

FIRST SEMESTER B E PROGRAM 2016-17
Electrical Science Stream Syllabi Content

Program: UG		
Course Code: 16EEEF101	Course Title: Basic Electrical Engineering	
L-T-P-SS: 3-0-0	Credits:4	Contact Hrs: 50
CIE Marks: 50	SEE Marks: 50	Total Marks: 100
Teaching Hrs: 3		Exam Duration: 3 hours
Unit I		
Chapter No. 1: Overview of Electrical Engineering Specialization, scope & role, impact of Electrical Engineering on national economy, environment, Sources of generation, sustainability, challenges and opportunities for electrical engineers, electrical engineering marvels, future challenges.		02 hrs
Chapter No. 2 : D.C. and Magnetic Circuits Ohm's law, Kirchoff's laws, network analysis by Maxwell's circulating currents, constant current and voltage source, nodal analysis, series magnetic circuits, mmf, reluctance and inductance, simple problems and analogy		08 hrs
Chapter No. 3. Actuators Electromagnetic principles, classification of Electric motors, DC motors-shunt, series, PMDC motors – Speed Control, Stepper Motors, BLDC motors, Characteristics and applications, selection of motors for various applications		05 hrs
Unit II		
Chapter No. 4 : Single phase AC Circuits Introduction to AC circuits and theory of generation of sinusoidal alternating voltage, concept of average and effective (rms) values, form factor, peak factor of sinusoidally varying voltage and current, phasor representation of alternating quantities, analysis with phasor diagrams of RLC circuits, power and power factor in AC circuits, parallel RLC Circuits and numerical. Introduction to Transformers (no-load phasor diagram).		10 hrs
Chapter No. 5: Three Phase Systems Necessity and advantages of three phase systems, generation of three phase e.m.f.s, relationship between line and phase values of balanced star and delta connections,		5 hrs

power in balanced three phase circuits and power measurement using two watt meters, three phase induction motor, numericals	
Unit III	
Chapter No. 6. Batteries: Basics of lead acid batteries, Lithium Ion Battery , Battery storage capacity, Coulomb efficiency, Numerical of high and low charging rates, Battery sizing.	05 hrs
Chapter No. 7: Electrical Wiring, Safety and protection Types of wires and cables for internal wiring, Types of switches and Circuits, Types of wiring, Safety precautions and rules in handling electrical appliances, Electric shock, first aid for electrical shocks, Importance of grounding and earthing, Methods for earthing, Fuses, MCB, ELCB and Relays	05 hrs

Text Books

1. Hughes , Electrical & Electronic Technology, 8th edition, Pearson Education
2. David G Alciatore and Michel B Histan, Introduction to Mechatronics and Measurement Systems, 3rd edition 2005, Tata McGraw Hill Education Private Limited, New Delhi.
3. Gilbert M Masters, Renewable and efficient Electrical Power systems, Published by John Wiley & Sons 2004 edition

Reference Books

1. D C Kulshreshtha, Basic Electrical Engineering, Mc Graw Hill Publications
2. Vincent Del Toro, Electrical Engineering Fundamentals, 2nd edition Prentice Hall India

Course Content (Electrical Sciences)

Course Code : 15EEEF101

L-T-P: 3-0-0

Course Title : Basic Electrical Engineering

CIE : 50

Teaching Hours : 40

SEE : 50

Unit I	
<p>Chapter No. 1: Overview of Electrical Engineering Specialization, scope & role, impact of Electrical Engineering on national economy, environment, Sources of generation, sustainability, challenges and opportunities for electrical engineers, electrical engineering marvels, future challenges.</p>	02 hrs
<p>Chapter No. 2 : D.C. Circuits Ohm's law, Kirchoff's laws, Analysis of series, parallel and series- parallel circuits excited by independent voltage sources, network analysis by Maxwell's circulating currents, constant current and voltage source, nodal analysis.</p>	05 hrs
<p>Chapter No. 3 : Single phase AC Circuits Introduction to AC circuits and theory of generation of sinusoidal alternating voltage, concept of average and effective (rms) values, form factor, peak factor of sinusoidally varying voltage and current, phasor representation of alternating quantities, analysis with phasor diagrams of R, L, C, RL, RC and RLC circuits, power in an AC circuits, and simple numerical problems</p>	08 hrs
Unit II	
<p>Chapter No. 4: Three Phase Systems Necessity and advantages of three phase systems, generation of three phase e.m.f.s, relationship between line and phase values of balanced star and delta connections, power in balanced three phase circuits, numerical problems</p>	7 hrs
<p>Chapter No. 5: Electrical Wiring, Safety and protection Service mains, Meter board and distribution board, types of wires and cables, Types of wiring, Types of connectors and switches, two and three way control of lamp, control circuit in domestic installation. Safety precautions and rules in handling electrical appliances, Electric shock, first aid for electrical shocks, importance of grounding and earthing, methods for earthing, Fuses, MCB and Relays.</p>	8 hrs
Unit III	
<p>Chapter No. 6 : Introduction to Electrical Machines Principles of DC Motors: PMDC Motor, stepper motor, single phase transformer, Three phase induction Motors, applications, Simple Numericals on transformers and three phase induction motors.</p>	05 hrs
<p>Chapter No. 7: Illumination Types of lamps, fixtures and reflectors, Illumination schemes for domestic, industrial and commercial premises, lumen requirement for different categories</p>	05 hrs

Text Books

1. Hughes , Electrical & Electronic Technology, 8th edition, Pearson Education
2. P C Sen, Principals of Electrical Machines and Power Electronics, 2nd edition, Wiley Publications
3. Vincent Del Toro, Electrical Engineering Fundamentals, 2nd edition Prentice Hall India
4. Robert Helm, Illumination Engg for energy efficient luminous environments

Reference Books

1. D C Kulshreshtha, Basic Electrical Engineering, Mc Graw Hill Publications
2. David G Alciatore and Michel B Histan, Introduciton to Mechatronics and Measurement Systems, 3rd edition 2005, Tata McGraw Hill Education Private Limited, New Delhi.



FIRST SEMESTER B E PROGRAM 2016-17
Electrical Science Stream Syllabi Content

Course Code: 16EPHP101	Course Title: Engineering Physics lab		
L-T-P: 0-0-1	Credits : 1	Contact Hrs.: 02 Hrs./Week	
CIE Marks: 80	SEE Marks: 20	Total Marks: 100	
Teaching Hrs.: 24		Examination Duration: 3 Hrs.	
Experiments			
1.	Four probe method		
2.	V-I characteristics of p-n junction diode		
3.	Zener diode characteristics		
4.	Hysteresis loss		
5.	Transistor characteristics		
6.	Measurement of dielectric constant		
7.	Resonance frequency of LCR circuits		
8.	Study of frequency response of passive components		
9.	Calibration of thermocouple		
10.	Calibration of electrical meters		



Course 15EPHP101	Code:	Course Title: Engineering Physics lab (Electrical Sciences)	
L-T-P-SS: 0-0-1-0	Credits : 1	Contact Hrs: 02 Hrs/Week	
CIE Marks: 80	SEE Marks: 20	Total Marks: 100	
Teaching Hrs: 24 Hrs		Examination Duration: 3 Hrs	
Experiments			
1.	Study of Lissajous figures using Cathode ray Oscilloscope		
2.	Self inductance and resistance of a coil		
3.	Hysteresis Loop for a ferromagnetic material (M-B curve)		
4.	Electromagnetic induction		
5.	Magnetic field along the axis of a coil (Biot-Savart Law) Study of Hall effect (Lorentz Force)		
6.	Charging and discharging of a capacitor		
7.	Four probe method to determine the energy gap and electrical resistivity of given semiconductor material.		
8.	V-I characteristics of p-n junction diode		
9.	V-I characteristics of zener diode		
10.	Rectifier circuits with and without filter (Half wave, Full wave & Bridge)		
11.	Zener diode as voltage regulator		
12.	V-I characteristics of BJT.		
13.	Resonance in LCR circuit		



