KARNATAK UNIVERSITY, DHARWAD
ACADEMIC (S&T) SECTION
ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಧಾರವಾಡ
ವಿದ್ಯಾಮಂಡಳ (ಎಸ್&ಟಿ) ವಿಭಾಗ

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NAAC Accredited
'A' Grade 2014

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No. KU/Aca(S&T)/SSL-394A/2022-23/1056

Date: 2 3 SEP 2022

ಅಧಿಸೂಚನೆ

ವಿಷಯ: 2022–23ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಎಲ್ಲ ಸ್ನಾತಕ ಕೋರ್ಸಗಳಿಗೆ 3 ಮತ್ತು 4ನೇ ಸೆಮೆಸ್ಟರ್ NEP-2020 ಮಾದರಿಯ ಪಠ್ಯಕ್ರಮವನ್ನು ಅಳವಡಿಸಿರುವ ಕುರಿತು.

ಉಲ್ಲೇಖ: 1. ಸರ್ಕಾರದ ಅಧೀನ ಕಾರ್ಯದರ್ಶಿಗಳು(ವಿಶ್ವವಿದ್ಯಾಲಯ 1) ಉನ್ನತ ಶಿಕ್ಷಣ ಇಲಾಖೆ ಇವರ ಆದೇಶ ಸಂಖ್ಯೆ: ಇಡಿ 260 ಯುಎನ್ಇ 2019(ಭಾಗ–1), ದಿ:7.8.2021.
2. ವಿಜ್ಞಾನ & ತಂತ್ರಜ್ಞಾನ ನಿಖಾಯ ಸಭೆಯ ಠರಾವುಗಳ ದಿನಾಂಕ: 06.09.2022
3. ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರ್ಣಯ ಸಂ. 01, ದಿನಾಂಕ: 17.09.2022
4. ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶ ದಿನಾಂಕ: 22-09-2022

—————

ಮೇಲ್ಕಾಣಿಸಿದ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಿಗಳನ್ವಯ ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶದ ಮೇರೆಗೆ, 2022–23ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಅನ್ವಯವಾಗುವಂತೆ, **ವಿಜ್ಞಾನ & ತಂತ್ರಜ್ಞಾನ** ನಿಖಾಯದ ಎಲ್ಲ ಸ್ನಾತಕ ಕೋರ್ಸಗಳ ರಾಷ್ಟ್ರೀಯ ಶಿಕ್ಷಣ ನೀತಿ (NEP)-2020 ರಂತೆ 3 ಮತ್ತು 4ನೇ ಸೆಮೆಸ್ಟರ್ಗಳಿಗಾಗಿ ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಅನುಮೋದಿತ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಪ್ರಕಟಪಡಿಸಿದ್ದು, ಸದರ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಕ.ವಿ.ವಿ. www.kud.ac.in ಅಂತರ್ಜಾಲದಿಂದ ಡೌನಲೋಡ ಮಾಡಿಕೊಳ್ಳಲು ಸೂಚಿಸುತ್ತಾ, ವಿದ್ಯಾರ್ಥಿಗಳು ಹಾಗೂ ಸಂಬಂಧಿಸಿದ ಎಲ್ಲ ಬೋಧಕರ ಗಮನಕ್ಕೆ ತಂದು ಅದರಂತೆ ಕಾರ್ಯಪ್ರವೃತ್ತರಾಗಲು ಕವಿವಿ ಅಧೀನದ / ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ ಸೂಚಿಸಲಾಗಿದೆ.

ಅಡಕ: ಮೇಲಿನಂತೆ

ಕುಲಸಚಿವರು.

ಗೆ,
ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಬರುವ ಎಲ್ಲ ಅಧೀನ ಹಾಗೂ ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ. (ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ ಹಾಗೂ ಮಿಂಚಂಚೆ ಮೂಲಕ ಬಿತ್ತರಿಸಲಾಗುವುದು)

