



B.M.S. College of Engineering, Bengaluru-19
Autonomous Institute, affiliated to VTU

Department of Computer Science and Engineering
Curriculum Design for UG

UG Scheme from 3rd to 8th Semester
Academic Year of admission 2020-2021

Definition of Credit: 1Hr. Lecture (L) per week 1 credit ; 2Hrs Tutorial (T) per week 1 credit ; 2Hrs Practical per week 1 credit

Credit Distribution among Curricular Components

Sem	HS	BS	ES	PC	PE	OE	Proj/Mini Proj	Seminar Technical (SR)	Seminar – Internship (SR)	Non- Credit	Total Credits
I		9	11							A1	20
II		9	11							A2	20
III	2	4	4	14			2			A3	26
IV	1	4		16			2		1	A4	24
V	3			15	6		2			A5	26
VI	3			12	4	3	2		1	A6	25
VII	3	1		1	6	3	3	1		A7	18
VIII				2		3	10	1		A8	16
Total	12	27	26	60	16	9	21	2	2		175

Note: HS: Humanities and Social Sciences/Management Course, BS: Basic Science Course, ES: Engineering Science Course, PC: Professional Core Course, PE: Professional Elective Course, OE: Open Elective Course; PW: Project/Mini Project Work, SR: Seminar Technical/ Seminar Internship, NC: Non-credit mandatory course

UG CSE 4th Semester (Academic Year of admission 2020-21)

Course Type	Code	Course Title	Credits			Total Credits	Total Cont.Hrs	Marks		
			L	T	P			CIE	SEE	Total
BS-6	19MA4BSLIA	Linear Algebra	3	1	0	4	5	50	50	100
PC-5	19CS4PCTFC	Theoretical Foundations of Computations	3	1	0	4	5	50	50	100
PC-6	19CS4PCDBM	Database Management Systems	3	0	1	4	5	50	50	100
PC-7	19CS4PCADA	Analysis and Design of Algorithms	3	0	1	4	5	50	50	100
PC-8	19CS4PCOPS	Operating Systems	3	1	0	4	5	50	50	100
HS-3	19IC3HSCPH/ 19IC4HSCPH	Constitution of India, Professional Ethics and Human Rights	1	0	0	1	1	50	50	100
SR-1	19CS4SRSTI	Seminar Technical/ Internship	0	0	1	1	0	50	50	100
PW-2	19CS4PWPW2	Project Work-2	0	0	2	2	2	50	50	100
NC-4	19CS4NCNC4	Cultural Activity (Music/Dance etc.)	Non-credit mandatory Course							
TOTAL			16	3	5	24	28	400	400	800

Course prescribed to lateral entry Diploma holders admitted to III semester of Engineering programs: Additional Mathematics-II (19MA4IMMAT)

SR-1: Technical Seminar Based on **i.** Summer/Winter Internship (with any NGO or company during mandatory internship of at least one week (at least five days) during the vacation period of 1st, 2nd and 3rd Sem) or **ii.** Research paper presentation based on Technology Trends in Healthcare, Finance etc.

PW-2: Database Application Development - Under this project work, student should develop back end database table for any chosen database applications. It can be extension of 3rd sem project with backend connection. Front end can be either Visual basic or Java framework. Tables developed should be more than six database tables. Students can form a group with minimum of two and maximum of four. Teacher allotted for project work to students should teach students back end technologies like Oracle and front end technologies like Visual during Lab hours as per the allotment. Teacher should guide the students in choosing the topic & towards carrying out project work and complete the evaluation of assigned students. The evaluation of project work will be based on the rubrics set by the department under the committee of HOD, UGNBA coordinator, One professor, One Associate professor and One Assistant Professor.

NC-4: Student can participate in any of the cultural activities such as Music, dance conducted by college or any organization. Student should produce participation certificate for clearing this mandatory course. Note: If student is unable to participate in outside cultural activities then department Head should take care of conducting any small cultural event (like Essay, Debate etc.) of one or two day event in the college. Physically challenged students can produce participation certificate of any technical/cultural events conducted by college/department clubs.

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FOURTH SEMESTER B.E COURSE - (CSE/ISE)

Course Title	Linear Algebra	Course Code	19MA4BSLIA
Credits	04	L – T – P	3 – 1 – 0
Contact hours	48 hours (36L+12T)	CS/IS Cluster	

Prerequisites: Vector Algebra, Matrix computations, Calculus, Geometry, Group Theory.

Course Objectives: To provide the students with a foundation of concepts in linear algebra that is essential to engineers of computer and information science.

UNIT-1

SYSTEM OF LINEAR EQUATIONS AND VECTOR SPACES

[11 hours]

Elementary row operations, echelon forms, rank of matrix.

System of Linear Equations: solution of homogeneous equations, consistency of non-homogeneous system of linear equations. Gauss elimination method, LU decomposition method.

Vector spaces: Subspaces, Linear Combinations, Linear Spans, row space and column space of a Matrix, Linear Dependence and Independence, Basis and Dimension, Coordinates.

(9L+2T)

UNIT-2

LINEAR TRANSFORMATIONS

[9 hours]

Introduction, Linear Mappings, Geometric linear transformation of \mathbb{R}^2 , Kernel and Image of a linear transformations, Matrix representation of linear transformations, Rank-Nullity Theorem(No proof), Singular and Nonsingular linear transformations, Invertible linear transformations.

(7L+2T)

UNIT-3

EIGENVALUES AND EIGENVECTORS

[10 Hours]

Introduction, Polynomials of Matrices, Characteristic polynomial, Cayley-Hamilton Theorem, eigenvalues and eigenvectors, eigen spaces of a linear transformation, Diagonalization, Minimal Polynomial, Characteristic and Minimal Polynomials of Block Matrices, Jordan Canonical form, Solving differential equations in Fundamental form.

(7L+3T)

UNIT-4

INNER PRODUCT SPACES

[10 hours]

Inner product, inner product spaces, length and orthogonality, orthogonal sets and Bases, projections, Gram-Schmidt process, QR-factorization, least squares problem and least square error.

(7L+3T)

SYMMETRIC MATRICES AND QUADRATIC FORMS

[8 hours]

Diagonalization of real symmetric matrices, Orthogonal diagonalization of real symmetric matrices, quadratic forms and its classifications, Singular value decomposition

(8L+2T)



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On completion of the course, student will have the ability to:

Course Code	CO #	Course Outcome (CO)	PO
19MA4BSLIA	CO 1	Apply the concepts of Matrices to linear systems and Vectors spaces.	1
	CO 2	Relate the concepts of Eigen values, Eigen vectors & functions to linear algebra.	
	CO 3	Apply the concepts of inner products to matrix decomposition.	

Text Books:

1. Linear Algebra and its applications, David C. lay, Steven R. lay, Judi J Mc. Donald, 5th Edition, 2015, Pearson Education.
2. Linear Algebra and its applications, Gilbert Strang, 4th edition, 2005, Brooks Cole.

Reference Books:

1. Schaum's outline series-Theory and problems of linear algebra, Seymour Lipschutz, 5th edition, 2012, McGraw-Hill Education.
2. Linear Algebra an Introduction, Richard Bronson & Gabriel B. Costa, 2nd edition.