FIRST SEMESTER B E PROGRAM 2016-17
Mechanical Science Stream Syllabi Content

Course Content

Course Code: 15ECRP101	Course Title: Engineering Exploration	
L-T-P: 0-0-3	Credits: 3	Contact Hrs: 78
CIE Marks: 80	SEE Marks: 20	Total Marks: 100
Teaching Hrs: 78		SEE Exam Duration: 3 hrs

No	Content	Sessions
1	Introduction to Engineering and Engineering Study	1
2	Role of Analysis in Engineering, Analysis Methodology	2
3	Data Analysis Graphing	2
4	Basics of Engineering Design, Multidisciplinary Nature of Engineering Design	5
5	Project Management	1
6	Sustainability in Engineering	2
7	Ethics	1
8	Modeling, Simulation and Data Acquisition using Software Tool	1
9	Platform based development : Arduino	3
9	Course Project	3

Reference Books:

1. Engineering Fundamentals & Problem Solving by Arvid Eide, Roland Jenison, Larry Northup, Steven, Mc GrawHill Higher Education, 6th Edition (2011)
2. Engineering Exploration (Edited Book, 2008) by Pearson Publication

Evaluation Scheme

Chapter No	Name	Weightage in percentage
1	Introduction to Engineering and Engineering Study	-
2	Role of Analysis in Engineering	10
3	Analysis Methodology	
4	Data Analysis Graphing	10



5	Basics of Engineering Design	20
	Multidisciplinary Nature of Engineering Design	
6	Project Management	5
7	Sustainability in Engineering	10
8	Ethics	5
9	Modelling, Simulation and Data Acquisition using Software Tool	-
10	Platform Based Development: Arduino	-
10	Course Project	40

FIRST SEMESTER B E PROGRAM 2016-17
Electrical Science Stream Syllabi Content

Program: UG		
Course Code: 15EHSP101	Course Title: Social Innovation	
L-T-P-SS: 0-1-1	Credits:2	Contact Hrs: 40
CIE Marks: 50	SEE Marks: 50	Total Marks: 100
Teaching Hrs: 3	Exam Duration: 1.5 hours	

Module	Topics	Assignments	Tools
KNOWLEDGE & TOOLS	1. Induction to Social Innovation: <ul style="list-style-type: none"> Awakening social consciousness Engineering & Social innovation Site Visits Course Overview 	<ul style="list-style-type: none"> Read the handout on "The Process of Social Innovation" by Geoff Mulgan Submit report on field visit 	<ul style="list-style-type: none"> Special Lectures Field visit Review course objectives and syllabus through PPT Behavioral Blocks to Innovation Questionnaire Case review
	2. Social Innovation and Leadership	<ul style="list-style-type: none"> Report on two social innovations created by engineers/social innovators 	<ul style="list-style-type: none"> Video session & discussion on applications of engineering in social field
	3. Idea Generation	<ul style="list-style-type: none"> One page write up on idea generated about social issues through literatures and observation 	<ul style="list-style-type: none"> Literature survey Field visits
	4. Identifying Local Issues & work team formation	<ul style="list-style-type: none"> One page report on literature review Justification Campus activity 	<ul style="list-style-type: none"> Focused Group Discussions on local challenges observed & Idea pitching Experience sharing by senior students



KNOWLEDGE & TOOLS	5. Issues Based Problem Solving Tree	<ul style="list-style-type: none">• Designing Issue Based Problem Solving Tree for issue identified	<ul style="list-style-type: none">• Case study
	6. Project Proposals	<ul style="list-style-type: none">• Present the project proposal	<ul style="list-style-type: none">• Case study• Report template
	7. Team Analysis	<ul style="list-style-type: none">• Carryout & present SWOT analysis for individual & the team	<ul style="list-style-type: none">• Case study/ Videos
	8. Stakeholder Analysis	<ul style="list-style-type: none">• Prepare & present stakeholder analysis for group project	<ul style="list-style-type: none">• Stakeholder engagement activity
	9. Innovative Budgeting and Fundraising	<ul style="list-style-type: none">• Preparing budget and fundraising report for group project	<ul style="list-style-type: none">• Presentation on fundraising techniques applied for the project
DEVELOPMENT	10. Experiential Sessions	<ul style="list-style-type: none">• Brief write up	<ul style="list-style-type: none">• Special lecture
	11. Experiential Sessions	<ul style="list-style-type: none">• Brief write up	<ul style="list-style-type: none">• Special lecture
	12. Innovative Resource Management	<ul style="list-style-type: none">• Classroom Activity	<ul style="list-style-type: none">• Structure building games
	13. Calculative Risk Management	<ul style="list-style-type: none">• Classroom Activity	<ul style="list-style-type: none">• Risk Management games
IT SESSIONS	14. Exposure to IT Skills- session 1 and session 2	<ul style="list-style-type: none">• IT assignments	<ul style="list-style-type: none">• PPT• Movie Maker• Web Designing & Hosting• Internet Basics



(2015-16)

Engineering Exploration (ISECRP 101)

Experiment wise Plan

List of experiments/jobs planned to meet the requirements of the course.

Category: Exercise		Total Weightage: 80		No. of lab sessions: 16
Expt./ Job No.	Experiment / Job Details	No. of Lab Session(s) per batch (estimate)	Marks / Experiment	Correlation of Experiment with the theory
1	Introduction to Engineering and Engineering Study	2		
	Learning Outcomes: The students should be able to: 1. Explain the importance of engineering profession in the world 2. List the roles of an engineer in the engineering workplace 3. Describe common engineering disciplines and their Specialisations 4. Differentiate between learning at school and learning in college			
2 a	Role of Analysis in Engineering	1		
	Learning Outcomes: The students should be able to: 1. Explain the importance of analysis in engineering 2. Characterize an engineering problem by defining the inputs, output, stating assumptions and uncertainties 3. Prioritize the identified attributes for analysis			
2 b	Analysis Methodology	1	10	
	Learning Outcomes: The students should be able to: 1. Write a mathematical model of a system in terms of applicability and required accuracy 2. Interpret the model of the system using scientific and engineering principles			
3	Data Analysis and Graphing	2	10	
	Learning Outcomes: The students should be able to: 1. Explain the significance of Data Analysis 2. Choose appropriate procedures, tools and techniques to represent a dataset 3. Interpret and analyse data quantitatively and/or graphically 4. Establish the relationship between the physical parameters of raw data to reach appropriate conclusions			
4 a	Basics of Engineering Design	2	10	



	<p>Learning Outcomes: The students should be able to:</p> <ol style="list-style-type: none"> 1. Explain engineering design process 2. Formulate problem definition for the need statement 3. Generate possible design alternatives/ solutions 		
4 b	Multidisciplinary Nature of Engineering Design	3	10
	<p>Learning Outcomes: The students should be able to:</p> <ol style="list-style-type: none"> 1. Identify multi-disciplinary facet of design 2. Construct proposed simple mechanical / mechatronic systems 		
5	Project Management	1	5
	<p>Learning Outcomes: The students should be able to:</p> <ol style="list-style-type: none"> 1. Illustrate the importance of team work in managing project 2. Plan project using relevant project management tools like checklist, timeline and Gantt chart 3. Prepare project report for the chosen project following the given standards 		
6	Sustainability in Engineering	2	10
	<p>Learning Outcomes: The students should be able to:</p> <ol style="list-style-type: none"> 1. Explain that role of engineers is vital in sustainable Engineering Design 2. Analyse an engineering situation based on the three main pillars of sustainable development: Society, Environment and Economy 3. Discriminate engineered products based on their life cycle assessment 4. Draw inferences out of carbon footprint calculations in day to day life 		
7	Ethics	1	5
	<p>Learning Outcomes: The students should be able to:</p> <ol style="list-style-type: none"> 1. Define the terms: etiquette, law, morals and ethics 2. Explain the need for ethics in engineering profession 3. Explain moral theories 4. Analyse the situation for ethical dilemma and make decision 		
8	Modelling, Simulation, Data Acquisition & Analysis using Software Tool	4	20
	<p>Learning Outcomes: The students should be able to:</p> <ol style="list-style-type: none"> 1. Describe the significance of Modelling, Simulation, Data 		



