



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA – 533 003, Andhra Pradesh, India

COURSE STRUCTURE AND SYLLABUS

For UG – R20

B. Tech - COMPUTER SCIENCE AND DESIGN

(Applicable for batches admitted from 2020-2021)



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
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II Year – I SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	BS2101	Mathematics - III	3	0	0	3
2	CS2101	Mathematical Foundations of Computer Science	3	0	0	3
3	CS2102	Computer Graphics	3	0	0	3
4	CS2103	Multimedia and Application Development	3	0	0	3
5	CS2104	Database Management Systems	3	0	0	3
6	CS2105	Computer Graphics Lab	0	0	3	1.5
7	CS2106	Multimedia and Application Development Lab	0	0	3	1.5
8	CS2107	Database Management Systems Lab	0	0	3	1.5
9	SO2101	Mobile App Development	0	0	4	2
10	MC2101	Essence of Indian Tradition Knowledge	2	0	0	0
Total Credits			17	0	13	21.5

II Year – II SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	BS2201	Probability and Statistics	3	0	0	3
2	CS2201	Computer Organization	3	0	0	3
3	CS2202	Data warehousing and Mining	3	0	0	3
4	ES2201	Visual Design and Communication	3	0	0	3
5	HS2201	Managerial Economics and Financial Accountancy	3	0	0	3
6	CS2203	Games Development Lab	0	0	3	1.5
7	CS2204	Data Mining using Python Lab	0	0	3	1.5
8	ES2202	Web Application Development Lab	0	0	3	1.5
9	SO2201	Digital Photography using Adobe Photoshop	0	0	4	2
Total Credits			15	0	13	21.5



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II Year -I Semester		L	T	P	C
		3	0	0	3
MATHEMATICS – III (BS2101)					

Course Objectives:

- To familiarize the techniques in partial differential equations
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

Course Outcomes:

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

- Interpret the physical meaning of different operators such as gradient, curl and divergence (L5)
- Estimate the work done against a field, circulation and flux using vector calculus (L5)
- Apply the Laplace transform for solving differential equations (L3)
- Find or compute the Fourier series of periodic signals (L3)
- Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3)
- Identify solution methods for partial differential equations that model physical processes (L3)

UNIT I: Vector calculus: (10 hrs)

Vector Differentiation: Gradient, Directional derivative, Divergence, Curl, Scalar Potential.

Vector Integration: Line integral, Work done, Area, Surface and volume integrals, Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof).

UNIT II: Laplace Transforms: (10 hrs)

Laplace transforms of standard functions, Shifting theorems, Transforms of derivatives and integrals, Unit step function, Dirac's delta function, Inverse Laplace transforms, Convolution theorem (without proof).

Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

UNIT III: Fourier series and Fourier Transforms: (10 hrs)

Fourier Series: Introduction, Periodic functions, Fourier series of periodic function, Dirichlet's conditions, Even and odd functions, Change of interval, Half-range sine and cosine series.

Fourier Transforms: Fourier integral theorem (without proof), Fourier sine and cosine integrals, Sine and cosine transforms, Properties, inverse transforms, Finite Fourier transforms.

UNIT IV: PDE of first order: (8 hrs)

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Solutions of first order linear (Lagrange) equation and nonlinear (standard types) equations.

UNIT V: Second order PDE and Applications: (10 hrs)

Second order PDE: Solutions of linear partial differential equations with constant coefficients, RHS term of the type e^{ax+by} , $\sin(ax+by)$, $\cos(ax+by)$, $x^m y^n$.

Applications of PDE: Method of separation of Variables, Solution of One dimensional Wave, Heat and two-dimensional Laplace equation.



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Text Books:

- 1) B. S. Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers, 2020.
- 2) B. V. Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.

Reference Books:

- 1) Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India, 2008.
- 2) Dean. G. Duffy, Advanced Engineering Mathematics with MATLAB, 3rd Edition, CRC Press, 2013.
- 3) Peter O' Neil, Advanced Engineering Mathematics, 7thed, Cengage, 2011.
- 4) Srimantha Pal, S C Bhunia, Engineering Mathematics, Oxford University Press, 2015.



