Tel. No.: 2419700/2419567
Fax: 0821-2419363/2419301

Email: registrar@uni-mysore.ac.in
www.uni-mysore.ac.in

UNIVERSITY OF MYSORE

Estd.1916

Vishwavidyanilaya Karyasoudha
Crawford Hall, Mysuru- 570 005

(Re-accredited by NAAC at 'A')

(NIRF-2022 Ranked 33 in University Category & 54 in Overall Category)

No.: PMEB-1/Spl./28(8)/2021-22 **Date: 03-11-2022**

NOTIFICATION

Sub.: Syllabus and Examination pattern of **BCA (Hons.) (Cloud Computing & Digital Science)** course under Specialized Programmes from the academic year 2022-23-reg.

Ref.: 1. Decision of the BOS Meeting held on 04-06-2022.
2. Decision of the Faculty of Science & Technology meeting held on 15-09-2022.
3. Decision of the Academic Council meeting held on 23-09-2022.

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The Board of Studies in **BCA (Cloud Computing & Digital Science) (UG)** at its meeting held on 04-06-2022 has recommended approve the 1st year Syllabus of **BCA (Hons.) (Cloud Computing & Digital Science)** course in University of Mysore under specialized/specified programs from the academic year 2022-23 as per NEP-2020.

The Faculty of Science & Technology and the Academic Council at their meetings held on 15-09-2022 and 23-09-2022 respectively, have also approved the above said proposal and the same is hereby notified.

The syllabus of **BCA (Hons.) (Cloud Computing & Digital Science)** course may be downloaded from the University website **https://uni-mysore.ac.in/PMEB/.**

REGISTRAR
REGISTRAR
University of Mysore
MYSURU - 570 005

To;

1. The Registrar (Evaluation), University of Mysore, Mysuru.
2. The Dean, Faculty of Science & Technology, DoS in Earth Science, Manasagangothri, Mysuru.
3. Prof. D.S. Guru, DoS in Computer Science, Manasagangothri, Mysuru.
4. The Principal, Cresta First Grade College, #182/145/C, Bannur Road, Alanahalli, Mysuru.
5. The Deputy Registrar/ Asst. Registrar/ Superintendent, Examination Branch, UOM, Mysuru.
6. The PA to Vice-Chancellor/Registrar/Registrar (Evaluation), University of Mysore, Mysuru.
7. Office Copy.

O/C

Phone No. : 91-821-2510789
91-821-2419551
91-821-2419331

UNIVERSITY OF MYSORE

DEPARTMENT OF STUDIES IN COMPUTER SCIENCE

No. MG/CS/ 132/2022-2023

MANASAGANGOTRI
MYSORE-570 006

Dated 08-06-22

Dr. D S Guru
Professor and Chairman
BoS in BCA (Cloud Computing and Digital Science)

To,

1. The Syndicate Section, University of Mysore
2. The Academic Section, University of Mysore
3. The Director, PMEB, University of Mysore

Dear Sir / Madam,

Sub: Submitting proceedings of the BoS meeting in connection with specialized BCA (Cloud Computing and Digital Science) program.
Ref: Your letter No. UA2/379/2016-2017 dated: 17-05-2022.

With reference to the above, I am herewith submitting a copy of the proceedings of the meeting of the members of BoS in BCA (Cloud Computing and Digital Science) along with the recommended list of courses and respective syllabi for your further needful action.

Thanking you,

Sincerely your's

8/6/22

(D S Guru)

Copy to: The Registrar, University of Mysore, for your Information

Dr. D. S. Guru
M.Sc., Ph.D., PostDoc (USA)
Fellow of BOYSCAST (2005)
Professor & Chairman
Dept. of Studies in Computer Science
University of Mysore,
Manasagangotri, Mysuru-570 006
Karnataka, INDIA
Email :dsg@compsci.uni-mysore.ac.in

Proceedings of the meeting of the members of the Board of Studies in BCA (Cloud Computing and Digital Science) (UG) held on 04-06-2022 at 12.30 PM at the CRESTA First Grade College, Mysuru.

