

RCS-603: COMPUTER GRAPHICS		3-0-0
Unit	Topic	Proposed Lecture
I	Introduction and Line Generation: Types of computer graphics, Graphic Displays- Random scan displays, Raster scan displays, Frame buffer and video controller, Points and lines, Line drawing algorithms, Circle generating algorithms, Mid-point circle generating algorithm, and parallel version of these algorithms.	08
II	Transformations: Basic transformation, Matrix representations and homogenous coordinates, Composite transformations, Reflections and shearing. Windowing and Clipping: Viewing pipeline, Viewing transformations, 2-D Clipping algorithms- Line clipping algorithms such as Cohen Sutherland line clipping algorithm, Liang Barsky algorithm, Line clipping against non rectangular clip windows; Polygon clipping – Sutherland Hodgeman polygon clipping, Weiler and Atherton polygon clipping, Curve clipping, Text clipping	08
III	Three Dimensional: 3-D Geometric Primitives, 3-D Object representation, 3-D Transformation, 3-D viewing, projections, 3-D Clipping.	08
IV	Curves and Surfaces: Quadric surfaces, Spheres, Ellipsoid, Blobby objects, Introductory concepts of Spline, Bspline and Bezier curves and surfaces.	08
V	Hidden Lines and Surfaces: Back Face Detection algorithm, Depth buffer method, A-buffer method, Scan line method, basic illumination models– Ambient light, Diffuse reflection, Specular reflection and Phong model, Combined approach, Warn model, Intensity Attenuation, Color consideration, Transparency and Shadows.	08
REFERENCES: 1. Donald Hearn and M Pauline Baker, “Computer Graphics C Version”, Pearson Education 2. Foley, Vandom, Feiner, Hughes – “Computer Graphics principle”, Pearson Education. 3. Rogers, “ Procedural Elements of Computer Graphics”, McGraw Hill 4. W. M. Newman, R. F. Sproull – “Principles of Interactive computer Graphics” – Tata MCGraw Hill. 5. Amrendra N Sinha and Arun D Udai,” Computer Graphics”, Tata MCGraw Hill. 6. R.K. Maurya, “Computer Graphics ” Wiley Dreamtech Publication. 7. M.C. Trivedi, NN Jani, Computer Graphics & Animations, Jaico Publications 8 Rishabh Anand, Computer Graphics- A practical Approach, Khanna Publishing House 9. Mukherjee, Fundamentals of Computer graphics & Multimedia, PHI Learning Private Limited. 10. Donald Hearn and M Pauline Baker, “Computer Graphics with OpenGL”, Pearson education		

NHU-301/NHU-401: INDUSTRIAL PSYCHOLOGY

Unit-I

Introduction to Industrial Psychology – Definitions & Scope. Major influences on Industrial Psychology- Scientific Management and Human relations -Hawthorne Experiments. Implications of Industrial Psychology on Modern Industries.

Unit-II

Individual in Workplace

Motivation and Job satisfaction . Stress management. Organizational culture, Leadership and Group dynamics.

Unit-III

Work Environment & Engineering Psychology-fatigue, Monotony, Boredom. Accidents and Safety. Job Analysis, Recruitment, Selection and Interview– Reliability & Validity of recruitment tests.

Unit –IV

Performance Management : Training & Development.

References :

1. Miner J.B. (1992) Industrial/Organizational Psychology. N Y : McGraw Hill.
2. Blum & Naylor (1982) Industrial Psychology. Its Theoretical & Social Foundations CBS Publication.
3. Aamodt, M.G. (2007) Industrial/Organizational Psychology : An Applied Approach (5th edition) Wadsworth/Thompson : Belmont, C.A.
4. Aswathappa K. (2008). Human Resource Management (fifth edition) New Delhi : Tata McGraw Hill.
5. Bisen Vikram & Priya (2008), Industrial Psychology (third edition), New Age International *Publishers*, New Delhi