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II Year – I Semester		L	T	P	C
		3	0	0	3
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (CS2101)					

Course Objectives:

This course is designed to:

- Introduce the students to the topics and techniques of discrete methods and combinatorial reasoning
- Introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science

Course Outcomes:

At the end of the course student will be able to

- Demonstrate skills in solving mathematical problems
- Comprehend mathematical principles and logic
- Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software
- Manipulate and analyze data numerically and/or graphically using appropriate Software
- Communicate effectively mathematical ideas/results verbally or in writing

UNIT I

Mathematical Logic: Propositional Calculus: Statements and Notations, Connectives, Well Formed Formulas, Truth Tables, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications, Normal Forms, Theory of Inference for Statement Calculus, Consistency of Premises, Indirect Method of Proof, Predicate Calculus: Predicates, Predicative Logic, Statement Functions, Variables and Quantifiers, Free and Bound Variables, Inference Theory for Predicate Calculus.

UNIT II

Set Theory: Sets: Operations on Sets, Principle of Inclusion-Exclusion, Relations: Properties, Operations, Partition and Covering, Transitive Closure, Equivalence, Compatibility and Partial Ordering, Hassie Diagrams, Functions: Bijective, Composition, Inverse, Permutation, and Recursive Functions, Lattice and its Properties, Algebraic Structures: Algebraic Systems, Properties, Semi Groups and Monoids, Group, Subgroup and Abelian Group, Homomorphism, Isomorphism.

UNIT III

Combinatorics: Basis of Counting, Permutations, Permutations with Repetitions, Circular and Restricted Permutations, Combinations, Restricted Combinations, Binomial and Multinomial Coefficients and Theorems, Number Theory: Properties of Integers, Division Theorem, Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic, Fermat's and Euler's Theorems

UNIT IV

Recurrence Relations: Generating Functions, Function of Sequences, Partial Fractions, Calculating Coefficient of Generating Functions, Recurrence Relations, Formulation as Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, Method of Characteristic Roots, Solving Inhomogeneous Recurrence Relations



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UNIT V

Graph Theory: Basic Concepts, Graph Theory and its Applications, Sub graphs, Graph Representations: Adjacency and Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Bipartite and Planar Graphs, Euler's Theorem, Graph Colouring and Covering, Chromatic Number, Spanning Trees, Prim's and Kruskal's Algorithms, BFS and DFS Spanning Trees.

Text Books:

1. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and P. Manohar, Tata McGraw Hill, 1997.
2. Elements of Discrete Mathematics-A Computer Oriented Approach, C. L. Liu and D. P. Mohapatra, 3rd Edition, Tata McGraw Hill, 2008.

Reference Books:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel and T. P. Baker, 2nd Edition, Prentice Hall of India, 1985.
2. Discrete Mathematical Structures, Bernard Kolman, Robert C. Busby and Sharon Cutler Ross, PHI, 2018.
3. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K. H. Rosen, 7th Edition, Tata McGraw Hill, 2010.

e-Resources:

- 1) <https://nptel.ac.in/courses/106/106/106106094/>



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II Year – I Semester		L	T	P	C
		3	0	0	3
COMPUTER GRAPHICS (CS2102)					

Course objectives:

This course allows the students to:

1. Understand the fundamental concepts and theory of computer graphics
2. Understand modeling, and interactive control of 3D computer graphics applications
3. The underlying parametric surface concepts be understood
4. Learn multimedia authoring tools.

Course outcomes:

Upon successful completion of the course, students will be able to:

1. Use the principles and commonly used paradigms and techniques of computer graphics
2. Write basic graphics application programs including animation
3. Design programs to display graphic images to given specifications

UNIT-I

INTRODUCTION: Application areas of computer graphics, overview of graphic system, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices.

