

Course No.	Course Name	L-T-P - Credits	Year of Introduction
MA201	LINEAR ALGEBRA AND COMPLEX ANALYSIS	3-1-0-4	2016
Prerequisite : Nil			
Course Objectives COURSE OBJECTIVES <ul style="list-style-type: none"> To equip the students with methods of solving a general system of linear equations. To familiarize them with the concept of Eigen values and diagonalization of a matrix which have many applications in Engineering. To understand the basic theory of functions of a complex variable and conformal Transformations. 			
Syllabus Analyticity of complex functions-Complex differentiation-Conformal mappings-Complex integration-System of linear equations-Eigen value problem			
Expected outcome . At the end of the course students will be able to (i) solve any given system of linear equations (ii) find the Eigen values of a matrix and how to diagonalize a matrix (iii) identify analytic functions and Harmonic functions. (iv) evaluate real definite Integrals as application of Residue Theorem (v) identify conformal mappings (vi) find regions that are mapped under certain Transformations			
Text Book: Erwin Kreyszig: Advanced Engineering Mathematics, 10 th ed. Wiley			
References: 1. Dennis g Zill & Patric D Shanahan-A first Course in Complex Analysis with Applications-Jones & Bartlet Publishers 2. B. S. Grewal. Higher Engineering Mathematics, Khanna Publishers, New Delhi. 3. Lipschutz, Linear Algebra, 3e (Schaums Series) McGraw Hill Education India 2005 4. Complex variables introduction and applications-second edition-Mark.J.Owitz-Cambridge Publication			
Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	Complex differentiation Text 1[13.3,13.4] Limit, continuity and derivative of complex functions	3	15%
	Analytic Functions	2	
	Cauchy–Riemann Equation (Proof of sufficient condition of analyticity & C R Equations in polar form not required)-Laplace's Equation	2	
	Harmonic functions, Harmonic Conjugate	2	
II	Conformal mapping: Text 1[17.1-17.4] Geometry of Analytic functions Conformal Mapping,	1	15%
	Mapping $w = z^2$ conformality of $w = e^z$.	2	

	<p>The mapping $w = z + \frac{1}{z}$</p> <p>Properties of $w = \frac{1}{z}$</p> <p>Circles and straight lines, extended complex plane, fixed points</p> <p>Special linear fractional Transformations, Cross Ratio, Cross Ratio property-Mapping of disks and half planes</p> <p>Conformal mapping by $w = \sin z$ & $w = \cos z$</p> <p>(Assignment: Application of analytic functions in Engineering)</p>	1 3 3	
FIRST INTERNAL EXAMINATION			
III	<p><u>Complex Integration. Text 1[14.1-14.4] [15.4&16.1]</u></p> <p>Definition Complex Line Integrals, First Evaluation Method, Second Evaluation Method</p> <p>Cauchy's Integral Theorem(without proof), Independence of path(without proof), Cauchy's Integral Theorem for Multiply Connected Domains (without proof)</p> <p>Cauchy's Integral Formula- Derivatives of Analytic Functions(without proof)Application of derivative of Analytical Functions</p> <p>Taylor and Maclaurin series(without proof), Power series as Taylor series, Practical methods(without proof)</p> <p>Laurent's series (without proof)</p>	2 2 2 2 2	15%
IV	<p><u>Residue Integration Text 1 [16.2-16.4]</u></p> <p>Singularities, Zeros, Poles, Essential singularity, Zeros of analytic functions</p> <p>Residue Integration Method, Formulas for Residues, Several singularities inside the contour Residue Theorem.</p> <p>Evaluation of Real Integrals (i) Integrals of rational functions of $\sin\theta$ and $\cos\theta$ (ii) Integrals of the type $\int_{-\infty}^{\infty} f(x)dx$ (Type I, Integrals from 0 to ∞)</p> <p>(Assignment : Application of Complex integration in Engineering)</p>	2 4 3	15%
SECOND INTERNAL EXAMINATION			
V	<p>Linear system of Equations Text 1(7.3-7.5)</p> <p>Linear systems of Equations, Coefficient Matrix, Augmented Matrix</p> <p>Gauss Elimination and back substitution, Elementary row operations, Row equivalent systems, Gauss elimination-Three possible cases, Row Echelon form and Information from it.</p>	1 5	20%

	Linear independence-rank of a matrix Vector Space-Dimension-basis-vector space \mathbf{R}^3	2	
	Solution of linear systems, Fundamental theorem of non-homogeneous linear systems(Without proof)-Homogeneous linear systems (Theory only)	1	
VI	Matrix Eigen value Problem Text 1.(8.1,8.3 &8.4) Determination of Eigen values and Eigen vectors-Eigen space Symmetric, Skew Symmetric and Orthogonal matrices –simple properties (without proof) Basis of Eigen vectors- Similar matrices Diagonalization of a matrix- Quadratic forms- Principal axis theorem(without proof) (Assignment-Some applications of Eigen values(8.2))	3 2 4	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks : 100 Exam Duration: 3 hours

The question paper will consist of 3 parts.

Part A will have 3 questions of 15 marks each uniformly covering modules I and II. Each question may have two sub questions.

Part B will have 3 questions of 15 marks each uniformly covering modules III and IV. Each question may have two sub questions.

Part C will have 3 questions of 20 marks each uniformly covering modules V and VI. Each question may have three sub questions.

Any two questions from each part have to be answered.

