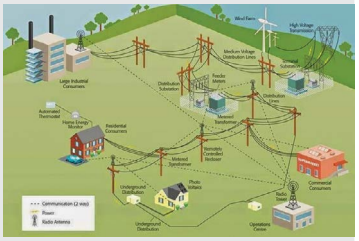


Source: https://www.pinterest.com/pin/power-generationtransmissionand-distribution-by-smart-grids-electrical-eng--104075441365330046/

22EE202 POWER TRANSMISSION AND DISTRIBUTION

Hours Per Week :

L	T	P	C
2	0	2	3

PREREQUISITE KNOWLEDGE: Basic Engineering Products, Electrical Circuit Analysis.

COURSE DESCRIPTION AND OBJECTIVES:

This course provides an overview of various types of electric substations and the methods for improvement of power factor. It also provides the knowledge of transmission line parameters, cables and insulators. The objective of this course is to enable the students to understand the economic aspects of power generation, analyse the performance of transmission lines, distribution systems, insulators and cables.

MODULE-1

UNIT-1 **10L+0T+0P=10 Hours**

ECONOMICS OF POWER GENERATION, POWER FACTOR CORRECTION AND TRANSMISSION LINE PARAMETERS:

Economics of Power Generation: Load curve, load duration and integrated load duration curves, load, demand, diversity, capacity, utilization and plant use factors, numerical problems.

Power Factor Correction: Causes of low power factor, methods of improving power factor- static capacitors, synchronous condenser, phase advancers. Most economical power factor for constant KW load and constant KVA type loads.

Transmission Line Parameters: Classification of line conductors, calculation of resistance, skin effect, inductance and capacitance of single phase and three phase lines with symmetrical and unsymmetrical spacing, proximity effect, significance of transposition.

UNIT-2 **6L+0T+16P=22 Hours**

SUBSTATIONS AND PERFORMANCE OF TRANSMISSION LINES:

Substations: Classification of substations, selection of site and layout of substation, bus bar arrangements.

- **Performance of Transmission Lines:** Classification of lines - short, medium (nominal T and) and long (equivalent T and), calculation of A, B, C, D constants, ferranti effect, power flow through a transmission line.

PRACTICES:

- Familiarization of the transmission line.
- Verification of Ferranti Effect of the transmission line.
- ABCD parameters of transmission line.
- Finding the efficiency of the transmission lines at different loads.

MODULE-2

UNIT-1 **8L+0T+0P=8 Hours**

SAG AND TENSION CALCULATIONS, OVERHEAD LINE INSULATORS AND CORONA:

SAG and Tension Calculations: Sag and tension calculations with equal and unequal heights of towers, effect of wind and ice on weight of conductors, stringing chart, sag template.

Overhead Line Insulators: Types of insulators, string efficiency and methods for improvement, voltage distribution.

Corona: Introduction, critical disruptive voltage, corona loss, factors affecting corona loss and methods of reducing corona loss, disadvantages of corona, interference between power and Communication lines. Numerical problems.

UNIT-2 **8L+0T+16P=24 Hours**

UNDERGROUND CABLES AND AC DISTRIBUTION:

Underground Cables: Types of cables, construction, calculation of insulation resistance, stress and capacitance, grading of cables, proximity effect.

AC Distribution: Introduction, single phase, 3-phase 3 wire, 3 phase 4 wire system.

PRACTICES

- Determination of the SIL of the transmission line.
- Determination of regulation of the given transmission line.
- To find out the string efficiency across the string of insulators.
- Formation for symmetric π configuration for Verification of AD-BC=1.

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Determine the parameters of transmission line.	Apply	1	1, 2, 3, 9, 11
2	Illustrate the role of insulators and calculation of string efficiency.	Apply	2	1, 2, 4, 6, 9, 11
3	Analyse the significance for economic analysis of power generation and power factor.	Analyze	1	1, 2, 9, 11
4	Analyse the selection of underground cables, different distribution system topologies.	Analyze	2	1, 2, 6, 7, 9, 11
5	Evaluate the performance of short, medium and long transmission lines.	Evaluate	1	1, 2, 5, 9, 11

TEXT BOOKS:

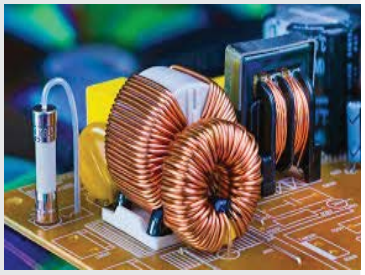
1. C.L. Wadhwa, “Generation, Distribution and Utilization of Electrical Energy”, 8th edition, New Age International, 2022.
2. W.D. Stevenson, “Elements of Power System Analysis,” 4th edition, Mc Graw Hill, 2000.

REFERENCE BOOKS:

1. C.L. Wadhwa, “Electrical Power Systems”, 6th edition, New Age International, 2018.
2. M.V. Deshpande, “Elements of Electrical Power Station Design”, 3rd edition, Wheeler Pub. 2018.