UNIT-II

OUTPUT PRIMITIVES: Points and lines, line drawing algorithms, mid-point circle algorithm, Filled area primitives: scan-line polygon fill algorithm, boundary-fill and flood-fill algorithm.

2-D GEOMETRICAL TRANSFORMATIONS: Translation, scaling, rotation, reflection and shear transformation matrix representations and homogeneous co-ordinates, composite transformations, transformations between coordinates.

UNIT -III

2-D VIEWING : The viewing pipe-line, viewing coordinate reference frame, window to view-port co-ordinate transformations, viewing function, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland-Hodgeman polygon clipping algorithm

UNIT -IV

3-D OBJECT REPRESENTATION: spline representation, Hermite curve, Bezier curve and B-spline curve, Polygon surfaces, quadric surfaces, Solid modeling Scalars – wire frame, CSG, B-rep. Bezier and B-spline surfaces, Basic illumination models, shading algorithms

UNIT -V

3-D GEOMETRIC TRANSFORMATIONS: Translation, rotation, scaling, reflection and shear transformation and composite transformations. Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting.

COMPUTER ANIMATION: Design of animation sequence, general computer animation functions, raster animation, computer animation language, key frame system, motion specification

Text Books:

1. Computer Graphics C version/ Donald Hearn and M. Pauline Baker/Pearson/PHI, 2002
2. Computer Graphics Principles & Practice, Second edition in C/ Foley, VanDam, Feiner and Hughes/Pearson Education, 2013



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References:

1. Computer Graphics Second edition, Zhigandxiang, Roy Plastock, Schaum's outlines, Tata McGraw hill edition, 2002.
2. Procedural elements for Computer Graphics, David F Rogers, Tata McGraw hill, 2nd edition, 1988.
3. Principles of Interactive Computer Graphics, Neuman and Sproul, TMH, 1979.
4. Computer Graphics, Steven Harrington, TMH, 1987.



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II Year – I Semester		L	T	P	C
		3	0	0	3
MULTIMEDIA AND APPLICATION DEVELOPMENT(CS2103)					

Course Objectives:

- This course aims to further develop students' competency in producing dynamic and creative graphic solutions for multimedia productions.
- It provides students with the basic concepts and techniques of interactive authoring.
- It also introduces students with the advanced scripting skills necessary for implementing highly interactive, rich internet applications using multimedia technologies and authoring tools.
- Students will develop aesthetic value and competencies in multimedia authoring.
- Artistic visual style and layout design are stressed, as well as the editing and integration of graphic images, animation, video and audio files.
- The course allows students to master industry-wide software and technologies to create highly interactive, rich internet applications.

Course Outcomes:

- Ability to apply different multimedia development tools to produce web based and stand-alone user interfaces.

UNIT - I

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, **Color in image and video:** color science, color models in images, color models in video.

UNIT - II

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio. **Multimedia Data Compression:** Lossless compression algorithms, Lossy compression algorithms, Image compression standards.

UNIT - III

Basic Video compression techniques, Case study: MPEG Video Coding I, Basic Audio compression techniques, Case study: MPEG Audio compression.

Web 2.0: What is web 2.0, Search, Content Networks, User Generated Content, Blogging, Social Networking, Social Media, Tagging, Social Marking, Rich Internet Applications, Web Services, Mashups, Location Based Services, XML, RSS, Atom, JSON, and VoIP, Web 2.0 Monetization and Business Models, Future of the Web.

UNIT - IV

Rich Internet Applications (RIAs) with Adobe Flash: Adobe Flash- Introduction, Flash Movie Development, Learning Flash with Hands-on Examples, Publish your flash movie, Creating special effects with Flash, Creating a website splash screen, action script, web sources.

Rich Internet Applications (RIAs) with Flex 3 - Introduction, Developing with Flex 3, Working with Components, Advanced Component Development, Visual Effects and Multimedia.