ಪ್ರತಿ:
1. ಕುಲಪತಿಗಳ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
2. ಕುಲಸಚಿವರ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
3. ಕುಲಸಚಿವರು (ಮೌಲ್ಯಮಾಪನ) ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
4. ಅಧೀಕ್ಷಕರು, ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ / ಗೌಪ್ಯ / ಜಿ.ಎ.ಡಿ. / ವಿದ್ಯಾಂಡಳ (ಪಿ.ಜಿ.ಪಿಎಚ್.ಡಿ) ವಿಭಾಗ, ಸಂಬಂಧಿಸಿದ ಕೋರ್ಸಗಳ ವಿಭಾಗಗಳು ಪರೀಕ್ಷಾ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
5. ನಿರ್ದೇಶಕರು, ಕಾಲೇಜು ಅಭಿವೃದ್ಧಿ / ವಿದ್ಯಾರ್ಥಿ ಕಲ್ಯಾಣ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

KARNATAK UNIVERSITY, DHARWAD

04 - Year B.Sc.(Hons.) Program

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SYLLABUS

Course: Computer Science

With Effect from 2021-22

DISCIPLINE SPECIFIC CORE COURSE (DSCC) FOR SEM III & IV,

OPEN ELECTIVE COURSE (OEC) FOR SEM III & IV and

SKILL ENHANCEMENT COURSE (SEC) FOR SEM III

AS PER N E P - 2020

Karnatak University, Dharwad
Four Years under Graduate Program in **Computer Science** for B.Sc. (Hons.)
Effective from 2022-23

Sem.	Type of Course	Theory/ Practical	Course Code	Course Title	Instruction hour per week	Total hours of Syllabus / Sem	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks	Credits
III	DSCC-5	Theory	033CSC011	Object Oriented Programming using JAVA	04hrs	52	02 hrs	40	60	100	04
	DSCC-6	Practical	033CSC012	Java Lab	04 hrs	52	03 hrs	25	25	50	02
	OEC-3	Theory	003CSC051	Python Programming Concepts	03 hrs	42	02 hrs	40	60	100	03
	*SEC-2	Practical	053CSC061	Artificial Intelligence (SEC-Model 2)	03 hrs	39	02 hrs	25	25	50	02
IV	DSCC-7	Theory	034CSC011	Database Management Systems	04 hrs	52	02 hrs	40	60	100	04
	DSCC-8	Practical	034CSC012	Database Management Systems Lab	04 hrs	52	03 hrs	25	25	50	02
	OEC-4	Theory	004CSC051	Electronic Commerce	03 hrs	42	02 hrs	40	60	100	03
Details of the other Semesters will be given later											

Programme Specific Outcome (PSO):

On completion of the 03/ 04 years Degree in Computer Science students will be able to:

PSO 1 :   Understand basic concepts involved in computing.

PSO 2 :   Apply the knowledge in computer techniques to solve real world problems.

PSO 3 : Think of new approaches for solving problems in different domains.

PSO 4 : Follow ethics in designing software with team members.

PSO 5 : Develop research-oriented skills

PSO 6 : Understand good lab practices

B.Sc. Semester – III

Discipline Specific Course (DSC)

The course Computer Science **in III semester has two papers (Theory Paper –I for 04 credits & Practical Paper -II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.**

Course No.3 (Theory): **Object Oriented Programming using JAVA: 033CSC011**

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-03	DSCC-5	Theory	04	04	52 hrs.	2hrs.	40	60	100

Course Outcomes (COs):

At the end of the course, (Theory), students will be able to:

CO 1: Explain the object-oriented concepts using JAVA.

CO 2: Implement Classes, objects and constructors.

CO 3: Write JAVA programs using OOP concepts like Abstraction, Encapsulation, Inheritance and Polymorphism.

CO 4: Implement multithreading using JAVA.

CO 5: Demonstrate the basic principles of creating Java applications with GUI.

Course 3 (Theory): Title-Object Oriented Programming using JAVA
DSC3: Subject Code: 033CSC011

Unit I	**Introduction to Java:** Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java. **Objects and Classes:** Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, String Buffer, File, this reference.	13 hrs.
Unit II	**Inheritance and Polymorphism:** Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.	13 hrs.
Unit III	**Event and GUI programming:** Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing, Exceptional handling mechanism.	13 hrs.
Unit IV	**I/O programming:** Text and Binary I/O, Binary I/O classes, Object I/O, Random Access Files. Multithreading in java: Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try catch-finally, Collections in java, Introduction to JavaBeans and Network Programming	13 hrs.