E books and online course materials:

1. <https://ocw.mit.edu/courses/mathematics/18-06sc-linear-algebra-fall-2011/index.htm>
2. <https://www.math.ucdavis.edu/~linear/linear.pdf>

Online Courses and Video Lectures:

1. <https://www.coursera.org/learn/linear-algebra-machine-learning>
2. <https://nptel.ac.in/syllabus/111106051/>

Question Paper Pattern:

1. Five full questions to be answered.
2. To set one question each in Units 2, 4, 5 and two questions each in Unit 1 and Unit 3.



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Sem	4th		
Course Title:	Theoretical Foundations of Computations		
Course Code:	19CS4PCTFC		
L-T-P:	3-1-0	Total Credits:	4

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	Introduction to Finite Automata Introduction to Finite Automata, Central Concepts of Automata Theory, Deterministic Finite Automata (DFA), Nondeterministic Finite Automata (NFA), Finite Automata with Epsilon Transition, An Application Text Search.	8	Textbook 1 Chapter 1-1.1.1, 1.5 Chapter 2- 2.2, 2.3, 2.4, 2.5
2	Regular Expressions and Languages Regular Expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions, Proving Languages Not to Be Regular, Closure Properties of Regular Languages, Equivalence and Minimization of Automata	8	Textbook 1 Chapter 3-3.1, 3.2, 3.3 Chapter 4- 4.1, 4.2, 4.4
3	Context Free Grammars and Languages Parse Trees Applications of Context Free Grammars, Applications of Context Free Grammars, Ambiguity in Grammars and Languages, Eliminating Useless Symbols, Computing the Generating and Reachable Symbols, Eliminating Epsilon Productions, Eliminating Unit Productions, Chomsky Normal Form	8	Textbook 1 Chapter 5-5.1, 5.2, 5.3, 5.4 Chapter 7-7.1.1 - 7.1.5
4	Pushdown Automata Definition of the Pushdown Automaton, The Languages of a PDA, Equivalence of PDA's and CFG's, Deterministic Pushdown Automata, The Pumping Lemma for Context Free Languages, Closure Properties of Context Free Languages	8	Textbook 1 Chapter 6 - 6.1, 6.2, 6.3, 6.4 Chapter 7-7.2, 7.3
5	Problems That Computers Cannot Solve The Turing Machine, Programming Techniques for Turing Machines, Extensions to the Basic Turing Machine, Restricted Turing Machines, Turing Machines and Computers, Definition of Post's Correspondence Problem, A Language That Is Not Recursively Enumerable, An Undecidable Problem That is RE Other Undecidable Problems	7	Textbook 1 Chapter 8 - 8.1, 8.2, 8.3, 8.4, 8.5, 8.6 Chapter 9- 9.1, 9.2, 9.4.1, 9.5

Prescribed Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Introduction to Automata Theory, Languages and Computation	John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman: education	3 rd Edition	Pearson	2007

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Introduction to Languages and Automata Theory	John C Martin	3 rd Edition	Tata McGraw-Hill	2007
2.	An Introduction to formal Languages and Automata	Peter Linz	II edition	Narosa publishing house	1997
3.	Introduction to Computer Theory	Daniel I.A. Cohen	2 nd Edition	John Willy & Sons Inc.,	2000



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E-Book						
Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Introduction to Theory of Computation	Anil Maheshwari, Michiel smid	---	Carleton University	2019	https://cglab.ca/~michi/TheoryOfComputation/TheoryOfComputation.pdf

MOOC Course				
Sl. No.	Course name	Course Offered By	Year	URL
1.	Automata Theory	edx	2020	https://www.edx.org/course/automata-theory
2.	www.nptel.ac.in	IIT B	2019	nptel.ac.in/courses/106104028/theory of computation.
3.	https://lagunita.stanford.edu/courses	Stanford University	Self –paced 2019	https://lagunita.stanford.edu/courses/course-v1:ComputerScience+Automata+SelfPaced/about

B Course Outcomes

At the end of the course the student will be able to

CO1	Able to Apply the knowledge of Automata Theory, Grammars & Regular Expressions for solving the Problem.
CO2	Ability to analyse the given Automata, Regular Expression & Grammar to know the Language it represents.
CO3	Design Automata & Grammar for pattern recognition and syntax checking.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3													2	
CO2		2												2	
CO3			2											2	

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	Two	40
QUIZ/AAT	Two	10
Lab Component	---	---
Total		50



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E Tutorial Plan (if applicable)

Tutorial #	Unit #	Topic
1	I	Problems on DFA Book 1, Chapter 2. Exercise 2.2.1, 2.2.6, 2.2.7,
2	I	Problems on NFA Book 1, Chapter 2. Exercise 2.3.1, 2.3.2, 2.3.3, 2.4.1
3	I	Problems on conversion of NFA to DFA Book 1, Chapter 2. Exercise 2.5.1, 2.5.2, 2.5.3
4	I	Real-life examples for DFA and NFA Book 1, Chapter 2. Exercise 2.2.10 Design a Vending Machines, Video Games, Traffic lights
5	II	Problems on regular expressions Book 1, Chapter 3. Exercise 3.1.1, 3.1.2, 3.1.3
6	II	Problems on regular expressions Book 1, Chapter 3. Exercise 3.1.4, 3.1.5, 3.1.3, 3.2.1, 3.2.3
7	III	Problems on Grammar and Minimization Book 1, Chapter 4. Exercise 4.2.1, 4.4.1, 4.4.2
8	III	Problems on CFG Book 1, Chapter 5. Exercise 5.1.1, 5.1.2, 5.4.5, 5.4.7
9	IV	Problems on PDA Book 1, Chapter 6. Exercise 6.2.1, 6.2.2, 6.2.3
10	IV	Problems on conversion of CGF to PDA and vice versa Book 1, Chapter 6. Exercise 6.3.1, 6.3.2, 6.3.3 Book 1, Chapter 7. Problem 7.4, 7.8
11	V	Problems on Turing machine Book 1, Chapter 8. Exercise 8.2.1, 8.2.2, 8.2.3
12	V	Book 1, Chapter 8. Exercise 8.4.9, 8.4.10

F Laboratory Plan (if applicable)

G Alternate Assessment Tool Plan (if applicable)

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Mandatory	One Question to be asked for 20 Marks

Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%



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Sem	4th		
Course Title:	Database Management Systems		
Course Code:	19CS4PCDBM		
L-T-P:	3-0-1	Total Credits:	4