SKILLS:

- ✓ *Design overhead transmission lines by considering different parameters.*
- ✓ *Design and suggest insulators for specific voltage level.*
- ✓ *Design underground cables by considering different parameters.*
- ✓ *Identify reasons for voltage fluctuations at the consumer end.*



Source: https://www.capabilitydevelopment.org/Coursedesc/ioc/D-C-MACHINES-AND-TRANSFORMERS

22EE203 DC MACHINES AND TRANSFORMERS

Hours Per Week :

L	T	P	C
3	0	2	4

PREREQUISITE KNOWLEDGE: Basics of Electromagnetics.

COURSE DESCRIPTION AND OBJECTIVES:

- To present a problem oriented introductory knowledge of Electrical Machines.
- To focus on the study of electro mechanical energy conversion & different parts of electrical machine.
- To address the underlying concepts & methods behind Electrical Engineering machines.
- To identify & formulate solutions to problems relevant to Electrical Machines and find the efficiency of machine.
- To Enable the students to understand the characteristics of DC Machines and Transformers and analyse their performance under different testing conditions.

MODULE-1

UNIT-1 **12L+0T+8P=20 Hours**

INTRODUCTION TO DC MACHINES:

Constructional details, Principle of operation, EMF equation, Classification of DC machine based on excitation, Armature reaction and commutation methods, Applications in real time systems.

UNIT-2 **12L+0T+8P=20 Hours**

Performance of DC Machines Torque equation, characteristics and Speed control techniques, Power flow diagram and relations, Losses and efficiency, Parallel operation of DC Generators, Methods of testing on DC Machines.

PRACTICES:

- Determination of critical field resistance and critical speed using magnetization characteristics of DC shunt generator.
- Load test on DC shunt generator.
- Brake test on DC shunt motor.
- Speed control of DC shunt motor.
- Swinburne's test on DC shunt motor.
- Hopkinson's test on DC machines.

MODULE-2

UNIT-1 **12L+0T+8P=20 Hours**

INTRODUCTION TO 1-PHASE & 3-PHASE TRANSFORMERS:

Constructional details-Principle of operation, EMF equation, Equivalent circuits, Voltage regulation, Conditions for minimum and maximum voltage regulation, Applications in real time systems, Different configuration of 3 phase transformers.

UNIT-2 **12L+0T+8P=20 Hours**

TESTING & PARALLEL OPERATION OF TRANSFORMERS:

Losses, Efficiency, Testing of Transformers, Parallel operation of single phase transformer with equal and unequal voltage ratio, Single phase auto transformer, saving of copper, equivalent circuit.

PRACTICES:

- OC and SC test on single phase transformer.
- Sumpner's test on a pair of single phase transformers.
- Parallel operation of two single phase transformers.
- Scott connection of transformers.

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Analyze the effect of armature reaction and the process of commutation.	Analyze	1	1, 2, 9, 11
2	Analyse parallel operation of single phase Transformers and DC Generators.	Analyze	1, 2	1, 2, 9, 11
3	Select different 3-phase transformers connections in real time transmission system.	Analyze	2	1, 2, 3, 9, 11
4	Evaluate the performance and characteristics of DC motors through experimentation.	Analyze	1	1, 2, 6, 9, 11
5	Describe the construction and working principle of single phase Transformers.	Evaluate	2	1, 2, 9, 11

TEXT BOOKS:

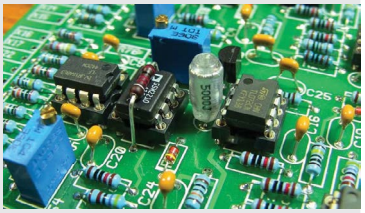
1. P.S. Bimbra, "Electrical Machinery", 7th edition, Khanna Publishers, 2011.
2. I.J. Nagrath and D.P. Kothari, "Electric Machines", 5th edition, Tata Mc-Graw Hill Publishers, 2017.

REFERENCE BOOKS:

1. A.E. Clayton and Hancock, "Performance and Design of D.C Machines", 3rd edition, BPB Publishers, 2004.
2. R. D. Begamudre, "Electromechanical Energy Conversion with Dynamics of Machines", 2nd edition, New Age International (P) Ltd., 2003.

SKILLS:

- ✓ *Analyze the magnetising and load characteristics of DC generators*
- ✓ *Analyze the performance of DC machines by conducting various tests.*
- ✓ *Test the transformer under no load and short circuit conditions and obtain the Equivalent circuit.*



Source: https://www.eletimes.com/the-perennial-role-of-analog-electronics

22EE204 ANALOG ELECTRONICS

Hours Per Week :

L	T	P	C
3	0	2	4

PREREQUISITE KNOWLEDGE: Basic Electrical and Electronics Engineering.

COURSE DESCRIPTION AND OBJECTIVES:

This course deals with fundamental concepts of semi-conductor devices and circuits. Along with semi-conductor devices it also deals with the op-amps. The objective of the course is to enable students to understand the working of simple electronic circuits such as clippers, clampers, amplifiers, filters and regulators.

MODULE–1

UNIT-1 **12L+0T+8P=20 Hours**

INTRODUCTION TO SEMICONDUCTOR DEVICES:

Diodes: Current equation of diode and temperature variations, Analysis of half-wave and full-wave rectifiers with capacitor filter, Clippers and clampers.