	Acquisition & Analysis 2. Build Virtual Instrument for an application 3. Use looping, timing and formula node concepts appropriately for an application 4. Build a system by interfacing a sensor/transducer	
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References:

1. Engineering Fundamentals & Problem Solving by Arvid Eide, Roland Jenison, Larry Northup, Steven, Mc GrawHill Higher Education, 6th Edition (2011)
2. Engineering Exploration (Edited Book, 2008) by Pearson custom Publishing

Evaluation Scheme

Chapter No	Name	Sessions	Weightage in percentage
1	Introduction to Engineering and Engineering Study	3 hrs	10
2	Role of Analysis in Engineering	3 hrs	
3	Analysis Methodology	3 hrs	
4	Data Analysis Graphing	6 hrs	10
5	Basics of Engineering Design	6 hrs	20
	Multidisciplinary Nature of Engineering Design	6 hrs	
	Review	3hrs	
6	Project Management	3 hrs	5
7	Sustainability in Engineering	3 hrs	10
8	Ethics	6 hrs	5
9	Modelling, Simulation, Data Acquisition & Analysis using Software Tool	12 hrs	20
10	Course Project	24 hrs	20

Date: 7-1-15


CEER Director



FIRST SEMESTER B E PROGRAM 2016-17
Electrical Science Stream Syllabi Content

Common Course

Program: UG			
Course Code: 15EHSP101		Course Title: Social Innovation	
L-T-P-SS: 0-1-1		Credits:2	Contact Hrs: 40
CIE Marks: 50		SEE Marks: 50	Total Marks: 100
Teaching Hrs: 3		Exam Duration: 1.5 hours	
Module	Topics	Assignments	Tools
KNOWLEDGE & TOOLS	1. Induction to Social Innovation: <ul style="list-style-type: none"> Awakening social consciousness Engineering & Social innovation Site Visits Course Overview 	<ul style="list-style-type: none"> Read the handout on "The Process of Social Innovation" by Geoff Mulgan Submit report on field visit 	<ul style="list-style-type: none"> Special Lectures Field visit Review course objectives and syllabus through PPT Behavioral Blocks to Innovation Questionnaire Case review
	2. Social Innovation and Leadership	<ul style="list-style-type: none"> Report on two social innovations created by engineers/social innovators 	<ul style="list-style-type: none"> Video session & discussion on applications of engineering in social field
	3. Idea Generation	<ul style="list-style-type: none"> One page write up on idea generated about social issues through literatures and observation 	<ul style="list-style-type: none"> Literature survey Field visits
	4. Identifying Local Issues & work team formation	<ul style="list-style-type: none"> One page report on literature review Justification Campus activity 	<ul style="list-style-type: none"> Focused Group Discussions on local challenges observed & Idea pitching Experience sharing by senior students
	5. Issues Based Problem Solving Tree	<ul style="list-style-type: none"> Designing Issue Based Problem Solving Tree for issue identified 	<ul style="list-style-type: none"> Case study



KNOWLEDGE & TOOLS	6. Project Proposals	<ul style="list-style-type: none">• Present the project proposal	<ul style="list-style-type: none">• Case study• Report template
	7. Team Analysis	<ul style="list-style-type: none">• Carryout & present SWOT analysis for individual & the team	<ul style="list-style-type: none">• Case study/ Videos
	8. Stakeholder Analysis	<ul style="list-style-type: none">• Prepare & present stakeholder analysis for group project	<ul style="list-style-type: none">• Stakeholder engagement activity
	9. Innovative Budgeting and Fundraising	<ul style="list-style-type: none">• Preparing budget and fundraising report for group project	<ul style="list-style-type: none">• Presentation on fundraising techniques applied for the project
DEVELOPMENT	10. Experiential Sessions	<ul style="list-style-type: none">• Brief write up	<ul style="list-style-type: none">• Special lecture
	11. Experiential Sessions	<ul style="list-style-type: none">• Brief write up	<ul style="list-style-type: none">• Special lecture
	12. Innovative Resource Management	<ul style="list-style-type: none">• Classroom Activity	<ul style="list-style-type: none">• Structure building games
	13. Calculative Risk Management	<ul style="list-style-type: none">• Classroom Activity	<ul style="list-style-type: none">• Risk Management games
IT SESSIONS	14. Exposure to IT Skills- session 1 and session 2	<ul style="list-style-type: none">• IT assignments	<ul style="list-style-type: none">• PPT• Movie Maker• Web Designing & Hosting• Internet Basics



2015-16

Course Code: 15EHSP101

Course Title: **Social Innovation**

L-T-P: 0-1-1

Credits: 2

Contact Hrs: 3 hrs/week

Module	Topics	Assignments	Tools
KNOWLEDGE & TOOLS	1. Induction to Social Innovation: <ul style="list-style-type: none"> Awakening social consciousness Engineering & Social innovation Site Visits Course Overview 	<ul style="list-style-type: none"> Read the handout on "The Process of Social Innovation" by Geoff Mulgan Submit report on field visit 	<ul style="list-style-type: none"> Special Lectures Field visit Review course objectives and syllabus through PPT Behavioral Blocks to Innovation Questionnaire Case review
	2. Social Innovation and Leadership	<ul style="list-style-type: none"> Report on two social innovations created by engineers/social innovators 	<ul style="list-style-type: none"> Video session & discussion on applications of engineering in social field
	3. Idea Generation	<ul style="list-style-type: none"> One page write up on idea generated about social issues through literatures and observation 	<ul style="list-style-type: none"> Literature survey Field visits
	4. Identifying Local Issues & work team formation	<ul style="list-style-type: none"> One page report on literature review Justification Campus activity 	<ul style="list-style-type: none"> Focused Group Discussions on local challenges observed & Idea pitching Experience sharing by senior students
	5. Issues Based Problem Solving Tree	<ul style="list-style-type: none"> Designing Issue Based Problem Solving Tree for issue identified 	<ul style="list-style-type: none"> Case study
	6. Project Proposals	<ul style="list-style-type: none"> Present the project proposal 	<ul style="list-style-type: none"> Case study Report template
	7. Team Analysis	<ul style="list-style-type: none"> Carryout & present SWOT analysis for individual & the team 	<ul style="list-style-type: none"> Case study/ Videos
	8. Stakeholder Analysis	<ul style="list-style-type: none"> Prepare & present stakeholder analysis for group project 	<ul style="list-style-type: none"> Stakeholder engagement activity
	9. Innovative Budgeting and Fundraising	<ul style="list-style-type: none"> Preparing budget and fundraising report for group project 	<ul style="list-style-type: none"> Presentation on fundraising techniques applied for the project
DEVELOPMENT	10. Experiential Sessions	<ul style="list-style-type: none"> Brief write up 	<ul style="list-style-type: none"> Special lecture
	11. Experiential Sessions	<ul style="list-style-type: none"> Brief write up 	<ul style="list-style-type: none"> Special lecture
	12. Innovative Resource Management	<ul style="list-style-type: none"> Classroom Activity 	<ul style="list-style-type: none"> Structure building games
	13. Calculative Risk Management	<ul style="list-style-type: none"> Classroom Activity 	<ul style="list-style-type: none"> Risk Management games



IT SESSIONS	14.Exposure to IT Skills- session 1 and session 2	• IT assignments	<ul style="list-style-type: none">• Presentation Skills• Movie Maker• Web Designing & Hosting• Internet Basics
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Monitoring: Faculty will maintain individual student dairy and assess the performance on weekly basis.