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	Introduction to Databases: Introduction, An Example, Characteristics of Database approach, Advantages of using DBMS approach, When not to use a DBMS Database System Concepts and Architecture: Data models, Schemas and instances, Three schema architecture and data independence Database languages and interfaces, The database system environment, SQL: SQL Data Definition and Data Types specifying basic constraints in SQL, Basic retrieval queries in SQL, Insert, Delete and Update statements in SQL, Additional features of SQL ,More complex SQL Queries, Specifying Constraints as Assertions and Triggers, Views (Virtual Tables) in SQL,Schema Change Statement in SQL.	7	Text book 1 Chapter 1: 1.1, 1.2, 1.3, 1.6, 1.8 Chapter 2: 2.1, 2.2, 2.3, 2.4 Chapter 4: 4.1, 4.2, 4.3, 4.4, 4.5 Chapter 5: 5.1, 5.2, 5.3, 5.4
2	Data Modelling using the Entity-Relationship(ER) model: Using High-Level conceptual Data Models for Database Design, A sample Database Application, Entity types, Entity Sets, Attributes and Keys, Relationship Types, Relationship Sets, Roles and Structural Constraints, Weak Entity types, Refining the ER Design, ER Diagrams, Naming Conventions and Design Issues, Relationship Types of Degree Higher than two, Relational Database Design using ER-to-Relational Mapping.	8	Text book 1 Chapter 7: 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.9 Chapter 9: 9.1
3	Relational Data Model and Relational Database Constraints: Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Transactions and Dealing with Constraint Violations. Relational Algebra: Unary Relational Operations, SELECT and PROJECT, Relational Algebra Operations from Set Theory Binary Relational Operations: JOIN and DIVISION, Additional Relational Operations, Examples of Queries in Relational Algebra.	8	Text book 1 Chapter 3: 3.1, 3.2, 3.3 Chapter 6: 6.1, 6.2, 6.3, 6.4, 6.5
4	Database Design Theory and Normalization: Informal Design Guidelines for Relation Schemas, Functional Dependencies, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Multi-valued Dependencies and a Fourth Normal Form, Join Dependencies, Fifth Normal Form.	8	Text book 1 Chapter 15: 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7
5	Transaction Processing, Concurrency Control, and Recovery: Introduction to Transaction Processing, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability, Characterizing Schedules Based on Serializability, Two-Phase Locking Techniques for Concurrency Control, Recovery Concepts ,NO-UNDO/REDO Recovery Techniques based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow Paging, The ARIES Recovery Algorithm.	8	Text book 1 Chapter 21: 21.1, 21.2, 21.3, 21.4, 21.5 Chapter 22: 22.1 Chapter 23: 23.1, 23.2, 23.3, 23.4, 23.5



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Prescribed Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Fundamental of Database Systems	Ramez Elmasri and Shamkant B Navathe	Sixth Edition	Pearson	2017
2.	Database Management Systems	Ramakrishnan and Gehrke	3 rd Edition	McGraw Hill	2014

Reference Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	An Introduction to Database Systems	C.J.Date, A.Kannan, S.Swamyathan	8 th Edition	Pearson Education	2006
2.	Database Systems: The Complete Book	Hector Garcia-Molina, Jeffrey D.Ullman, Jennifer Widom ,	Second Edition	Pearson Education	2001
3.	Database System Concepts	Abraham Silberschatz, HenryF. Korth, S. Sudarshan	Sixth Edition	Tata McGraw-Hill	2010

E-Book						
Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	An Introduction to Relational Database Theory	Hugh Darwen	3 rd Edition	Ventus Publishing ApS	2012	https://zodml.org/sites/default/files/An Introduction to Relational Database Theory 0.pdf
2.	Database Systems: Design, Implementation, and Management, Eighth Edition	Peter Rob and Carlos Coronel	8 th Edition		2009	http://m5zn.com/newuploads/2015/04/27/pdf/b38963a5c2824b9.pdf

MOOC Course				
Sl. No.	Course name	Course Offered By	Year	URL
1.	Data Base Management System	NPTEL	2019	https://onlinecourses.nptel.ac.in/noc19_cs12/preview
2.	Data Base Management System	SWAYAM	2017	https://swayam.gov.in/course/220-database-management-system
3.	SQL tutorial	W3 schools	--	www.w3schools.com/sql/

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to apply the concepts of database management system for various applications.
CO2	Ability to analyse the given database concepts to its correctness.
CO3	Ability to design and demonstrate conceptual models, query and optimization.
CO4	Ability to conduct experiments to demonstrate the various SQL query processing.



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C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3												1		
CO2		3												2	
CO3			3											3	
CO4			3		3									2	

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	Average of two	20
QUIZ	ONE	5
Lab Component	Lab Test	25
Alternate Assessment Tool	---	
Total		50

E Tutorial Plan (if applicable)

F Laboratory Plan (if applicable)

Instructions to Students to be followed in each DBMS lab:

1. Each Student should write down the work carried out and the outputs in the observation book and get it evaluated by the respective lab faculty in-charge.
2. Each Student should bring the lab record with the programs and output written for the programs completed in their respective previous week and get it evaluated by the lab faculty in-charge.

Writing SQL Queries using Oracle for the following database systems:

Experiment #	Name of Experiment
1	Insurance Database
2	Banking Enterprise Database
3	Supplier Database
4	Student Faculty Database
5	Airline Flight Database
6	Order Processing Database
7	Book dealer Database
8	Student Enrolment Database
9	Movie Database
10	College Database

PROGRAM 1: INSURANCE DATABASE

Consider the Insurance database given below. The primary keys are underlined and the data types are specified.

PERSON (driver-id #: String, name: String, address: String)

CAR (Regno: String, model: String, year: int)

ACCIDENT (report-number: int, date: date, location: String)

OWNS (driver-id #: String, Regno: String)

PARTICIPATED (driver-id: String, Regno: String, report-number: int, damage-amount: int)



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- i. Create the above tables by properly specifying the primary keys and the foreign keys.
- ii. Enter at least five tuples for each relation.
- iii. Demonstrate how you
 - a. Update the damage amount for the car with a specific Regno in the accident with report number 12 to 25000.
 - b. Add a new accident to the database.
- iv. Find the total number of people who owned cars that involved in accidents in 2008.
- v. Find the number of accidents in which cars belonging to a specific model were involved.

PROGRAM 2. BANKING ENTERPRISE DATABASE

Consider the following database for a banking enterprise.

BRANCH (branch-name: String, branch-city: String, assets: real)

ACCOUNTS (accno: int, branch-name: String, balance: real)

DEPOSITOR (customer-name: String, customer-street: String, customer-city: String)

LOAN (loan-number: int, branch-name: String, amount: real)

BORROWER (customer-name: String, loan-number: int)

- i. Create the above tables by properly specifying the primary keys and the foreign keys.
- ii. Enter at least five tuples for each relation.
- iii. Find all the customers who have at least two accounts at the Main branch.
- iv. Find all the customers who have an account at all the branches located in a specific city.
- v. Demonstrate how you delete all account tuples at every branch located in a specific city.

PROGRAM 3. SUPPLIER DATABASE

Consider the following schema:

SUPPLIERS (sid: integer, sname: string, address: string)

PARTS (pid: integer, pname: string, color: string)

CATALOG (sid: integer, pid: integer, cost: real)

The Catalog relation lists the prices charged for parts by Suppliers. Write the following queries in SQL:

- i. Find the pnames of parts for which there is some supplier.
- ii. Find the snames of suppliers who supply every part.
- iii. Find the snames of suppliers who supply every red part.
- iv. Find the pnames of parts supplied by Acme Widget Suppliers and by no one else.
- v. Find the sids of suppliers who charge more for some part than the average cost of that part (averaged over all the suppliers who supply that part).
- vi. For each part, find the sname of the supplier who charges the most for that part.
- vii. Find the sids of suppliers who supply only red parts.