BJT: Formation of PNP and NPN transistor, Transistor current components, Transistor as an amplifier-CB, CE and CC configurations with performance comparison.

FET: Working principles and characteristics of JFET and MOSFET.

UNIT-2 **12L+0T+8P=20 Hours**

TRANSISTOR BIASING (BJT & FET):

DC load line, AC load line and selection of operating point, Need for biasing, Biasing techniques, Thermal runaway and thermal stability.

PRACTICES:

- Study of clipping operation.
- Study of clamping operation.
- Input and Output Characteristics of BJT.
- Input and Output Characteristics of MOSFET.

MODULE-2

UNIT-1 **6L+0T+4P=10 Hours**

OPERATIONAL AMPLIFIERS:

Ideal op-amp, Non-idealities in an op-amp, Inverting and non-inverting amplifier, differential amplifier.

555 TIMER: Working and pin diagram of 555 timer.

UNIT-2 **18L+0T+12P=30 Hours**

APPLICATIONS OF OP-AMP:

Linear Applications of OP-AMP: V-I converters, Sample & Hold circuits, Instrumentation amplifier, Integrator, Active filter, P, PI and PID controllers using op-amp.

Non Linear Applications: Voltage comparators, Hysteretic comparator, Square-wave and triangular-wave generators; Precision half wave rectifier, Peak detector, Zero crossing Detector, Oscillators (Wein bridge and phase shift), Application of 555 timer.

PRACTICES:

- Design of basic arithmetic circuits such as adder and subtractor.
- Design of Integrator and differentiator.
- Design of oscillator circuits.
- Design of voltage comparators using op-amp.
- Design of active LPF/HPF using op-amp.
- Design of Astable multi vibrator using op-amp.
- Schmitt trigger by using BJT/op-amp/555 Timer.

SKILLS:

- ✓ *Analyze the signal conditioning circuits*
- ✓ *Realization of multi vibrator using 555 times.*
- ✓ *Analyze the oscillator circuits.*

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

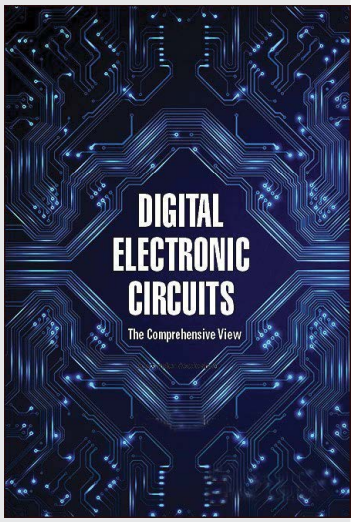
CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Identify the characteristics of diode, transistors, 555 timer and op-amp.	Apply	2	1, 2, 3, 4, 9, 11
2	Analyse various rectifier and amplifier circuits.	Analyse	1, 2	1, 2, 3, 4, 9, 11
3	Design sinusoidal and non-sinusoidal oscillators.	Evaluate	2	1, 2, 3, 4, 9, 11
4	Apply the knowledge of KVL and KCL to obtain voltage / current waveforms at different points in analog electronic circuits such as diode clippers and clampers.	Apply	1, 2	1, 2, 3, 4, 9, 11
5	Conduct experiment using analog electronic components to function as amplifier, comparator, rectifier, ADC and DAC.	Evaluate	1, 2	1, 2, 3, 4, 9, 11

TEXT BOOKS:

1. Ramakant A. Gayakwad, “Op-Amps and Linear - Integrated Circuits”, 4th edition, PHI, 2000.
2. D. Roy Choudhary and Shail. B.Jain, “Linear Integrated Circuits”, 5th edition, New Age International Publishers, 2018.

REFERENCE BOOKS:

1. R.L. Boylestad and Lovis Nashelsky, “Electronic Devices and Circuits Theory”, 10th edition, Pearson Eduction, 2010.
2. A.S. Sedra and K.C. Smith, “Microelectronic Circuits”, 7th edition, New York, Oxford University Press, 2017.



Source: https://www.worldscientific.com/

22EE205 DIGITAL ELECTRONIC CIRCUITS

Hours Per Week :

L	T	P	C
2	2	0	3

PREREQUISITE KNOWLEDGE: Basic Athematic.

COURSE DESCRIPTION AND OBJECTIVES:

- This course deals with the fundamentals of number systems, and Boolean expressions that are used to realize combinational and sequential circuits.
- Its objective is to minimize the logical expressions using Boolean postulates, to design various combinational and sequential circuits.
- To provide a sufficient number of applications/case studies to demonstrate the techniques used.

MODULE-1

UNIT-1 **8L+8T+0P=16 Hours**

FUNDAMENTALS OF DIGITAL SYSTEMS:

Concept of Number systems, Binary Arithmetic, One's and two's complements, Canonical and Standard Forms - SOP and POS forms, Basic Logic gates, and universal gates, Simplification of logic functions using Karnaugh maps.

UNIT-2 **8L+8T+0P=16 Hours**

COMBINATIONAL LOGIC DESIGN:

Design using conventional logic gates, Half adder, Full adder, Half subtractor, and Full subtractor, Code converters, Comparators, and Parity generator/detector, Decoders, Encoders, De-multiplexers, and Multiplexers, Design of combination circuits using Decoders and Multiplexers.