FIRST SEMESTER B E PROGRAM 2018-19

Syllabi Content (New Title) (Common course)		
Program: UG		
Course Title: Single Variable Calculus		Course Code: 18EMAB101
L-T-P: 4-1-0	Credits: 05	Contact Hours: 72
CIE Marks: 50	SEE Marks: 50	Total Marks: 100
Teaching Hours: 06	Examination Duration: 3hrs	
Unit I		
1. Functions, Graphs and Models		07
hours		
Functions, types of functions, transformations and models (Linear, exponential, trigonometric).		
MATLAB: Graphing functions, Domain-Range and Interpreting the models		
2. Calculus of functions and models		13
hours		
Limit of a function, Infinite limits- graph, Continuity and discontinuity, Intermediate value theorem statement, Roots of the equation using Bisection Method and Newton- Raphson Method		
Interpretation of derivative as a rate of change, All the rules of derivatives (List only), Maxima, Minima and optimization problems. Curvature and Radius of Curvature, Indeterminate forms, L- Hospital's rule- Examples		
MATLAB: optimization problems. Curvature problems		
Unit II		
3. Infinite Series		06
hours		
Definition, Convergence of series, Tests of convergence – p-series, Alternating series. Power series, radius of convergence, Taylor's and Maclaurin's series, Applications of Taylor's and Maclaurin's series		

MATLAB: Convergence of series

4. Integral calculus

14

hours

Tracing of standard curves in Cartesian form, Parametric form and Polar form; Beta and gamma function, relation between them, evaluation of integrals using Beta and gamma functions; Applications to find arc length, Area, Volume and surface area (Cartesian, parametric and polar curves). Approximate integration- Trapezoidal rule, Simpson's 1/3 rule

MATLAB: problems on arc length, area, volume and surface area

Unit III

5. Ordinary differential equations of first order

10

hours

(a) Introduction to Initial Value problems. Linear and Bernoulli's equations, Exact equations and reducible to exact form, Numerical solution to Initial Value problems-Euler's method, Modified Euler's method and Runge-Kutta method

(b) Applications of first order differential equations-Orthogonal trajectories growth and decay problems, mixture problems, Electrical circuits, falling bodies.

MATLAB: Solve differential equations

Text Books

1. Early Transcendentals Calculus- James Stewart, Thomson Books, 7ed 2010.

Reference Books:

1. Calculus Single and Multivariable, Hughes-Hallett Gleason, Wiley India Ed, 4ed, 2009.
2. Thomas Calculus, George B Thomas, Pearson India, 12ed, 2010

FIRST SEMESTER B E PROGRAM 2017-18

Syllabi Content

(Old Title) (Common course)

Program: UG		
Course Title: Analytical Geometry and Calculus		Course Code: 15EMAB101
L-T-P: 5-0-0	Credits: 05	Contact Hours: 60
CIE Marks: 50	SEE Marks: 50	Total Marks: 100
Teaching Hours: 05	Examination Duration: 3hrs	
Unit I		
2. Functions and Graphs		05
hours Trigonometric Functions, Exponential Functions and Logarithmic Functions		
3. Limits and continuity		
10 hours Limit of a function, Infinite limits- graph, Continuity and discontinuity, Intermediate value theorem statement, Roots of the equation using Bisection Method and Newton- Raphson Method		
4. Derivatives and applications		10
hours Definition and Interpretation of derivatives as a rate of change, All the rules of derivatives (List only), Maxima, Minima, What does f' and f'' say about f , Curvature and Radius of Curvature, Indeterminate forms – L'Hospital's rule		
Unit II		
5. Infinite Series		10
hours Definition, Convergence of series, Tests of convergence – p-series, comparison test, ratio test Representation of a function as a power series, radius of convergence, Taylor's and Maclaurin's series, Applications of Taylor's and Maclaurin's series		
6. Integral calculus		15
hours Tracing of standard curves in Cartesian form, Parametric form and Polar form; Beta and gamma function, relation between them, evaluation of integrals using Beta and gamma functions; Applications to find arc length, Area, Volume and surface area (Cartesian, parametric and polar curves). Approximate integration- Trapezoidal rule, Simpson's 1/3 rule.		

Unit III

7. Vectors and Geometry of space (5+5)

hours (a) Three dimensional Coordinate system, Vectors in space, position vector, Direction cosines, Direction angles and planes, angle between planes.

(b) Equations of line, coplanar lines, skew lines, surfaces. Cylindrical and spherical coordinates, curves in 3-d spaces

Text Books

1. Early Transcendental Calculus- James Stewart, Thomson Books, 5e 2007

Reference Books:

3. Calculus Single and Multivariable, Hughues- Hallett Gleason, Wiley India Ed, 4ed, 2009.
4. Calculus I, Jerrold Marsden and Alan Weinstein, Springer-Verlag, 2e, 1986.
5. Calculus II, Jerrold Marsden and Alan Weinstein, Springer-Verlag, 2e, 1986.
6. Calculus III, Jerrold Marsden and Alan Weinstein, Springer-Verlag, 2e, 1986.



SECOND SEMESTER B E PROGRAM 2018-19

Syllabi Content

(New Title) (Common course)

Program: UG		
Course Title: Multivariable calculus		Course Code: 18EMAB102
L-T-P: 4-1-0	Credits: 05	Contact Hours: 72
ISA Marks: 50	ESA Marks: 50	Total Marks: 100
Teaching Hours: 06	Examination Duration: 3hrs.	
Unit I		
1. Partial differentiation Function of several variables, Partial derivatives, Level curves, Chain rule, Errors and Approximations. Extreme value problems. Lagrange's multipliers.		12 hours
2. Double integrals Double integrals- Rectangular and polar coordinates, Change the order of integration. Change of variables, Jacobian. Application of double integrals MATLAB: optimization problems, application of double integrals		08 hours
Unit II		
3. Triple integrals Triple integrals, Cartesian, change to Cylindrical and Spherical coordinates Application of Triple integrals		07 hours
4. Calculus of Vector Fields Vector fields, Gradient and directional derivatives. Line and Surface integrals. Independence of path and potential functions. Green's theorem, Divergence of vector field, Divergence theorem, Curl of vector field. Stokes theorem. MATLAB: application of Triple integrals, Vector calculus problems		13 hours
Unit III		
5. Differential equations of higher orders (a) Linear differential equations of second and higher order with constant coefficients. The method of Variation of parameters. Initial and boundary value problems. (b) Applications of second order differential equations-Newton's 2 nd law, electrical circuits, Simple Harmonic motion. Series solution of differential equations. Validity of Series solution of Differential equations.		(5+5) hours

MATLAB: application of differential equations

Text Books :

1. Early Transcendental Calculus- James Stewart, Thomson Books, 7ed 2010

Reference Books:

1. Calculus Single and Multivariable, Hughues-Hallett Gleason, Wiley India Ed, 4ed, 2009.
2. Thomas Calculus, George B Thomas, Pearson India, 12ed, 2010



SECOND SEMESTER B E PROGRAM 2017-18

Syllabi Content (Common course)

