



# ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY

Guwahati

## Course Structure and Syllabus

### Computer Science and Engineering (CSE)

#### Semester V/ CSE/ B.TECH

Sl. No.	Subject Code	Subject	Hrs/week			Credits
			L	T	P	
Theory						
1	MA131501	Probability and Random process	3	2	0	4
2	CS131502	Formal Language and Automata Theory	3	2	0	4
3	CS131503	Computer Graphics	3	2	0	4
4	CS131504	Database Management Systems	3	2	0	4
5	EE131505	Microprocessor and Microcontroller	3	2	0	4
6	HS131506	Principles of Management	2	0	0	2
Practical						
7	CS131513	Computer Graphics Lab	0	0	2	1
8	CS131514	Database Management Systems Lab	0	0	2	1
9	EE131515	Microprocessor and Microcontroller Lab	0	0	2	1
Total			17	10	6	25
Total Contact Hours: 33						
Total Credits : 25						

**Course Title : PROBABILITY AND RANDOM PROCESS**  
**Course Code: MA131501**  
**L-T-P-C: 3-2-0-4**

Class Hours/week	4
Expected weeks	12
Total hrs. of classes	36+12 = 48

MODULE	TOPIC	COURSE CONTENT	HOURS
1	INTRODUCTION	Sets and set operations; Probability space; Conditional probability and Bayes theorem.	8
2	DISCRETE RANDOM VARIABLES	Probability mass function, probability distribution function, example random variables and distributions; Continuous random variables, probability density function, probability distribution function, example distributions.	10
3	JOINT DISTRIBUTIONS	Functions of one and two random variables, moments of random variables; Conditional distribution, densities and moments; Characteristic functions of a random variable; Markov, Chebyshev and Chernoff bounds.	10
4	RANDOM SEQUENCES AND MODES OF CONVERGENCE	Limit theorems; Strong and weak laws of large numbers, central limit theorem.	10
5	RANDOM PROCESS AND STATIONARY PROCESSES	Mean and covariance functions. Ergodicity. Transmission of random process through LTI. Power spectral density.	10
<b>TOTAL</b>			<b>48</b>

### Text/Reference Books:

1. H. Stark and J. Woods, "Probability and Random Processes with Applications to Signal Processing," Third Edition, Pearson Education
2. A. Papoulis and S. Unnikrishnan Pillai, "Probability, Random Variables and Stochastic Processes," Fourth Edition, McGraw Hill.
3. K. L. Chung, Introduction to Probability Theory with Stochastic Processes, Springer International,
4. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability, UBS Publishers,
5. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Stochastic Processes, UBS Publishers
6. S. Ross, Introduction to Stochastic Models, Harcourt Asia, Academic Press.

**Course Title : FORMAL LANGUAGE AND AUTOMATA  
THEORY**

**Course Code: CS131502**

**L-T-P-C: 3-2-0-4**

Class Hours/week	4
Expected weeks	12
Total hrs. of classes	36+12 = 48

MODULE	TOPIC	COURSE CONTENT	HOURS
1	STRINGS AND ALPHABETS	Basics of Strings and Alphabets	6
2	FINITE AUTOMATA	DFA, transition graphs, regular languages, non-deterministic FA, equivalence of DFA and NDFA	8
3	GRAMMAR AND LANGUAGES	Regular grammars, regular expressions, equivalence between regular languages, properties of regular languages, pumping lemma.	8
4	CONTEXT FREE LANGUAGES	Leftmost and rightmost derivation, parsing and ambiguity, ambiguity in grammar and languages, normal forms	8
5	PUSHDOWN AUTOMATA	NDPDA, DPDA, context free languages and PDA, comparison of deterministic and non-deterministic versions, closure properties, pumping lemma for CFL	10
6	TURING MACHINES	Turing Machines, variations, halting problem, PCP	4
7	CHOMSKY HIERARCHY	Chomsky Hierarchy	4
TOTAL			48

**TEXTBOOKS / REFERENCES:**

1. An Introduction to Formal Languages and Automata, by Peter Linz, Third Edition, Narosa Publishers
2. Introduction to Automata Theory, Languages & Computation – J. E. Hopcroft and J. D. Ullman, Published by Narosa
3. Introduction to Languages and The Theory of Computation – J. C. Martin, McGraw Hill International Edition.