PRACTICES:

- 7-Segment LED display.
- Digital Watch Design.

MODULE-2

UNIT-1 **8L+8T+0P=16 Hours**

SEQUENTIAL LOGIC CIRCUITS:

Latches, Flip-Flops and Triggering, Shift registers, Counters - Ripple counters, Mod-n counter and Concept of State diagram and State table.

UNIT-2 **8L+8T+0P=16 Hours**

FINITE STATE MACHINES:

Design of sequential counter, Design of Mealy FSM, Design of Moore FSM.

PRACTICES:

- Sequence Detectors.
- Traffic light control system.

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Apply the knowledge of digital logic concepts to optimize digital circuits.	Apply	1	1, 2, 3, 4, 9, 11
2	Analyze sequential digital circuits for given problem statement.	Analyze	2	1, 2, 3, 4, 9, 11
3	Design and practical implementation of Sequential logic circuits.	Create	2	1, 2, 3, 4, 9, 11
4	Design and practical implementation of Combinational logic circuits.	Create	1	1, 2, 3, 4, 9, 11

SKILLS:

- ✓ *Minimize Boolean expression.*
- ✓ *Construct different combinational and sequential circuits.*
- ✓ *Verify the functionality of digital circuits.*
- ✓ *Design combinational and sequential circuits for a given application*
- ✓ *Data acquisition using ADC & DAC*

TEXT BOOKS:

1. Digital Logic and Computer Design, M. Morris Mano, Pearson India, 2017, ISBN: 9789332586048.
2. Digital Electronics, G. K. Kharate, Oxford University Press, 2012, ISBN: 9780198061830.

REFERENCE BOOKS:

1. A Anand Kumar, “Fundamentals of Digital Circuits”, Prentice-Hall of India Pvt.Ltd, 2006, ISBN: 9788120317451.
2. J.F. Walkerly, “Digital Design Principles and Practices”, 5th edition, PHI/Pearson Education, 2018, ISBN: 9780134460093.
3. M. Predko , “Digital Electronics Demystified”, McgrawHill, 2005, ISBN: 9780071471244.

Source: https://www.geeksforgeeks.org/best-way-to-start-with-competitive-programming-geeksforgeeks-cp-live-course/

22TP203 ADVANCED CODING COMPETENCY

Hours Per Week :

L	T	P	C
0	0	2	1

PREREQUISITE KNOWLEDGE: Programming in C, Data Structures.

COURSE DESCRIPTION AND OBJECTIVES:

This course helps to understand the impact of the choice of data structures and design strategies to solve the problem in an efficient manner. This course also provides the understanding of advanced graph applications and also throw light in tractable intractable problems.

MODULE-1

UNIT-1 **0L+0T+8P =8 Hours**

STACKS, QUEUES AND SINGLE LINKED LISTS:

PRACTICES:

Problems On Stacks & Queues

- Check if given stack of integers are consecutive or not (could be ascending or descending).
- Find the maximum sum in a sliding window using queues.
- Given a queue of integers, rearrange the elements by interleaving the first half with the second half.
- Given an integer k and a queue of integers, reverse the order of the first k elements of the queue.
- Given a maze in the form of a rectangular matrix filled with O, X or M where O represents an open cell, X represents a blocked cell and M represents landmines, find the shortest distance of every open cell in the maze from its nearest mine.
- For a given parenthesis expression, check whether it is balanced parenthesis or not.
- Reverse a number using stack.
- You are given a string s consisting of lowercase English letters. A duplicate removal consists of choosing two adjacent and equal letters and removing them. We repeatedly make duplicate removals on s until we no longer can.
- Find first Unique character in a string (Queue).
- Implement Tower of Hanoi problem.

Problems On Linked Lists

- Given a random pointer to a random node in a singly linked list, clone the list.
- Given a list rotate the list to the right by k places.
- Remove duplicates from a sorted list.
- Find fractional node in a singly linked list.
- Sort a linked list using constant space complexity.
- Delete a node in start, middle, end of Singly linked list.
- Add a node in start, middle, end of Singly linked list.
- Find whether given single linked list is circular or not.
- Arrange a singly linked list in Descending order.
- Addition of two numbers using Singly Linked List.

UNIT-2 **0L+0T+8P =8 Hours**

DOUBLY LINKED LISTS, CIRCULAR LINKED LISTS:

PRACTICES:

Problems on Double Linked Lists and Circular Linked Lists

- Implement a clockwise rotation of a doubly linked list by N places.
- Count triplets in a sorted doubly linked list whose product is equal to a given value x.
- Find the product of all prime nodes in a doubly linked list.
- Find the count of common nodes in two doubly linked lists.
- Find pairs with given product in a sorted doubly linked list.
- Delete all the even nodes of a circular singly linked list.
- Count nodes in a circular linked list.
- Delete all prime nodes from a circular singly linked list.
- Exchange first and last nodes in a circular linked list.
- Reverse a doubly circular linked list.
- Linear search using a stack of incomplete sub problems.
- 1 2 3 4 5 6 in stack S is push X is pop, SSSSXXSSSXXX.
- Recursively remove all adjacent duplicates.
- Check if a given singly linked list is a palindrome using stack.
- Convert a multilevel singly linked list to a singly linked list.
- Remove duplicates from an unsorted doubly linked list.
- Sort a doubly linked list using insertion sort.
- Check if a doubly linked list of characters is palindrome or not.
- Swap Kth node from beginning with Kth node from end in a Double Linked List.
- Convert a Binary Tree into Double Linked List.