Program: UG		
Course Title: Multivariate calculus and differential equations		Course Code: 15EMAB102
L-T-P: 5-0-0	Credits: 05	Contact Hours: 60
CIE Marks: 50	SEE Marks: 50	Total Marks: 100
Teaching Hours: 05	Examination Duration: 3hrs	
Unit I		
6. Partial differentiation		12
hours Function of several variables, Partial derivatives, Level curves, Chain rule, Errors and Approximations. Extreme value problems. Lagrange's multipliers.		
7. Multiple integrals		13
hours Double integrals- Rectangular and polar coordinates, Change the order of integration. Change of variables, Jacobian. Triple integrals- Cartesian, Cylindrical and Spherical coordinates Application of multiple integrals		
Unit II		
8. Calculus of Vector Fields		13
hours Vector fields, Gradient and directional derivatives. Line and Surface integrals. Independence of path and potential functions. Green's theorem, Divergence of vector field, Divergence theorem, Curl of vector field. Stokes theorem.		
9. Differential equations of first order		12
hours Introduction to Initial Value problems. Linear and Bernoulli's equations, Exact equations and reducible to exact form, Applications of first order differential equations- Orthogonal trajectories, growth and decay problems, mixture problems, Electrical circuits, falling bodies. Approximate solution to Initial Value problems-Euler's method, Modified Euler's method and Runge-Kutta method.		
Unit III		
10. Differential equations of higher orders		(5+5)
hours (a) Linear differential equations of second and higher order with constant coefficients The method of Variation of parameters. Initial and boundary value problems. (b) Applications of second order differential equations-Newton's 2 nd law, electrical circuits, Simple Harmonic motion.		

Series solution of differential equations. Validity of Series solution of Differential equations.

Text Books :

1. Early Transcendental Calculus- James Stewart, Thomson Books, 5e 2007

Reference Books:

3. Calculus Single and Multivariable, Hughues-Hallett Gleason, Wiley India Ed, 4ed, 2009.
4. Calculus I, Jerrold Marsden and Alan Weinstein, Springer-Verlag, 2e, 1986.
5. Calculus II, Jerrold Marsden and Alan Weinstein, Springer-Verlag, 2e, 1986.
6. Calculus III, Jerrold Marsden and Alan Weinstein, Springer-Verlag, 2e, 1986.



FIRST SEMESTER B E PROGRAM 2018-19
Electrical Science Stream Syllabi Content

Program: UG		
Course Code: 18EEEF101	Course Title: Basic Electrical Engineering	
L-T-P: 3-0-0	Credits: 3	Contact: 40 Hrs.
CIA Marks: 50	SEE Marks: 50	Total Marks: 100
Teaching : 40 Hrs.		Exam Duration: 3 Hrs.

Chapter No.	Unit-I	Hours
1	Overview of Electrical Engineering Specialization, scope & role, impact of Electrical Engineering on national economy, environment, Sources of generation, sustainability, challenges and opportunities for electrical engineers, electrical engineering marvels, future challenges.	02
2	DC Circuits Voltage and current sources, Kirchoff's current and voltage laws, loop and nodal analysis of simple circuits with dc excitation. Time-domain analysis of first-order RL and RC circuits.	05
3	AC Circuits Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase series and parallel R-L-C ac circuits. Three-phase balanced circuits, voltage and current relations in star and delta connections. power measurement using two watt meters	08
	Unit-II	
4	Electrical Actuators Electromagnetic principles, Solenoid, Relays, classification of Electric motors, DC motors-shunt, series, compound, separately excited, PMDC motors –Speed Control, Stepper Motors, BLDC motors, three phase induction motor, Characteristics and applications, selection of motors for various applications.	9
5	Power Electronics (Text1, chapter 45) Introductory, Thyristor, Some thyristor circuits, Limitations to thyristor operation, The thyristor in practice, The fully controlled AC/DC converter,	6

	AC/DC inversion, Switching devices in inverters, Three-phase rectifier networks, The three-phase fully controlled converter, Inverter-fed induction motors, Soft-starting induction motors, DC to DC conversion switched-mode power	
	Unit-III	
6	Electrical Wiring, Safety and protection(Ref :Text3-page 1 to 10) Types of wires and cables for internal wiring, Types of switches and Circuits, Types of wiring, Safety precautions and rules in handling electrical appliances, Electric shock, first aid for electrical shocks, Importance of grounding and earthing, Methods for earthing, Fuses, MCB, ELCB and Relays, Lockout and Tagout, Electrical Codes and Standards.	05
7	Batteries: Basics of lead acid batteries, Lithium Ion Battery , Battery storage capacity, Coulomb efficiency, Numerical of high and low charging rates, Battery sizing. Numericals.	05

Text Books	
1	Hughes, Electrical & Electronic Technology, 8th , Pearson Education, 2001
2	P C Sen, Principals of Electrical Machines and Power Electronics, 2nd, Wiley Publications
3	Gilbert M Masters, Renewable and efficient Electrical Power systems, Published by John Wiley & Sons 2004 edition
4	Frank D. Petruzella, Electric Motors and Control Systems, McGraw Hill Education Private Limited 2009 Edition
Reference Books:	
1	D C Kulshreshtha, Basic Electrical Engineering, Mc Graw Hill Publications
2	David G Alciatore and Michel B Histan, Introduction to Mechatronics and Measurement Systems, 3rd, Tata McGraw Hill Education Private Limited, New Delhi., 2005
3	Vincent Del Toro, Electrical Engineering Fundamentals, 2 nd edition Prentice Hall India



FIRST SEMESTER B E PROGRAM 2017-18

Electrical Science Stream Syllabi Content

CONTENT

Program: UG		
Course Code: 16EEEF101	Course Title: Basic Electrical Engineering	
L-T-P-SS: 3-0-0	Credits:4	Contact Hrs: 50
CIE Marks: 50	SEE Marks: 50	Total Marks: 100
Teaching Hrs: 3		Exam Duration: 3 hours
Unit I		
Chapter No. 1: Overview of Electrical Engineering Specialization, scope & role, impact of Electrical Engineering on national economy, environment, Sources of generation, sustainability, challenges and opportunities for electrical engineers, electrical engineering marvels, future challenges.		02 hrs
Chapter No. 2 : D.C. and Magnetic Circuits Ohm's law, Kirchoff's laws, network analysis by Maxwell's circulating currents, constant current and voltage source, nodal analysis, series magnetic circuits, mmf, reluctance and inductance, simple problems and analogy		08 hrs
Chapter No. 3. Actuators Electromagnetic principles, classification of Electric motors, DC motors-shunt, series, PMDC motors – Speed Control, Stepper Motors, BLDC motors, Characteristics and applications, selection of motors for various applications		05 hrs
Unit II		
Chapter No. 4 : Single phase AC Circuits Introduction to AC circuits and theory of generation of sinusoidal alternating voltage, concept of average and effective (rms) values, form factor, peak factor of sinusoidally varying voltage and current, phasor representation of alternating quantities, analysis with phasor diagrams of RLC circuits, power and power factor in AC circuits, parallel RLC Circuits and numerical. Introduction to Transformers (no-load phasor diagram).		10 hrs
Chapter No. 5: Three Phase Systems Necessity and advantages of three phase systems, generation of three phase e.m.f.s, relationship between line and phase values of balanced star and delta connections,		5 hrs

power in balanced three phase circuits and power measurement using two watt meters, three phase induction motor, numericals	
Unit III	
Chapter No. 6. Batteries: Basics of lead acid batteries, Lithium Ion Battery , Battery storage capacity, Coulomb efficiency, Numerical of high and low charging rates, Battery sizing.	05 hrs
Chapter No. 7: Electrical Wiring, Safety and protection Types of wires and cables for internal wiring, Types of switches and Circuits, Types of wiring, Safety precautions and rules in handling electrical appliances, Electric shock, first aid for electrical shocks, Importance of grounding and earthing, Methods for earthing, Fuses, MCB, ELCB and Relays	05 hrs

Text Books

1. Hughes , Electrical & Electronic Technology, 8th edition, Pearson Education
2. David G Alciatore and Michel B Histan, Introducton to Mechatronics and Measurement Systems, 3rd edition 2005, Tata McGraw Hill Education Private Limited, New Delhi.
3. Gilbert M Masters, Renewable and efficient Electrical Power systems, Published by John Wiley & Sons 2004 edition

Reference Books

1. D C Kulshreshtha, Basic Electrical Engineering, Mc Graw Hill Publications
2. Vincent Del Toro, Electrical Engineering Fundamentals, 2nd edition Prentice Hall India



SECOND SEMESTER B E PROGRAM 2018-19
Mechanical Science Stream Syllabi Content

Program: UG		
Course Code: 18EEEF102	Course Title: Basic Electrical Engineering	
L-T-P: 3-0-0	Credits: 3	Contact Hrs.: 40
CIA Marks: 50	ESA Marks: 50	Total Marks: 100
Teaching:40 Hrs..	Exam Duration: 3 Hrs..	