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UNIT - V

Ajax- Enabled Rich Internet Application :Introduction, Traditional Web Applications vs. Ajax Applications, Rich Internet Application with Ajax, History of Ajax, Raw Ajax example using xml http request object, Using XML, Creating a full scale Ajax Enabled application, Dojo Tool Kit.

Text Books:

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI Learning, 2004 (UNITS 1, 2, 3.)
2. AJAX, Rich Internet Applications, and Web Development for Programmers, Paul J Deitel and Harvey M Deitel, Deitel Developer Series, Pearson Education, 2008. (UNITS 4,5)

Reference Books:

1. Professional Adobe Flex 3, Joseph Balderson, Peter Ent, et al, Wrox Publications, Wiley India, 2009.
2. Multimedia Communications: Applications, Networks, Protocols and Standards, FredHalsall, Pearson Education, 2001, RP 2005.
3. Multimedia making it work, Tay Vaughan, 7th edition, TMH, 2008.
4. Introduction to multimedia communications and Applications, Middleware, Networks, K. R. Rao, Zoran, Dragored, Wiley India, 2006, RP. 2009.
5. Multimedia Computing, Communications & Applications, Ralf Steinmetz and KlaraNahrstedt, Pearson Education, 2004
6. Principles of Multimedia, Ranjan Parekh, TMH, 2006.
7. Multimedia in Action, James E. Shuman, Cengage Learning, 198, RP 2008.
8. Multimedia Systems design, Prabhat K. Andleigh, KiranThakrar, PHI, 1986.
9. Multimedia and Communications Technology, Steve Heath, Elsevier, 1999, RP 2003.
10. Adobe Flash CS3 Professional, Adobe press, Pearson Education, 2007.
11. Flash CS3 Professional Advanced, Russel Chun, Pearson Education, 2007.
12. Flash CS5, Chris Grover, O'Reilly, SPD, 2010.
13. SAMS Teach yourself Adobe flash CS3, Pearson Education, 2007.
14. Flex 4 Cookbook, Joshua Noble, et. al, O'Reilly, SPD 2010.
15. Flex3 – A beginner's guide, Michele E. Davis, Jon A. Phillips, TMH, 2008.
16. Mastering Dojo, R. Gill, C. Riecke and A. Russell, SPD, 2008.



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II Year – I Semester		L	T	P	C
		3	0	0	3
DATABASE MANAGEMENT SYSTEMS(CS2104)					

Course Objectives:

- To introduce about database management systems
- To give a good formal foundation on the relational model of data and usage of Relational Algebra
- To introduce the concepts of basic SQL as a universal Database language
- To demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization
- To provide an overview of physical design of a database system, by discussing Database indexing techniques and storage techniques

Course Outcomes:

By the end of the course, the student will be able to

- Describe a relational database and object-oriented database
- Create, maintain and manipulate a relational database using SQL
- Describe ER model and normalization for database design
- Examine issues in data storage and query processing and can formulate appropriate solutions
- Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage

UNIT I

Introduction: Database system, Characteristics (Database Vs File System), Database Users (Actors on Scene, Workers behind the scene), Advantages of Database systems, Database applications. Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure, environment, Centralized and Client Server architecture for the database.

UNIT II

Relational Model: Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrity constraints) and their importance BASIC SQL: Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update), basic SQL querying (select and project) using where clause, arithmetic & logical operations, SQL functions (Date and Time, Numeric, String conversion).

UNIT III

Entity Relationship Model: Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, sub classes, super class, inheritance, specialization, generalization using ER Diagrams. SQL: Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, view (updatable and non-updatable), relational set operations.



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UNIT IV

Schema Refinement (Normalization): Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency (1NF, 2NF and 3 NF), concept of surrogate key, Boyce-Codd Normal Form (BCNF), Lossless join and dependency preserving decomposition, Fourth Normal Form (4NF), Fifth Normal Form (5NF).

UNIT V

Transaction Concept: Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability, Failure Classification, Storage, Recovery and Atomicity, Recovery algorithm.