Course code	Course Name	L-T-P - Credits	Year of Introduction
MR201	C Programming	3-1-0 -4	2016
Pre requisites : Nil			
Course Objectives			
<ul style="list-style-type: none"> To impart the basic concepts of computer and information technology To develop skill in problem solving concepts through learning C programming with a practical approach. 			
Syllabus			
Introduction to Computers- Evolution and comparative study of processors- Machine language, assembly language, and high level language- Concept of Program and data, System software- Windows, and Linux. Compilers and assemblers, Computer networks: LAN, WiFi- Basic elements of C- Input and Output functions- Functions and Program structures- Structures -Recursion- Arrays- Pointers-Concept of a file- Example programs.			
Expected outcome			
<ol style="list-style-type: none"> Students will acquire knowledge on the components and working of computers. Students will get knowledge in computer networks and operating systems. Students will understand the role of compilers, pointers, arrays etc in C programming. 			
Text Book:			
<ol style="list-style-type: none"> P. Norton, <i>Peter Norton's Introduction to Computers</i>, Tata McGraw Hill, New Delhi. E. Balaguruswamy, <i>Programming in ANSI C</i>, 3rd ed., Tata McGraw Hill, New Delhi, 2004 			
References:			
<ol style="list-style-type: none"> B. Gottfried, <i>Programming with C</i>, 2nd ed, Tata McGraw Hill, New Delhi, 2006 B. W. Kernighan, and D. M. Ritchie, <i>The C Programming Language</i>, Prentice Hall of India, New Delhi, 1988 K. N. King. <i>C Programming: A Modern Approach</i>, 2nd ed., W. W. Norton & Company, 2008 P. Norton, <i>Peter Norton's Computing Fundamentals</i>, 6th ed., Tata McGraw Hill, New Delhi, 2004. S. Kochan, <i>Programming in C</i>, CBS publishers & distributors M. Meyer, R. Baber, B. Pfaffenberger, <i>Computers in Your Future</i>, 3rd ed., Pearson Education India 			
Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	Introduction to Computers: CPU, Memory, input-output devices, secondary storage devices, Processor Concepts - Evolution and comparative study of processors. Machine language, assembly language, and high level language. Inside a PC, Latest trends and technologies of storage, memory, processor, printing etc	9	15%
II	Concept of Program and data, System software - BIOS, Operating System- Definition-Functions-Windows, and Linux. Compilers and assemblers, Computer networks: LAN, WiFi.	9	15%
FIRST INTERNAL EXAMINATION			

III	Basic elements of C: Flow chart and algorithm – Development of algorithms for simple problems. Structure of C program – Operators and expressions – Procedure and order of evaluation – Input and Output functions. while, do-while and for statements, if, if-else, switch, break, continue, goto, and labels. Programming examples.	10	15%
IV	Functions and Program structures: Functions – declaring, defining, and accessing functions – parameter passing methods – Recursion – Storage classes – extern, auto, register and static. Library functions. Header files – C pre-processor. Example programs.	9	15%
SECOND INTERNAL EXAMINATION			
V	Arrays: Defining and processing arrays – passing arrays to functions – two dimensional and multidimensional arrays – application of arrays. Example programs.	10	20%
VI	Structures – declaration, definition and initialization of structures, unions, Pointers: Concepts, declaration, initialization of pointer variables simple examples Concept of a file – File operations File pointer.	9	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN

Maximum Marks : 100

Exam Duration: 3 hours

PART A: FIVE MARK QUESTIONS

8 compulsory questions – 1 question each from first four modules and 2 questions each from last two modules (8 x 5 = 40 marks)

PART B: 10 MARK QUESTIONS

5 questions uniformly covering the first four modules. Each question can have maximum of three sub questions, if needed. Student has to answer any 3 questions (3 x 10 = 30 marks)

PART C: 15 MARK QUESTIONS

4 questions uniformly covering the last two modules. Each question can have maximum of four sub questions, if needed. Student has to answer any two questions (2 x 15 = 30 marks)

Course code	Course Name	L-T-P - Credits	Year of Introduction
EE209	Electrical Technology	3-1-0 -4	2016

Prerequisite : Nil

Course Objectives

- To understand about the network Elements, types of networks & analysis of complex circuits using Mesh current & Nodal voltage method.
- To impart knowledge on the solution methods of AC and DC circuits.
- To understand the working principle and characteristics of all electrical machines

Syllabus

Types of Networks- mesh current & Nodal voltage method for DC and AC circuits-Basics of Circuit theorems-AC circuits- RLC circuits- series and parallel resonance-Three phase circuits- Power measurements in three phase circuits-DC machines construction – working- EMF equation – Characteristics of DC shunt and series motor and generator-Starters- Concept of transformers-EMF equation- concept of rotating magnetic field- working principle of induction motors-special machines and their application.

Expected outcome.

- Understand the circuit analysis and theorems.
- Understand the concept of three phase RLC circuits.
- Get knowledge in construction and working of dc machines
- Get knowledge in special machines and their applications.
- Understand the construction and working of induction machines.

Text Book:

1. Theraja B.L., Theraja A.K. *A Text Book of Electrical Technology*, Vol.II “AC & DC Machines”, publication division of Nirja construction & development (p) Ltd., New Delhi, 1994.
2. Sudhakar, A. and Shyam Mojan, S.P. *Circuits and Networks Analysis and Synthesis*, Tata McGraw Hill Publishing Co. Ltd, New Delhi, 1994.

