos.
1	How to Speak Fluently	Jones	Indian Publishing House	1st	6
2	Speaking English Effectively	Krishna Mohan N.P. Singh	Macmillan	2nd	6
3	"Business Communication - Concepts Cases and Applications"	Chaturvedi and Chaturdevi	Pearson	2nd	5
4	"Communication Skills for Engineers"	Sunita Mishra and C. Murlikrishna	Pearson	1st	6
5	Business Communication- "Building Critical Skills"	Kitty O Locker	McGraw Hill	3rd	3, 4
6	"Body Language",	Alan Pease	Manjul Publications	18th	3, 4,6
7	"The Craft of Business Letter Writing"	Monipally	Tata McGraw Hill	1st	6
8	Soft Skills and Professional Communication	Francis Peter	Tata McGraw Hill	1st	3, 6
9	50 ways to improve your Business English	Ken Taylor	Summertown Publishing	1st	1, 5

10	50 ways to improve your Presentation Skills in English	Bob Dignen	Summertown Publishing	1st	6	

E Books						
Sr. No	E- Book Titles	Author/s	Publisher	Edition	Module Nos.	
1	Business Communication Today	Courtland L Bovee	Pretince Hall	--	3, 5, 6	
2	Excellence in Business Communication	John Thill	Pretince Hall	6	4,	
3	Business Communication: Building Critical Skills	Kitty O Locker	Mc Graw Hill	--	3	

Sr. No.	Examination	Module
1	T-I	1.2
2	T-II	3,5
3	End Sem	1 to 5

Value Added Courses

1. Soft Computing I (VA-BTE01)

Course Objective: Provide knowledge of MATLAB/ SCILAB.

Course Outcome: Students will be able to develop good applications using MATLAB/ SCILAB

Course content: 1. Basic Introduction and Overview, 2. Variables and Data types, 3. Operation,. Control Structure, 4. Function, Introduction to different tool boxes available, 5. introduction to MATLAB simulink

2. Introduction to Python (VA-BTE02)

Course Objective: Provide knowledge of Python

Course Outcome: Students will be able to develop good applications using Python

Course content: 1. Basic Introduction and Overview, 2. Variables and Data types., 3. Operations in Python, Control Structure, List, Tuples and Dictionary, 4. Function, Introduction to turtle and some introduction to modules, Exception handling, 5.Object oriented in python, Numpy, Matplotlib.

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute under Mumbai University)
Andheri (W), Mumbai – 400058

COURSE CONTENTS

Sem. IV

S. Y. B.Tech. (ELECTRICAL) ENGINEERING

Academic Year: 2020-2021

List of Courses

Applied Mathematics IV

Course Code	Course Name
BS-BTE401	Applied Mathematics IV

Course pre-requisites	

Course Objectives

The objectives of this course are

1. To provide an overview of probability and statistics to engineers.
2. Introduce Statistical methods, probability distribution and testing of hypothesis.
3. Introduce Complex Integrals.

Course Outcomes

Upon successful completion of the course, students should be able to

1. Solve problems in basic statistics, probability distribution and testing of hypothesis.
2. Apply statistical methods for analysing experimental data.
3. Solve the problems based on complex Integrals.

Course Content

Module No.	*Details*	*Hrs.*
1	**Statistics:** Correlation, Karl Pearson coefficient &Spearman‟s rank Correlation coefficient, linear regression, lines of regression. Curve fitting by the method of least squares.	**8**
2	**Discrete Random Variables:** Random variables, Probability distribution for discrete random variables, Expected value and Variance, Binomial Distribution and Poisson Distribution.	**6**
3	**Continuous Random Variables:** Probability Density Function for continuous random variable, Normal Distribution.	**4**
4	**Sampling Theory:** Sampling distribution. Test of Hypothesis. Level of significance, critical region. Large and small samples. Test of significance for Large samples: Test for significance of the difference between sample 5mean and population means, Test for significance of the difference b6etween the means of two samples. Test for significance of the dif7ference between sample S.D and population S.D, Test for significance of the difference between the S.D of two samples.	**6**
5	**T-Test:** Student‟s t-distribution and its properties. Test of significance of small samples. Test for significance of the difference between sample mean and population means, Test for significance of the difference between the means of two samples, Chi-square distribution and its properties.	**6**
6	**Numerical Methods 1:** Line Solution of polynomial and transcendental equations using Newton Raphson method. Solution	**6**

	of system of linear algebraic equations , by Gauss Elimination Method, Gauss Jacobi Iteration Method and Gauss Seidel Iteration Method	
7	**Numerical Methods II**: Numerical Solution of ordinary differential equations using Taylor‟s series, Euler and Modified Euler‟s methods, Runge Kutta method of fourth order.	**6**
Term Work		
Term work shall comprise of A total of 10 tutorials to be taken batch wise covering the entire syllabus...		