SKILLS:

- ✓ *Experienced to Store data and various types of data to handle.*
- ✓ *Ordering and sorting of data.*
- ✓ *Indexing and Searching of required data from large data sequences.*
- ✓ *Exposed to various characteristics such as Linear or non-linear, Homogeneous or heterogeneous and Static and Dynamic.*

MODULE-2

UNIT-1 **0L+0T+8P =8 Hours**

TREES:

PRACTICES:

Problems on Trees

- Given a sorted doubly linked list, convert it into a balanced BST.
- Given a singly linked list with data in the ascending order, convert it into a height balanced BST.
- Print the leaf to root path for every leaf node in a binary tree.
- Write a function to implement the reversed level order traversal of a binary tree.
- Truncate a given binary tree to remove nodes that lie on a path having sum less than K.
- Find the vertical sum in a given binary tree.
- Delete minimum & Maximum element from a BST.
- Implement Inorder, preorder and postorder tree traversal techniques.
- Print Kth largest element in a BST.
- Implement Zig-Zag tree traversal.

UNIT-2 **0L+0T+8P =8 Hours**

GRAPHS:

PRACTICES:

Problems on Graphs

- Given a directed acyclic graph, determine whether there is a path that visits every vertex exactly once.
- Reverse a directed graph such that each edge from v to w is replaced by an edge from w to v.
- Find the shortest path in a graph that visits each vertex at least once, starting and ending at the same vertex.
- Find the minimum number of throws required to win a snake and ladder game.
- Implement DFS of a Graph.
- Implement BFS of a Graph.
- Detect whether a cycle is present in an undirected graph.
- Detect cycle in a Directed Graph.
- Find Shortest Distance to goal node from root node in a graph.
- Find no. of nodes in Kth level of a Graph.

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Apply various data structures to solve a different algorithm.	Apply	1,2	1
2	Investigate the various data structures to solve a given problem in an efficient manner.	Analyse	1,2	2
3	Design and implement an appropriate hashing function for an application.	Create	1,2	4

TEXT BOOKS:

1. Reema Thareja, “Data Structures Using C”, 2nd Edition, Oxford University Press, 2014.
2. Seymour Lipschutz, “Data Structures with C”, 1st Edition, McGraw Hill Education, 2017.

REFERENCE BOOKS:

1. Ellis Horowitz and Sartaj Sahni, “Fundamentals of Data Structures”, illustrated edition, Computer Science Press, 2006.
2. Richard F. Gilberg and Behrouz A. Forouzan, “Data Structures: A Pseudocode Approach with C”, 2nd Edition, CENAGE Learning, 2005.
3. R G Dromey and Pearson, “How to solve it by Computer”, 2nd edition, Impression edition, 1998.

22TP204 PROFESSIONAL COMMUNICATION LABORATORY

Source: https://www.coursera.org/specializations/improve-english

Hours Per Week :

L	T	P	C
0	0	2	1

PREREQUISITE KNOWLEDGE: High School-level English.

COURSE DESCRIPTION AND OBJECTIVES:

To improve the overall professional communication skills (LSRW) of students and prepare them for their profession as engineers and managers. To provide them exposure to conventions of corporate communication and training them on how to function in the business world.

MODULE-1

UNIT-1 **0L+0T+8P=8 Hours**

BASICS OF BUSINESS WRITING SKILLS, PRACTICING BUSINESS CORRESPONDENCE AND REPORT WRITING:

Business English Vocabulary: Glossary of most commonly used words (formal and informal usage).

Elements of Technical Writing: Sentence structure, reducing verbosity, arranging ideas logically, building coherence, cohesive devices and transitional words.

Mechanics of Writing: Elementary rules of grammar, choice of diction, elementary principles of composition, matters of form, punctuation, conventions of business communication, language and professional tone, code of conduct (not sending illegal, offensive, disparaging personal remarks or comments) in written business communication.

Business Correspondence: E-mail: nature and scope, e-mail etiquette, clear call for action, common errors in composing e-mails, office communication such as meeting agenda and notice, circular and memo.

Letter-Writing: Formal and informal letters, structure of formal letters, expressions of salutations, different types of letters [such as sales letter, complaint letter, response to the complaint letter (dispute resolution), letter of permission, letter of enquiring, claim letter – letter of apology etc], introductory and concluding paragraphs and clear call for action.

Professional Proposal/Report: Differentiating proposals and reports, Drafting formal business proposals, types of reports such as factual reports, feasibility reports and survey reports, parts of a report (such as title page, declaration, acknowledgements, table of contents, abstract, introduction, findings, conclusion and recommendations).

New Age Corporate Communication Media: Importance of social media communication and Etiquettes, form and structure, sharing texts through Twitter, Whatsapp, instgram etc.