References:

1. Raina K.B., Bhattacharya S.K. *Electrical Design Estimating & Costing*, New Age International P Ltd.,2001.
2. Muthusubramanian R & Ayyappan K, *Circuit Theory*, Anuradha Publishign Pvt Ltd., Tamil Nadu 1999.
3. Arumugam & Premkumar, *Electric Circuit Theory*, Khanna Publishers. 2002

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	BASICS OF CIRCUIT ANALYSIS Types of Networks – Sources transformation – Star – Delta transformation – formation of matrix equation and analysis of circuits using mesh current & Nodal voltage method for DC and AC circuits.	10	15%
II	BASICS OF CIRCUIT THEOREMS Thevenin’s theorem – Norton’s theorem – superposition theorem – maximum power transfer theorem – statement, illustration & application to DC circuits.	9	15%

FIRST INTERNAL EXAMINATION			
III	AC CIRCUITS: Review of Basic concepts – solution of RLC circuit – power – power factor and energy relation – series resonance – parallel resonance – Q factor – bandwidth. Three phase star-delta connections – characteristic equations – phasor diagrams – solution of 3-phase balanced circuits & unbalanced circuits – Three phase power measurement using watt meters	10	15%
IV	DC MACHINES: Review of constructional details – Working principle of DC generator – EMF equation – No load & load characteristics of shunt generator – working principle of DC motor – back emf – equations for torque & power – characteristics of shunt, series & compound motors – Necessity of starters and their types— power stages – efficiency.	9	15%
SECOND INTERNAL EXAMINATION			
V	TRANSFORMERS Construction – working principle – emf equation & voltage regulation – vector diagram 3-PHASE INDUCTION MOTORS Production of rotating magnetic field – torque equation, torque – slip characteristics – power stages and efficiency – simple problems – starters & methods of speed control (quantitative treatment only).	10	20%
VI	SPECIAL MACHINES / APPLICATIONS (Qualitative treatment only) Working principle of single phase induction motor – capacitor start & capacitor run motors – Universal motor – stepper motor – servomotor - Synchronous motor Selection of motors with justifications for the following services, *Machine tools *Washing machine *Cranes *WetGrinder *Steel mills * Mixie *Hoist *Electric traction	9	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN

Maximum Marks : 100

Exam Duration: 3 hours

PART A: FIVE MARK QUESTIONS

8 compulsory questions – 1 question each from first four modules and 2 questions each from last two modules
(8 x 5 = 40 marks)

PART B: 10 MARK QUESTIONS

5 questions uniformly covering the first four modules. Each question can have maximum of three sub questions, if needed. Student has to answer any 3 questions
(3 x 10 = 30 marks)

PART C: 15 MARK QUESTIONS

4 questions uniformly covering the last two modules. Each question can have maximum of four sub questions, if needed. Student has to answer any two questions
(2 x 15 = 30 marks)

Course code	Course Name	L-T-P - Credits	Year of Introduction
EC209	Analog Electronics	3-1-0-4	2016
Prerequisites :Nil			
Course Objectives <ul style="list-style-type: none"> To familiarize basic electronic elements and their characteristics To develop understanding about BJT and FET circuits To understand the concept of power amplifier and differential amplifiers 			
Syllabus Diode: Diode as a circuit element-diode clipping circuits-clamping circuits-voltage regulators- BJT: Operating point of a BJT-thermal runaway-h parameter model of a BJT-frequency response of amplifiers-FET: Construction and characteristics of JFET and MOSFET-Feedback: - Concepts – negative and positive feedback-Power Amplifiers- Class A, B, AB, C, D & S power amplifier-Differential Amplifiers:- The BJT differential pair- Large and small signal operation-MOS differential amplifier- Large and small signal operation-UJT- 555 Timer IC, PLL.			
Expected outcome. <ul style="list-style-type: none"> Will get knowledge on electronic elements and their characteristics. 			
Text Book: 1. Allen Mottershead, <i>Electronic Devices and Circuits: An Introduction</i> , Prentice Hall of India. 2. V. Boylestad and Nashelsky, <i>Electronic Devices and Circuits</i> , Pearson Education 3. Ramakant A Gayakwad, <i>Op- Amps and Linear Integrated Circuits</i> , Prentice Hall of India			
References: 1. Schilling and Belove, <i>Electronic Circuits</i> , McGraw Hill 2. Theodore F. Bogart Jr., <i>Electronic Devices and Circuits</i> , 3. Coughlin and Driscoll, <i>Operational amplifiers and Linear Integrated Circuits</i> , 4. K. R. Botkar, <i>Integrated Circuits</i> , Khanna Publishers 5. Somanathan Nair, <i>Linear Integrated Circuits – Analysis, Design & Application</i> , Wiley-India			
Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	Diode: Diode as a circuit element - load line - piecewise linear model – single-phase half wave and full wave rectifier circuits – voltage regulation - ripple factor - rectifier efficiency - bridge rectifier - rectifier filters - diode clipping circuits - single level and two level clippers - clamping circuits –Zener diodes - Zener voltage regulators.	9	15%
II	BJT: Operating point of a BJT – DC biasing - bias stability - thermal runaway - AC Concepts –role of capacitors in amplifiers – common emitter AC equivalent circuit - amplifier gain and impedance calculations- h parameter model of a BJT –cascaded amplifiers, frequency response of amplifiers	9	15%

FIRST INTERNAL EXAMINATION			
III	FET Construction and characteristics of JFET and MOSFET, biasing a JFET and MOSFET, JFET and MOSFET small signal model - CS and CD amplifiers. feedback: - Concepts – negative and positive feedback feedback -feedback connection types - practical feedback circuits	9	15%
IV	Power Amplifiers Class A, B, AB, C, D & S power amplifiers - harmonic distortion efficiency -wide band amplifier - broad banding techniques - low frequency and high frequency compensation -cascode amplifier - broad banding using inductive loads - Darlington pairs.	10	15%
SECOND INTERNAL EXAMINATION			
V	OSCILLATORS & MULTI VIBRATORS Classification of oscillators – Barkhausen criteria- operation and analysis of RC phase shift – Hartely and Colpitts oscillators – Multi vibrators – astable, mono stable and bi stable multi vibrators	9	20%
VI	UJT-construction –working-UJT oscillator-UPS-brief overview of online UPS &off line UPS-SMPS-operation Timer IC 555: Functional diagram- astable and monostable modes Phase Locked Loops: Principles – building blocks of PLL-VCO-lock and capture ranges - capture process - frequency multiplication using PLL	10	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN

Maximum Marks : 100

Exam Duration:3 hours

PART A: FIVE MARK QUESTIONS

8 compulsory questions –1 question each from first four modules and 2 questions each from last two modules
(8 x 5= 40 marks)

PART B: 10 MARK QUESTIONS

5 questions uniformly covering the first four modules. Each question can have maximum of three sub questions, if needed. Student has to answer any 3 questions
(3 x10 = 30 marks)

PART C: 15 MARK QUESTIONS

4 questions uniformly covering the last two modules. Each question can have maximum of four sub questions, if needed. Student has to answer any two questions
(2 x15 = 30 marks)

Course code	Course Name	L-T-P - Credits	Year of Introduction
MR205	Science of Measurements	3-0-0-3	2016
Prerequisites : Nil			
Course Objectives			
<ul style="list-style-type: none"> To understand the basic principles of measurements. To learn about various methods of measuring instruments 			
Syllabus			
Mechanical measurement- direct comparison and indirect comparison-the generalized measurement system- types of input quantities'- calibration- uncertainty- systematic and random errors-common type of errors- terms used in rating instrument performance- propagation of uncertainty- Kline and Mcintock approach-Zero, First and Second order instruments- input output configuration of generalized measurement system-Sensors – primary and secondary transducers – active and passive transducers - Measurement of temperature – expansion thermometers-resistance thermometers– thermo electric thermometers-Pyrometers – optical, total radiation and photo electric pyrometers- Measurement of flow -Measurement of low pressure- measurement of high pressure – Linear and angular measurement- Measurement of surface roughness - Measurement of screw thread profiles – gear tooth measurement			
Expected outcome.			
<ul style="list-style-type: none"> The students will pick up familiarity with basics of measurements, methods of measuring various parameters and dimensions in engineering applications. 			
Text Book:			
1. Ernest O Doebelin, Measurement Systems Application and Design, Mc Graw- Hill Publishing Company 2. Jain R.K., “Engineering Metrology”, Khanna Publishers. 3. Beckwith, Marangoni, Lienhard, “Mechanical Measurements”, Pearson Education.			
References:			
1. Gupta S.C, “Engineering Metrology”, Dhanpat rai Publications, 2005 2. Jayal A.K, “Instrumentation and Mechanical Measurements”, Galgotia Publications 2000 3. A.K Sawhney “A course in Mechanical Measurements and Instrumentation & Control” 4. Donald Deckman, “Industrial Instrumentation”, Wiley Eastern, 1985. 5. Alan S. Morris, “The Essence of Measurement”, Prentice Hall of India, 1997			
Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	Mechanical measurement- direct comparison and indirect comparison-the generalized measurement system- types of input quantities- calibration- uncertainty- systematic and random errors-common - type of errors- classification of errors-terms used in rating instrument performance- introduction to uncertainty analysis-propagation of uncertainty- Kline and Mcintock approach .	7	15%
II	Zero, First and Second order instruments –input output configuration of generalized measurement system-methods for correcting for spurious inputs- inherent insensitivity-high gain feedback-signal filtering and opposing input	7	15%
FIRST INTERNAL EXAMINATION			

III	Sensors – primary and secondary transducers – active and passive transducers - linear variable differential transformer – construction and characteristics– capacitance transducers – piezo electric transducers – photoelectric sensors – Hall Effect transducers – Resistance wire strain gauges-gauge factor-measuring circuits-calibration	7	15%
IV	Expansion thermometers – liquid in glass thermometer – partial and total immersion thermometers – resistance thermometers– thermistors – Thermo electric thermometers – laws of thermocouples –Pyrometers – optical, total radiation and photo electric pyrometers Measurement of flow – rotameter - magnetic flow meters – hotwire anemometers – Measurement of low pressure – McLeod gauge – thermal conductivity gauge – measurement of high pressure – bulk modulus gauge	7	15%
SECOND INTERNAL EXAMINATION			
V	Linear and angular measurement: slip gauges - Measurement of angles – sine bar – sine center – angle gauges – optical instruments for angular measurement- auto collimator – applications – straightness and squareness –angle dekkor – Measurement of surface roughness – surface texture – methods of measuring surface finish -the Talysurf instrument – the profilograph – Tomlinson surface meter – Tracer type profilograph	7	20%
VI	Measurement of screw thread profiles – errors in pitch– microscopic method – measurement of internal thread – measurement of effective diameter – two wire and three wire method – measurement of root diameter – gear tooth measurement – measurement of gear profile – tooth thickness – tooth spacing – pitch circle diameter – Parkinson s gear tester.	7	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN

Maximum Marks : 100

Exam Duration:3 hours

PART A: FIVE MARK QUESTIONS

8 compulsory questions –1 question each from first four modules and 2 questions each from last two modules
(8 x 5= 40 marks)

PART B: 10 MARK QUESTIONS

5 questions uniformly covering the first four modules. Each question can have maximum of three sub questions, if needed. Student has to answer any 3 questions
(3 x10 = 30 marks)

PART C: 15 MARK QUESTIONS

4 questions uniformly covering the last two modules. Each question can have maximum of four sub questions, if needed. Student has to answer any two questions
(2 x15 = 30 marks)