Mathematics –III
(Integral Transform & Discrete Maths)
(To be offered to CE and Allied Branches CE/EV)

Subject Code	KAS303/KAS403					
Category	Basic Science Course					
Subject Name	MATHEMATICS-III (Integral Transform & Discrete Maths)					
Scheme and Credits	L-T-P	Theory Marks	Sessional		Total	Credit
			Test	Assig/Att.		
	3—1—0	100	30	20	150	4
Pre- requisites (if any)	Knowledge of Mathematics I and II of B. Tech or equivalent					

Course Outcomes

The objective of this course is to familiarize the students with Laplace Transform, Fourier Transform, their application, logic group, sets, lattices, Boolean algebra and Karnaugh maps. It aims to present the students with standard concepts and tools at B.Tech first year to superior level that will provide them well towards undertaking a variety of problems in the concern discipline.

The students will learn:

- The idea of Laplace transform of functions and their application
- The idea of Fourier transform of functions and their applications
- The basic ideas of logic and Group and uses.
- The idea s of sets, relation, function and counting techniques.
- The idea of lattices, Boolean algebra, Tables and Karnaugh maps.

Laplace Transform (8)

Laplace transform, Existence theorem, Laplace transforms of derivatives and integrals, Initial and final value theorems, Unit step function, Dirac- delta function, Laplace transform of periodic function, Inverse Laplace transform, Convolution theorem, Application to solve simple linear and simultaneous differential equations.

MODULE II

Integral Transforms (9)

Fourier integral, Fourier Transform , Complex Fourier transform, Inverse Transforms, Convolution Theorems, Fourier sine and cosine transform, Applications of Fourier transform to simple one dimensional heat transfer equations, wave equations and Laplace equations, Z-Transform and its application to solve difference equations.

Module- III

(8)

Formal Logic ,Group, Ring and Field: Introduction to First order logic, Proposition, Algebra of Proposition, Logical connectives, Tautologies, contradictions and contingency, Logical implication, Argument, Normal form, Rules of inferences, semi group, Monoid Group, Group, Cosets, Lagrange's theorem , Congruence relation , Cyclic and permutation groups, Properties of groups, Rings and Fields (definition, examples and standard results only)

Module- IV

(10)

Set, Relation, function and Counting Techniques - Introduction of Sets, Relation and Function, Methods of Proof, Mathematical Induction, Strong Mathematical Induction, Discrete numeric function and Generating functions, recurrence relations and their solution , Pigeonhole principle.

Module- V

(10)

Lattices and Boolean Algebra: Introduction, Partially ordered sets, Hasse Diagram, Maximal and Minimal element, Upper and Lower bounds, Isomorphic ordered sets, Lattices, Bounded Lattices and , Distributive Lattices.

Duality, Boolean Algebras as Lattices, Minimization of Boolean Expressions, prime Implicants, Logic Gates and Circuits, Truth Table, Boolean Functions, Karnaugh Maps.

Text Books

1. E. Kreyszig: Advanced Engineering Mathematics; John Wiley & Sons.
2. R.K. Jain & S.R.K. Iyenger: Advanced Engineering Mathematics, Narosa Publishing House.
3. C.L.Liu: Elements of Discrete Mathematics; Tata McGraw- Hill Publishing Company Limited, New Delhi.
4. S. Lipschutz, M.L. Lipson and Varsha H. Patil: Discrete Mathematics; Tata McGraw- Hill Publishing Company Limited, New Delhi
5. B. Kolman , Robert C. Busby & S. C. Ross: Discrete Mathematical Structures' 5th Edition, Pearson Education (Singapore), Delhi, India.