PROGRAM 4. STUDENT FACULTY DATABASE

Consider the following database for student enrolment for course:

STUDENT (snum: integer, sname: string, major: string, level: string, age: integer)

CLASS (name: string, meets at: time, room: string, fid: integer)

ENROLLED (snum: integer, cname: string)

FACULTY (fid: integer, fname: string, deptid: integer)

The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair



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such that the student is enrolled in the class. Level is a two character code with 4 different values (example: Junior: JR etc)

Write the following queries in SQL. No duplicates should be printed in any of the answers.

- Find the names of all Juniors (level = JR) who are enrolled in a class taught by
- Find the names of all classes that either meet in room R128 or have five or more Students enrolled.
- Find the names of all students who are enrolled in two classes that meet at the same time.
- Find the names of faculty members who teach in every room in which some class is taught.
- Find the names of faculty members for whom the combined enrolment of the courses that they teach is less than five.
- Find the names of students who are not enrolled in any class.
- For each age value that appears in Students, find the level value that appears most often. For example, if there are more FR level students aged 18 than SR, JR, or SO students aged 18, you should print the pair (18, FR).

PROGRAM 5. AIRLINE FLIGHT DATABASE

Consider the following database that keeps track of airline flight information:

FLIGHTS (flno: integer, from: string, to: string, distance: integer, departs: time, arrives: time, price: integer)

AIRCRAFT (aid: integer, aname: string, cruisingrange: integer)

CERTIFIED (eid: integer, aid: integer)

EMPLOYEE (eid: integer, ename: string, salary: integer)

Note that the Employees relation describes pilots and other kinds of employees as well; Every pilot is certified for some aircraft, and only pilots are certified to fly.

Write each of the following queries in SQL.

- Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs.80,000.
- For each pilot who is certified for more than three aircrafts, find the eid and the maximum cruising range of the aircraft for which she or he is certified.
- Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru to Frankfurt.
- For all aircraft with cruising range over 1000 Kms, find the name of the aircraft and the average salary of all pilots certified for this aircraft.
- Find the names of pilots certified for some Boeing aircraft.
- Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.
- A customer wants to travel from Madison to New York with no more than two changes of flight. List the choice of departure times from Madison if the customer wants to arrive in New York by 6 p.m.
- Print the name and salary of every non-pilot whose salary is more than the average salary for pilots.

PROGRAM 6. ORDER PROCESSING DATABASE

Consider the following relations for an Order Processing database application in a company.

CUSTOMER (CUST #: int, cname: String, city: String)

ORDER (order #: int, odate: date, cust #: int, ord-Amt: int)

ITEM (item #: int, unit-price: int)

ORDER-ITEM (order #: int, item #: int, qty: int)

WAREHOUSE (warehouse #: int, city: String)

SHIPMENT (order #: int, warehouse #: int, ship-date: date)



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- i. Create the above tables by properly specifying the primary keys and the foreign keys and the foreign keys.
- ii. Enter at least five tuples for each relation.
- iii. Produce a listing: CUSTNAME, #oforders, AVG_ORDER_AMT, where the middle column is the total numbers of orders by the customer and the last column is the average order amount for that customer.
- iv. List the order# for orders that were shipped from all warehouses that the company has in a specific city.
- v. Demonstrate how you delete item# 10 from the ITEM table and make that field null in the ORDER_ITEM table.

PROGRAM 7. BOOK DEALER DATABASE

The following tables are maintained by a book dealer:

AUTHOR(author-id: int, name: String, city: String, country: String)

PUBLISHER(publisher-id: int, name: String, city: String, country: String)

CATALOG (book-id: int, title: String, author-id: int, publisher-id: int, category-id: int, year: int, price: int)

CATEGORY(category-id: int, description: String)

ORDER-DETAILS(order-no: int, book-id: int, quantity: int)

- i. Create the above tables by properly specifying the primary keys and the foreign keys.
- ii. Enter at least five tuples for each relation.
- iii. Give the details of the authors who have 2 or more books in the catalog and the price of the books in the catalog and the year of publication is after 2000.
- iv. Find the author of the book which has maximum sales.
- v. Demonstrate how you increase the price of books published by a specific publisher by 10%.

PROGRAM 8. STUDENT ENROLLMENT DATABASE

Consider the following database of student enrollment in courses and books adopted for each course.

STUDENT (regno: String, name: String, major: String, bdate: date)

COURSE (course #: int, cname: String, dept: String)

ENROLL (regno: String, cname: String, sem: int, marks: int)

BOOK_ADOPTION (course #: int, sem: int, book-ISBN: int)

TEXT(book-ISBN:int, book-title:String, publisher:String, author:String)

- i. Create the above tables by properly specifying the primary keys and the foreign keys.
- ii. Enter at least five tuples for each relation.
- iii. Demonstrate how you add a new text book to the database and make this book be adopted by some department.
- iv. Produce a list of text books (include Course #, Book-ISBN, Book-title) in the alphabetical order for courses offered by the 'CS' department that use more than two books.
- v. List any department that has all its adopted books published by a specific publisher.

PROGRAM 9: MOVIE DATABASE

Consider the schema for Movie Database:

ACTOR(Act_id, Act_Name, Act_Gender)

DIRECTOR(Dir_id, Dir_Name, Dir_Phone)

MOVIES(Mov_id, Mov_Title, Mov_Year, Mov_Lang, Dir_id)

MOVIE_CAST(Act_id, Mov_id, Role)



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RATING(Mov_id, Rev_Stars)

Write SQL queries to

- i. List the titles of all movies directed by 'Hitchcock'.
- ii. Find the movie names where one or more actors acted in two or more movies.
- iii. List all actors who acted in a movie before 2000 and also in a movie after 2015 (use JOIN operation).
- iv. Find the title of movies and number of stars for each movie that has at least one rating and find the highest number of stars that movie received. Sort the result by movie title.
- v. Update rating of all movies directed by 'Steven Spielberg' to 5.

PROGRAM 10:COLLEGE DATABASE

Consider the schema for College Database:

STUDENT(USN, SName, Address, Phone, Gender)

SEMSEC(SSID, Sem, Sec)

CLASS(USN, SSID)

SUBJECT(Subcode, Title, Sem, Credits)

IAMARKS(USN, Subcode, SSID, Test1, Test2, Test3, FinalIA)

Write SQL queries to

- i. List all the student details studying in fourth semester 'C' section.
- ii. Compute the total number of male and female students in each semester and in each section.
- iii. Create a view of Test1 marks of student USN '1BI15CS101' in all subjects.
- iv. Calculate the FinalIA (average of best two test marks) and update the corresponding table for all students.
- v. Categorize students based on the following criterion:
 If FinalIA = 17 to 20 then CAT = 'Outstanding'
 If FinalIA = 12 to 16 then CAT = 'Average'
 If FinalIA < 12 then CAT = 'Weak'
 Give these details only for 8th semester A, B, and C section students.