References:

1. Programming with Java, By E Balagurusamy – A Primer, 4th Edition, McGraw Hill Publication.
2. Core Java Volume I – Fundamentals, By Cay S. Horstmann, Prentice Hall.
3. Object Oriented Programming with Java: Somashekara M.T., Guru, D.S., Manjunatha K.S, 1st Edition, PHI Learning 2017.
4. Java 2 - The Complete Reference, Herbert Schildt, 5th Edition, McGraw Hill Publication, 2017.
5. Java - The Complete Reference, Herbert Schildt, 7th Edition, McGraw Hill Publication, 2017.

B.Sc. Semester – III

Course: Computer Science
Discipline Specific Course (DSC)

Course No.3 (Practical): 033CSC012 Title of the Course: JAVA Lab

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-03	DSCC-6	Practical	02	04	52 hrs.	3 hrs.	25	25	50

Course Outcomes (COs):

At the end of the course, (Practical), students will be able to:

CO: Student would be able to implement OOP's concepts using JAVA.

List of Experiments for 52 hrs/ Semester.

Operators, Decision making and Loops:

1. Write a Java program to read the radius of a circle and to find the area and circumference.
2. Write a program to demonstrate String Operators
3. Write a Java program to find N prime numbers reading N as command line argument.
4. Write a program to find factorial of N numbers reading N as command line argument.
5. Write a program to read N numbers and sort them using one-dimensional arrays.

Classes and Methods:

6. Write a Java program to illustrate Method Overloading.
7. Write a Java program to illustrate Operator Overloading.
8. Write a program to demonstrate Single Inheritance.
9. Write a program to illustrate Constructor Overloading
10. Write a program to illustrate Method Overriding

Packages, Threads and Exception Handling:

11. Write a Java program demonstrating Multithreading.
12. Write a Java program demonstrating Exception Handling.
13. Write a Java program to demonstrate user defined package program.

Java Applet Programming

14.   Write an Applet program to display Geometrical Figures using objects.
15.   Write an Applet program which illustrate Scroll bar object.
16.   Write an Applet program to change the background color randomly.
17.   Write an Applet program to change the color of applet using combo box.
18.   Write an Applet program to implement Digital Clock using thread.

Event Handling:

19.   Write an Applet program to implement Mouse events.
20.   Write an Applet program to implement Keyboard events.

Note: A minimum of 20 assignments should be done by each student.

General Instructions

Implement all programs using JAVA.

Scheme of Practical Examination (distribution of marks): 25 marks for the Semester end examination

1. **7 Marks (Writing Program 1 + Execution without error)**

2. **7 Marks (Writing Program 2 + Execution without error)**

3. **Viva 6 marks**

4. **Journal 5 Marks**

   Total 25 Marks

Note: Same scheme may be used for IA (Formative Assessment) examination.

B.Sc. Semester – III

Course: Computer Science
Open Elective Course (OEC-3)
(OEC for other students)

Title of the Course : Python Programming Concepts
OEC-3 : Code: 003CSC051

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
OEC-3	OEC	Theory	03	03	42 hrs	2hrs	40	60	100

Course Outcomes (COs):

At the end of the course, (Practical), students will be able to:

CO 1: Explain the fundamentals of Computers.

CO 2: Explain the basic concepts of Python Programming.

CO 3: Demonstrate proficiency in the handling of loops and the creation of functions.

CO 4: Identify the methods to create and store strings.

Unit I	**Fundamentals of Computers** Introduction to Computers - Computer Definition, Characteristics of Computers, Evolution and History of Computers, Types of Computers, Basic Organization of a Digital Computer; Number Systems – different types, conversion from one number system to another; Computer Codes – BCD, Gray Code, ASCII and Unicode; Boolean Algebra – Boolean Operators with Truth Tables; Types of Software – System Software and Utility Software; Computer Languages - Machine Level, Assembly Level & High Level Languages, Translator Programs – Assembler, Interpreter and Compiler; Planning a Computer Program - Algorithm, Flowchart and Pseudo code with Examples.	**11 hrs.**
Unit II	**Python Basics** Introduction to Features and Applications of Python; Python Versions; Installation of Python; Python Command Line mode and Python IDEs; Simple Python Program. Identifiers; Keywords; Statements and Expressions; Variables; Operators; Precedence and Association; Data Types; Indentation; Comments; Built-in Functions- Console Input and Console Output, Type Conversions; Python Libraries; Importing Libraries with Examples; Illustrative programs.	**10 hrs.**