Text Books
1. B.S. Grewal, “Higher Engineering Mathematics”, Khanna Publishers, 2000.
Reference Books
1. N.P. Bali and M. Goyal, “A text book of Engineering Mathematics”, Laxmi Publications, 2010. 2. T. Veerarajan, “Engineering Mathematics”, Tata McGraw-Hill, New Delhi, 2010. 3. Murray Spiegel ,“Schaum's Outline of Probability and Statistics”, 4th Edition, Tata McGraw-Hill 201

Sr. No.	Examination	Module
1	T-I	1 , 2 and part of 3
2	T-II	Remaining part of 3, 4 and part of module 5
3	End Sem	1 to 7

Analog Circuits

Course Code	Course Name
PC-BTE401	Analog Circuits

Course pre-requisites	Electronic circuit

Course Objectives

The objectives of this course are

1. Introduce power amplifiers and frequency response of op-amp and FET.
2. Introduction and application of 555timer and voltage regulator.
3. Introduce active filters.
4. Discuss negative feedback amplifiers and oscillators

Course Outcomes

Upon successful completion of the course, students should be able to

1. Design power amplifier to meet the desired requirement.
2. Illustrate the functions of basic building blocks of 555 timer
3. Design voltage regulators.
4. Compare circuits using negative feedback.
5. Design active filters and to select appropriate components to design oscillator

Course Content

Module No.	*Details*	*Hrs.*
1	Power Amplifiers: Introduction to different types of Large signal amplifiers viz. Class A, B, AB, C	**05**
2	Frequency response: BJT and op-amp.	**05**
3	555timer: Introduction to the block diagram, Applications: a stable and mono Stable multi vibrator with applications of each.	**05**
4	Voltage regulator: FixedVoltageregulator:78XX,79XX,AdjustableVoltageregulator:723	**07**
5	Active Filters: First and Second order LP, HP, BP & band reject filters.	**05**
6	Feedback amplifiers(Negative Feedback): Introduction to negative and positive feedback, Negative feedback Current, Voltage: Series and Shunt type Effect of Negative feedback on: Input impedance, output impedance Voltage gain, current gain and bandwidth	**08**
7	Oscillators: Frequency of oscillation, Condition for maintenance of oscillations of: (i) RC phase shift (ii)Wien Bridge, Crystal oscillator.	**07**

Text Books

1. Robert Boylestad and Louis Nashelsky, „Electronic devices and circuits", Prentice HallofIndia, London

2. Donald A. Neamen,"ElectronicCircuitAnalysisandDesign",TataMcGraw-Hill publishing Company Limited.
3. Gayakwad Ramakant,"Op-Amps and Linear Integrated Circuits", PHI publication
4. K.R.Botkar,"IntegratedCircuits",KhannaPublication.
5. David Bell,,,ElectronicDevicesandCircuits",5thEdition,OxfordUniversity Press
6. AllenMottershead,"ElectronicDevicesandCircuitsanintroduction",Prentice Hall of India.

Reference Books

1. Bhargava,Kulshreshtha,Gupta:,,BasicElectronicsandLinearCircuits"TTTI Chandigarh,Tata McGrawHill, New Delhi.
2. D. Roy Choudhari and Shail B. Jain," Linear Integrated Circuits", New age International Publishers.
3. David Bell,,,ElectronicDevicesandCircuits",5thEdition,OxfordUniversity Press
AllenMottershead,"ElectronicDevicesandCircuitsanintroduction",Prentice Hall of India

Sr. No.	Examination	Module
1	T-I	**1,2,3**
2	T-II	**4,5**
3	End Sem	**1-7**

Electrical and Electronics Measurements

Course Code	Course Name
PC-BTE402	Electrical and Electronics Measurements

Course pre-requisites	Electronic Circuits and Digital Electronics

Course Objectives

The objectives of this course are

1. Detailed study of analog measurement instruments.
2. Understanding of digital measurement techniques.
3. Introduction to transducer and instrument transformer

Course Outcomes

Upon successful completion of the course, students should be able to

1. Select appropriate measuring technique and instrument for measurement of desired parameter/quantity.
2. Explain operating principles of electronic measuring instruments.
3. Compute the errors in measuring instrument
4. Appreciate operating principles of digital measuring instruments