Course code	Course Name	L-T-P - Credits	Year of Introduction
HS200	Business Economics	3-0-0-3	2016
Prerequisite: Nil			
Course Objectives <ul style="list-style-type: none"> • To familiarize the prospective engineers with elementary Principles of Economics and Business Economics. • To acquaint the students with tools and techniques that are useful in their profession in Business Decision Making which will enhance their employability; • To apply business analysis to the “firm” under different market conditions; • To apply economic models to examine current economic scenario and evaluate policy options for addressing economic issues • To gain understanding of some Macroeconomic concepts to improve their ability to understand the business climate; • To prepare and analyse various business tools like balance sheet, cost benefit analysis and rate of returns at an elementary level 			
Syllabus Business Economics - basic concepts, tools and analysis, scarcity and choices , resource allocation, marginal analysis, opportunity costs and production possibility curve. Fundamentals of microeconomics - Demand and Supply Analysis, equilibrium, elasticity, production and production function, cost analysis, break-even analysis and markets. Basics of macroeconomics - the circular flow models, national income analysis, inflation, trade cycles, money and credit, and monetary policy. Business decisions - investment analysis, Capital Budgeting decisions, forecasting techniques and elementary Balance Sheet and taxation, business financing, international investments			
Expected outcome . A student who has undergone this course would be able to <ol style="list-style-type: none"> i. make investment decisions based on capital budgeting methods in alignment with microeconomic and macroeconomic theories. ii. able to analyse the profitability of the firm, economy of operation, determination of price under various market situations with good grasp on the effect of trade cycles in business. iii. gain knowledge on Monetary theory, measures by RBI in controlling interest rate and emerging concepts like Bit Coin. iv. gain knowledge of elementary accounting concepts used for preparing balance sheet and interpretation of balance sheet 			
Text Books <ol style="list-style-type: none"> 1. Geetika, Piyali Ghosh and Chodhury, <i>Managerial Economics</i>, Tata McGraw Hill, 2015 2. Gregory Mankiw, <i>Principles of Macroeconomics</i>, Cengage Learning, 2006. 3. M.Kasi Reddy and S.Saraswathi, <i>Economics and Financial Accounting</i>. Prentice Hall of India. New Delhi. 			

References:

1. Dornbusch, Fischer and Startz, *Macroeconomics*, McGraw Hill, 11th edition, 2010.
2. Khan M Y, *Indian Financial System*, Tata McGraw Hill, 7th edition, 2011.
3. Samuelson, *Managerial Economics*, 6th edition, Wiley
4. Snyder C and Nicholson W, *Fundamentals of Microeconomics*, Cengage Learning (India), 2010.
5. Truett, *Managerial Economics: Analysis, Problems, Cases*, 8th Edition, Wiley
6. Welch, *Economics: Theory and Practice* 7th Edition, Wiley
7. Uma Kapila, *Indian Economy Since Independence, 26th Edition: A Comprehensive and Critical Analysis of India's Economy, 1947-2015*
8. C Rangarajan, *Indian Economy, Essays on monetary and finance*, UBS Publishers'Distributors, 1998
9. A.Ramachandra Aryasri, *Managerial Economics and Financial Analysis*, Tata McGraw-Hill, New Delhi.
10. Dominick Salvatore, *Managerial Economics in Global Economy*, Thomas Western College Publishing, Singapore.
11. I.M .Pandey, *Financial Management*, Vikas Publishing House. New Delhi.
12. Dominick Salvatore, *Theory and Problems of Micro Economic Theory*. Tata Mac Graw-Hill, New Delhi.
13. T.N.Hajela.*Money, Banking and Public Finance*. Anne Books. New Delhi.
14. G.S.Gupta. *Macro Economics-Theory and Applications*. Tata Mac Graw- Hill, New Delhi.
15. Yogesh, Maheswari, *Management Economics* , PHI learning, NewDelhi, 2012
16. Timothy Taylor , *Principles of Economics*, 3rdedition, TEXTBOOK MEDIA.
17. Varshney and Maheshwari. *Managerial Economics*. Sultan Chand. New Delhi

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	Business Economics and its role in managerial decision making-meaning-scope-relevance-economic problems-scarcity Vs choice (2 Hrs)-Basic concepts in economics-scarcity, choice, resource allocation- Trade-off-opportunity cost-marginal analysis- marginal utility theory, Law of diminishing marginal utility -production possibility curve (2 Hrs)	4	15%
II	Basics of Micro Economics I Demand and Supply analysis-equilibrium-elasticity (demand and supply) (3 Hrs.) -Production concepts-average product-marginal product-law of variable proportions- Production function-Cobb Douglas function-problems (3 Hrs.)	6	15%
FIRST INTERNAL EXAMINATION			
III	Basics of Micro Economics II Concept of costs-marginal, average, fixed, variable costs-cost curves-shut down point-long run and short run (3 Hrs.)- Break Even Analysis-Problem-Markets-Perfect Competition, Monopoly and Monopolistic Competition, Oligopoly-Cartel and collusion (3 Hrs.).	6	15%
IV	Basics of Macro Economics - Circular flow of income-two sector and multi-sector models- National Income Concepts-Measurement methods-problems-Inflation, deflation (4 Hrs.)-Trade cycles-Money-stock and flow concept-Quantity theory of money-Fischer's Equation and Cambridge Equation -velocity of circulation of money-credit control methods-SLR, CRR, Open Market Operations-Repo and Reverse Repo rate-emerging concepts in money-bit coin (4 Hrs.).	8	15%

SECOND INTERNAL EXAMINATION			
V	Business Decisions I -Investment analysis-Capital Budgeting-NPV, IRR, Profitability Index, ARR, Payback Period (5 Hrs.)- Business decisions under certainty-uncertainty-selection of alternatives-risk and sensitivity- cost benefit analysis-resource management (4 Hrs.).	9	20%
VI	Business Decisions II Balance sheet preparation-principles and interpretation-forecasting techniques (7 Hrs.)-business financing-sources of capital- Capital and money markets-international financing-FDI, FPI, FII-Basic Principles of taxation-direct tax, indirect tax-GST (2 hrs.).	9	20%
END SEMESTER EXAM			

Question Paper Pattern

Max. marks: 100, Time: 3 hours

The question paper shall consist of three parts

Part A

4 questions uniformly covering modules I and II. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B

4 questions uniformly covering modules III and IV. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C

6 questions uniformly covering modules V and VI. Each question carries 10 marks
Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.