Unit III	**Python Control Flow:** Types of Control Flow; Control Flow Statements- if, else, elif, while loop, break, continue statements, for loop Statement; range() and exit () functions; Illustrative programs. **Python Functions:** Types of Functions; Function Definition- Syntax, Function Calling, Passing Parameters/arguments, the return statement; Default Parameters; Command line Arguments; Key Word Arguments; Illustrative programs.	**11 hrs.**
Unit IV	**Strings:** Creating and Storing Strings; Accessing Sting Characters; the str() function; Operations on Strings- Concatenation, Comparison, Slicing and Joining, Traversing; Format Specifiers; Escape Sequences; Raw and Unicode Strings; Python String Methods; Illustrative programs.	**10 hrs.**

References

1. Computer Fundamentals (BPB), P. K. Sinha &Priti Sinha
2. Think Python How to Think Like a Computer Scientist, Allen Downey et al., 2nd Edition, Green Tea Press. Freely available online 2015. @https://www.greenteapress.com/thinkpython/thinkCSpy.pdf
3. Introduction to Python Programming, Gowrishankar S et al., CRC Press, 2019.
4. http://www.ibiblio.org/g2swap/byteofpython/read/
5. http://scipy-lectures.org/intro/language/python_language.html
6. https://docs.python.org/3/tutorial/index.html

B.Sc. Semester – III

Course: Computer Science
Skill Enhancement Course (SEC)-II

Title of the Paper: Artificial Intelligence (Model-2)
Subject Code: 033CSC061

Type of Course	Theory / Practical	Total No. of Lectures/Hours / Semester	Credits	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
SEC-II	Theory (13 hrs) + Practical (26 hrs)	39	02	2 hrs.	25	25	50

Course Outcomes (COs):

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

CO 1: Appraise the theory of Artificial intelligence and list the significance of AI.

CO 2: Discuss the various components that are involved in solving an AI problem.

CO 3: Illustrate the working of AI Algorithms in the given contrast.

CO 4: Analyze the various knowledge representation schemes, Reasoning and Learning techniques of AI.

CO 5: Apply the AI concepts to build an expert system to solve the real-world problems.

Unit – I	**Overview of AI:** Definition of Artificial Intelligence, Philosophy of AI, Goals of AI, Elements of AI system, Programming a computer without and with AI, AI Techniques, History of AI. **Intelligent Systems:** Definition and understanding of Intelligence, Types of Intelligence, Human Intelligence vs Machine Intelligence.	05 hrs
Unit- II	**AI Applications:** Virtual assistance, Travel and Navigation, Education and Healthcare, Optical character recognition, E-commerce and mobile payment systems, Image based search and photo editing. **AI Examples in daily life:** Installation of AI apps and instructions to use AI apps.	05 hrs
Unit- III	**Robotics:** Introduction to Robotics, Difference in Robot System and Other AI Program, Components of a Robot.	03 hrs

Laboratory Activities: • **Amazon Alexa:** https://play.google.com/store/apps/details?id=com.amazon.dee.app&hl=en&gl=US • **Google Lens:** https://play.google.com/store/search?q=google+lens&c=apps&hl=en&gl=US • **Image to Text to Speech ML OCR:** https://play.google.com/store/apps/details?id=com.mlscanner.image.text.speech&hl=en_IN&gl=US • **Google Pay:** https://play.google.com/store/apps/details?id=com.google.android.apps.nbu.paisa.user&hl=en_IN&gl=US • **Grammarly:** https://play.google.com/store/search?q=grammarly&c=apps&hl=en_IN&gl= • **Google Map:** https://play.google.com/store/search?q=google+maps&c=apps&hl=en&gl=US • **FaceApp:** https://play.google.com/store/apps/details?id=io.faceapp&hl=en_IN&gl=US • **Socratic:** https://play.google.com/store/apps/details?id=com.google.socratic&hl=en_IN&gl=US • **Google Fit: Activity Tracking:** https://play.google.com/store/apps/details?id=com.google.android.apps.fitness&hl=en_IN&gl=US • **SwiftKey Keyboard:** https://swiftkey-keyboard.en.uptodown.com/android • **E-commerce App:** https://play.google.com/store/apps/details?id=com.jpl.jiomart&hl=en_IN&gl=US	**26hrs**

Text Books:
1. Wolfgang Ertel, "Introduction to Artificial Intelligence", 2nd Edition, Springer International Publishing 2017.
2. Michael Negnevitsky, "Artificial Intelligence A Guide to Intelligent Systems", 2nd Edition, Pearson Education Limited 2005.