G Alternate Assessment Tool Plan (if applicable)

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Mandatory	One Question to be asked for 20 Marks

Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%



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Sem	4th		
Course Title:	Analysis and Design of Algorithms		
Course Code:	19CS4PCADA		
L-T-P:	3-0-1	Total Credits:	4

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	Introduction: What is an Algorithm? Fundamentals of Algorithmic Problem Solving, Fundamentals of the Analysis of Algorithm Efficiency: The Analysis Framework, Asymptotic Notations and Basic Efficiency Classes, Mathematical Analysis of Nonrecursive Algorithm, Mathematical Analysis of Recursive Algorithms.	7	Text Book 1 Chapter 1 - 1.1, 1.2, Chapter 2 - 2.1, 2.2, 2.3, 2.4
2	Brute Force and Exhaustive Search: Selection Sort and Bubble Sort, Sequential Search and Brute-Force String Matching, Exhaustive Search, Depth-First Search and Breadth-First Search Decrease-and-Conquer: Insertion Sort, Topological Sorting, Algorithms for Generating Combinatorial Objects, Decrease-by-a-Constant-Factor Algorithms: Binary Search, Variable-Size-Decrease Algorithms: Computing Median and the Selection Problem	8	Text Book 1 Chapter 3 - 3.1, 3.2, 3.4, 3.5 Chapter 4 - 4.1, 4.2, 4.3, 4.4, 4.5
3	Divide-and-Conquer: Mergesort, Quicksort, Multiplication of Large Integers and Strassen's Matrix Multiplication Transform-and-Conquer: Presorting, Heaps and Heapsort, Horner's Rule	8	Text Book 1 Chapter 5 - 5.1, 5.2, 5.4 Chapter 6 - 6.1, 6.4, 6.5
4	Dynamic Programming: Three Basic Examples, The Knapsack Problem [Without Memory Functions], Warshall's and Floyd's Algorithms Greedy Technique: Prim's Algorithm, Kruskal's Algorithm [Without disjoint subsets and Union Find algorithms], Dijkstra's Algorithm	8	Text Book 1 Chapter 8 - 8.1, 8.2, 8.4 Chapter 9 - 9.1, 9.2, 9.3
5	Coping with the Limitations of Algorithm Power: Backtracking: n -Queens Problem, Subset-Sum Problem, Branch-and-Bound : Knapsack Problem, Traveling Salesman Problem NP-Completeness: Polynomial time, Polynomial-time verification, NP-completeness and reducibility, NP-Complete Problems: The clique problem, The vertex cover problem, Approximation Algorithms: The vertex-cover problem	8	Text Book 1 Chapter 12 - 12.1, 12.2 Text Book 2 Chapter 34 - 34.1, 34.2, 34.3, 34.5-34.5.1, 34.5.2, 35:35.1



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Prescribed Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Introduction to the Design and Analysis of Algorithms	Anany Levitin	Third Edition	Pearson	2011
2.	Introduction to Algorithms	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein	Third Edition	The MIT Press	2009

Reference Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Fundamentals of Computer Algorithms	Ellis Horowitz, Satraj Sahni and Rajasekharam	2nd Edition	University Press Pvt. Ltd,	2009
2.	Analysis and design of Algorithms	Padma Reddy,		Sri Nandi Publications	2009

E-Book						
Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Introduction to Design & Analysis of Algorithms	K. Raghava Rao		Smashwords	2013	https://www.smashwords.com/books/view/365630
2.	Data structures and Algorithm Analysis in C++	Allen Weiss	Fourth edition	Pearson education	2014	http://iips.icci.edu.iq/images/exam/DataStructuresAndAlgorithmAnalysisInCpp_2014.pdf

MOOC Course				
Sl. No.	Course name	Course Offered By	Year	URL
1.	Algorithms-design-and-analysis-part-1-coursera	Coursera	2016	https://www.mooc-list.com/course/algorithms-design-and-analysis-part-1-coursera
2.	Design and Analysis of Algorithms	NPTEL	2015	https://onlinecourses.nptel.ac.in/noc15_cs02/preview

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to analyze time complexity of Recursive and Non-recursive algorithms using asymptotic notations.
CO2	Ability to design efficient algorithms using various design techniques.
CO3	Ability to apply the knowledge of complexity classes P, NP, and NP-Complete and prove certain problems are NP-Complete
CO4	Ability to conduct practical experiments to solve problems using an appropriate designing method and find time efficiency.



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C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3													
CO2			3												3
CO3	1														
CO4				3											

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	TWO	20
QUIZ/AAT	ONE	5
Lab Component	Two Lab Tests	25
Total		50

E Tutorial Plan (if applicable)

F Laboratory Plan (if applicable)

Instructions:

- Lab faculty should discuss the topics from Text Book 1(Introduction to the Design and Analysis of Algorithms- Anany Levitin- Third Edition)
 - 2.6 -Empirical Analysis of Algorithm
 - 2.7- Algorithm Visualization
- Design, develop and implement the specified algorithms for the following problems
 - Using any programming Language in LINUX / Windows environment. But preferably C language and on LINUX environment.
- For sorting and searching problems,
 - The program should allow both manual entry of the array elements and also reading of array elements using random number generator.
 - Plot a graph of the time taken versus N using MS Excel and paste the same in the record.
 - Lab Record - Handwrite the Algorithm, Program and the output

Lab Program	Unit #	Program Details
1	1	Write a recursive program to a. Solve Towers-of-Hanoi problem b. To find GCD
2	2	Implement Recursive Binary search and Linear search and determine the time required to search an element. Repeat the experiment for different values of N and plot a graph of the time taken versus N.
3	2	Sort a given set of N integer elements using Selection Sort technique and compute its time taken. Run the program for different values of N and record the time taken to sort.
4	2	Write program to do the following: a. Print all the nodes reachable from a given starting node in a digraph using BFS method. b. Check whether a given graph is connected or not using DFS method.
5	2	Sort a given set of N integer elements using Insertion Sort technique and compute its time taken.



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6	2	Write program to obtain the Topological ordering of vertices in a given digraph.
7	2	Implement Johnson Trotter algorithm to generate permutations
8	3	Sort a given set of N integer elements using Merge Sort technique and compute its time taken. Run the program for different values of N and record the time taken to sort.
9	3	Sort a given set of N integer elements using Quick Sort technique and compute its time taken
10	3	Sort a given set of N integer elements using Heap Sort technique and compute its time taken.
11	4	Implement Warshall's algorithm using dynamic programming.
12	4	Implement 0/1 Knapsack problem using dynamic programming.
13	4	Implement All Pair Shortest paths problem using Floyd's algorithm.
14	4	Find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm.
15	4	Find Minimum Cost Spanning Tree of a given undirected graph using Kruskals algorithm.
16	4	From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.
17	5	Implement "Sum of Subsets" using Backtracking. "Sum of Subsets" problem: Find a subset of a given set $S = \{s_1, s_2, \dots, s_n\}$ of n positive integers whose sum is equal to a given positive integer d. For example, if $S = \{1, 2, 5, 6, 8\}$ and $d = 9$ there are two solutions $\{1, 2, 6\}$ and $\{1, 8\}$. A suitable message is to be displayed if the given problem instance doesn't have a solution.
18	5	Implement "N-Queens Problem" using Backtracking.