Course code	Course Name	L-T-P-Credits	Year of Introduction
HS210	LIFE SKILLS	2-0-2	2016
Prerequisite : Nil			
<p>Course Objectives</p> <ul style="list-style-type: none"> • To develop communication competence in prospective engineers. • To enable them to convey thoughts and ideas with clarity and focus. • To develop report writing skills. • To equip them to face interview & Group Discussion. • To inculcate critical thinking process. • To prepare them on problem solving skills. • To provide symbolic, verbal, and graphical interpretations of statements in a problem description. • To understand team dynamics & effectiveness. • To create an awareness on Engineering Ethics and Human Values. • To instill Moral and Social Values, Loyalty and also to learn to appreciate the rights of others. • To learn leadership qualities and practice them. 			
<p>Syllabus</p> <p>Communication Skill: Introduction to Communication, The Process of Communication, Barriers to Communication, Listening Skills, Writing Skills, Technical Writing, Letter Writing, Job Application, Report Writing, Non-verbal Communication and Body Language, Interview Skills, Group Discussion, Presentation Skills, Technology-based Communication.</p> <p>Critical Thinking & Problem Solving: Creativity, Lateral thinking, Critical thinking, Multiple Intelligence, Problem Solving, Six thinking hats, Mind Mapping & Analytical Thinking.</p> <p>Teamwork: Groups, Teams, Group Vs Teams, Team formation process, Stages of Group, Group Dynamics, Managing Team Performance & Team Conflicts.</p> <p>Ethics, Moral & Professional Values: Human Values, Civic Rights, Engineering Ethics, Engineering as Social Experimentation, Environmental Ethics, Global Issues, Code of Ethics like ASME, ASCE, IEEE.</p> <p>Leadership Skills: Leadership, Levels of Leadership, Making of a leader, Types of leadership, Transactions Vs Transformational Leadership, VUCA Leaders, DART Leadership, Leadership Grid & leadership Formulation.</p>			
<p>Expected outcome</p> <p>The students will be able to</p> <ul style="list-style-type: none"> • Communicate effectively. • Make effective presentations. • Write different types of reports. • Face interview & group discussion. • Critically think on a particular problem. • Solve problems. • Work in Group & Teams • Handle Engineering Ethics and Human Values. • Become an effective leader. 			

Resource Book:

Life Skills for Engineers, Compiled by ICT Academy of Kerala, McGraw Hill Education (India) Private Ltd., 2016

References:

- Barun K. Mitra; (2011), *“Personality Development & Soft Skills”*, First Edition; Oxford Publishers.
- Kalyana; (2015) *“Soft Skill for Managers”*; First Edition; Wiley Publishing Ltd.
- Larry James (2016); *“The First Book of Life Skills”*; First Edition; Embassy Books.
- Shalini Verma (2014); *“Development of Life Skills and Professional Practice”*; First Edition; Sultan Chand (G/L) & Company
- John C. Maxwell (2014); *“The 5 Levels of Leadership”*, Centre Street, A division of Hachette Book Group Inc.

Course Plan

Module	Contents	Hours L-T-P		Sem. Exam Marks
		L	P	
I	Need for Effective Communication, Levels of communication; Flow of communication; Use of language in communication; Communication networks; Significance of technical communication, Types of barriers; Miscommunication; Noise; Overcoming measures,	2		See evaluation scheme
	Listening as an active skill; Types of Listeners; Listening for general content; Listening to fill up information; Intensive Listening; Listening for specific information; Developing effective listening skills; Barriers to effective listening skills.		2	
	Technical Writing: Differences between technical and literary style, Elements of style; Common Errors, Letter Writing: Formal, informal and demi-official letters; business letters, Job Application: Cover letter, Differences between bio-data, CV and Resume, Report Writing: Basics of Report Writing; Structure of a report; Types of reports.		4	
	Non-verbal Communication and Body Language: Forms of non-verbal communication; Interpreting body-language cues; Kinesics; Proxemics; Chronemics; Effective use of body language	3		
	Interview Skills: Types of Interviews; Ensuring success in job interviews; Appropriate use of non-verbal communication, Group Discussion: Differences between group discussion and debate; Ensuring success in group discussions, Presentation Skills: Oral presentation and public speaking skills; business presentations, Technology-based Communication: Netiquettes: effective e-mail messages; power-point presentation; enhancing editing skills using computer software.		4	