References:
1. https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_tutorial.pdf
2. Kevin Knight, Elaine Rich, Shivashankar B. Nair, "Artificial Intelligence", 3rd Edition, July 2017.

Reference Links:

1. Voice Assistant: https://alan.app/blog/voiceassistant-2/

2. Browse with image: https://www.pocket-lint.com/apps/news/google/141075-what-is-google-lens-and-how-does-it-work-and-which-devices-have-it

3. OCR: https://aws.amazon.com/what-is/ocr/

4. Mobile Payment system: https://gocardless.com/en-us/guides/posts/how-do-mobile-payment-systems-work/

5. Grammarly: https://techjury.net/blog/how-to-use-grammarly/#gref

6. Travel & Navigation: https://blog.google/products/maps/google-maps-101-ai-power-new-features-io-2021/

7. AI in photo editing: https://digital-photography-school.com/artificial-intelligence-changed-photo-editing/

8. AI in education: https://www.makeuseof.com/what-is-google-socratic-how-does-it-work/

9. AI in health and fitness: https://cubettech.com/resources/blog/implementing-machine-learning-and-ai-in-health-and-fitness/

10. E-commerce and online shopping: https://medium.com/@nyxonedigital/importance-of-e-commerce-and-online-shopping-and-why-to-sell-online-5a3fd8e6f416

Implement Laboratory activitiesas specified tools in the SEC-3.

Scheme of Practical Examination (distribution of marks): 25 marks for the Semester end examination

1. **7 Marks (Writing Activity 1 + Execution without error)**

2. **7 Marks (Writing Activity 2 + Execution without error)**

3. **Viva 6 marks**

4. **Journal 5 Marks**

   Total 25 Marks

Note: Same scheme may be used for IA (Formative Assessment) examination.

Details of Formative assessment (IA) for DSCC theory/OEC: 40% weight age for total marks

Type of Assessment	Weight age	Duration	Commencement
Written test-1	10%	1 hr	8th Week
Written test-2	10%	1 hr	12th Week
Seminar	10%	10 minutes	--
Case study / Assignment / Field work / Project work/ Activity	10%	------	--
Total	40% of the maximum marks allotted for the paper		

Faculty of Science
04 - Year UG Honors programme:2022-23

GENERAL PATTERN OF THEORY QUESTION PAPER FOR DSCC/ OEC
(60 marks for semester end Examination with 2 hrs duration)

Part-A
1. Question number 1-06 carries 2 marks each. Answer any 05 questions   : 10marks

Part-B
2. Question number 07- 11 carries 05Marks each. Answer any 04 questions   : 20 marks
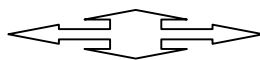
Part-C
3. Question number 12-15 carries 10 Marks each. Answer any 03 questions   : 30 marks

(Minimum 1 question from each unit and 10 marks question may have sub
 questions for 7+3 or 6+4 or 5+5 if necessary)

Total: 60 Marks
 Note: Proportionate weight age shall be given to each unit based on number of hours prescribed.

B.Sc. Semester – IV

Course: Computer Science
Discipline Specific Course (DSC)

The course Computer Science **in IV semester has two papers (Theory Paper –I for 04 credits & Practical Paper -II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.**

Title of the Course: Database Management Systems
Course No.4 (Theory): Code: 034CSC011

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-04	DSCC-7	Theory	04	04	52 hrs	2hrs	40	60	100

Course Outcomes (COs):

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

CO 1: Explain the various database concepts and the need for database systems.
CO 2: Identify and define database objects, enforce integrity constraints on a database using DBMS.
CO 3: Demonstrate a Data model and Schemas in RDBMS.
CO 4: Identify entities and relationships and draw ER diagram for a given real-world problem.
CO 5: Convert an ER diagram to a database schema and deduce it to the desired normal form.
CO 6: Formulate queries in Relational Algebra, Structured Query Language (SQL) for database manipulation.
CO 7: Explain the transaction processing and concurrency control techniques.