G Alternate Assessment Tool Plan (if applicable)

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Mandatory	One Question to be asked for 20 Marks
Unit-4	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-5	Mandatory	One Question to be asked for 20 Marks

Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%



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Sem.	4th		
Course Title:	Operating Systems		
Course Code:	19CS4PCOPS		
L-T-P:	3-1-0	Total Credits:	4

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	Introduction: What Operating Systems Do?, Computer System Architecture, Operating System Structure, Operating System Operations System Structures: User Operating system interface, system Calls, Types of System calls, System programs, Operating System Structure, System boot. Process Concept: Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication.	7	Book 1: 1.1, 1.3-1.5 Book 1: 2.2-2.5, 2.7, 2.10 Book 1: 3.1-3.4
2	Multithreaded Programming: Overview, Multi-core Programming, Multithreading Models, Implicit Threading, Threading Issues. Process Scheduling: Basic concepts, Scheduling Criteria, Scheduling Algorithms. Thread Scheduling, Multiple-Processor Scheduling, Real-Time CPU Scheduling.	8	Book 1: 4.1-4.3, 4.5-4.6 Book 1: 5.1-5.6
3	Synchronization: Background, Critical Section Problem, Mutex locks, Semaphores, Classic Problems of Synchronization. Deadlocks: System Model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock Detection and Recovery from deadlock.	8	Book 1: 6.1, 6.2, 6.5-6.7 Book 1: 7.1-7.7
4	Memory management strategies : Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of Page Table Virtual Memory Management: Background, Demand paging, Copy on write, Page replacement algorithms, Allocation of frames, Thrashing.	8	Book 1: 8.1-8.6 Book 1: 9.1-9.6
5	Implementing File-system: File-System Structure, File-System Implementation, Directory Implementation, Allocation methods, Free-space management. Mass-storage structure: Disk Structure, Disk Attachment, Disk Scheduling. System Protection: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix.	8	Book 1: 11.1-11.5 Book 1: 12.1-12.4 Book 1: 14.1-14.5

Prescribed Text Book

Sl.No.	Book Title	Authors	Edition	Publisher	Year
1.	Operating System Concepts	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne	9th Edition	John Wiley & Sons, Inc.	2012.



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Reference Text Book					
Sl.No.	Book Title	Authors	Edition	Publisher	Year
1.	Modern Operating System 3	Andrew S. Tanenbaum	3rd Edition	Prentice Hall	2007
2.	Operating System: Internals and Design Principles	William Stallings	8th Edition	Prentice Hall	2014
3.	Schaum's Outline of Operating Systems (Schaum's Outline Series)	J. Archer Harris	Kindle Edition	McGraw-Hill	2001

E-Book						
Sl.No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Operating Systems Guide	Tim Bower	-	Kansas State Polytechnic	2009	http://faculty.salina.k-state.edu/tim/oss/
2.	Operating Systems Course Notes	Dr. John T. Bell	-	University of Illinois Chicago	2006 & 2013	https://www.cs.uic.edu/~jbell/CourseNotes/OperatingSystems/index.html
3.	Schaum's Outline of Operating Systems (Schaum's Outline Series)	J. Archer Harris.	[Kindle Edition]		2002	http://www.naturdligtraw.com/schaum-s-outline-of-operating-systems.pdf

MOOC Course				
Sl.No.	Course name	Course Offered By	Year	URL
1.	Introduction to operating system	Coursera		www.coursera.org/lecture/technical-support-fundamentals/module-introduction-I3n9l
2.	Introduction to operating system	IIT, Madras	2017	https://onlinecourses.nptel.ac.in/noc17_cs29/preview
3.	Introduction to operating system	Udacity Georgia Tech		in.udacity.com/course/introduction-to-operating-systems--ud923

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to Apply Various Process Scheduling Algorithms, Disk Scheduling algorithms, Page replacement algorithms and Deadlock detection and avoidance techniques for providing Operating System functionalities
CO2	Ability to Analyse various process management concepts (including scheduling, synchronization and deadlocks), Memory Management strategies and Design considerations of file system.
CO3	Ability to Demonstrate the Basic Concepts of Operating System.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3														
CO2		3													2
CO3			2						1	1					2



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D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	2	40
QUIZ	1	5
Lab Component	--	--
Alternate Assessment Tool	1	5
Total		50

E Tutorial Plan (if applicable)

Tutorial #	Unit #	Topic
1	I	Group Assignment on different functionalities of Operating system Book 1, Chapter 1 Exercise 1.2, 1.6, 1.13, 1.27-1.30 Chapter 2 Exercise 2.20, 2.25
2	I	Problems on Inter process communication Book 1 Chapter 3 Exercise 3.5, 3.6, 3.18, 3.19
3	II	Problems on Process Scheduling Book 1 Chapter 3 Exercise 3.19, 3.20
4	II	Problems on Process Scheduling Book 1 Chapter 4.18, 4.24
5	II	Problems on Real time CPU Scheduling Book 1 Chapter 6 Exercise 6.12, 6.14, 6.16, 6.31
6	III	Problems on Synchronization Book 1 Chapter 5 Exercise 5.8, 5.17, 5.23
7	III	Problems on Deadlock detection Book 1 Chapter 7 Exercise 7.8, 7.9, 7.18
8	III	Problems on Deadlock Avoidance Book 1 Chapter 7 Exercise 7.22, 7.23
9	IV	Problems on Contiguous Memory allocation Book 1 Chapter 8 Exercise 8.11, 8.20, 8.21
10	IV	Problems on Page replacement Book 1 Chapter 9 Exercise 9.4, 9.8, 9.11
11	V	Problems on Disk scheduling Book 1 Chapter 10 Exercise 10.11, 10.12, 10.16
12	V	Problems on Disk scheduling Book 1 Chapter 10 Exercise 10.7, 10.9

F Laboratory Plan (if applicable)

G Alternate Assessment Tool Plan (if applicable)

Demonstrate the basic concepts of Operating system like Scheduling, Synchronization, Deadlock, Page replacement and Disk Scheduling algorithms using any Programming Language and present the same along with the report.

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Mandatory	One Question to be asked for 20 Marks
Unit-3	Mandatory	One Question to be asked for 20 Marks
Unit-4	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-5	Internal Choice	Two Questions to be asked for 20 Marks each

Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%



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Course Code	19IC3HS CPH / 19IC4HS CPH	Course Name	Constitution of India, Professional Ethics and Human Rights
Credits	01	L-T-P-S	1-0-0-0

Total Hours: 12

Course Objectives:

1. To educate students about the Supreme Law of the Land.
2. To value human dignity and to save the liberties of the people against discriminations.
3. To raise awareness and consciousness of the issues related to the profession and discuss the issue of liability of risks and safety at work place.

UNIT-1

Introduction to Indian Constitution

[03 hours]

Historical Background of the Indian Constitution. Framing of the Indian constitution: Role of the Constituent Assembly - Preamble and Salient features of the Constitution of India, Fundamental Rights and its limitations. Fundamental Duties and their significance. Directive Principles of State Policy: Importance and its relevance. Case Studie

UNIT-2

Union Executive and State Executive

[02 hours]

The Union Executive – The President and The Vice President, The Prime Minister and The Council of Ministers. The Union Parliament – Lok Sabha & Rajya Sabha. The Supreme Court of India. State Executive – The Governors, The Chief Ministers and The Council of Ministers. The State Legislature – Legislative Assembly and Legislative Council. State High Courts.