<p>II</p>	<p>Need for Creativity in the 21st century, Imagination, Intuition, Experience, Sources of Creativity, Lateral Thinking, Myths of creativity</p> <p>Critical thinking Vs Creative thinking, Functions of Left Brain & Right brain, Convergent & Divergent Thinking, Critical reading & Multiple Intelligence.</p> <p>Steps in problem solving, Problem Solving Techniques, Problem Solving through Six Thinking Hats, Mind Mapping, Forced Connections.</p> <p>Problem Solving strategies, Analytical Thinking and quantitative reasoning expressed in written form, Numeric, symbolic, and graphic reasoning, Solving application problems.</p>	<p>2</p> <p>2</p> <p>2</p>	<p>2</p> <p>2</p> <p>2</p>	
<p>III</p>	<p>Introduction to Groups and Teams, Team Composition, Managing Team Performance, Importance of Group, Stages of Group, Group Cycle, Group thinking, getting acquainted, Clarifying expectations.</p> <p>Group Problem Solving, Achieving Group Consensus.</p> <p>Group Dynamics techniques, Group vs Team, Team Dynamics, Teams for enhancing productivity, Building & Managing Successful Virtual Teams. Managing Team Performance & Managing Conflict in Teams.</p> <p>Working Together in Teams, Team Decision-Making, Team Culture & Power, Team Leader Development.</p>	<p>3</p> <p>3</p> <p>3</p>	<p>2</p> <p>2</p> <p>2</p>	
<p>IV</p>	<p>Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic Virtue, Respect for Others, Living Peacefully.</p> <p>Caring, Sharing, Honesty, Courage, Valuing Time, Cooperation, Commitment, Empathy, Self-Confidence, Character</p> <p>Spirituality, Senses of 'Engineering Ethics', variety of moral issues, Types of inquiry, moral dilemmas, moral autonomy, Kohlberg's theory, Gilligan's theory, Consensus and controversy, Models of Professional Roles, Theories about right action, Self-interest, customs and religion, application of ethical theories.</p> <p>Engineering as experimentation, engineers as responsible experimenters, Codes of ethics, Balanced outlook on.</p> <p>The challenger case study, Multinational corporations, Environmental ethics, computer ethics,</p>	<p>3</p> <p>3</p> <p>3</p>	<p>2</p> <p>2</p> <p>2</p>	

	Weapons development, engineers as managers, consulting engineers, engineers as expert witnesses and advisors, moral leadership, sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers(India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers(IETE), India, etc.	3		
V	Introduction, a framework for considering leadership, entrepreneurial and moral leadership, vision, people selection and development, cultural dimensions of leadership, style, followers, crises.	4	2	
	Growing as a leader, turnaround leadership, gaining control, trust, managing diverse stakeholders, crisis management			
	Implications of national culture and multicultural leadership Types of Leadership, Leadership Traits.	2		
	Leadership Styles, VUCA Leadership, DART Leadership, Transactional vs Transformational Leaders, Leadership Grid, Effective Leaders, making of a Leader, Formulate Leadership		2	
END SEMESTER EXAM				

EVALUATION SCHEME

Internal Evaluation

(Conducted by the College)

Total Marks: 100

Part – A

(To be started after completion of Module 1 and to be completed by 30th working day of the semester)

1. Group Discussion – Create groups of about 10 students each and engage them on a GD on a suitable topic for about 20 minutes. Parameters to be used for evaluation is as follows;

- | | | | |
|-------|------------------------|---|----------|
| (i) | Communication Skills | – | 10 marks |
| (ii) | Subject Clarity | – | 10 marks |
| (iii) | Group Dynamics | - | 10 marks |
| (iv) | Behaviors & Mannerisms | - | 10 marks |

(Marks: 40)

Part – B

(To be started from 31st working day and to be completed before 60th working day of the semester)

2. Presentation Skills – Identify a suitable topic and ask the students to prepare a presentation (preferably a power point presentation) for about 10 minutes. Parameters to be used for evaluation is as follows;

(i)	Communication Skills*	-	10 marks
(ii)	Platform Skills**	-	10 marks
(iii)	Subject Clarity/Knowledge	-	10 marks

(Marks: 30)

* Language fluency, audibility, voice modulation, rate of speech, listening, summarizes key learnings etc.

** Postures/Gestures, Smiles/Expressions, Movements, usage of floor area etc.

Part – C

(To be conducted before the termination of semester)

3. Sample Letter writing or report writing following the guidelines and procedures. Parameters to be used for evaluation is as follows;

(i)	Usage of English & Grammar	-	10 marks
(ii)	Following the format	-	10 marks
(iii)	Content clarity	-	10 marks

(Marks: 30)

External Evaluation
(Conducted by the University)

Total Marks: 50

Time: 2 hrs.

Part – A

Short Answer questions

There will be one question from each area (five questions in total). Each question should be written in about maximum of 400 words. Parameters to be used for evaluation are as follows;

- (i) Content Clarity/Subject Knowledge
- (ii) Presentation style
- (iii) Organization of content

(Marks: 5 x 6 = 30)