Course Content

Module No.	*Details*	*Hrs.*
1	**Standards of electric measurements** Analog Measuring instruments General features of indicating, recording and integrating type of instruments, ammeter, voltmeter,wattmeter and energy meter, Measurement of power in balanced and unbalanced electrical systems.	06
2	**Measurement of electrical parameters** Measurement of low, medium and high resistance, insulation resistance, earth resistance, Wheatstone bridge, Kelvin double bridge, Megger, AC bridges for measurement of inductance and capacitance.	07
3	**Instrument transformer** Theory of Current and potential transformers, Definition, various types, importance and applications, ratings, Definition of ratio and phase angle errors.	06
4	**Electronic Measurement** Introduction. Essentials of electronic instruments, Advantages of electronic instruments. Electronic multi-meters. Power factor meter, tri vector meter, Q meter. Principle of working of electronic energy meter, maximum demand meter, Cathode ray oscilloscope: time, frequency and phase angle measurement using CRO	07
5	**Digital Instruments** Analog to digital conversion ,sampling theorem, Digital time measurement technique, Digital frequency meter, Digital voltmeters (DVM). . Digital Storage Oscilloscope,	06

	harmonic and distortion, Power analyzer	
6	**Transducers:** Measurement of temperature, vibration, velocity (speed), flow, level, Photoelectric, strain gauge , Characteristics and selection for given Application	05
7	**Calibration of Instruments and Safety in instrumentation:** Need of Instrument Calibration, Preparation for calibration, Standard calibration procedure, Five point calibration procedure, Safety in instrumentation.	05

Text Books
1. Sawhney. A.K. „A course in Electrical and electronics measurements and Instrumentation by Dhanpat Rai and Sons 17th edition 2007. 2. T.S. Rathore „Digital measurement techniques" by Narosa Publishing house
Reference Books
1. Kalsi H.S. "Electronic Instrumentation", Tata McGraw Hill, 3rd edition1997. 2. Doeblin E.O „Measurement system application and design", Tata McGraw Hill, 4th edition1990

Sr. No.	Examination	Module
1	T-I	
2	T-II	
3	End Sem	1 to 7

Signals and Systems

Course Code	Course Name
PC-BTE403	Signals and Systems

Course pre-requisites	Basic Electrical Engineering, Laplace Transform, Fourier Series

Course Objectives

The objectives of this course are

1. To introduce the concepts of signals and systems.
2. To discuss different analysis tools (Fourier Series, Fourier Transform, Laplace Transform and Z Transform) and their properties.
3. To carry out analysis and synthesis of both continuous-time and discrete time systems both in time domain and transformed domain using different transforms and applied mathematics concepts

Course Outcomes

Upon successful completion of the course, students should be able to

1. Understand and characterize CT and DT signals and systems.
2. Analyze CT and DT systems in Time domain using convolution.
3. Represent CT signals in the Frequency domain using Fourier analysis tools, CTFS and CTFT.
4. Analyze CT system using Fourier and Laplace transform.
5. Evaluate Z-Transform of a given function and Analyze DT systems using Z Transform.

Course Content

Module No.	*Details*	*Hrs.*
1	Introduction to Signals and Systems Introduction: Basics, need, advantages, limitations, applications, etc. Definition and basic signals such as impulse, unit step, unit ramp. Classification of signals. Signal operations. Concept of a Continuous time (CT) and Discrete time(DT) system, properties and classification of systems. Examples of continuous-time and discrete-time system models, modeling of electrical circuit models such as RL circuit. Analog to digital conversion of signal	**06**
2	Discrete time LTI Systems Introduction FIR and IIR Systems. Discrete convolution, properties of convolution. Correlation of two signals Solution of linear constant coefficient difference equation: Zero input and zero state response.	**06**
3	CT Fourier Series and Fourier Transform Introduction, Trigonometric Fourier Series, Dirichlet‟s conditions Complex exponential form of Fourier Series, Parseval‟s theorem	**06**

	for Fourier Series , Power Spectrum of a Periodic Function , Fourier Transform, energy spectrum, Properties of Fourier Transform such as Linearity, Symmetry, Scaling, Convolution, Time shifting, Frequency shifting, Fourier transform of some important signals such as rectangular, triangular, exponential, Gaussian pulse. System analysis of CT system, frequency response of a CT system, Introduction to DTFS and DTFT.	
4	Applications of Laplace Transform to System Analysis Introduction Definition, ROC, Laplace Transform of important functions, Initial and Final value theorem, Partial fraction expansions , Network transfer function, step and impulse response, Mapping of s- plane poles and zeros, stability in s-domain, Laplace transform of periodic functions,	**06**
5	z-Transforms Introduction , Definition, one sided and two sided z-transform, ROC, Properties of ROC, z-plane. Properties of z-transform. Inverse z- transform using methods such as long division, partial fraction expansion, residue method.	**06**
6	Analysis of LTI systems using z-transform Solution of linear constant coefficient difference equation using method of z transforms, transfer function, impulse response and step response. Pole zero concepts, stability criterion for systems. Relation between s- plane and z-plane. Inverse system and deconvolution.	**06**
7	Realization of Linear Systems Basic realization block diagram of CT and DT system. Basic structures for IIR Systems: Direct form – I, direct form – II, series, parallel. Basic structures of FIR Systems	**06**

Text Books

1. Alan V. Oppenheim, Alan V. Willsky and S.Hamid Nawab, “Signals and Systems”, Prentice-Hall India.
2. Mrinal Mandal and Amir Asif, “Continous and Discrete Time Signals and Systems”, Cambrige International Student Edition, Tata McGraw-Hill.
3. Haykin S and Van Veen B., “Signal & Systems”, Wiley Publication, 2nd Ed.,2002.
4. Hwei P. Hsu, SCHAUM'S OUTLINES OF “Theory and Problems of Signals and Systems”, McGraw-Hill International.