Ref: 1. No. UA2/159(4)/2017-2018 dt 18-03-2021
2. No. UA2/379/2016-2017 dt 17-05-2022

With references to the above cited, a meeting of the members of the Board of Studies in BCA (Cloud Computing and Digital Science) has been conducted at the CRESTA First Grade College on Saturday the 04-06-2022 at 12.30 PM. The following members have attended the meeting.

1. Dr. H N Meenakshi	Member	4/6/22
2. Dr. B M Chethana Kumara	Member	4/6/22
3. Dr. V Vinay Kumar	Member	4/6/22
4. Dr. Rakesh H M	Member	Rakesh H.M.
5. Mrs. Amreen Saba	Invited Member	4/6/22
6. Prof. H S Nagendraswamy	Invited Member	
7. Prof. D S Guru	Chairman	4/6/22

The following member were absent for the meeting.

1. Sri. S Shreyas Member

The meeting was initiated with a welcome speech by Prof. D S Guru, Chairman of the board. The importance of the meeting was presented along with the agenda of framing the syllabus as per NEP 2020 Regulations for various courses to be offered as part of the existing specialized UG Program called BCA (Cloud Computing and Digital Science) (Hons.). The draft of the restructured scheme, titles of the courses and the respective syllabi for only first year are placed before the members of the board for discussion and suggestions were sought. However, the board

has decided to take up preparation of the course titles and respective syllabi for the remaining semesters (3rd to 8th Semester) in the next BoS meeting.

After detailed presentation and discussion among the members, the following were resolved to be recommended.

1. This specialized BCA (Cloud Computing and Digital Science) (Hons.) should also be offered under the common NEP 2020 regulations being followed by the University from time to time for the existing general (conventional) BCA program from the academic year 2022-23. The only difference is in the titles of various courses and their respective syllabi offered under DSC, DSE and SEC.
2. The overall number of credits to be earned by the students and the distributions of credits in each semester are exactly on par with the existing general BCA (Hons.) program of the University.
3. The list of the titles of the courses finalized along with respective to syllabi for first year of the program including SEC to be offered as an alternative to Digital Fluency Course are attached in ANNEXURE – A: BCA (Cloud Computing and Digital Science) (Hons.).
4. The board has resolved to follow the same list of examiners approved for general BCA program for this specialized program also.

4/6/22

Prof. Guru D S

Chairman

UNIVERSITY OF MYSORE

No. UA2/159(4)/2017-2018 Dated: 18-03-2021

NOTIFICATION

Sub: Constitution of the Board of Studies in **BCA (Cloud Computing and Digital Science) (UG)**

Ref: Letter dated 01-03-2021received from Dr.H.M. Rakesh, Principal, Cresta First Grade College, #182/145/C, Bannur Road, Alanahalli, Mysuru.

* * * * *

Pursuant to the approval of the Hon'ble Vice-chancellor and pending approval of the University Syndicate the Board of Studies in **BCA (Cloud Computing and Digital Science) (UG)** is constituted as per the Statutes framed under Section 33 (1) and (2) of the Karnataka State Universities Act 2000, with the following members for a period of **three years** from the date of this notification or until further orders, whichever is earlier.

1.	Prof.D.S. Guru Professor, DOS in Computer Science, Manasagangotri, Mysuru.	Chairman
2.	Dr.H.M.Rakesh Principal, Cresta First Grade College, #182/145/C, Bannur Road, Alanahalli, Mysuru – 570 028	Member
3.	Sri.S.Shreyas HOD – Computer Application & Assistant Professor, Cresta First Grade College, #182/145/C, Bannur Road, Alanahalli, Mysuru – 570 028	Member
4.	Dr.V.Vinay Kumar Founder Director, IVIS Labs #1608, 5th Main, 6th Cross, Vijayanagar 2nd Stage, Mysuru – 570 017	Member
5.	Dr.B.M.Chethana Kumara Lead Engineer, R & D, Samsung Electro Mechanics 20th Floor, World Trade Center, Next to Orion Mall, Malleshwaram, Bengaluru – 560 001	Member
6.	Dr.H.N.Meenakshi # 1564, 7th Cross, 2nd Stage, Police Layout, Sardar Vallababhai Patel Nagar, T.Narasipura Road, Nadanahalli Post, Mysuru – 570 028	Member

REGISTRAR 20/3/2021

To:

1. The Concerned Members.
2. Dr.H.M. Rakesh, Principal, Cresta First Grade College, #182/145/C, Bannur Road, Alanahalli, Mysuru – 570 028
3. The Dean, Faculty of Science and Technology, University of Mysore, Mysuru
4. The Registrar (Evaluation), University of Mysore, Mysuru.
5. The Finance Officer, University of Mysore, Mysuru.
6. The Director, PMEB, University of Mysore, Mysuru.
7. The Deputy Registrar/Assistant Registrar/Superintendent (Academic), AB, UOM, Mysuru.
8. P.A. to the Vice-Chancellor/Registrar/Registrar(Evaluation), UOM, Mysuru.
9. The Superintendent, Ph.D Section, Examination Branch, UOM, Mysuru.

ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ

ವಿಶ್ವವಿದ್ಯಾನಿಲಯ ಕಾರ್ಯಸೌಧ
ಕ್ರಾಫರ್ಡ್ ಭವನ, ಮೈಸೂರು

ಸಂಖ್ಯೆ : ಯುಎ2/379/2016-2017 ದಿನಾಂಕ : 17-05-2022

ಎಲ್ಲಾ ಅಧ್ಯಯನ ಮಂಡಳಿ ಅಧ್ಯಕ್ಷರುಗಳಿಗೆ
ಸ್ನಾತಕ/ಸಂಯುಕ್ತ ಅಧ್ಯಯನ ಮಂಡಳಿಗಳು
ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ,
ಮೈಸೂರು.

ಮಾನ್ಯರೆ,

ವಿಷಯ : 2020ರ ಹೊಸ "ರಾಷ್ಟ್ರೀಯ ಶಿಕ್ಷಣ ನೀತಿ" ಅನ್ವಯ ಸ್ನಾತಕ/ಸಂಯುಕ್ತ ವಿಶೇಷ ಅಧ್ಯಯನ ಮಂಡಳಿಗಳ ಸಭೆಗಳನ್ನು ನಡೆಸುವ ಬಗ್ಗೆ.

ಉಲ್ಲೇಖ :1. ನಿರ್ದೇಶಕರು, ಯೋಜನೆ ಉಸ್ತುವಾರಿ ಮತ್ತು ಮೌಲ್ಯಮಾಪನ ಮಂಡಳಿ ಇವರ ಪತ್ರ ಸಂಖ್ಯೆ: /PMEB/35/Spl.Gen/2020-21 Dated :09-05-2022.

2. ಉಪ ಕುಲಸಚಿವರು (ಶೈಕ್ಷಣಿಕ) ಇವರ ಟಿಪ್ಪಣಿ ಸಂಖ್ಯೆ : ಎಸಿ2(ಎಸ್)/525/2009-10, ದಿನಾಂಕ : 16-05-2022.

* * * * * *

ಮೇಲ್ಕಂಡ ವಿಷಯ ಮತ್ತು ಉಲ್ಲೇಖಿತ ಪತ್ರಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ, ಹೊಸ "ರಾಷ್ಟ್ರೀಯ ಶಿಕ್ಷಣ ನೀತಿ" (NEP)-2020ರ ಅನುಷ್ಠಾನದನ್ವಯ 2022-23ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನ ಸ್ನಾತಕ ಪದವಿಯ ಎರಡನೇ ವರ್ಷದ/ Specialized Programmeಗಳ ಮೊದಲನೇ ವರ್ಷದ ಪಠ್ಯಕ್ರಮವನ್ನು ಸರ್ಕಾರ ನಿಗಧಿಪಡಿಸಿರುವ Model Structure ನಂತೆ ಸಿದ್ದಪಡಿಸುವ ಸಂಬಂಧ ಎಲ್ಲಾ ಅಧ್ಯಯನ ಮಂಡಳಿಯ ಅಧ್ಯಕ್ಷರುಗಳು ಸ್ನಾತಕ/ಸಂಯುಕ್ತ/Specialized Programme ಒಳಗೊಂಡಂತೆ ತುರ್ತಾಗಿ ಅಧ್ಯಯನ ಮಂಡಳಿಯ ಸಭೆಗಳನ್ನು ನಡೆಸಿ ದಿನಾಂಕ : 31-05-2022ರೊಳಗೆ ಸದರಿ ಅಧ್ಯಯನ ಮಂಡಳಿಯ ಶಿಫಾರಸ್ಸುಗಳ Soft Copy ಮತ್ತು Hard Copy ಗಳನ್ನು ಈ ಕೆಳಕಂಡ ವಿಭಾಗಗಳಿಗೆ ನೇರವಾಗಿ ಸಲ್ಲಿಸಲು ಕೋರಿದೆ.