**Course Title : COMPUTER GRAPHICS**  
**Course Code: CS131503**  
**L-T-P-C: 3-2-0-4**

Class Hours/week	4
Expected weeks	12
Total hrs. of classes	36+12 = 48

MODULE	TOPIC	COURSE CONTENT	HOURS
1	INTRODUCTION	History of computer graphics, applications, graphics pipeline, physical and synthetic images, synthetic camera, modeling, animation, rendering, relation to computer vision and image processing, review of basic mathematical objects (points, vectors, matrix methods)	8
2	INTRODUCTION TO OPENGL	OpenGL architecture, primitives and attributes, simple modeling and rendering of two- and three-dimensional geometric objects, indexed and RGB color models, frame buffer, double buffering, GLUT, interaction, events and callbacks, picking.	10
3	GEOMETRIC TRANSFORMATIONS	Homogeneous coordinates, affine transformations (translation, rotation, scaling, shear), concatenation, matrix stacks and use of model view matrix in OpenGL for these operations.	8
4	VIEWING	Classical three dimensional viewing, computer viewing, specifying views, parallel and perspective projective transformations; Visibility- z-Buffer, BSP trees, Open-GL culling, hidden-surface algorithms.	9
5	SHADING AND RASTERIZATION	Light sources, illumination model, Gouraud and Phong shading for polygons. Rasterization- Line segment and polygon clipping, 3D clipping, scan conversion, polygonal fill, Bresenham's algorithm.	9
6	DISCRETE TECHNIQUES	Texture mapping, compositing, textures in OpenGL; Ray Tracing- Recursive ray tracer, ray-sphere intersection.	4
<b>TOTAL</b>			<b>48</b>

**Text Books:**

1. Edward Angel, Interactive Computer Graphics. A Top-Down Approach Using OpenGL (fifth Edition), Pearson Education
2. Donald Hearn and Pauline Baker, Computer Graphics with OpenGL (third edition), Prentice Hall
3. F. S. Hill Jr. and S. M. Kelley, Computer Graphics using OpenGL (third edition), Prentice Hall
4. Peter Shirley and Steve Marschner, Computer Graphics (first edition), A. K. Peters

**Web Resources:**

<http://www.graphicsforum.in>

**Course Title : DATABASE MANAGEMENT SYSTEMS**

**Course Code: CS131504**

**L-T-P-C: 3-2-0-4**

Class Hours/week	4
Expected weeks	12
Total hrs. of classes	36+12 = 48

MODULE	TOPIC	COURSE CONTENT	HOURS
1	BASIC CONCEPTS	Purpose of database systems- Components of DBMS – DBMS Architecture and Data Independence- Data modeling - Entity Relationship Model, Relational – Network- Hierarchical and object oriented models- Data Modeling using the Entity Relationship Model.	10
2	STRUCTURE OF RELATIONAL DATABASES	Relational databases – relational algebra- tuple relational calculus. Data definition with SQL, insert, delete and update statements in SQL –views – data manipulation with SQL	8
3	INTRODUCTION TO TRANSACTION PROCESSING	Transaction and System Concepts- Desirable properties of Transactions- Schedules and Recoverability- Serializability of Schedules- Query processing and Optimization- Concurrency Control- -assertions – triggers. Oracle case study: The basic structure of the oracle system – database structure and its manipulation in oracle- storage organization in oracle - Programming in PL/SQL- Cursor in PL/SQL	12
4	DATABASE DESIGN	Design guidelines– Relational database design – Integrity Constraints – Domain Constraints- Referential integrity – Functional Dependency- Normalization using Functional Dependencies, Normal forms based on primary keys- general definitions of Second and Third Normal Forms. Boyce Codd Normal Form– Multivalued Dependencies and Forth Normal Form – Join Dependencies and Fifth Normal Form – Pitfalls in Relational Database Design.	12