Reference Books

1. Nagrath I. J., Sharan S. N. and Ranjan R., “Signal & Systems”, 2nd Ed., 2010.
2. Narayan Iyer, “Signal & Systems”, Cengage Learning, 2011.
3. Lindner D.K., “Introduction to Signal & Systems”, McGraw-Hill International Edition, 1999.
4. Ambardar, “Analog & Digital Signal Processing”, Thomson learning, 2nd Ed.
5. Proakis J.G. and Manolakis D. G., “Digital Signal Processing: Principles, Algorithms and applications”, PHI publications (1995).
6. Lathi B.P., “Signal & Systems”, Oxford University Press, second edition, 1998.

Sr. No.	Examination	Module
1	T-I	**1,2**
2	T-II	**3,4**
3	End Sem	**1-7**

Microprocessor and Microcontroller

Course Code	Course Name
PC-BTE404	Microprocessor and Microcontroller

Course pre-requisites	Digital Electronics

Course Objectives

The objectives of this course are

1. To introduce computer design and classify computer organization.
2. To understand different types of memory used in computer systems.
3. To understand the applications of Microprocessors & Microcontrollers
4. To understand architecture and features of typical Microcontroller.
5. To learn interfacing of real world input and output devices

Course Outcomes

Upon successful completion of the course, students should be able to

1. Do assembly language programming.
2. Do interfacing design of peripherals like I/O, A/D, D/A, timer etc.
3. Develop systems using different microcontrollers

Course Content

Module No.	*Details*	*Hrs.*
1	Fundamentals of Microprocessors: Fundamentals of Microprocessor Architecture. 8-bitMicroprocessor and Microcontroller architecture, Comparison of 8-bit, 16-bit and 32-bit microcontrollers. Definition of embedded system and its characteristics, Role of microcontrollers in embedded Systems. Overview of the 8051 family.	06
2	The 8051 Architecture Internal Block Diagram, CPU, ALU, address, data and control bus, Working registers, SFRs, Clock and RESET circuits, Stack and Stack Pointer, Program Counter, I/O ports, Memory Structures, Data and Program Memory, Timing diagrams and Execution Cycles	06
3	Instruction Set and Programming I Addressing modes: Introduction, Instruction syntax, Data addressing, Indirect addressing, Relative addressing, Indexed addressing, Bit inherent addressing, bit direct addressing. 8051 Instruction set,	06
4	Instruction Set and Programming II Instruction timings. Data transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Subroutine instructions, Bit manipulation instruction. Assembly language programs, C language programs. Assemblers and compilers. Programming and	06

	debugging tools.	
5	Memory and I/O Interfacing Memory and I/O expansion buses, control signals, memory wait states. Interfacing of peripheral devices such as General Purpose I/O, ADC, DAC, timers, counters, memory devices	08
6	External Communication Interface Synchronous and Asynchronous Communication. RS232, SPI, I2C. Introduction and interfacing to protocols like Blue-tooth and Zig-bee.	05
7	Applications LED, LCD and keyboard interfacing. Stepper motor interfacing, DC Motor interfacing, sensor interfacing.	05

Text Books

1. Ramesh Gaonkar, "Microprocessor Architecture, Programming, and applications with the 8086", Penram International Publication.
2. Muhammad Ali Mazidi, "The 8051 Microcontrollers and Embedded Systems using Assembly and C", PHI.
3. KennethJ.Ayala,"The 8086 Microprocessor: Programming &Interfacing the PC", Delmar Publishers

Reference Books

1. Mano M., "Computer System and Architecture", Prentice Hall of India , New Delhi.
2. William Stallings, " Computer Organization and Architecture", Pearson Education
3. A K Ray, K M Bhurchandi, Advanced Microprocessors and Peripherals, TMH.

Sr. No.	Examination	Module
1	T-I	**1,2**
2	T-II	**3,4**
3	End Sem	**01-07**

Electrical Machines I

Course Code	Course Name
PC-BTE405	Electrical Machines I

Course pre-requisites	

Course Objectives

The objectives of this course are

1. Discuss the concepts of magnetic field, magnetic circuits, electromagnetic force and torque.
2. Introduce DC machines, transformer.