Reference Books

1. B.S. Grewal: Higher Engineering Mathematics; Khanna Publishers, New Delhi.
2. B.V. Ramana: Higher Engineering Mathematics; Tata McGraw- Hill Publishing Company Limited, New Delhi.
3. Peter V.O' Neil. Advanced Engineering Mathematics, Thomas (Cengage) Learning.
4. Kenneth H. Rosen: Discrete Mathematics its Application, with Combinatorics and Graph Theory; Tata McGraw- Hill Publishing Company Limited, New Delhi
5. K.D. Joshi: Foundation of Discrete Mathematics; New Age International (P) Limited, Publisher, New Delhi.

COURSE OUTCOMES

	Course Outcome (CO)	Bloom's Knowledge Level (KL)
At the end of this course, the students will be able to:		
CO 1	Remember the concept of Laplace transform and apply in solving real life problems.	K ₁ & K ₃
CO 2	Understand the concept of Fourier and Z – transform to evaluate engineering problems	K ₂ & K ₄
CO 3	Remember the concept of Formal Logic ,Group and Rings to evaluate real life problems	K ₁ & K ₅
CO 4	Apply the concept of Set, Relation, function and Counting Techniques	K ₃
CO 5	Apply the concept of Lattices and Boolean Algebra to create Logic Gates and Circuits, Truth Table, Boolean Functions, Karnaugh Maps	K ₃ & K ₆

K₁ – Remember, K₂ – Understand, K₃ – Apply, K₄ – Analyze, K₅ – Evaluate, K₆ – Create

Evaluation methodology to be followed:

The evaluation and assessment plan consists of the following components:

- Class attendance and participation in class discussions etc.
- Quiz.
- Tutorials and assignments.
- Sessional examination.
- Final examination.

Award of Internal/External Marks:

Assessment procedure will be as follows:

- These will be comprehensive examinations held on-campus (Sessionals).
- Quiz.
 - Quiz will be of type multiple choice, fill-in-the-blanks or match the columns.
 - Quiz will be held periodically.
- Tutorials and assignments
 - The assignments/home-work may be of multiple choice type or comprehensive type at least one assignment from each Module/Unit.
 - The grades and detailed solutions of assignments (of both types) will be accessible online after the submission deadline.
- Final examinations.

These will be comprehensive external examinations held on-campus or off campus (External examination) on dates fixed by the Dr. APJ Abdul Kalam Technical University, Lucknow.

Microprocessor (KCS403)		
Course Outcome (CO)		Bloom's Knowledge Level (KL)
At the end of course , the student will be able to understand		
CO 1	Apply a basic concept of digital fundamentals to Microprocessor based personal computer system.	K ₃ , K ₄
CO 2	Analyze a detailed s/w & h/w structure of the Microprocessor.	K ₂ , K ₄
CO 3	Illustrate how the different peripherals (8085/8086) are interfaced with Microprocessor.	K ₃
CO 4	Analyze the properties of Microprocessors(8085/8086)	K ₄
CO 5	Evaluate the data transfer information through serial & parallel ports.	K ₅
DETAILED SYLLABUS		3-1-0
Unit	Topic	Proposed Lecture
I	Microprocessor evolution and types, microprocessor architecture and operation of its components, addressing modes, interrupts, data transfer schemes, instruction and data flow, timer and timing diagram, Interfacing devices.	08
II	Pin diagram and internal architecture of 8085 microprocessor, registers, ALU, Control & status, interrupt and machine cycle. Instruction sets. Addressing modes. Instruction formats Instruction Classification: data transfer, arithmetic operations, logical operations, branching operations, machine control and assembler directives.	08
III	Architecture of 8086 microprocessor: register organization, bus interface unit, execution unit, memory addressing, and memory segmentation. Operating modes. Instruction sets, instruction format, Types of instructions. Interrupts: hardware and software interrupts.	08
IV	Assembly language programming based on intel 8085/8086. Instructions, data transfer, arithmetic, logic, branch operations, looping, counting, indexing, programming techniques, counters and time delays, stacks and subroutines, conditional call and return instructions	08
V	Peripheral Devices: 8237 DMA Controller, 8255 programmable peripheral interface, 8253/8254 programmable timer/counter, 8259 programmable interrupt controller, 8251 USART and RS232C.	08
Text books: <ol style="list-style-type: none"> Gaonkar, Ramesh S , “Microprocessor Architecture, Programming and Applications with 8085”, Penram International Publishing. Ray A K , Bhurchandi K M , “Advanced Microprocessors and Peripherals”, TMH Hall D V ,”Microprocessor Interfacing’, TMH Liu and, “ Introduction to Microprocessor”, TMH Brey, Barry B, “INTEL Microprocessors”, PHI Renu Sigh & B.P. Gibson G A , “ Microcomputer System: The 8086/8088 family” ,PHI Aditya P Mathur Sigh, “Microprocessor, Interfacing and Applications M Rafiqzaman, “Microprocessors, Theory and Applications J.L. Antonakos, An Introduction to the Intel Family of Microprocessors, Pearson, 1999 		