5	<b>DISTRIBUTED DATABASES</b>	Distributed Database Concepts- Data Fragmentation, Replication and Allocation Techniques- Different Types- Query Processing – semijoin - Concurrency Control and Recovery.	6
<b>TOTAL</b>			<b>48</b>

#### **TEXT BOOKS:**

1. Fundamentals of Database System Elmasri and Navathe (4rd Edition), Pearson Education Asia
2. Database System Concepts - Henry F Korth, Abraham Silbershatz, Mc Graw Hill 2<sup>nd</sup> edition.
3. Atul Kahate , “ Introduction to Database Management System”, Pearson Educations
4. Paneerselvam,”DataBase Management System”, PHI Learning

#### **REFERENCE BOOKS:**

1. An Introduction to Database Systems - C.J.Date (7th Edition) Pearson Education Asia
2. An Introduction to Database Systems – Bibin C. Desai, Galgotia Publications

**Course Title : MICROPROCESSOR AND MICROCONTROLLER****Course Code: EE131505****L-T-P-C: 3-2-0-4**

Class Hours/week	4
Expected weeks	12
Total hrs. of classes	36+12 = 48

MODULE	TOPIC	COURSE CONTENT	HOURS
1	<b>MICROPROCESSOR ARCHITECTURE</b>	Introduction to the microprocessor, The ALU, Up registers, Basic concepts of programmable device – Bus organization, system components etc., The interface section, The timing and control section, State transition sequence, Block diagram.	8
2	<b>PROGRAMMING MICROPROCESSORS</b>	Data representation, instruction formats, addressing modes, Instruction set, software design, assembly language programming, program looping, subroutine linkage, position independency, recursion.	8
3	<b>MEMORY INTERFACING</b>	Memory structure and its requirements, basic concepts and address decoding, interfacing circuit, address decoding and memory addresses, basics of 8155, interfacing of 8155 memory section.	8
4	<b>DATA TRANSFER SCHEMES</b>	Serial and parallel data transfer schemes, interrupts and interrupt service procedure. 8085 interrupts and vector locations, SIM and RIM instructions, RST instructions.	8
5	<b>I/O DEVICES</b>	OPAMPS, Opto-couples, DAC, ADC, sample& hold amplifiers, multiplexers, buffers, Timer counter, Data acquisition systems.	8
6	<b>INTRODUCTION TO MICROCONTROLLER</b>	Architecture, RISC and CISC processors.	4
7	<b>INSTRUCTION SET AND PROGRAMMING</b>	Instruction set and programming 8051 micro controllers.	4
<b>TOTAL</b>			<b>48</b>

**REFERENCES:**

- 1.Ramesh S.Gaonkar - Microprocessor Architecture, Programming and Applications (3e), Penram Pub
- 2.Mazidi M. A. & J. G. Mazidi - The 8051 Microcontroller and embedded systems, Pearson
- 3.Microprocessors and Interfacing: Nikhil Marriwala, Katson

**Course Title : PRINCIPLES OF MANAGEMENT**  
**Course Code: HS131506**  
**L-T-P-C: 2-0-0-2**

Class Hours/week	2
Expected weeks	12
Total hrs. of classes	24

MODULE	TOPIC	COURSE CONTENT	HOURS
1	MANAGEMENT	Definition, nature, importance, evolution of management thoughts – pre & post scientific era, contributions made by Taylor, Fayol, Gilbreth, Elton Mayo, McGregor, Maslow – covering Time & Motion Study, Hawthorne Experiments; Is management a science or art? Functions of manager, ethics in managing and social responsibility of managers.	4
2	PLANNING & CONTROL	Why Management process starts with planning, steps in planning, planning premises, types of planning, barriers to effective planning, operational plan, strategic planning, McKinsey's 7's Approach, SWOT analysis, Controlling- concept, Planning- control relationship, process of control, human response to control, dimension of control, MBO.	4
3	DECISION MAKING & ORGANIZING	Nature, process of decision making, decision making under Certainty and Uncertainty, decision-tree, group-aided decision, brainstorming. Organizing – concept, nature and process of organizing, authority and responsibility, delegation and empowerment, centralization and decentralization, concept of departmentation.	4
4	STAFFING & MOTIVATION	Concept, Manpower planning, Job design, recruitment & selection, training and development, performance appraisal, motivation, motivators and satisfaction, motivating towards organizing objectives, morale building.	3
5	LEADERSHIP & COMMUNICATION	Defining leadership and its role, should managers lead, leadership style, leadership development, Leadership behaviour. Communication- Process, Bridging gap-using tools of communication, electronic media in Communication	3