Course Outcomes

Upon successful completion of the course, students should be able to

1. Understand the concepts of magnetic circuits.
2. Analyze the differences in operation of different dc machine configurations.
3. Analyze single phase and three phase transformers and high frequency transformer circuits

Course Content

Module No.	*Details*	*Hrs.*
1	Magnetic fields and magnetic circuits: Review of magnetic circuits - MMF, flux, reluctance, inductance; review of Ampere Law and Biot Savart Law; Visualization of magnetic fields produced by a bar magnet and a current carrying coil through air and through a combination of iron and air; influence of highly permeable materials on the magnetic flux lines.	08
2	Electromagnetic force and torque: B-H curve of magnetic materials; flux- linkage vs current characteristic of magnetic circuits;	06
3	Linear and nonlinear magnetic circuits; energy stored in the magnetic circuit; force as a partial derivative of stored energy with respect to position of a moving element; torque as a partial derivative of stored energy with respect to angular position of a rotating element.	04
4	DC machines : EMF equation, Armature winding and commutation-lap and wave windings, construction of commutator, linear commutation, Derivation of torque equation, armature reaction, air gap flux density distribution with armature reaction.	04
5	DC machine - motoring and generation, Types of field excitations – separately excited, shunt and series. Open circuit characteristic of separately excited DC generator, V-I characteristics and torque-speed characteristics of separately excited Dc machines.	04
6	Transformers: Principle of operation of single phase and three phase transformers, Equivalent circuit, Phasor diagram, O.C. and	08

	S.C. test: Efficiency and regulation, Transformer And Vector Groups, Parallel operation of transformers	
7	Excitation phenomenon in transformers: Transformer harmonics, Oscillating neutral, Transformer switching current transient, Autotransformers, Tap changing transformers. High Frequency Transformers (HFT): Basic Principle - construction – equivalent circuit -different types of HFT– comparison of HFT with conventional power transformers – Application of HFT.	08

Text Books
1. P.C.Sen, Principles of Electric Machines and Power Electronics Wiley India Pvt Ltd. 2. P.S.Bimbra, Electrical Machinery , by Khanna Publisher
Reference Books
1. NagrathI.J., Kothari D.P., Electric Machines, TMH Publication. 2. P.S.Bimbra, Generalized theory of Electrical Machines, Khanna Publisher.

Sr. No.	Examination	Module
1	T-I	**1, 2**
2	T-II	**3,4,5**
3	End Sem	**1-7**

Analog Circuits Laboratory

Course Code	Course Name
PC-BTE406	Analog Circuits Laboratory

Course pre-requisites	Electronic Circuits

Course Objectives

The objectives of this course are

a. Study frequency response of Op-Amp and BJT, oscillators
b. Use IC 555 as mono-stable and a stable multi-vibrator.
c. Introduction to active filters, negative feedback amplifiers.
d. Learn to develop application based on digital electronics circuit

Course Outcomes

Upon successful completion of the course, students should be able to

1. Compare frequency response of Op-Amp and BJT by plotting it experimentally.
2. Able to select component values for astable and mono-stable multi-vibrators using IC 555
3. Able to use voltage regulators using IC 723, to design active filters and to select appropriate components to design oscillator.
4. Develop managerial skills

Course Content

Module No.	*Details*	*Hrs.*
1	Frequency Response of Op-amp	02
2	Astable multi-vibrator using 555	02
3	Mono-stable multi-vibrator using 555	02
4	Low voltage regulator	02
5	High voltage Regulator	02
6	First order LPF.	02
7	Wein Bridge Oscillator	02
8	RC phase shift Oscillator	02
9	Gain of CE amplifier with and without Feedback (CE bypass Capacitor)	02

Term Work

Term work shall comprise of

3. Practical examination/ MCQ Examination
4. Mini Project*

*Mini Project: There will be a course mini project where the students will be able to apply and integrate the knowledge gained during the course. The projects will be developed by teams of Four to Five students. The group has to present the project and submit the project report

Text Books

1. Robert Boylestad and Louis Nashelsky, „Electronic devices and circuits", Prentice HallofIndia, London
2. Donald A. Neamen,"ElectronicCircuitAnalysisandDesign",TataMcGraw-Hill publishing Company Limited.
3. Gayakwad Ramakant,"Op-Amps and Linear Integrated Circuits", PHI publication
4. K.R.Botkar,"IntegratedCircuits",KhannaPublication.

5. David Bell,,,ElectronicDevicesandCircuits‟‟,5thEdition,OxfordUniversity Press
6. AllenMottershead,“ElectronicDevicesandCircuitsanintroduction”,Prentice Hall of India.