Indexing Techniques: B+ Trees: Search, Insert, Delete algorithms, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing: Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning

Text Books:

1. Database Management Systems, 3rded, , Raghurama Krishnan, Johannes Gehrke, TMH, 2014
2. Database System Concepts, 5thed, Silberschatz, Korth, TMH, 2005.

Reference Books:

1. Introduction to Database Systems, 8thed, C J Date, PEA, 2004.
2. Database Management System, 6thed Ramez Elmasri, Shamkant B. Navathe, PEA, 2019.
3. Database Principles Fundamentals of Design Implementation and Management, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning.

e-Resources:

1. <https://nptel.ac.in/courses/106/105/106105175/>
2. <https://www.geeksforgeeks.org/introduction-to-nosql/>



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II Year – I Semester	L	T	P	C
	0	0	3	1.5
COMPUTER GRAPHICS LAB (CS2105)				

Course Objectives:

This is an introductory course on principles of computer graphics including both 2D and 3D graphics. Main objective is to give a practical exposure of raster scan graphics including line and circle drawing, polygon filling, anti-aliasing algorithms, clipping, hidden-line and hidden surface algorithms

Course Outcomes: The students, after the completion of the course, are expected to

- Design and develop programs for drawing Computer Graphics primitives.
- Implement different algorithms for line clipping,
- Create 3D graphical scenes using C.
- Implement image manipulation and enhancement.
- Create 2D animations using C.

Software Requirement:

- Turbo C / C++ compiler that supports graphics.h package.
- special DOSBOXed installer for Turbo C++ compiler

Download from following link:

http://www.megaleecher.net/Download_Turbo_For_Windows

List of Experiments:

1. Using Digital Differential Analyzer Algorithm, Write C-Program to draw a line segment between two given points.
2. Write a C program for determining pixel activation list between two given points in order to draw line segment using bresenham's Line drawing algorithm.
3. Using Midpoint circle generation algorithm, write a C-Program to generate pixel activation list for drawing a circle with a given centre of circle P(x, y) and a radius r.
4. Using Midpoint ellipse generation algorithm, write a C-Program to generate pixel activation list for drawing an ellipse.
5. Using different graphics functions available for text formatting in C-Language, Write a C program for displaying text in different sizes, different colors, different font styles.
6. Using certain graphic functions available in C-language for drawing lines, rectangles & circles, Write a C- Program which generates pixel activation list for drawing the following simple two dimensional objects.
i) House ii) Car iii) Fish iv) man
7. Write a C-program for performing the basic 2D transformations such as translation, Scaling, Rotation, shearing and reflection for a given 2D object?



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8.
 - i. Using the concept of flood fill algorithm, Write a C- program for filling a given rectangle object with color.
 - ii. Using the concept of Boundary fill algorithm, Write a C- program for filling a given rectangle object with color.
 - iii. Using the concept of Scan line polygon fill algorithm, write a C- program for filling a given object with color.
9. Write a C-program for performing the basic transformations such as translation, Scaling, Rotation for a given 3D object?
10. Write a C-program for generating a curve for a given set of control points.
11. Write C-programs for designing simple animations using transformations.



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II Year – I Semester		L	T	P	C
		0	0	3	1.5
MULTIMEDIA AND APPLICATION DEVELOPMENT LAB (CS2106)					

Course Outcomes:By the end of the course, student will be able to

- Describe different realizations of multimedia tools and the way in which they are used.
- Compare various data compression schemes.
- Analyze user interface for a given application

Multimedia Programs using FLASH

1. Write a Program to perform motion tweening operation using flash
2. Write a Program to create a 24 spokes on a wheel using flash.
3. Write a Program to change and object shape using a shape tweening concept.
4. Write a program to create an animated e-card using adobe Flash.
5. Write a Program to create an animation to represent the Growing Moon.
6. Write a Program to create an animation to indicate a ball bouncing on Steps
7. Write a Program to simulate a ball hitting another ball.
8. Write a Program to change a circle into a square using Flash.