DSC4: Database Management Systems (DBMS)

Unit I	**Database Architecture:** Introduction to Database system applications. Characteristics and Purpose of database approach. People associated with Database system. Data models. Database schema. Database architecture. Data independence. Database languages, interfaces, and classification of DBMS.	13 hrs.
Unit II	**E-R Model:** Entity-Relationship modeling: E – R Model Concepts: Entity, Entity types, Entity sets, Attributes, Types of attributes, key attribute, and domain of an attribute. Relationships between the entities. Relationship types, roles and structural constraints, degree and cardinality ratio of a relationship. Weak entity types, E -R diagram.	13 hrs.

Unit III	**Relational Data Model:** Relational model concepts. Characteristics of relations. Relational model constraints: Domain constrains, key constraints, primary & foreign key constraints, integrity constraints and null values. Relational Algebra: Basic Relational Algebra operations. Set theoretical operations on relations. JOIN operations Aggregate Functions and Grouping. Nested Sub Queries-Views. Introduction to PL/SQL & programming of above operations in PL/SQL.	13 hrs.
Unit IV	**Data Normalization:** Anomalies in relational database design. Decomposition. Functional dependencies. Normalization. First normal form, Second normal form, Third normal form. Boyce-Codd normal form. **Query Processing Transaction Management:** Introduction Transaction Processing. Single user & multiuser systems. Transactions: read & write operations. Need of concurrency control: The lost update problem, Dirty read problem. Types of failures. Transaction states. Desirable properties (ACID properties) of Transactions. Concurrency Control Techniques: Locks and Time stamp Ordering. Deadlock & Starvation.	13 hrs.

References:
1. Fundamentals of Database Systems, RamezElamassri, Shankant B. Navathe, 7th Edition, Pearson, 2015
2. An Introduction to Database Systems, Bipin Desai, Galgotia Publications, 2010.
3. Introduction to Database System, C J Date, Pearson, 1999.
4. Database Systems Concepts, Abraham Silberschatz, Henry Korth, S.Sudarshan, 6th Edition, McGraw Hill, 2010.
5. Database Management Systems, Raghu Rama Krishnan and Johannes Gehrke, 3rd Edition, McGraw Hill, 2002

B.Sc. Semester – IV

Course: Computer Science
Discipline Specific Course (DSC)

Title of the Course: Database Management Systems Lab
Course No.3 (Practical) Code: 034CSC012

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-04	DSCC-8	Practical	02	04	52 hrs.	3 hrs.	25	25	50

Course Outcomes (COs):

At the end of the course, (Practical), students will be able to:

CO: Student would be able to create a tables, execute queries and PL/SQL programs.

List of Experiments for 52 hrs/ Semester.

Database 1: EMPLOYEE

Consider the following relations for Employee database application.

EMPLOYEE (Empno, Name, Dept_ID, DOJ, City)

DEPARTMENT (Dept_ID, Name, Manager)

Salary (Empno, Basic, HRA, Deductions, Tax, Net_Pay)

a. Create the above tables by properly specifying the primary key.

b. Enter at least five tuples for each relation.

c. Execute the following queries (SQL)

     i. Find out the Employees who have the same date of joining.

     ii. Get Department ID, the average, maximum, and minimum basic pay of all departments having more than two employees.

d. Write PL/SQL procedure to insert a new row (INSERT INTO command).

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Database 2: Company

Consider the following relations for company database application

EMPLOYEE (<u>Adhar_no</u>, Name, Address, Sex, Salary, DNo)

DEPARTMENT (<u>DNo</u>, DName, Mgr_Adharno, MgrStartDate)

DLOCATION (DNo,DLoc)

PROJECT (<u>PNo</u>, PName, PLocation, DNo)

WORKS_ON (<u>Adhar_no</u>,PNo, Hours)

a. Create the above tables by properly specifying the primary key.

b. Enter At least five tuples for each relation.

c. Execute the following queries (SQL)

> 1. Make a list of all project numbers for projects that involve an employee whose last name is 'Smith', either as a worker or as a manager of the department that controls the project.