B.TECH. (COMPUTER SCIENCE AND ENGINEERING)**FOURTH SEMESTER (DETAILED SYLLABUS)**

Operating systems (KCS401)		
Course Outcome (CO)		Bloom's Knowledge Level (KL)
At the end of course , the student will be able to understand		
CO 1	Understand the structure and functions of OS	K ₁ , K ₂
CO 2	Learn about Processes, Threads and Scheduling algorithms.	K ₁ , K ₂
CO 3	Understand the principles of concurrency and Deadlocks	K ₂
CO 4	Learn various memory management scheme	K ₂
CO 5	Study I/O management and File systems.	K ₂ ,K ₄
DETAILED SYLLABUS		3-0-0
Unit	Topic	Proposed Lecture
I	Introduction : Operating system and functions, Classification of Operating systems- Batch, Interactive, Time sharing, Real Time System, Multiprocessor Systems, Multiuser Systems, Multiprocess Systems, Multithreaded Systems, Operating System Structure- Layered structure, System Components, Operating System services, Reentrant Kernels, Monolithic and Microkernel Systems.	08
II	Concurrent Processes: Process Concept, Principle of Concurrency, Producer / Consumer Problem, Mutual Exclusion, Critical Section Problem, Dekker's solution, Peterson's solution, Semaphores, Test and Set operation; Classical Problem in Concurrency- Dining Philosopher Problem, Sleeping Barber Problem; Inter Process Communication models and Schemes, Process generation.	08
III	CPU Scheduling: Scheduling Concepts, Performance Criteria, Process States, Process Transition Diagram, Schedulers, Process Control Block (PCB), Process address space, Process identification information, Threads and their management, Scheduling Algorithms, Multiprocessor Scheduling. Deadlock: System model, Deadlock characterization, Prevention, Avoidance and detection, Recovery from deadlock.	08
IV	Memory Management: Basic bare machine, Resident monitor, Multiprogramming with fixed partitions, Multiprogramming with variable partitions, Protection schemes, Paging, Segmentation, Paged segmentation, Virtual memory concepts, Demand paging, Performance of demand paging, Page replacement algorithms, Thrashing, Cache memory organization, Locality of reference.	08
V	I/O Management and Disk Scheduling: I/O devices, and I/O subsystems, I/O buffering, Disk storage and disk scheduling, RAID. File System: File concept, File organization and access mechanism, File directories, and File sharing, File system implementation issues, File system protection and security.	08
Text books: <ol style="list-style-type: none"> 1. Silberschatz, Galvin and Gagne, "Operating Systems Concepts", Wiley 2. Sibsankar Halder and Alex A Aravind, "Operating Systems", Pearson Education 3. Harvey M Dietel, " An Introduction to Operating System", Pearson Education 4. D M Dhamdhare, "Operating Systems : A Concept based Approach", 2nd Edition, 5. TMH 5. William Stallings, "Operating Systems: Internals and Design Principles ", 6th Edition, Pearson Education 		