Reference Books

1. Bhargava,Kulshreshtha,Gupta:,,BasicElectronicsandLinearCircuits‟‟TTTI Chandigarh, Tata McGrawHill, New Delhi.
2. D. Roy Choudhari and Shail B. Jain,” Linear Integrated Circuits”, New age International Publishers.
3. David Bell,,,ElectronicDevicesandCircuits‟‟,5thEdition,OxfordUniversity Press
AllenMottershead,“ElectronicDevicesandCircuitsanintroduction”,Prentice Hall of India

Electrical and Electronics Measurements Laboratory

Course Code	Course Name
PC-BTE407	Electrical and Electronics Measurements Laboratory

Course pre-requisites	Electronic Circuits and Digital Electronics

Course Objectives

The objectives of this course are

1. To conduct experiment on calibration of energy meter
2. To understand different in-built Lab view result functions related to signals and system.
3. To validate the theoretical concept

Course Outcomes

Upon successful completion of the course, students should be able to

1. Understand construction and working principle of various analog instruments.
2. Understand various measurement techniques used for measurement of various parameters.
3. Apply theoretical knowledge to convert analog signal into digital signal.

Course Content

Module No.	*Details*	*Hrs.*
1	To measure the energy consumed by load using analog energy meter and compare the measurement with static energy meter. Wattmeter.	02
2	Study of Moving iron, PMMC and Dynamometer type instruments (Basic moving systems).	02
3	To study the working of Megger and carry out measurement of insulation resistance.	02
4	Study of construction of LVDT and measurement of displacement, force and pressure by using it.	02
5	Measurement of R, L and C Using Different Bridges and confirmation with analytical calculations.	02
6	Comparative study of temperature measurement using RTD and thermocouple.	02
7	To measure input voltage signal using Voltage to Frequency Converter using IC 555	02
8	Study of Cathode Ray Oscilloscope	02
9	Speed measurement using photoelectric pick up, magnetic pick up and stroboscope.	02
10	Measurement of power in three phase balanced and unbalanced circuits by conventional two wattmeter method and by power analyzer.	2
11	Demonstration of current transformer and potential transformer	02

Term Work

Term work shall comprise of

Practical Examination/ MCQ examination.

Text Books
1. Sawhney. A.K. „A course in Electrical and electronics measurements and Instrumentation by Dhanpat Rai and Sons 17th edition 2007. 2. T.S. Rathore „Digital measurement techniques" by Narosa Publishing house
Reference Books
1. Kalsi H.S. "Electronic Instrumentation", Tata McGraw Hill, 3rd edition1997. 2. Doeblin E.O „Measurement system application and design", Tata McGraw Hill, 4th edition1990

Microprocessor and Microcontroller Laboratory

Course Code	Course Name
PC-BTE408	Microprocessor and Microcontroller Laboratory

Course pre-requisites	Digital Electronics

Course Objectives

The objectives of this course are

1. Study of instruction set an architecture of microprocessor and Microcontroller
2. Study of external interface
3. Learn to develop application using microprocessor/ microcontroller

Course Outcomes

Upon successful completion of the course, students should be able to

1. Apply instruction set of microprocessor and Microcontroller
2. Interface with external devices
3. Develop managerial skills

Course Content

Module No.	*Details*	*Hrs.*
	Microprocessoe	
1	Addition of Two 8-bit Numbers and Sum is 8-bit.	02
2	Addition of two 8 bit numbers and sum is 16-bit.	
3	Addition of Two 16-Bit Numbers and Sum is 16-bit.	
4	Decimal Addition of Two 8-Bit Numbers and Sum is 8-bit.	02
5	One‟s Complement and Two‟s Complement of an 8-bit Number	
	Microcontroller	
6	To add and subtract two 8 bit numbers using registers	02
7	To multiply and divide two 8 bit numbers using register	
8	Addition and subtraction of two numbers using DPTR	02
9	Multiply and divide two numbers using DPTR	
10	Count number of ones in given 8 bit number	02
11	To perform read and write operation by 8255 interfacing	02
12	Interfacing of microcontroller to seven segment display.	02
13	Interfacing of microcontroller to LCD display	02

Term Work

Term work shall comprise of

1. Practical examination/ MCQ Examination
2. Mini Project*

*Mini Project: There will be a course mini project where the students will be able to apply and integrate the knowledge gained during the course. The projects will be developed by teams of Four to Five students. The group has to present the project and submit the project report

Text Books

1. Ramesh Gaonkar, “Microprocessor Architecture, Programming, and applications with the 8086”, Penram International Publication.
2. Muhammad Ali Mazidi, “The 8051 Microcontrollers and Embedded Systems using Assembly and C”, PHI.

3. KennethJ.Ayala,"The 8086 Microprocessor: Programming &Interfacing the PC", Delmar Publishers

Reference Books

1. Mano M., "Computer System and Architecture", Prentice Hall of India , New Delhi.
2. William Stallings, " Computer Organization and Architecture", Pearson Education
3. A K Ray,K M Bhurchandi, Advanced Microprocessors and Peripherals, TMH.