> 1. Retrieve all Employees in department 5 whose salary is between 30000 and 40000.

d. Write PL/SQL program to demonstrate **%ROWCOUNT attribute.**

Database 3: Insurance

Consider the following relations for an accident recording database application

PERSON   (Driverid :String, name:String, Address: String)
CAR   (Regno: String, Model(Company): String,Year: int)
ACCIDENT   (Reportno :Number, Date: Date, Location: String)
OWNS   (Driverid: String, Regno: String)
PARTICIPATED   (Driverid:String, Regno:String, Reportno:Number,Damageamount:integer)

a. Create the above tables by properly specifying the primary key.
b. Enter At least five tuples for each relation.
b. Execute the following queries (SQL)

> 1. Demonstrate how to update the damage amount for the car with a specific regno.
> 2. List the drivers (name, address & damage amt) who have participated in an accident.

d. Write PL/SQL program demonstrate exception handling for the above query 2.

Database 4: COMPANY (SHIPMENT)

Consider the following relations for an order processing database application in a company

CUSTOMER   (Customerno:Integer,Customername:String,City:String)
ORDER   (Orderno:integer,orderDate:date, customerno:int,Orderamount:dec)
ITEM   (Itemno:int,unitprice:decimal)
ORDERITEM   (Orderno:int,Itemno:int,Quantity: int)
WAREHOUSE   (Warehno:int,City:String)
SHIPMENT   (Orderno:int,Warehno:int,Shipdate:Date)

a. Create the above tables by properly specifying the primary key

b. Enter At least five tuples for each relation.

c. Execute the following queries (SQL)

    1. List the item no, unit price, quantity and total price for a particular order no.

    2. List the customer name, city, order number and order amount for a particular customer.

d. Write PL/SQL procedure to illustrate, how to create and call a function.

Database 5: STUDENTS, COURSES & BOOK ISSUED

Consider the following relations for Student, courses & Book issued database.

STUDENT   (Regno:String, Name:String; Major:String; Bdate:Date)
COURSE   (Courseno:Integer, Cname:String; Dept:String)
ENROLL   (Regno:String; Courseno;integer; Semester:Integer: Marks:int)
BOOKADOPTION   (Courseno:Integer ;Semester:Integer;BookISBN:Int)
TEXT   (BookISBN:Int; BookTitle:String;Publisher:String;Author:string)

a. Create the above tables by properly specifying the primary key.
b. Enter At least five tuples for each relation.
c. Execute the following queries (SQL)

    1. Produce a list of textbooks with Book ISBN, Title, publisher, author, course name and course number adopted by some course.
    2. List the name, major, course name, semester and the marks obtained by a particular student.

d. Write PL/SQL procedure to demonstrate user defined exception handling.

Database 6: BOOK DEALER

Consider the following relations for a database application for a Book Dealer

AUTHOR   (Authorid int, Name:String, City:String,Country:String)
PUBLISHER   (Publisherid:int, Name:String, City:String, Country:String)
CATALOG   (Bookid:int, Title:String, Authorid int, Publisherid:int,
Categoryid: int,Year:int, Price:int)
CATEGORY   (Categoryid: int, Description:String)
ORDERDETAIL   (Oredrno:int, Bookid:int, Quantity:int)

a. Create the above tables by properly specifying the primary key.
b. Enter At least five tuples for each relation.
c. Execute the following queries (SQL)

    1. Demonstrate how to increase the price of the book published by a specific publisher by 10%.

    2. Display the title of the book having maximum sales.

d. Write PL/SQL program to demonstrate Implicit/Explicit **cursor.**

Database 7:   BANK

Consider the following relations for a Bank database application

BRANCH   (BranchID: integer, Branchname: String, Branchcity:String, Assets:Real)
ACCOUNT   (Accno:Int, BranchID:Integer, Balance:Real)
CUSTOMER   (AccountNo: Integer,Customername:String, CustomerCity:String)
LOAN   (Loano:Integer, BranchID : Integer, Amount:Real)
BRROWER   (AccountNo: Integer, Loano:Integer)

    a.   Create the above tables by properly specifying the primary key.
    b.   Enter At least five tuples for each relation.
    c.   Execute the following queries (SQL)

       1.   List the names of the customers with their Loan Amount who have taken loan from the main branch(in any city).

       2.   Find all the customers who have accounts at the main branch.

 d. Write PL/SQL Procedure for an application using package.