Chapter No.	Unit-I	Hrs..
1	Overview of Electrical Engineering Specialization, scope & role, impact of Electrical Engineering on national economy, environment, Sources of generation, sustainability, challenges and opportunities for electrical engineers, electrical engineering marvels, future challenges.	02
2	DC Circuits Voltage and current sources, Kirchoff's current and voltage laws, loop and nodal analysis of simple circuits with dc excitation. Time-domain analysis of first-order RL and RC circuits.	05
3	AC Circuits Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase series and parallel R-L-C ac circuits. Three-phase balanced circuits, voltage and current relations in star and delta connections. power measurement using two watt meters	08
	Unit-II	
4	Electrical Actuators Electromagnetic principles, Solenoid, Relays, classification of Electric motors, DC motors-shunt, series, compound, separately excited, PMDC motors – Speed Control, Stepper Motors, BLDC motors, three phase induction motor, Characteristics and applications, selection of motors for various applications.	9
5	Power Electronics (Text1, chapter 45) Introductory, Thyristor, Some thyristor circuits, Limitations to thyristor operation, The thyristor in practice, The fully controlled AC/DC converter, AC/DC inversion, Switching devices in inverters, Three-phase rectifier networks, The three-phase fully controlled converter, Inverter-fed induction motors, Soft-starting induction motors, DC to DC conversion switched-mode power	6
	Unit-III	



6	Electrical Wiring, Safety and protection(ref :Text3-page 1 to 10) Types of wires and cables for internal wiring, Types of switches and Circuits, Types of wiring, Safety precautions and rules in handling electrical appliances, Electric shock, first aid for electrical shocks, Importance of grounding and earthing, Methods for earthing, Fuses, MCB, ELCB and Relays, Lockout and Tagout, Electrical Codes and Standards.	05
7	Batteries: Basics of lead acid batteries, Lithium Ion Battery , Battery storage capacity, Coulomb efficiency, Numerical of high and low charging rates, Battery sizing. Numericals..	05

Text Books	
1	Hughes, Electrical & Electronic Technology, 8th , Pearson Education, 2001
2	P C Sen, Principals of Electrical Machines and Power Electronics, 2nd, Wiley Publications
3	Gilbert M Masters, Renewable and efficient Electrical Power systems, Published by John Wiley & Sons 2004 edition
4	Frank D. Petruzella, Electric Motors and Control Systems, McGraw Hill Education Private Limited 2009 Edition
Reference Books:	
1	D C Kulshreshtha, Basic Electrical Engineering, Mc Graw Hill Publications
2	David G Alciatore and Michel B Histan, Introduction to Mechatronics and Measurement Systems, 3rd, Tata McGraw Hill Education Private Limited, New Delhi., 2005
3	Vincent Del Toro, Electrical Engineering Fundamentals, 2 nd edition Prentice Hall India

SECOND SEMESTER B E PROGRAM 2017-18

Mechanical Science Stream Syllabi Content

Course Code: 16EEEF102	Course Title: Basic Electrical Engineering	
L-T-P-SS: 3-0-0	Credits: 3	Contact Hrs/Week: 3
CIE Marks: 50	SEE Marks: 50	Total Marks: 100
Teaching Hrs: 50	Exam Duration: 3 hours	
Unit I		
Chapter No. 1: Overview of Electrical Engineering Specialization, scope & role, impact of Electrical Engineering on national economy, environment, Sources of generation, sustainability, challenges and opportunities for electrical engineers, electrical engineering marvels, future challenges.		02 hrs.
Chapter No. 2 : D.C. and Network Theorems Ohm's law, Kirchhoff's laws, Analysis of series, parallel and series- parallel circuits excited by independent voltage sources, network analysis by Maxwell's circulating currents, constant current and voltage source, nodal analysis, Thevenin's Theorem, Norton's Theorem.		8 hrs.
Chapter No. 3. Actuators Electromagnetic principles, classification of Electric motors, DC motors- shunt, series, PMDC motors – Speed Control, Stepper Motors, BLDC motors, Characteristics and applications, selection of motors for various applications		5 hrs.
Unit II		
Chapter No. 5 : Single phase AC Circuits Introduction to AC circuits and theory of generation of sinusoidal alternating voltage, concept of average and effective (rms) values, phasor representation of alternating quantities, analysis with phasor diagrams of RLC circuits, power and power factor in AC circuits, parallel RLC Circuits and numericals, transformers.		10 hrs.
Chapter No. 6. Three Phase Systems Necessity and advantages of three phase systems, generation of three phase e.m.f.s, relationship between line and phase values of balanced star and delta connections, power in balanced three phase circuits, three phase induction motor, numerical		05 hrs.
Unit III		

<p>Chapter No. 6: Batteries Basics of lead acid batteries, Lithium Ion Battery, Battery storage capacity, Coulomb efficiency, high and low charging rates, Battery sizing, numericals.</p>	<p>05 hrs.</p>
<p>Chapter No. 7: Electrical Wiring, Safety and protection Types of wires and cables for internal wiring, Types of switches and Circuits, Types of wiring, Safety precautions and rules in handling electrical appliances, Electric shock, first aid for electrical shocks, Importance of grounding and earthing, Methods for earthing, Fuses, MCB, ELCB, and Relay</p>	<p>05 hrs.</p>

Text Books

1. Hughes , Electrical & Electronic Technology, 8th edition, Pearson Education
2. David G Alciatore and Michel B Histan, Introduciton to Mechatronics and Measurement Systems, 3rd edition 2005, Tata McGraw Hill Education Private Limited, New Delhi.
3. Gilbert M Masters, Renewable and efficient Electrical Power systems, Published by John Wiley & Sons 2004 edition

Reference Books

1. D C Kulshreshtha, Basic Electrical Engineering, Mc Graw Hill Publications
2. Vincent Del Toro, Electrical Engineering Fundamentals, 2nd edition Prentice Hall India