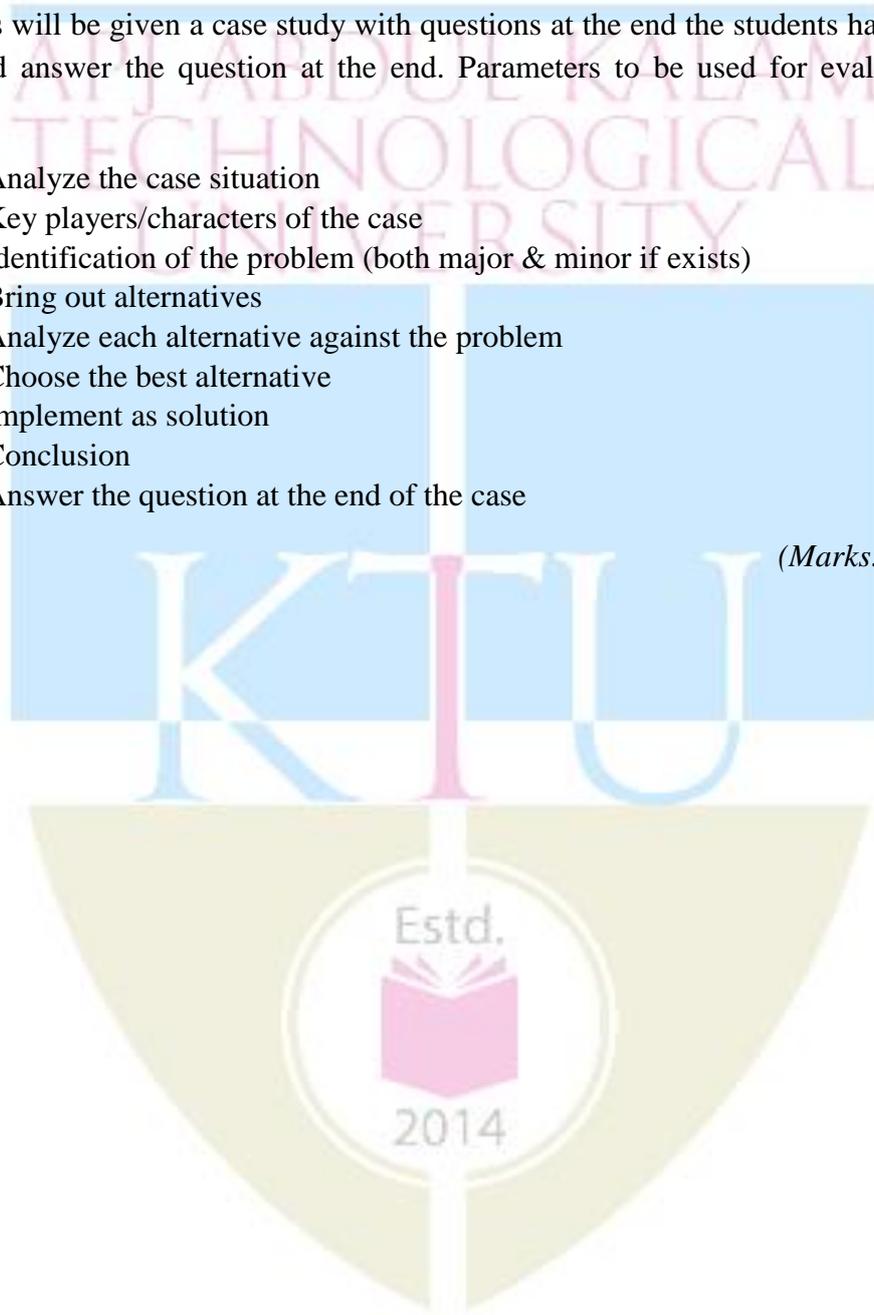
Part – B

Case Study

The students will be given a case study with questions at the end the students have to analyze the case and answer the question at the end. Parameters to be used for evaluation are as follows;

- (i) Analyze the case situation
- (ii) Key players/characters of the case
- (iii) Identification of the problem (both major & minor if exists)
- (iv) Bring out alternatives
- (v) Analyze each alternative against the problem
- (vi) Choose the best alternative
- (vii) Implement as solution
- (viii) Conclusion
- (ix) Answer the question at the end of the case

(Marks: 1 x 20 = 20)



Course code	Course Name	L-T-P - Credits	Year of Introduction
EE235	Electrical Technology lab	0-0-3-1	2016
Prerequisite : EE209 Electrical technology			
Course Objectives <ul style="list-style-type: none"> To impart working knowledge on electrical circuits, A C machines, DC machines and transformers. 			
List of Exercises/Experiments : (Minimum 10 experiments are mandatory) <ol style="list-style-type: none"> Verification of Thevenin's theorem Verification of Norton's theorem Verification of Superposition theorem Verification of Maximum power transfer theorem Power measurement in 3 phase balanced circuits Power measurement in 3 phase unbalanced circuits Load test on DC shunt motor Load test on DC series motor Speed control of DC shunt motor Open circuit characteristics of DC series motor. Open circuit characteristics of dc shunt motors Swinburne's test and separation of losses in DC machine. Load test on single phase transformer Load test on 3-phase induction motor No load test on 3- phase induction motors. 			
List of major equipment DC shunt motor, DC series motor, DC series motor, single phase transformer, 3-phase induction motor, Watt meters, Ammeters, voltmeters, Tachometers.			
Expected outcome. <ul style="list-style-type: none"> On completion of this lab course, the students will be able to understand the concept of electric circuits and the performance characteristics of electrical machines. 			
Text Book: Theraja B.L., Theraja A.K. <i>A Text Book of Electrical Technology</i> , Vol.II "AC & DC Machines", publication division of Nirja construction & development (p) Ltd., New Delhi.			

Course code	Course Name	L-T-P - Credits	Year of Introduction
EC235	ANALOG ELECTRONICS LABORATORY	0-0-3:1	2016
Prerequisite: EC209 Analog electronics			
Course Objectives			
<ul style="list-style-type: none"> To develop working knowledge on electronic devices and their performance characteristics 			
List of Exercises/Experiments : (Ten experiments are mandatory)			
<ol style="list-style-type: none"> Study & Use of CRO: Measurement of current voltage, frequency and phase shift. Diode Clipping Circuits Clamping Circuits Rectifiers and filters with and without shunt capacitors- Characteristics full wave rectifier- Ripple factor, Rectification efficiency, and % regulation RC coupled amplifier using BJT in CE configuration- Measurement of gain, input and output impedance and frequency response FET amplifier- Measurement of voltage gain, current gain, input and output impedance Darlington Emitter Follower R.C. Phase Shift Oscillator using BJT or Op- Amp Characteristics of voltage regulators- Design and testing of: a) simple zener voltage regulator b) zener regulator with emitter follower output Series & Parallel Resonance Circuits Voltage Series Feedback Amplifier Class 'B' Push-Pull Amplifier Astable and monostable multivibrators using IC 555 Design of PLL for given lock and capture ranges& frequency multiplication Applications using PLL 			
List of major equipments			
CRO, Function generator, Regulated power supply , Dual power supply, Digital multimeter, Ammeter ,Voltmeter.			
Expected outcome.			
<ul style="list-style-type: none"> On completion of the course the student will be able to understand the working of electrical devices ,their performance characteristics and will be able to design circuits for various electronic devices 			
Text Book:			
Allen Mottershead, <i>Electronic Devices and Circuits: An Introduction</i> , Prentice Hall of India			