Electrical Machines I Laboratory

Course Code	Course Name
PC-BTE409	Electrical Machines I Laboratory

Course pre-requisites	

Course Objectives

The objectives of this course are

1. Study construction of DC motor and transformer..
2. Conduct experiment to learn open circuit and short circuit test on 1 phase and 3 Phase Transformer.
3. Conduct experiment to perform load test on DC shunt motor and transformer.
4. Learn speed control techniques of DC shunt & series motor.
5. Learn concepts of electromagnetics through simulations

Course Outcomes

Upon successful completion of the course, students should be able to

1. Understand the performance characteristics of DC shunt and Series motors
2. Understand the equivalent circuit parameters of transformer.
3. Observe the effect of load variation on the performance of DC motor and transformer
4. Understand and apply concepts of electromagnetics

Course Content

Module No.	*Details*	*Hrs.*
1	Demonstration on construction of transformer and DC machin**es**	**02**
2	To perform load test on DC Shunt Motor.	**02**
3	To study speed control of DC Shunt Motor.	**02**
4	Simulation 1 based on Magnetic fields and magnetic circuits	**02**
5	Simulation 2 based on Electromagnetic force and torque	**02**
6	To study speed control of DC Series Motor.	**02**
7	To perform open circuit and short circuit test on 1 Phase Transformer	**02**
8	To perform load test on 1 Phase Transformer	**02**
9	To perform open circuit and short circuit test on 3 Phase Transformer	**02**
10	To study parallel operation of two single phase transformer.	**02**

Term Work

Term work shall comprise of
Practical examination/ MCQ Examination

Text Books

1. P.C.Sen, Principles of Electric Machines and Power Electronics Wiley India Pvt Ltd.
2. P.S.Bimbra, Electrical Machinery , by Khanna Publisher

Reference Books

1. NagrathI.J., Kothari D.P., Electric Machines, TMH Publication.
2. P.S.Bimbra, Generalized theory of Electrical Machines, Khanna Publisher.

Signals and Systems Laboratory

Course Code	Course Name
PC-BTE410	Signals and Systems Laboratory

Course pre-requisites	

Course Objectives

The objectives of this course are

1. Solve exercises for better understanding of the concepts.
2. To plot the signals.
3. To understand different in-built MATLAB functions related to signals and system.
4. To validate the theoretical results

Course Outcomes

Upon successful completion of the course, students should be able to

1. Solve numerical examples and verify the results.
2. Write a MATLAB/ SCILAB Program to do analysis of signals and systems.
3. Use in-built MATLAB/ SCILAB functions for signals and system analysis.

Course Content

Module No.	*Details*	*Hrs.*
1	Signal plotting and manipulation	02
2	Convolution	02
3	Construction of CT time signal using Fourier Series	02
4	Analysis of a DT system (solving difference equation)	02
5	Analysis of a CT system (solving differential equation)	02
6	Analysis of a CT system (using transfer function), draw pole – zero plot	02
7	Analysis of a DT system (using transfer function), draw pole – zero plot	02

Term Work

Term work shall comprise of

1. Experients
2. Tutorials*
3. MCQ Examination

*Tutorial List

Tut1	Signal plotting, manipulation and classification
Tut2	System classification and convolution
Tut3	DT system analysis in time domain
Tut4	CT Fourier Series, Fourier Transform and system analysis
Tut5	Laplace Transform and system analysis
Tut6	Z Transform and system analysis

Tut7	Realization of CT and DT system

Text Books

1. Alan V. Oppenheim, Alan V. Willsky and S.Hamid Nawab, "Signals and Systems", Prentice-Hall India.
2. Mrinal Mandal and Amir Asif, "Continous and Discrete Time Signals and Systems", Cambrige International Student Edition, Tata McGraw-Hill.
3. Haykin S and Van Veen B., "Signal & Systems", Wiley Publication, 2nd Ed.,2002.
4. Hwei P. Hsu, SCHAUM'S OUTLINES OF "Theory and Problems of Signals and Systems", McGraw-Hill International.

Reference Books

1. Nagrath I. J., Sharan S. N. and Ranjan R., "Signal & Systems", 2nd Ed., 2010.
2. Narayan Iyer, "Signal & Systems", Cengage Learning, 2011.
3. Lindner D.K., "Introduction to Signal & Systems", McGraw-Hill International Edition, 1999.
4. Ambardar, "Analog & Digital Signal Processing", Thomson learning, 2nd Ed.
5. Proakis J.G. and Manolakis D. G., "Digital Signal Processing: Principles, Algorithms and applications", PHI publications (1995).
6. Lathi B.P., "Signal & Systems", Oxford University Press, second edition, 1998.