FIRST SEMESTER B E PROGRAM 2018-19

Mechanical Science Stream Syllabi Content

Program: UG			Teaching Hours
Course Title: Basic Electronics		Course Code: 18EECF102	
L-T-P: 4-0-0	Credits: 4	Contact Hours: 4Hrs/week	
ISA Marks: 50	ESA Marks: 50	Total Marks: 100	
Teaching Hours: 50 Hrs.	Examination Duration: 3 Hrs.		
Unit I			
Chapter 1: Overview of Electronics in Mechanical Engineering Definition & overview of Mechatronics, Mechatronics and Design Innovation, Mechatronics and Manufacturing, Mechatronics and Education; Typical Mechatronics Components; Sensors and Transducers.			03
Chapter 2: Semiconductor Devices and Applications: PN junction diode, characteristics and parameters, diode approximations, half wave rectifier, full wave bridge rectifier, full wave bridge rectifier capacitor filter, Zener diode, Voltage regulator design, BJT, Darlington Pair, JFET, MOSFET, UJT, SCR.			10
Chapter 3: Operational Amplifiers: Ideal op-amp characteristics, op-amp applications: Comparator, Inverting amplifier, Non-inverting amplifier, Voltage follower, Integration, Differentiation, Adder, Subtractor and numerical as applicable.			08
Unit II			
Chapter 4: Digital Logic: Digital Number system: Binary & Hexadecimal number systems, Conversion, BCD Number system, Gray code, Data word representation , Binary Arithmetic, Boolean Algebra, Logic gates, Combinational & Sequential circuits, Adders, Flip-Flops, Registers, Counters, Multiplexer.			13
Introduction to Digital Electronics (Text-2): Introduction, Switching and Logic Levels using circuits, Digital Waveform (Sections 9.1to 9.3).Number system: Binary, Octal Decimal and Hexadecimal, Inter Conversion, BCD Number system, Gray code, Data word representation , Binary Arithmetic, Boolean Algebra: Laws, rules & theorems of Boolean algebra, Sum of products form (SOP), products of sum form (POS) of Boolean functions. Study of Karnaugh Maps (K-maps) for 2, 3 & 4 variables only. Logic gates, Adders, Encoder, Decoder, Multiplexer and Demultiplexer. Combinational & Sequential circuits, Latches and Flip-Flops(SR, JK, D, T),			

<p>Chapter 5: Sensors and Transducers : Introduction, Classification of sensors and transducers, Contact type – Mechanical switches, Non-contact type - proximity sensors & Hall sensors, principle of working of light sensors, Future Challenges</p>	06
Unit – III	
<p>Chapter 6: Signal Conditioning: Analog & Digital signals, Digital to Analog Conversion, R-2R DAC, Analog to Digital Conversion, SAR ADC, Data Acquisition.</p>	06
<p>Chapter 7: Case Studies of Mechatronic Systems: Automatic Camera, Drilling Machine, Bar code reader.</p>	04
<p>Text Book</p> <ol style="list-style-type: none"> 1. David A Bell, “Electronic devices and Circuits” , PHI New Delhi, 2004. 2. Morris Mano, “Digital logic and Computer design” 21st Indian print Prentice Hall India, 2000. 3. W.Bolton, "Mechatronics - Electronic Control Systems in Mechanical and Electrical Engineering", 3rd edition Pearson Education, 2005. 4. David Bradley and David W., “Mechatronics in Action”, 2nd edition, Springer, 2010 <p>References</p> <ol style="list-style-type: none"> 1. David G Alciatore, Michael B Histan, “Introduction to Mechatronics and Measurement Systems”, TMH 3rd edition, 2007. 2. K.A Krishnamurthy and M.R.Raghuveer, “Electrical, Electronics and Computer Engineering for Scientist and Engineers”, Second Edition New Age International Publishers, Wiley Eastern, 2001. 3. P. Malvino, “Electronic Principles” Sixth edition Tata McGraw Hill, 1999. 4. Floyd, “Digital fundamentals” Third Edition Prentice Hall India, 2001 5. BoylesteadNashelsky, “Electronic devices & Circuit theory” Sixth Edition Prentice Hall India, 2000. 6. RamakantGayekawad “Operational Amplifiers & applications” 3rd Edition, PHI, 2000. 	



FIRST SEMESTER B E PROGRAM 2017-18
Mechanical Science Stream Syllabi Content

Course code: 15EECF101	Course Title: Basic Electronics	
L-T-P: 4-0-0	Credits: 4	Contact Hrs.: 4
CIE Marks: 50	SEE Marks: 50	Total Marks: 100
Teaching Hrs: 50	Exam Duration: 3 hrs	
1. Introduction to Mechatronics: Definition & overview of Mechatronics, Introduction to microprocessor based control. Mechatronics approach, examples of Mechatronics systems.		03 Hrs
2. Semiconductor Devices and Applications: PN junction diode, characteristics and parameters, diode approximations, Half wave rectifier, full wave bridge rectifier, full wave bridge rectifier capacitor filter, Zener diode, Voltage regulator design. BJT, Darlington Pair, JFET, MOSFET, UJT, SCR, Triac, IGBT.		10 Hrs
3. Operational Amplifiers: Ideal op-amp characteristics, op-amp applications: Comparator, Inverting amplifier, Non inverting amplifier, Voltage follower, Integration, Differentiation, Adder, Subtractor and numerical as applicable.		08 Hrs
Unit – II		
4. Digital Logic: Digital Number system -- Binary & Hexadecimal number systems, Conversion, BCD Number system, Gray code, Data word representation, Binary Arithmetic, Boolean Algebra, Logic gates, Combinational & Sequential circuits, Adders, Flip-Flops, Registers, Counters, Multiplexer.		13 Hrs
5. Sensors and Transducers : Introduction, Classification of sensors and transducers, Contact type – Mechanical switches, Non-contact type - proximity sensors & Hall sensors, principle of working of light sensors.		06 Hrs
Unit – III		
6. Signal Conditioning: Analog & Digital signals, Digital to Analog Conversion, R-2R DAC, Analog to Digital Conversion, SAR ADC, Data Acquisition.		06 Hrs
7. Case Studies of Mechatronics Systems: Automatic Camera, Drilling Machine, Bar code reader.		04 Hrs

Text Book

- David G Alciatore, Michael B Histan, "Introduction to Mechatronics and Measurement Systems", TMH 3rd edition, 2007.
- David A Bell, "Electronic devices and Circuits", PHI New Delhi, 2004.

3. W.Bolton, "Mechatronics - Electronic Control Systems in Mechanical and Electrical Engineering", 3rd edition Pearson Education, 2005.

References

1. N.P.Mahalik, "Mechatronics - Principles, Concepts and Applications", Tata McGraw-Hill, 2011.
2. K.A Krishnamurthy and M.R.Raghuveer, "Electrical, Electronics and Computer Engineering for Scientist and Engineers", Second Edition New Age International Publishers, Wiley Eastern, 2001.
3. P. Malvino, "Electronic Principles" Sixth edition Tata McGraw Hill, 1999.
4. George Kennedy, "Electronic Communication Systems" Fourth Edition Tata McGraw Hill, 2000.
5. Morris Mano, "Digital logic and Computer design" 21st Indian print Prentice Hall India, 2000.
6. Floyd, "Digital fundamentals" Third Edition Prentice Hall India, 2001.
7. Boylestead Nashelsky, "Electronic devices & Circuit theory" Sixth Edition Prentice Hall India, 2000.
8. Ramakant Gayekawad "Operational Amplifiers & applications" 3rd Edition, PHI, 2000.



SECOND SEMESTER B E PROGRAM 2018-19
Electrical Science Stream Syllabi Content

Program: UG			
Course Title: Basic Electronics		Course Code: 18EECF101	
L-T-P: 4-0-0	Credits: 4	Contact Hours: 4 Hrs./week	
ISA Marks: 50		ESA Marks: 50	Total Marks: 100
Teaching Hours: 50Hrs.		Examination Duration: 3 Hrs..	