ಕ್ರಮ ಸಂಖ್ಯೆ	ವಿವರ	ಇ-ಮೇಲ್
1.	Soft Copy/Hard Copy ಸಿಂಡಿಕೇಟ್ ವಿಭಾಗಕ್ಕೆ ಸಲ್ಲಿಸುವುದು	syndicate109999@gmail.com
2.	Soft Copy/ Hard Copy ಶೈಕ್ಷಣಿಕ ವಿಭಾಗಕ್ಕೆ	academicsection123@gmail.com
3.	Specialized Programme ಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ Soft Copy/ Hard Copy ಯನ್ನು ನಿರ್ದೇಶಕರು (PMEB) ಯೋಜನೆ ಉಸ್ತುವಾರಿ ಮತ್ತು ಮೌಲ್ಯಮಾಪನ ಮಂಡಳಿ. ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ ಮೈಸೂರು-05 ಇವರಿಗೆ ಸಲ್ಲಿಸುವುದು	pmeb@uni-mysore.ac.in

ಸೂಚನೆ: ಅಧ್ಯಯನ ಮಂಡಳಿ ಶಿಫಾರಸುಗಳನ್ನು ಸಂಬಂಧಪಟ್ಟ ನಿಕಾಯಗಳು, ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಗಳಿಗೆ ಮಂಡಿಸಬೇಕಾಗಿರುವುದರಿಂದ ಇದನ್ನು ಅತ್ಯಂತ ಜರೂರು ಎಂದು ಪರಿಗಣಿಸಿ ಕ್ರಮವಹಿಸಲು ತಿಳಿಸಲಾಗಿದೆ.

ನಿಮ್ಮ ನಂಬುಗೆಯ,

ಕುಲಸಚಿವರು
17/5/2022

ಪ್ರತಿ :

1. ಕುಲಸಚಿವರು (ಮೌಲ್ಯಾಂಕನ), ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು
2. ಪ್ರೊ. ವಿನಯ್ ಶ್ರೀನಿವಾಸ್, ನಿರ್ದೇಶಕರು, ಯೋಜನೆ ಉಸ್ತುವಾರಿ ಮತ್ತು ಮೌಲ್ಯಮಾಪನ ಮಂಡಳಿ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು-05

[illegible]