6	<b>FINANCIAL MANAGEMENT</b>	Financial functions of management, Financial Planning, Management of Working Capital, Sources of Finance.	3
7	<b>MARKETING MANAGEMENT</b>	Functions of Marketing, Product Planning & Development, Marketing Organization, Sales Organization, Sales Promotion, Consumer Behaviour, Marketing Research and Information	3
<b>TOTAL</b>			<b>24</b>

#### **TEXTBOOKS/REFERENCE BOOKS:**

1. Robbins & Cautler, Management, Prentice Hall of India.
2. John R.Schermerhorn, Introduction to Management, Wiley-India Edition.
3. Koontz, Principles of Management, Tata-McGraw Hill.
4. Richard L. Daft, New Era of Management, Cengage Learning.
5. Stoner, Freeman and Gilbert. Jr., Management, Prentice Hall of India.
6. Koontz, Weihrich, Essentials of Management, Tata-McGraw Hill.
7. D.C. Bose, Principles of Management and Administration, Prentice Hall of India.



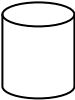

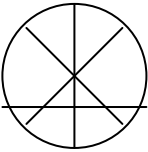
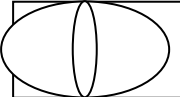
## PRACTICALS

**Course Title : COMPUTER GRAPHICS LAB**

**Course Code: CS131513**

**L-T-P-C: 0-0-2-1**

**Expected No. of weeks : 12 (approx)**

EXPERIMENT NO.	AIM OF THE EXPERIMENT	HOURS
1	<p>1. WAP to draw following figure using inbuilt function:-</p> <div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="text-align: center;">a. </div> <div style="text-align: center;">c. </div> <div style="text-align: center;">b. </div> <div style="text-align: center;">d. </div> <div style="text-align: center;">e. </div> <div style="text-align: center;">f. </div> </div>	3
2	<p>Write a program to draw a cube using inbuilt function.  Write a program to write your name.  Write a program to draw your name and department.  Write a program to draw a football moving on x-axis.  Write a program to draw a concentration circle.  Write a program to draw a line using DDA algorithms.  Write a program to draw a line using Bresenham's algorithms.  Write a program draw a moving car.  Write a program to draw a rectangle using boundary fill algorithms.  Write a program to Draw a circle and fill color with flood fill algorithm.  Write a program to draw a rectangle is using flood-fill algorithms and inside that draw a circle using boundary-fill algorithms.  Write a program to draw a circle using midpoint circle drawing algorithms.  Write a program to draw two circles which is moving from</p>	27

	<p>both side of the screen and join it on the middle of the screen.</p> <p>Write a program to draw an Indian flag and fill color.</p> <p>Write a program to Rotate, Translate and scaling a line</p> <p>Write a program to draw a moving man.</p> <p>Write a program to draw a chess board.</p> <p>Write a program to draw a clock.</p> <p>Write a program to draw a poster for your college.</p>	
<b>TOTAL</b>		<b>30</b>