Unit 1	Hours
Chapter 1: Trends in Electronic Industries: Introduction, Roadmap of electronic sector, scope and opportunities in various segments of electronics (i.e., Consumer, Telecom, IT, Defense, Industrial, Medical and Automobiles), Government and private sectors, Growth profile of Electronic industries, Standards and PoliISAs, Electronic System Components.	03
Chapter 2: Basic Components, Devices and Applications: Diode: PN junction characteristics; modeling as a circuit element, ideal and practical diode. AC to DC converter: Half wave and full wave rectifier (centre tap and bridge), capacitor filter and its analysis, numerical examples. Zener diode and its applications (Voltage reference and voltage regulator). Realization of simple logic gates like AND and OR gates.	10
Chapter 3: Transistor: BJT, transistor voltages and currents, Signal amplifier (Fixed bias, Collector base bias, Voltage divider bias, CE configuration). DC load line. Voltage, current and power gains. Transistor as a switch: NOT Gate, Basic (DTL) NAND gate. Transistor as a Small Signal Amplifier (Single Stage and Two Stage RC-coupled Amplifier).	07
Unit 2	
Chapter 4: Digital Logic: Number systems: Decimal, Binary, Octal and Hexadecimal number systems, Conversions, Binary Operations-Addition and subtraction in binary number systems. Logic gates: Realization of simple logic functions using basic gates (AND, OR, NOT), Realization using universal gates (NAND, NOR). Boolean algebra: Theorems and postulates, DeMorgan's Theorems, simplification of logical expressions, Karnaugh Maps, Use of Karnaugh Maps to Minimize Boolean Expressions (2 Variables, 3 Variables and 4 Variables), Design of Half Adder and Full Adder, Parallel Adder using full adders.	14
Chapter 5: Operational Amplifier: OPAMP characteristics (ideal and practical), Linear and non-linear applications: Inverting amplifier, Non inverting amplifier, Voltage follower, Integration, Differentiation, Adder, Subtractor, ZCD and Comparator.	06

Unit 3	
Chapter 6: Communication Systems: Basic block diagram of communication system, types of modulation. Amplitude modulation: Time-Domain description, Frequency-Domain description. Generation of AM wave: square law modulator. Detection of AM waves: envelope detector. Double side band suppressed carrier modulation (DSBSC), Generation of DSBSC wave : balanced modulator, Super heterodyne principle.	07
Chapter 7: Linear Power Supply, UPS & CRO: Working principle of linear power supply, UPS and CRO. Measurement of amplitude, frequency and phase of a given signal.	03

Text Book

1. David A Bell, Electronic devices and Circuits, PHI New Delhi, 2004
2. K.A Krishnamurthy and M.R.Raghuveer, Electrical, Electronics and Computer Engineering for SIS Antist and Engineers, 2, New Age International Publishers, 2001
3. A.P. Malvino, Electronic Principles, Tata McGraw Hill, 1999

References

1. George Kennedy, Electronic Communication Systems, Tata McGraw Hill, 2000
2. Morris Mano, Digital logic and Computer design , 21st Indian print Prentice Hall India, 2000
3. Floyd, Digital fundamentals, 3, Prentice Hall India, 2001
4. BoylesteadNashelsky, Electronic devices & Circuit theory, Prentice Hall India, 2000
5. RamakantGaikawad , Operational Amplifiers & applications, PHI, 2000

SECOND SEMESTER B E PROGRAM 2017-18

Electrical Science Stream Syllabi Content

Course Code: 15EECF102	Course Title: Basic Electronics	
L-T-P: 0-0-3	Credits: 3	Contact Hrs.: 6
CIE Marks: 80	SEE Marks: 20	Total Marks: 100
Teaching Hrs: 78	Exam Duration: 3 hrs	

<u>Unit - I</u>	
1. Trends in Electronic Industries: Introduction, Roadmap of electronic sector, scope and opportunities in various segments of electronics (i.e., Consumer, Telecom, IT, Defense, Industrial, Medical and Automobiles), Government and private sectors, Growth profile of Electronic industries, Standards and Policies, Electronic System Components.	3 hours
2. Basic components, devices and Applications: Diode: PN junction characteristics; forward conduction, reverse breakdown, temperature dependence, modeling as a circuit element, approximations. AC to DC converter: Half wave and full wave rectifier (centre tap and bridge), capacitor filter and its approximate analysis, numerical examples as applicable. Zener diode and its applications (Voltage reference and voltage regulator). Common anode and common cathode connections, Simple logic gates : AND , OR	11 hours
3. Transistor: BJT, transistor voltages and currents, Signal amplifier (Fixed bias, CE configuration). DC load line. Voltage, current and power gains. Transistor as a switch: NOT Gate, Basic (DTL) NAND gate	6 hours
<u>Unit-II</u>	
4. Digital Logic: Number systems: Decimal, Binary, Octal and Hexadecimal number systems, Conversions, Addition and subtraction in binary number systems. Logic gates: Realization of simple logic functions using basic gates (AND, OR, NOT), Realization using universal gates (NAND, NOR) . Boolean algebra: Theorems and postulates, DeMorgan's Theorems, simplification of logical expressions, Design of Half Adder and Full Adder, Parallel Adder using full adders.	10 Hrs
5. Operational Amplifier: OPAMP characteristics (ideal and practical). Concept of positive and negative feedback (At zero frequency). Linear and non-linear	8 hours

applications: Inverting amplifier, Non inverting amplifier, Voltage follower, Integration, Differentiation, Adder, Subtractor, ZCD and Comparator.	
Unit-III	
6. Communication Systems: Basic block diagram of communication system, concept of multiplexing, modulation. Different modulation techniques: AM, FM, their comparison	6 hours
7. Receivers & CRO: Super heterodyne receivers (block schematic) Block diagram of CRO, Block diagram of CRT, measurement of amplitude, frequency and phase of a given signal.	6 hours

Text Books:

- David A Bell, "Electronic devices and Circuits", PHI New Delhi, 2004.
- K.A Krishnamurthy and M.R.Raghuveer, "Electrical, Electronics and Computer Engineering for Scientist and Engineers", Second Edition New Age International Publishers, Wiley Eastern, 2001.
- A. P. Malvino, "Electronic Principles" Sixth edition Tata McGraw Hill, 1999.

Reference Books:

- George Kennedy, "Electronic Communication Systems" Fourth Edition Tata McGraw Hill, 2000.
- Morris Mano, "Digital logic and Computer design" 21st Indian print Prentice Hall India, 2000.
- Floyd, "Digital fundamentals" Third Edition Prentice Hall India, 2001.
- Boylestead Nashelsky, "Electronic devices & Circuit theory" Sixth Edition Prentice Hall India, 2000.
- Ramakant Gaikwad "Operational Amplifiers & applications" 3rd Edition, PHI, 2000.



SECOND SEMESTER B E PROGRAM 2018-19
Electrical Science Stream Syllabi Content
(New Course)

Program: UG		
Course Title: Problem Solving with Data Structures	Course Code: 18ECSP102	
L-T-P: 0-0-3	Credits: 3	Contact : 6 Hrs./week
ISA Marks: 80	ESA Marks: 20	Total Marks: 100
Teaching : 78 Hrs..	Exam Duration: 3 Hrs..	

1	Pointers, Structures and Files Recap of basics: Pointers ,Structures; Self-referential structures, dynamic memory management Files – File manipulation programs	12 hrs.
2	Stacks and Recursion Stack: Definition, Operations, Stack ADT Implementation of stack operations. Applications of stack. Recursion- Need for Recursion and problems on Recursion.	16 hrs.
3	Queues Queue: Definitions of Linear, Circular queues, Queue ADT Linear and circular queue operations Definition and working of Priority queue, Double ended queue; Applications of queues.	16 hrs.
4	Lists Concept of lists and dynamic memory management lists, definitions and representations: singly, doubly, circular lists. Dynamic Implementation of lists and its operations, Applications of linked lists	18 hrs.
5	Binary trees	16 hrs.

	Binary Tree: Definition, Terminology and representation, Tree Traversals both recursive and iterative. Binary Search Tree and its applications.	
Text Books <ol style="list-style-type: none">1. Data Structures with C -- Seymour Lipschutz, Schaum's Outline Series2. Data Structures Using C and C++ -- Langsam and Tanenbaum, PHI Publication3. Data Structures Through C -- Yashavant P Kanetkar, BPB Publication		
Reference Books: <ol style="list-style-type: none">1. Data Structures, Algorithms and Applications In C++ -- Satraj Sahani2. Data Structures and Algorithms Made Easy – Narshiman Karumunchi, Career Monk		