UNIT-3

Election Commission of India, Amendments and Emergency Provisions

[02 hours]

Election Commission of India – Powers & Functions – Electoral Process in India. Methods of Constitutional Amendments and their Limitations. Important Constitutional Amendments – 42nd, 44th, 61st, 74th, 76th, 77th, 86th and 91st. Emergency Provisions. Case Studies

UNIT-4

Special Constitutional Provisions/Human Rights

[02 hours]

Special Constitutional Provisions for Schedule Castes, Schedule Tribes & Other Backward Classes, Women & Children. Case Studies. Human Rights/values – Meaning and Definitions, Legislative Specific Themes in Human Rights and Functions / Roles of National Human Rights Commission of India. Human Rights (Amendment Act) 2006

UNIT-5

Professional Ethics

[03 hours]

Scope and Aims of Engineering Ethics, Responsibilities of Engineers and impediments to responsibilities. Honesty, Integrity and Reliability; Risks – Safety and Liability in Engineering. Case Studies.



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At the end of the course, the student will have the ability to

CO1	Understand and explain the significance of Indian Constitution as the Fundamental Law of the Land.	Remember
CO2	Analyse the concepts and ideas of Human Rights.	Analyse
CO3	Apply the practice of ethical responsibilities and duties to protect the welfare and safety of the public.	Application

Text Books:

1. “An Introduction to Constitution of India and Professional Ethics” by Merunandan K.B. and B.R. Venkatesh, Meragu Publications, 3rd edition, 2011.
2. “Constitution of India & Professional Ethics & Human Rights” by Phaneesh K. R., Sudha Publications, 10th edition, 2016.

Reference Books:

1. “V.N. Shukla's Constitution of India” by Prof (Dr.) Mahendra Pal Singh (Revised), Eastern Book Company, Edition: 13th Edition, 2017, Reprint 2019.
2. “Ethics in Engineering” by Martin, W. Mike., Schinzinger, Roland., McGraw-Hill Education; 4th edition (February 6, 2004).

E-Book:

1. https://books.google.co.in/books/about/Constitution_of_India_and_Professional_E.html?id=VcvuVt-d88QC
Constitution of India and Professional Ethics, by G.B. Reddy and Mohd Suhaib, I.K. International Publishing House Pvt. Ltd., 2006.
2. <http://www.scribd.com/doc/82372282/Indian-Constitution-M-Raja-Ram-2009#scribd>
Indian Constitution, by M. Raja Ram, New Age International Pvt. Limited, 2009.

Course Outcomes and Programme outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						✓						
CO2						✓						
CO3								✓				

Correlation between programme outcome and course outcome:

Programme Outcome	Course Outcome	Blooms Taxonomy
PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	CO1 Understand and explain the significance of Indian Constitution as the Fundamental Law of the Land.	Remember
	CO2 Analyse the concepts and ideas of Human Rights.	Analyse
	CO3 Apply the practice of ethical responsibilities and duties to protect the welfare and safety of the public.	Application



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SEE Exam Question paper format

SEE	Online Examination	
Pattern	50 Multiple Choice Questions	Total Marks 50 X 2 = 100

CIE format	
Type of Assessment	Marks
AAT-1	5 Marks
AAT-2	5 Marks
Test 1,2,3 (Online Test)	20 Marks
Multiple Choice Questions	20 Marks
	20 Marks



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Academic Year	Aug-Dec 2019/Jan-May 2020	Sem.	4 th
Course Title:	Seminar Technical/Internship		
Course Code:	19CS4SRSTI		
L-T-P:	0-0-1	Total Credits:	1

A Syllabus

Introduction: Technical Seminar Based on,

i. Summer/Winter Internship (with any NGO or company during mandatory internship of at least one week (at least five days) during the vacation period of 1st, 2nd and 3rd Semester) or

ii. Research paper presentation based on Technology Trends in Healthcare, Finance etc.

Sl. No	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	Ability to apply domain knowledge during the course of internship or research paper presentation	3												3		
2	Ability to work independently and in a collaboration/multidisciplinary environment.							2		3						
3	Ability to demonstrate effective verbal and written communication skills										3					
4	Ability to exhibit integrity and ethical behavior while research paper presentation or carrying out the internship on site.								3							
5	Ability to allocate time effectively and manage to complete the work allotted within appropriate time											3				



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B Proposed Assessment Plan (for 50 marks of CIE)

Evaluation will be based on the rubrics set by the department under the committee of HOD, UG NBA coordinator, One professor, One Associate professor and One Assistant Professor.

Criteria	Very Good	Good	Average	Poor
Ability to apply domain knowledge during the course of internship or research paper presentation (10M)	Ability to apply domain knowledge completely during the course of internship or research paper presentation (10M)	Ability to apply domain knowledge moderately during the course of internship or research paper presentation (7M)	Ability to apply domain knowledge partially during the course of internship or research paper presentation (5M)	Unable to apply domain knowledge during the course of internship or research paper presentation (2M)
Ability to work independently and in a collaboration/ multidisciplinary environment. (10M)	Able to work independently and in a multidisciplinary environment. (10M)	Able to work independently with minimal guidance and in a multidisciplinary environment. (7M)	Able to work independently with more guidance and in a multidisciplinary environment. (5M)	Unable to work independently without guide support and in a multidisciplinary environment. (2M)
Ability to demonstrate effective verbal and written communication skills. (10M)	Able to demonstrate effective oral and written communication skills (10M)	Able to demonstrate oral and written communication skills moderately. (7M)	Able to demonstrate oral and written communication skills minimally. (5M)	Unable to demonstrate effective verbal and written communication skills (2M)
Ability to exhibit integrity and ethical behavior while research paper presentation or carrying out the internship on site and for the preparation of report. (10M)	Able to effectively exhibit integrity and ethical behaviour while presenting the selected module and for the preparation of technical report. (10M)	Able to moderately exhibit integrity and ethical behaviour while presenting the selected module and for the preparation of technical report. (7M)	Able to partially exhibit integrity and ethical behaviour while presenting the selected module and for the preparation of technical report. (5M)	Unable to exhibit integrity and ethical behaviour while presenting the selected module and for the preparation of technical report. (2M)
Ability to allocate time effectively and manage to complete the work allotted within appropriate time	Able to allocate time effectively and complete all the work within appropriate time. (5M)	Able to allocate time effectively and complete most of the work within appropriate time. (4M)	Able to allocate time effectively and manage to complete the work (3M)	Unable to use time effectively and complete the work on time.(1M)

C SEE Exam (for 50 Marks)

Seminar Technical / Internship evaluation is will be carried out by External examiner along with internal faculty.



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Sem	4th		
Course Title:	Project Work-2		
Course Code:	19CS4PWPW2		
L-T-P:	0-0-2	Total Credits:	2

A Introduction

1. Database Application Development - Under this project work, student should develop back end data base table for any chosen data base applications. It can be extension of 3rd sem. project with back end connection.
2. Front end can be either Visual basic or C# or Java framework. Tables developed should be more than six database table. Students can form a group with minimum of two and maximum of four.
3. Teacher allotted for project work to students should teach students back end technologies like Oracle and front-end technologies like Visual during Lab hours as per the allotment.
4. Teacher allotted for project work should guide the students in choosing the topic and towards carrying out project work and complete the evaluation of assigned students.
5. The evaluation of project work will be based on the rubrics set by the department under the committee of HOD, UG NBA coordinator, One professor, One Associate professor and One Assistant Professor.