UNIT-2 **0L+0T+8P=8 Hours**

PRACTICING COMMUNICATIVE LANGUAGE IN VARIOUS PROFESSIONAL CONTEXTS:

Speaking: Speaking in business context, assertiveness, politeness, making requests, queries and questions, negotiations, asking for information, offering suggestions, conflict resolution, contacting clients, initiating, addressing delegates (in public), delivering the presentation effectively, telephone etiquettes, delivering seminar/proposal/report effectively, team meeting etiquettes (face to face and conference call), making effective one minute presentations(JAM) and participating in Group Discussions.

PRACTICES:

- Basic grammar practice, framing paragraphs on topics allocated, paraphrasing an article or a video in your own words, finding topic sentences in newspaper articles, finding out new words from a professional viewpoint and understanding the meaning and its usage.

SKILLS:

- ✓ *To enhance listening and spoken abilities of students needed for professional and social success in interpersonal situations, group interactions, and personal and professional presentations.*
- ✓ *Understand and practice specific functions and vocabulary in a business context.*
- ✓ *Produce short business reports, proposals and correspondence.*
- ✓ *Write various business documents through reading techniques.*

- Perusing samples of well-prepared business emails, memo, letter writing and short proposals and reports, students will draft business correspondence writing tasks and different proposals/ reports on topics assigned.
- Watching videos/listening to audios of business presentations, classroom activities of team and individual presentations, using PPTs, mock exercises for BEC speaking, agreeing, disagreeing politely, developing content, extended speaking in Group Discussion(s).

MODULE-2

UNIT-1 **0L+0T+8P=8 Hours**

READING AND COMPREHENDING BUSINESS DOCUMENTS:

Reading: Reading and comprehending business documents, learning business register, regularizing the habit of reading business news, suitable vocabulary, skimming and scanning a text for effective and speedy reading and dealing with ideas from different sectors of corporate world in different business contexts.

UNIT-2 **0L+0T+8P=8 Hours**

IMPARTING AND PRACTICING LISTENING SKILLS:

Listening: Specific information in business context, listening to telephonic conversations / messages and understanding the correct intended meaning, understanding the questions asked in interviews or in professional settings, summarizing speaker's opinion or suggestion, enable active listening.

PRACTICES:

- Hand-outs; matching the statements with texts, finding missing appropriate sentence in the text from multiple choices, using right vocabulary as per the given context and editing a paragraph.
- Working out BEC/TOEFL/IELTS listening exercises with hand-outs; matching the statements with texts, finding missing appropriate sentence in the text from multiple choice- multiple choices, using right vocabulary in context-editing a paragraph, listening to a long conversation such as an interview and answer MCQ s based upon listening.

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Possess comprehensive skills in listening and reading business texts in formal context.	Apply	2	7
2	Communicate effectively both in their academic as well as professional environment.	Apply	2 &1	10
3	Clear grasp on the register of business language.	Analyze	1	8
4	Possess the ability to write business reports and proposals clearly and precisely to succeed in their future.	Create	1	12
5	Make effective presentations and participate in formal context.	Create	2	10

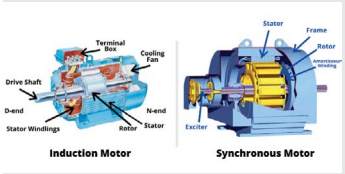
TEXT BOOK:

1. S. Schnurr, "Exploring Professional Communication: Language in Action", London: Routledge, 2013

REFERENCE BOOKS:

1. Brook Hart Guy, "Cambridge English Business Bench Mark: Upper Intermediate", 2nd Edition: CUP, 2014.
2. Cambridge University Publication, "Cambridge: BEC VANTAGE Practice Papers", CUP, 2002.
3. J. Seely, "The Oxford Guide to Effective Writing and Speaking", Oxford University Press, 2005.

22EE207 INDUCTION AND SYNCHRONOUS MACHINES



Source: https://hermitageautomation.com/difference-induction-and-synchronous-motor/

Hours Per Week :

L	T	P	C
3	0	2	4

PREREQUISITE KNOWLEDGE: DC Machines.

COURSE DESCRIPTION AND OBJECTIVES:

- Provide knowledge on construction, operation, types and applications of Induction and synchronous machines.
- Discuss the complete characteristic features of different Induction and synchronous machine and special machines in their field of applications.
- Study of special machines.

MODULE-1

UNIT-1 **12L+0T+2P=14 Hours**

INTRODUCTION TO INDUCTION MACHINES:

Constructional details, Principle of operation, Starting Methods, Applications in real time systems.

UNIT-2 **12L+0T+14P=26 Hours**

PERFORMANCE OF INDUCTION MACHINES:

Torque-slip characteristics, Power flow diagram and relations, Losses and efficiency, Speed control techniques, Equivalent circuit.

PRACTICES:

- Separation of no-load losses in three phase induction motor.
- Load test on three-phase squirrel cage induction motor.
- Load test on three-phase slip ring induction motor.
- Determination of performance characteristics of single phase induction motor.

MODULE-2

UNIT-1 **12L+0T+2P=14 Hours**

INTRODUCTION TO SYNCHRONOUS MACHINES:

Constructional details, Principle of operation, EMF equation, Prediction of voltage regulation methods, V and inverted V-curves of Synchronous motor, Power output of Synchronous motor & hunting.