-ಪುಟ ತಿರುಗಿಸಿ-

3. ಎಲ್ಲಾ ಅಧ್ಯಯನ ಮಂಡಳಿಯ ಅಧ್ಯಕ್ಷರು, ಸಭೆಗೆ ಸಂಬಂಧಿಸಿದ ಹುಂಡಿಗಳನ್ನು ನೇರವಾಗಿ ಹಣಕಾಸು ಶಾಖೆಗೆ ಸಲ್ಲಿಸುವುದು.
4. ಹಣಕಾಸು ಅಧಿಕಾರಿಗಳು, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು ಅಧ್ಯಯನ ಮಂಡಳಿ ಸಭೆಗೆ ಹಾಜರಾಗುವ ಸದಸ್ಯರಿಗೆ ನಿಯಮಾನುಸಾರ ಪ್ರಯಾಣ ಭತ್ಯೆ, ದಿನಭತ್ಯೆ ಅಥವಾ ಸಭಾಭತ್ಯೆ ಪಾವತಿಗಾಗಿ ಸೂಕ್ತ ಕ್ರಮ ತೆಗೆದುಕೊಳ್ಳುವಂತೆ ಮತ್ತು ಲೇಖನ ಸಾಮಗ್ರಿಗಳು ಹಾಗೂ ಲಘು ಉಪಾಹಾರ ಅಥವಾ ಭೋಜನಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ಸಲ್ಲಿಸಲ್ಪಡುವ ಹುಂಡಿಗಳಿಗೆ ನಿಯಮಾನುಸಾರ ಹಣ ಪಾವತಿಸುವಂತೆ ಕೋರಲಾಗಿದೆ
5. **Specialized Programe**ನ ಅಧ್ಯಯನ ಮಂಡಳಿಯ ಅಧ್ಯಕ್ಷರು, ಸದರಿ ಸಭೆಗೆ ಹಾಜರಾಗುವ ಸದಸ್ಯರುಗಳಿಗೆ ತಮ್ಮ ಸಂಸ್ಥೆಯ ವತಿಯಿಂದ ನಿಯಮಾನುಸಾರ ಪ್ರಯಾಣ ಭತ್ಯೆ/ದಿನ ಭತ್ಯೆಯನ್ನು ಪಾವತಿಸಲು ಕ್ರಮವಹಿಸುವುದು.
6. ಕಲಾ, ವಾಣಿಜ್ಯ, ಶಿಕ್ಷಣ, ಕಾನೂನು ಮತ್ತು ವಿಜ್ಞಾನ ಮತ್ತು ತಂತ್ರಜ್ಞಾನ ನಿಕಾಯಗಳ ಡೀನರುಗಳಿಗೆ.
7. ನಿರ್ದೇಶಕರು, ಸ್ನಾತಕೋತ್ತರ ಕೇಂದ್ರ, ಹಾಸನ/ಮಂಡ್ಯ/ಚಾಮರಾಜನಗರ.
8. ಅಧ್ಯಕ್ಷರು, ಎಲ್ಲಾ ಸ್ನಾತಕೋತ್ತರ ಅಧ್ಯಯನ ವಿಭಾಗಗಳು, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು.
9. ಪ್ರಾಂಶುಪಾಲರು, ವಿಶ್ವವಿದ್ಯಾನಿಲಯದ ಎಲ್ಲಾ ಘಟಕ/ಸ್ವಾಯತ್ತ ಕಾಲೇಜುಗಳು, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು.
10. ನಿರ್ದೇಶಕರು, ಯೋಜನೆ, ಉಸ್ತುವಾರಿ ಮತ್ತು ಮೌಲ್ಯಮಾಪನ ಮಂಡಳಿ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು.
11. ಆಡಳಿತಾಧಿಕಾರಿಗಳು, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು.
12. ಉಪಕುಲಸಚಿವರು (ಶೈಕ್ಷಣಿಕ), ಆಡಳಿತ ಶಾಖೆ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು.
13. ಮಾನ್ಯ ಕುಲಪತಿ/ ಕುಲಸಚಿವ/ ಕುಲಸಚಿವ (ಪರೀಕ್ಷಾಂಗ)/ ಹಣಕಾಸು ಅಧಿಕಾರಿಗಳ ಆಪ್ತ ಸಹಾಯಕರು, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು.
14. ಕಛೇರಿ ಪ್ರತಿ.

NEP 2020 CURRICULUM

Proposed Syllabus for

Bachelor of Computer Applications (BCA)

(Cloud Computing and Digital Science)

Curriculum for BCA (CC&DS)

Sem	Course Code	Core Courses	Credits	Hour/Week	
				Theory	Lab
1	CCDSIT1	Computer Concepts and C Programming	3	3	
	CCDS1T2	Data Structures and Problem Solving	3	3	
	CCDS1T3	Cloud Computing Fundamentals	3	3	
	CCDS1L1	LAB: Computer Concepts and C Programming	2		4
	CCDS1L2	LAB: Data Structures and Problem Solving	2		4
2	CCDS2T1	Object Oriented Programming with JAVA	3	3	
	CCDS2T2	Cloud Infrastructure and Services	3	3	
	CCDS2T3	Discrete Mathematics	3	3	
	CCDS2L1	LAB: Object Oriented Programming with JAVA	2		4
	CCDS2L2	LAB: Cloud Infrastructure and services	2		4

SEC for I and II Semester

Sem	SEC Code	SEC Course	Credits	Hour/Week
				Theory
1	--	Environmental Studies	2	2
2	--	Digital Operational Skills	2	2

Note:

- **Environmental** studies is same as that of general BCA(Hons.)
- The course **Digital Operational skill** is an alternative to digital fluency of general BCA(Hons.)