**Course Title : DATABASE MANAGEMENT SYSTEMS LAB**

**Course Code: CS131514**

**L-T-P-C: 0-0-2-1**

**Expected No. of weeks : 12 (approx)**

EXPERIMENT NO.	AIM OF EXPERIMENT	HOURS
1	Consider the following relational schema  Employee (Emp_no, Name, Salary, design, dept_id, DOJ)  Department (Dept_id, DName, loc, DOE)  (a) Display the name of the employees working in marketing dept. (b) Display the details of the employee joined in the month of July. (c) Display the details of the employee who gets maximum salary. (d) Count the no of employees in each dept.	3
2	Consider the following relational schema  Student (Rollno, Name, Address, DOB, C_id)  Course ( C_id, Cname, Dur, Fees)  (a) Display rollno,name,cname,fees of each student (b) Count the no of students in each course	3
3	Consider the following relational schema  Books(book_id,b_name,author,purchase_date,cost)  Members(member_id,m_name,address,phone,birthdate)  Issue_return(book_id,member_id,issue_date,return_date)  (a) Find the author of the books that have not been issued. (b) Display the member_id and no of books issued to that (Assume that if a book in Issue_Return relation does not have a return_date then it is issued) (c) Find the book that has been issued the minimum no of times. (d) Display the names and author of the books that have been issued at any time to a member whose name begins with "Ra". (e) Display the name and Cost of those books that have been issued to any member whose date of birth is less than 01-01-1989 but not been issued to any member having the birth date equal to or	3

	greater than 01-01-1989.	
4	<p>Consider the following relational schema</p> <p>Student(name,phone,dob,s_id)</p> <p>Course(c_id,cname,credit,teacher_id)</p> <p>Result(s_id,c_id,mark)</p> <p>(a) Find the name of the students whose results are not declared in any course</p> <p>(b) Find the teachers who are teaching more than one course</p> <p>(c) Display the name and marks of those students who were born before 1-1-1989 and score more than 80 marks in any course</p> <p>(d) Find the details of students securing pass marks in more than 3 course</p> <p>(e) Find the total no of credits earned by a students whose id is 10.</p> <p>(f) Find name of the students who got maximum overall marks.</p> <p>(g) Display the name and marks of those students who scored more than 80 marks in any subject.</p> <p>(h) Find the details of the students securing less than 30 marks in more than 3 subjects.</p>	3
5	<p>Consider the following relational schema</p> <p>Customer( C_id, Name , Address )</p> <p>Item(i_code , Name , Price )</p> <p>Purchase (P_id ,C_id , I_code, qty , pdate )</p> <p>(a) Find the name of the customer who has done maximum purchase.</p> <p>(b) Display the name of the item that has been purchased maximum no of times in the month of Feb.</p> <p>(c) Display the name of the customer who didn't purchase any item.</p>	3
6	<p>Create three triggers (insert, delete and update) on emp table so that:</p> <p>i) Whenever a new record is inserted then the emp_id and date of insertion is stored in another table called new_rec.</p> <p>ii) whenever a record is deleted the emp_id and date of deletion is stored in another table called old_rec.</p>	3

	iii) whenever employee's salary is updated the emp_id , old salary and updated salary is stored in another table called update_info.	
7	Write a procedure to accept a emp_id and display the employee details.	3
8	Write a procedure to accept a emp_id and return the employee salary.	3
9	Emp(emp_no,name,salary,supervisor_no,dept_code) Dept(dept_code, dept_name) i) employees who get more salary than their supervisor ii) Department name and total number of employees in each Department. iii) Name and department of employee(s) who earn maximum salary.	3
<b>TOTAL</b>		<b>27</b>

**Course Title : MICROPROCESSOR AND MICROCONTROLLER LAB**

**Course Code: EE131515**

**L-T-P-C: 0-0-2-1**

**Expected No. of weeks : 12 (approx)**

<b>EXPERIMENT NO.</b>	<b>AIM OF THE EXPERIMENT</b>	<b>HOURS</b>
1	Addition of immediate 8 bit numbers	3
2	Subtraction of immediate 8 bit numbers	3
3	Addition of 8 bit numbers stored in memory location	3
4	Block transfer of data in memory segments far apart	3
5	Block transfer of data in memory segments overlapping each other	3
6	Addition of an array of bytes stored in consecutive memory	3
7	Addition of unknown number of bytes stored in consecutive memory	3
8	Addition of two 16 bit numbers stored in memory	3
9	Subtraction of two 16 bit numbers stored in memory	3
10	Multiplication of two 8 bit unsigned numbers stored in memory	3
11	Division of one 8 bit unsigned number by another 8 bit unsigned number stored in memory	3
<b>TOTAL</b>		<b>33</b>

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