UNIT-2 **12L+0T+14P=26 Hours**

PARALLEL OPERATION OF SYNCHRONOUS MACHINES:

Methods of synchronization, Synchronizing power., Effect of change in excitation and prime mover torque, Two reaction theory - direct and quadrature axis synchronous reactance; Slip test.

PRACTICES:

- Regulation of a three phase alternator by synchronous impedance method.
- Regulation of a three phase alternator by M.M.F. method.
- Regulation of three phase alternator by Z.P.F. method.

SKILLS:

- ✓ *Identify suitable starting method for a 3-phase induction motor based on the application.*
- ✓ *Suggest a suitable speed control technique for a 3-phase induction motor based on the application.*
- ✓ *Determine the voltage regulation of alternator at any given load.*
- ✓ *Choose an appropriate special machine for given application.*

- V and Inverted V curves of a three phase synchronous motor.
- Determination of Xd and Xq of a salient pole synchronous machine.
- Load Test on three phase alternator.

COURSE OUTCOMES:

Upon successful completion of this course, students will have to ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Analyse speed torque characteristics and speed control of induction motors.	Analyze	1	1, 2, 9, 11
2	Analyse parallel operation of alternators.	Analyze	2	1, 2, 9, 11
3	Evaluate the performance of induction motor.	Evaluate	1	1, 2, 9, 11
4	Evaluate performance characteristics of induction machines.	Evaluate	1	1, 2, 9, 11
5	Obtain V and characteristics of synchronous machine.	Evaluate	2	1, 2, 9, 11

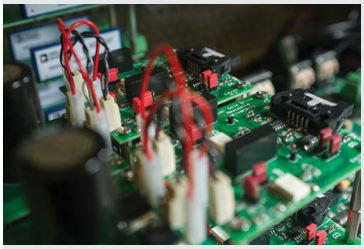
TEXT BOOKS:

1. P.S. Bimbra, “Electrical Machinery”, 7th edition, Khanna Publishers, 2011.
2. I.J. Nagrath and D.P. Kothari, “Electric Machines”, 5th edition, Tata Mc-Graw Hill Publishers, 2017.

REFERENCE BOOKS:

1. Charles I Hubert, “Electric Machines (Theory, operation, applications, adjustment and control)”, 2nd edition, Pearson India, 2009.
2. P.S.Bimbra, “Generalized Theory of Electrical Machines”, 5th edition, Khanna Publications, 2009.

22EE208 POWER ELECTRONIC DEVICES AND CIRCUITS



Source: https://www.ncl.ac.uk/engineering/research/electrical-electronic-engineering/electrical-power/electronics/

Hours Per Week :

L	T	P	C
3	0	2	4

PREREQUISITE KNOWLEDGE: Basics of Electrical and Electronics Engineering, Analog Electronics.

COURSE DESCRIPTION AND OBJECTIVES:

Power electronics involves the study of electronic circuits intended to control the flow of electrical energy. It deals with the processing and control of 'raw' electrical power from an electrical source such as an AC mains supply, a battery bank, a photovoltaic array, or a wind turbine into a form quality suitable for a particular electrical load. It is an enabling technology with a very wide range of applications, such as military/avionic products, industrial products, transportation system, telecom products, medical equipments etc.

MODULE–1

UNIT-1 **15L+0T+10P=25 Hours**

POWER SEMI-CONDUCTOR DEVICES AND SINGLE PHASE CONTROLLED CONVERTERS:

Power Semi-Conductor Devices: Introduction, operation and characteristics of power devices (SCR, MOSFET, IGBT and GTO); Snubber Protection, Triggering and commutation of SCR.

Single Phase Controlled Converters: Study of semi and full bridge converters for R and RL loads; Analysis of load voltage - derivations of form factor and ripple factor; Effect of source impedance. Performance parameters.

UNIT-2 **09L+0T+06P=15 Hours**

THREE PHASE:

Study of semi and full bridge converters for R and RL loads, Load voltage and current waveforms. Performance parameters.

PRACTICES:

- Study of characteristics of SCR, MOSFET & IGBT.
- Gate firing circuits for SCR's.
- Forced commutation circuits (Class A, Class B, Class C, Class D & Class E).
- Single phase fully controlled bridge converter with R and RL loads (MATLAB Simulation & Hardware).
- Single phase half controlled converter with R load (MATLAB Simulation & Hardware).

MODULE–2

UNIT-1 **15L+0T+10P=25 Hours**

CHOPPERS AND AC-AC CONVERTERS:

Choppers: Analysis of step-down (Buck Converter) and step-up (Boost Converter), Control strategies-time ratio and current limit control; Analysis of fly-back, forward converters for SMPS.

AC-AC Converters: Single phase AC voltage regulators with R and RL loads, Sequence control of AC voltage regulators; Single phase to single phase cyclo converter - step up and step down with R and RL loads.

SKILLS:

- ✓ *Understand the switching characteristics of various power semi conductor devices.*
- ✓ *Design the commutation circuits for SCRs based on application.*
- ✓ *Design a SCR based controlled converter for given specifications.*
- ✓ *Design a buck converter for given specifications.*
- ✓ *Design a boost converter for given specifications.*
- ✓ *Design a PWM generator for given duty ratio.*

UNIT-2 **09L+0T+06P=15 Hours**

INVERTERS:

Principle of operation of single phase full bridge square wave, Quasi-square wave, PWM inverters and comparison of their performance; Three phase inverters (120 & 180 degree); voltage control of single and three phase inverters.