Rich Internet Applications (RIA) using Adobe Flex and Ajax

9. Write an MXML code to display Hello World using Flex.
10. Create a Flex Project using Flash Builder IDE to run Hello World Application.
11. Implement an AJAX program to fetch RSS feeds from a well-known RSS feed site. Provide a scrolling display of latest news on your page. You can use xparser.js if you like.
12. Implement an RSS-based search feature. Have a text box and a button in your page for the same. Show the results in a separate <div> which has the results as hyperlinks, which the user can click.
13. Use the Reverse AJAX technique to build a web-based chat application. The application is one-way browser-based. That is, we have a window in which one user types his messages. From other side, the second user directly updates a file on the server (instead of a browser area).
14. A file on a server has information about cricket players. The fields represent name, country, matches, runs and centuries. The fields are separated by colons (:). The front end screen has a text field in which the user can enter a country. The server returns details of all players belonging to that country in the form of one big JSON object. The client parses the JSON object and builds an HTML table to print the results. Implement the server side script and the client code.
15. Write an Ajax enabled address book web application that interacts with a web service to obtain data and to modify data in a server-side database.
16. Write a Calender web application built using Dojo toolkit



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II Year – I Semester		L	T	P	C
		0	0	3	1.5
DATABASE MANAGEMENT SYSTEMS LAB (CS2107)					

Course Objectives:

This Course will enable students to

- Populate and query a database using SQL DDL/DML Commands
- Declare and enforce integrity constraints on a database
- Writing Queries using advanced concepts of SQL
- Programming PL/SQL including procedures, functions, cursors and triggers

Course Outcomes:

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

- Utilize SQL to execute queries for creating database and performing data manipulation operations
- Examine integrity constraints to build efficient databases
- Apply Queries using Advanced Concepts of SQL
- Build PL/SQL programs including stored procedures, functions, cursors and triggers

List of Exercises:

1. Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOT EXISTS, UNION, INTERSET, Constraints. Example:- Select the roll number and name of the student who secured fourth rank in the class.
3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
4. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)
5.
 - i. Create a simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)
 - ii. Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
6. Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.
7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE-APPLICATION ERROR.
8. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
9. Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.



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10. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
11. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers
12. Create a table and perform the search operation on table using indexing and non-indexing techniques.

Text Books/Suggested Reading:

- 1) Oracle: The Complete Reference by Oracle Press
- 2) Nilesh Shah, "Database Systems Using Oracle", PHI, 2007
- 3) Rick F Vander Lans, "Introduction to SQL", Fourth Edition, Pearson Education, 2007



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II Year - I Semester	Skill Oriented Course- I	L	T	P	C
		0	0	4	2
MOBILE APP DEVELOPMENT(SO2101)					

Course Objectives:

- To understand the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
- To understand how to work with various mobile application development frameworks.
- To learn the basic and important design concepts and issues of development of mobile applications.
- To understand the capabilities and limitations of mobile devices.

Course Outcomes:

At the end of this course, students will be able to:

1. Identify various concepts of mobile programming that make it unique from programming for other platforms
2. Critique mobile applications on their design pros and cons
3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
4. Program mobile applications for the Android operating system that use basic and advanced phone features and
5. Deploy applications to the Android marketplace for distribution.

LIST OF EXPERIMENTS

1. Introduction to mobile technologies and devices , Android platform and applications overview
2. Setting Android development environments
3. Writing Android applications, Understanding anatomy of an Android application
4. Develop an application that uses GUI components, Font and Colours
5. Develop an application that uses Layout Managers and event listeners.
6. Write an application that draws basic graphical primitives on the screen.
7. Develop an application that makes use of databases.
8. Develop an application that makes use of Notification Manager
9. Implement an application that uses Multi-threading
10. Develop a native application that uses GPS location information
11. Implement an application that writes data to the SD card.
12. Implement an application that creates an alert upon receiving a message
13. Write a mobile application that makes use of RSS feed
14. Develop a mobile application to send an email.
15. Develop a Mobile application for simple needs (Mini Project)