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to apply practical knowledge and latest tools usage along with project development.
CO2	Ability to design and develop a project using Database technologies to solve societal problems.
CO3	Ability to report and present the implemented solutions in a team

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				3										
CO2	3	3	3	2	3	2	2	2				1	1	3	2
CO3								2	3	3					



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D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	---	--
QUIZ	---	--
Lab Component	---	50
Alternate Assessment Tool	---	--
Total		50

Rubrics for Project Evaluation:

Criteria	Exemplary	Proficient	Partially Proficient	Points
Form Layout	(10) The Management System has an exceptional design, attractive and usable layout. It is easy to locate all important elements.	(6) The Management System have an attractive design and usable layout. It is easy to locate all important elements.	(4) The Management System have a usable design layout, but may appear busy or boring. It is easy to locate most of the important elements.	___ / 10
ER Diagram	(10) Complete ER diagram with details of Constraints, Cardinality ratio, different type's entities, participation, Keyes, relationship and attributes.	(6) Partial ER diagram with details of only Cardinality ratio, different type's entities, participation, Keys, relationship and attributes.	(4) Incomplete ER diagram with only entities, relationship, keys and attributes.	___ / 10
Schema diagram	(5) Complete Schema diagram with clear identification of all relationships	(3) Partial Schema diagram with identification of only few relationships	(2) Incomplete Schema diagram with improper identification of relationships	___ / 5
Normalized tables	(5) Complete normalization of all the tables	(3) Normalization of only few tables	(2) Tables has not been normalized.	___ / 5
Validation of Form fields	(5) Validations have been carried out for all form fields completely in all the forms.	(3) Most of the validations have been carried out for all form fields completely in all the forms.	(2) Few of the validations has been carried out for the form fields in the forms.	___/5
Report	(5) Clear and Effective writing and adherence to appropriate style guidelines	(3) Writing that is clear and effective for the most part and minor errors in adherence to appropriate style guidelines	(2) Unclear and ineffective writing and multiple errors in adherence to appropriate style guidelines	___/5
Oral communication / Presentation	(5) Clear and effective communication	(3) Communication is clear	(2) Unclear communication	___/5
Participation in Discussions	(5) Provided many good ideas; inspired others; clearly communicated ideas, needs, and feelings.	(3) Participated in discussions; on some occasions, made suggestions.	(2) Listened mainly; Rarely spoke up, and ideas were off the mark.	___/5
Total				___/50



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E Tutorial Plan (if applicable)

F Laboratory Plan (if applicable)

Project Topics for Database Application Development:

Online shopping system, College ERP (Small Scale), Library Management System, Banking Application, Hostel Management System, Event Management, Online Food Delivery, Timed Quiz, Gym management, matrimonial website, Pharmacy Management System, Railway reservation, Department level Course End Survey Tool, Alumni Survey Submission System, Class Room Discussion Between Teacher and Student, Notification Dashboard, Students SEE exam results, CIE Marks and attendance, Department Faculty Self-Assessment Report Submission System; Department Faculty Self-Appraisal form Submission System; College TEQIP student project proposal submission system; College TEQIP Faculty Workshop/Conference/Seminar Application Submission System; College Exam Application Form Submission System; Placement management System (Company details, Company schedules on presentation, exams, placed students details);

Note: Apart from the above mentioned project topics if student groups come up with any innovative project ideas which are useful for the college academic purpose will be considered based on the approval and acceptance from class teacher.

For Front-end tool (for Form Design): Visual basic or C# or Java framework or any relevant drag-drop from design tool for front end design.

Back –end tool (for database table creation): Oracle or any relevant tool

Note: At least for three users Login form, at least four main forms which has functionality for insert, delete, search, update and view the data base tables

Sl.No	Week	Activity	Content deliverables by the assigned teacher
1	1 st	Formation of groups. Note: Student groups of size 2 or 3 or 4	Introduction of front end frameworks such as Visual basic or C# or Java framework
2	2 nd	Project topic selection by each group	Front-end development using Visual C# Focus of Visual C# is only on learning to develop front-end i.e., form design using the toolbox. Students will learn the basic coding to handle events. Demonstration of Visual C# lab programs. Adding two numbers, Finding Largest of three numbers
3	3 rd	Presentation: Student and Project topic introduction by each group with ER diagram	Student USN validation Collect Student Information (USN, Name, Department Name(Combo Box) and Semester (Radio Button) Using Form And Display it on Message Box Reading data from already existing database table and displaying it using form grid. Note: Database table should contain Student name, USN, Department name and Semester.
4	4 th 5 th and 6 th	Front-end Design Layout of the Forms	Insert the new record into the existing database table by accepting the new record information through form and Update any of the existing database record. Note: Database table should contain Student name, USN, Department name and Semester.



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5	7 th	Presentation on Front-end Design by each group	Delete the existing record from the database table against USN by accepting it through the form text box and Search the student database records.
6	8 th and 9 th	Back end design of the project tables with schema diagram, Design and Development of connecting among different web pages	Demonstration of for connecting front end with back end database system
7	10 th	Presentation of Normalized tables with front-end back-end connectivity.	
8	11 th	Complete Project Work Demonstration by each group	
9	12 th	Project Report Preparation	

G SEE Exam (50 Marks)

Evaluation of Projects carried out by students from External examiner along with internal faculty.



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Sem	4th		
Course Title:	Cultural Activity (Music/Dance etc.)		
Course Code:	19CS4NCNC4		
L-T-P:	0-0-0	Total Credits:	ZERO PASS /FAIL

A Introduction

- Student can participate in any of the cultural activities such as Music, dance conducted by college or any other institute.
- Student should produce participation certificate for clearing this mandatory course.
Note: If student is unable to participate in outside cultural activities then department Head should take care of conducting any small cultural event (like Essay, Debate etc.) of one or two day event in the college.
- Physically challenged students can produce participation certificate of any technical/cultural events conducted by college/department clubs.

B Course Outcomes

At the end of the course the student will be able to

CO1	Able to reflect creatively on artistic and cultural processes of the society.
CO2	Demonstrate characters of individuality and teamwork in both competition and practice.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1						3									
CO2									3						

D Assessment Plan (for 50 marks of CIE)

CATEGORY	MARKS (RANGE)	CULTURAL ACTIVITIES
L1	90 (90-100)	Winning Certificates at International/National/Zonal Level Competitions.
L2	80 (80-89)	Winning Certificates at State and University Level Competitions
L3	70 (70-79)	<ul style="list-style-type: none"> • Winning Certificates/ at Inter-Collegiate competitions. • Representing college team Organizing • National/ State/University level events. • Core Committee of techno cultural activity. • Debating society (Adjudicator, Secretary, and President). • NGO activity with registered NGO recognized by the Institution.
L4	60 (60-69)	Organizing Inter –Collegiate/ College level Events(Organizer and volunteers)
L5	50 (50-59)	<ul style="list-style-type: none"> • Participation in International/National/ Zonal/State/University Level Events. • NGO activity With registered NGO recognized by the institution(Participation only)
L6	40 (40-49)	Participation in Inter-Collegiate /College level events/ Blood donation /NGO/ Personality development Programs

E SEE Exam Question paper

Student should produce participation certificate for clearing this mandatory course.