PRACTICES

- DC-DC non isolated converters (Buck , boost) (MATLAB Simulation & Hardware).
- Single phase cyclo-converter with R and RL loads.
- Single phase series inverter with R and RL loads.
- Single phase parallel inverter with R and RL loads.
- Single phase AC Voltage Controller with R and RL Loads (MATLAB Simulation & Hardware).

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Selection of Power Semiconductor device as per application of converter.	Apply	1	1, 2, 6, 9
2	Compare the operation of two, three and six pulse converters and draw output waveforms with / without source and load inductance.	Analyse	1	1, 2, 9, 12
3	Classify choppers and outline the applications of SMPS.	Analyse	2	1, 2, 3, 9, 12
4	Design and analysis of DC/AC, AC/DC and AC/AC converters through experimentation.	Create	1, 2	1, 2, 9, 12
5	Illustrate the operation of AC voltage controller, cyclo-converter and its application.	Create	2	1, 2, 3, 9, 12

TEXT BOOKS:

1. Dr. P.S. Bimbra, “Power Electronics” 4th edition, Khanna publishers, 2021.
2. M.D. Singh and K.B. Khanchandani, “Power Electronics”, 2nd edition, Tata Mc-Graw Hill, 2017.

REFERENCE BOOKS:

1. Vedam Subrahmanyam, “Power Electronics Devices, Converters, Application”, 1st edition, New Age International, 2015.
2. Ned mohan, Tore M.Undeland and William P. Robbins, “Power Electronics Converters, Applications and Design”, 3rd edition, Wiley, 2022.

22MS201 MANAGEMENT SCIENCE

Source: https://xueqi326.wordpress.com/semester-3/management-science/

Hours Per Week :

L	T	P	C
2	2	0	3

PREREQUISITE KNOWLEDGE: Basic knowledge of management

COURSE DESCRIPTION AND OBJECTIVES:

The goal of this course is to analyze the importance of management, significance of operation management and carry out production operations through work-study. Students will be able to analyse the markets, customers, competitors, and then plan HR function effectively. These management practices, functional areas of the organisation will helps the students to build up their career in the corporate world.

MODULE-1

UNIT-1 **6L+6T+0P =12 Hours**

INTRODUCTION TO MANAGEMENT:

Concepts of Management and organization- nature, importance and Functions of Management, Systems approach to Management - Taylor's Scientific Management Theory, Fayol's Principles of Management, Mayo's Hawthorne Experiments, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Leadership Styles, Social responsibilities of Management.

UNIT-2 **10L+10T+0P =20 Hours**

OPERATIONS MANAGEMENT:

Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement, Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records. Statistical Quality Control: control charts for variables and attributes (simple problems).

PRACTICES:

- Collect some examples with videos for types of production.
- Carry out production operations through work-study.
- Practice problems with Inventory control methods and Quality Control charts.

MODULE-2

UNIT-1 **8L+8T+ 0P =16 Hours**

HUMAN RESOURCES MANAGEMENT:

Concepts of Human Resource Management, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation, and Merit Rating.

UNIT-2 **8L+8T+0P =16 Hours**

MARKETING MANAGEMENT:

Evolution of Marketing, Functions of Marketing Selling Vs Marketing, 4 P's of Marketing – Product Mix - Product Life Cycle – Place Mix – Channels of Distribution – Price Mix – Pricing Methods – Promotion Mix – Tools of Promotions.

SKILLS:

- ✓ *Expert in managerial skills*
- ✓ *Maintain social relations*
- ✓ *Evaluate pricing strategies*

PRACTICES:

- Select any Designation in an organization and try to describe its job description and job specifications
- How do you deal with grievances at your work
- Analyze marketing mix in various situations

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Carry out production operations through work-study	Apply	1, 2	1, 2, 3, 5
2	Analyze the nature and importance of management	Analyze	1	1,2,4,6
3	Significance of Operations Management.	Analyze	1, 2	1,2,5
4	Analyze the markets, customers, and competition	Analyze	2	1,2,4,5,6
5	Plan and control the HR function effectively	Evaluate	1, 2	1,2,3,4,5,6

TEXT BOOKS:

1. Rajan Saxena: Marketing Management, 4th Edition, TMH, 2013.
2. Dilip Kumar Battacharya, Principles of Management, Pearson, 2012.

REFERENCE BOOKS:

1. Philip Kotler, Kevin Lane Keller, Abraham Koshy and Mithleshwar Jha: Marketing Management, 13th Edition, Pearson Education, 2012.
2. Dipak Kumar Bhattacharyya, Production and Operations Management, Universities Press, 2012.
3. Gary Dessler, “Human Resource Management”, 12th Edition, Pearson- 2012.
4. K.Aswathappa, “Human Resource Management”, Text and Cases”, TMH, 2011.
5. Harold Koontz, Heinz Weihrich, A.R. Aryasri, Principles of Management, TMH, 2010.