Indian Traditional Knowledge

Course Code	Course Name
MC-BTE02	Indian Traditional Knowledge

Course pre-requisites	Higher Secondary Education

Course Objectives

The course aims at imparting basic principles of thought process, reasoning and inferencing. Sustainability is at the core of Indian Traditional knowledge Systems connecting society and nature. Holistic life style of yogic science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions. The course provides an introduction to Indian Knowledge Systems, Indian perspective of modern scientific world-view, and basic principles of Yoga and holistic health care system. The course also provides offers an overview of Indian philosophical traditions, Indian linguistic Tradition, and Indian artistic tradition.

Course Outcomes

Upon successful completion of the course, students should be able to

1. Explain basics of Indian tradition and Indian traditional knowledge systems.
2. Describe basics of Indian traditional health care, technologies and its scientific perspectives.
3. Explain basics of Indian artistic, linguistic and philosophical tradition.
4. Co-relate the Indian traditional knowledge in modern scientific perspective

Course Content

Module No.	*Details*	*Hrs.*
1	**Indian Tradition:** Fundamental unity of India, India‟s heroic role in world civilization, The Indian way of life, Introduction to Indian tradition, The Scientific Outlook and Human Values.	06
2	**Basic structure of Indian Knowledge System:** Indian Traditional Scriptures, Exposure to 4-Vedas, 4-Upvedas (Ayurveda, Dhanurveda, Gandharvaveda, Sthapatya etc.), 6-Vedangas (Shiksha, Kalp, Nirukta, Vyakaran, Jyotish), 6-Upangas (Dharmashastra, Meemansa, Puranas, Tarkashastra/Logic) etc.	06
3	**Indian Knowledge System and Modern Science:** Relevance of Science and Spirituality, Science and Technology in Ancient India, Superior intelligence of Indian sages and scientists.	06
4	**Indian Traditional Health Care:** Importance and Practice of Yoga, Pranayam and other prevailing health care techniques.	06
5	**Indian Artistic Tradition:** Introduction and overview of significant art forms in ancient India such as painting, sculpture, Civil Engineering, Architecture, Music, Dance, Literature etc.	06

6	**Indian Linguistic Tradition:** Ancient Indian languages and literary Heritages, Phonology, Morphology, Syntax and Semantics.	06
7	**Indian Philosophical Tradition:** (Sarvadarshan)- Nyay, Viaishepik, Sankhya, Yoga, Meemansa, Brief understanding of Philosophy of Charvaka, Bhagwan Mahaveer Jain, Bhagwan Buddha, Kabeer, Guru Nanak Dev and other eminent	06

Term Activities

The Term Activities will consist of one assignment on each module, group discussions, presentations, case study on various topics based on above curriculum. Required attendances, involvement in academic activities related to course and overall conduct carry weightage.

Text Books

1. Ajwani L.H., *Immortal India*, Vora & Co. Publishers, 1997.
2. Swami Jitatmananda, *Modern Physics and Vedanta*, Bharatiya Vidya Bhavan, 2004.
3. Krishnamurthy, V. *Science and Spirituality- A Vedanta Perception*, Bharatiya Vidya Bhavan, 2002.
4. Sharma D.S., The Upanishadas- An Anthology, Bharatiya Vidya Bhavan, 1989.
5. Raman V.V., *Glimpses of Indian Heritage*, Popular Prakashan,1993.

Reference Books

1. Sivaramakrishnan, V., *Cultural Heritage of India- Course Material*, Bharatiya Vidya Bhavan, Mumbai 5th Edition, 2014.
2. Capra F., Tao of Physics, Shambhala, 2010.
3. Chaterjee S.C. and Datta D.M., *An Introduction to Indian Philosophy*, University of Calcutta, 1984.
4. Krishna Chaitanya, *Arts of India*, Abhinav Publications, 1987.
5. Jha V.N., *Language, Thought and Reality*

Sr. No.	Examination	Module
1	T-I	1,2
2	T-II	3,4
3	End Sem	1 to 7

Value Added Courses

1. PLC (VA-BTE03)

Course Objective:

1. Discuss the purpose, functions, and operations of a PLC
2. Explain basic components of the PLC and how they function

Course Outcome: Students will be able to

1. Generate and print out a ladder logic report using PLC software
2. Create a PLC project using PLC
3. Configure the I/O for a PLC project using PLC

Course content: 1. Introductions to the purpose, functions, and operations of the PLC, 2. Identification of various components of the PLC, Introduction to PLC ladder logic and basic programming concepts, 3. Establishing communications with the PLC, Definitions of conditional inputs and outputs, Electrical continuity versus logical continuity, 4. PLC timer and counter concepts and programming applications, 5. Programming applications using sequencers.

2. Numerical Computations (VA-BTE04)

Course Objective: Provide knowledge of various numerical method available for solving engineering problems.

Course Outcome: Students will be able to write code for numerical methods to solve engineering problems

Course content: Different techniques and programming in C, C++ or MATLAB used for finding 1. roots of equation, 2. solving simultaneous,3. differential equations, 4. integration, 5. interpolation, optimization methods.