References:

1. Android Programming unleashed , B.M. Harwani, Pearson, 2013.
2. Android Programming (Big Nerd Ranch Guide), by Bill Phillips, Chris Stewart, Brian Hardy, Kristin Marsicano, Pearson, 2016
3. Android Programming – Pushing the limits by Hellman by Erik Hellman, WILEY, 2013



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Web References:

1. The Complete Android N Developer Course –Udemy
<https://www.udemy.com/course/complete-android-n-developer-course/?altsc=428526>
2. Android Development Courses on Google developers training
<https://developers.google.com/training/android/>
3. Mobile Computing - Video course- NPTEL
<https://nptel.ac.in/courses/106/106/106106147/#>
4. Android Tutorial – Tutorial Point <https://www.tutorialspoint.com/android/index.htm>



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II Year - I Semester	L	T	P	C
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ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE (MC2101)				

Course Objectives:

- The course aims at imparting basic principles of thought process, reasoning and inferencing. Sustainability is at the core of Indian Traditional Knowledge Systems connecting society and nature.
- Holistic life style of Yogic-science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions.
- The course focuses on introduction to Indian Knowledge System, Indian perspective of modern scientific world-view and basic principles of Yoga and holistic health care system

Course Outcomes:

Upon successful completion of the course, the student will be able to:

- Understand the significance of Indian Traditional Knowledge
- Classify the Indian Traditional Knowledge
- Compare Modern Science with Indian Traditional Knowledge system.
- Analyze the role of Government in protecting the Traditional Knowledge
- Understand the impact of Philosophical tradition on Indian Knowledge System.

Unit I

Introduction to Traditional Knowledge: Define Traditional Knowledge- Nature and Characteristics- Scope and Importance- kinds of Traditional Knowledge- The historical impact of social change on Traditional Knowledge Systems- Value of Traditional knowledge in global economy.

Unit II

Basic structure of Indian Knowledge System: AstadashVidya- 4 Ved - 4 Upaved (Ayurved,Dhanurved,Gandharva Ved&SthapthyaAdi),6vedanga(Shisha,Kalppa,Nirukha,Vyakaran,Jy othisha&Chand),4upanga(Dharmashastra,Meemamsa,purana&Tharka Shastra).

Unit III

Modern Science and Indian Knowledge System-Indigenous Knowledge, Characteristics- Yoga and Holistic Health care-cases studies.

Unit IV

Protection of Traditional Knowledge: The need for protecting traditional knowledge - Significance of Traditional knowledge Protection-Role of government to harness Traditional Knowledge.

Unit V

Impact of Traditions: Philosophical Tradition (Sarvadarshan) Nyaya, Vyshepec, Sankhya, Yog, Meemamsa, Vedantha, Chavanka, Jain & Boudh - Indian Artistic Tradition - Chitrakala, Moorthikala, Vasthukala, Sthapthya, Sangeetha, Nruthya Yevam Sahithya



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Reference Books :

1. Traditional Knowledge System in India, by AmitJha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, PratibhaPrakashan 2012.
3. Sivaramakrishnan (Ed.), Cultural Heritage of India-course material, Bharatiya Vidya
4. Swami Jitatmanand, Holistic Science and Vedant, Bharatiya Vidya Bhavan
5. Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkata.
6. Pramod Chandra, India Arts, Howard Univ. Press, 1983.
7. Krishna Chaitanya, Arts of India, Abhinav Publications, 1987.

Web Resources:

1. https://www.wipo.int/wipo_magazine/en/2017/01/article_0004.html
2. <http://iks.iitgn.ac.in/wp-content/uploads/2016/01/Indian-Knowledge-Systems-Kapil-Kapoor.pdf>
3. https://www.wipo.int/edocs/mdocs/tk/en/wipo_grtkf_ic_21/wipo_grtkf_ic_21_ref_facilitators_text.pdf