Note: Draw ER diagram and Schema diagram for each database application

General Instructions

Implement all programs using

Scheme of Practical Examination (distribution of marks): 25 marks for the Semester end examination

    1. **7 Marks (Creating tables, inserting 5 tuples for any one database application)**

    2. **7 Marks (Executing SQL and PL/SQL)**

    3. **Viva 6 marks**

    4. **Journal 5 Marks**

       Total 25 Marks

Note: Same scheme may be used for IA (Formative Assessment) examination.

Course: Computer Science
Open Elective Course (OEC-4)
(OEC for other students)

Title of the Course: Electronic Commerce
OEC-4: Code: 004CSC051

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
OEC-4	OEC	Theory	03	03	42 hrs	2hrs	40	60	100

Course Outcomes (COs):

CO 1:Compare how internet and other information technologies support business processes.
CO2:Demonstrate an overall perspective of the importance of application of internet technologies in business administration
CO 3:Explain the basic business management concepts.
CO 4:Demonstrate the basic technical concepts relating to E-Commerce.
CO 5:Identify the security issues, threats and challenges of E-Commerce.

UNIT I	**Introduction to E-Commerce and Technology Infrastructure** Working of Web - HTML Markup for Structure - Creating simple page - Marking up text - Adding Links - Adding Images - Table Markup - Forms - HTML5.	**10 Hrs**
UNIT II	**Building an E-Commerce Website, Mobile Site and Apps** Systematic approach to build an E-Commerce: Planning, System Analysis, System Design, Building the system, Testing the system, Implementation and Maintenance, Optimize Web Performance – Choosing hardware and software – Other E-Commerce Site tools – Developing a Mobile Website and Mobile App.	**10 Hrs**
UNIT III	**E-Commerce Security and Payment Systems** E-Commerce Security Environment – Security threats in E-Commerce – Technology Solutions: Encryption, Securing Channels of Communication, Protecting Networks, Protecting Servers and Clients – Management Policies, Business Procedure and Public Laws - Payment Systems	**11 Hrs**

UNIT IV	**Business Concepts in E-Commerce** Digital Commerce Marketing and Advertising strategies and tools – Internet Marketing Technologies – Social Marketing – Mobile Marketing – Location based Marketing – Ethical, Social, Political Issues in E-Commerce. **UNIT V Project Case Study** Case Study: Identify Key components, strategy, B2B, B2C Models of E-commerce Business model of any e-commerce website - Mini Project : Develop E-Commerce project in any one of Platforms like Woo-Commerce, Magento or Opencart	**11 Hrs**

Text Book:

1. Kenneth C. Laudon, Carol Guercio Traver - E-Commerce, Pearson, 10th Edition, 2016

References:

1. http://docs.opencart.com/

2. http://devdocs.magento.com/

3. http://doc.prestashop.com/display/PS15/Developer+tutorials

4. RobbertRavensbergen, ―Building E-Commerce Solutions with Woo Commerce, PACKT,

   2nd Edition

Details of Formative assessment (IA) for DSCC theory/OEC: 40% weight age for total marks

Type of Assessment	Weight age	Duration	Commencement
Written test-1	10%	1 hr	8th Week
Written test-2	10%	1 hr	12th Week
Seminar	10%	10 minutes	--
Case study / Assignment / Field work / Project work/ Activity	10%	------	--
Total	40% of the maximum marks allotted for the paper		

Faculty of Science
04 - Year UG Honors programme:2022-23

GENERAL PATTERN OF THEORY QUESTION PAPER FOR DSCC/ OEC
(60 marks for semester end Examination with 2 hrs duration)

Part-A
4. Question number 1-06 carries 2 marks each. Answer any 05 questions   : 10marks

Part-B
5. Question number 07- 11 carries 05Marks each. Answer any 04 questions   : 20 marks

Part-C
6. Question number 12-15 carries 10 Marks each. Answer any 03 questions   : 30 marks

(Minimum 1 question from each unit and 10 marks question may have sub
 questions for 7+3 or 6+4 or 5+5 if necessary)

Total: 60 Marks
Note: Proportionate weight age shall be given to each unit based on number of hours prescribed.