Theory of Automata and Formal Languages (KCS402)		
Course Outcome (CO)		Bloom's Knowledge Level (KL)
At the end of course , the student will be able to understand		
CO 1	Analyse and design finite automata, pushdown automata, Turing machines, formal languages, and grammars	K ₄ , K ₆
CO 2	Analyse and design, Turing machines, formal languages, and grammars	K ₄ , K ₆
CO 3	Demonstrate the understanding of key notions, such as algorithm, computability, decidability, and complexity through problem solving	K ₁ , K ₅
CO 4	Prove the basic results of the Theory of Computation.	K ₂ , K ₃
CO 5	State and explain the relevance of the Church-Turing thesis.	K ₁ , K ₅
DETAILED SYLLABUS		3-1-0
Unit	Topic	Proposed Lecture
I	Basic Concepts and Automata Theory: Introduction to Theory of Computation- Automata, Computability and Complexity, Alphabet, Symbol, String, Formal Languages, Deterministic Finite Automaton (DFA)- Definition, Representation, Acceptability of a String and Language, Non Deterministic Finite Automaton (NFA), Equivalence of DFA and NFA, NFA with ϵ -Transition, Equivalence of NFA's with and without ϵ -Transition, Finite Automata with output- Moore Machine, Mealy Machine, Equivalence of Moore and Mealy Machine, Minimization of Finite Automata, Myhill-Nerode Theorem, Simulation of DFA and NFA	08
II	Regular Expressions and Languages: Regular Expressions, Transition Graph, Kleen's Theorem, Finite Automata and Regular Expression- Arden's theorem, Algebraic Method Using Arden's Theorem, Regular and Non-Regular Languages- Closure properties of Regular Languages, Pigeonhole Principle, Pumping Lemma, Application of Pumping Lemma, Decidability- Decision properties, Finite Automata and Regular Languages, Regular Languages and Computers, Simulation of Transition Graph and Regular language.	08
III	Regular and Non-Regular Grammars: Context Free Grammar(CFG)-Definition, Derivations, Languages, Derivation Trees and Ambiguity, Regular Grammars-Right Linear and Left Linear grammars, Conversion of FA into CFG and Regular grammar into FA, Simplification of CFG, Normal Forms- Chomsky Normal Form(CNF), Greibach Normal Form (GNF), Chomsky Hierarchy, Programming problems based on the properties of CFGs.	08
IV	Push Down Automata and Properties of Context Free Languages: Nondeterministic Pushdown Automata (NPDA)- Definition, Moves, A Language Accepted by NPDA, Deterministic Pushdown Automata(DPDA) and Deterministic Context free Languages(DCFL), Pushdown Automata for Context Free Languages, Context Free grammars for Pushdown Automata, Two stack Pushdown Automata, Pumping Lemma for CFL, Closure properties of CFL, Decision Problems of CFL, Programming problems based on the properties of CFLs.	08
V	Turing Machines and Recursive Function Theory : Basic Turing Machine Model, Representation of Turing Machines, Language Acceptability of Turing Machines, Techniques for Turing Machine Construction, Modifications of Turing Machine, Turing Machine as Computer of Integer Functions, Universal Turing machine, Linear Bounded Automata, Church's Thesis, Recursive and Recursively Enumerable language, Halting Problem, Post's Correspondance Problem, Introduction to Recursive Function Theory.	08
Text books: <ol style="list-style-type: none"> 1. Introduction to Automata theory, Languages and Computation, J.E.Hopcraft, R.Motwani, and Ullman. 2nd edition, Pearson Education Asia 2. Introduction to languages and the theory of computation, J Martin, 3rd Edition, Tata McGraw Hill 3. Elements and Theory of Computation, C Papadimitrou and C. L. Lewis, PHI 4. Mathematical Foundation of Computer Science, Y.N.Singh, New Age International 		