Syllabus for I year (I and II semester) BCA (CC&DS) (Basic and Hons.)

Semester: 1

Course Code: CCDS1T1	Course Title: Computer Concepts and C Programming
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 02

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- Confidently operate Desktop Computers to carry out computational tasks
- Understand working of Hardware and Software and the importance of operating systems
- Understand programming languages, number systems, peripheral devices,networking, multimedia and internet concepts
- Read, understand and trace the execution of programs written in C language
- Write the C code for a given problem
- Perform input and output operations using programs in C
- Write programs that perform operations on arrays

Course Content

Content	Hours
Unit – 1	
Introduction, Block Diagram of Computer, Input and Output devices, Memory and Storage devices, Types of Software, Introduction to Operating System, Computer Languages, Translator Programs, Planning of Computer Program. **Introduction to C Programming:** Overview of C; History and Features of C; Structure of a C Program with Examples; Creating and Executing a C Program; Compilation process in C. **C Programming Basic Concepts:** C Character Set; C tokens - keywords, identifiers, constants, and variables; Data types; Declaration & initialization of variables; Symbolic constants. **Input and output with C:** Formatted I/O functions - *printf* and *scanf*, control stings and escape sequences, output specifications with *printf* functions;	14

Unformatted I/O functions to read and display single character and a string - *getchar, putchar, gets* and *puts* functions. **C Operators & Expressions:** Arithmetic operators; Relational operators; Logical operators; Assignment operators; Increment & Decrement operators; Bitwise operators; Conditional operator; Special operators; Operator Precedence and Associatively; Evaluation of arithmetic expressions; Type conversion.	
Unit-2	
Control Structures: Decision making Statements - *Simple if, if_else, nested if_else, else_if ladder, Switch Case, goto, break* & *continue* statements; Looping Statements - Entry controlled and exit controlled statements, *while, do-while, for* loops, Nested loops. **Arrays:** One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays - Declaration, Initialization and Memory representation. **Strings:** Declaring & Initializing string variables; String handling functions - *strlen, strcmp, strcpy and strcat;* Character handling functions - *toascii, toupper, tolower, isalpha, isnumeric* etc.	14
Unit-3	
Pointers in C: Understanding pointers - Declaring and initializing pointers, accessing address and value of variables using pointers; Pointers and Arrays; Pointer Arithmetic; Advantages and disadvantages of using pointers; **User Defined Functions:** Need for user defined functions; Format of C user defined functions; Components of user defined functions - return type, name, parameter list, function body, return statement and function call; Categories of user defined functions - With and without parameters and return type. **User defined data types:** Structures - Structure Definition, Advantages of Structure, declaring structure variables, accessing structure members,Structure members initialization, comparing structure variables, Array of Structures; Unions - Union definition; difference between Structures and Unions.	14

Text Books:

1. C: The Complete Reference, By Herbert Schildt.
2. Problem solving with C, M.T Somashekara, D.S Guru and K.S. Manjunatha: PHI publication

3. C Programming Language, By Brain W. Kernighan
4. The C Programming Language, Kernighan & Ritchie,(PHI)

Reference Books:

1. Computer Fundamentals, P. K. Sinha & Priti Sinha,(BPB)
2. Programming in ANSI C, E. Balaguruswamy (TMH)
3. Programming with ANSI and TURBO C, Kamthane, Pearson Education
4. Programming in C, V. Rajaraman, (PHI – EEE)
5. Programming with C , S. Byron Gottfried, (TMH)
6. Let us C, Yashwant Kanitkar
7. Programming in C, P.B. Kottur, (Sapna Book House)

Course code : CCDS1T2	Course Title : Data Structures and Problem Solving
Course Credits : 03	Hours/Week : 03
Total Contact Hours : 42	Formative assessment marks : 40
Exam Marks : 60	Exam Duration : 02

Course Outcomes (Cos) :

- Demonstrate Different Data Structure it's operations
- Analyze the performance of stack, Queue, list, Searching and Sorting Techniques
- Design and apply appropriate data structures solving computing problems

Course Content

Content	Hours
Unit-1	
Definition, Classification of Data Structures: Primitive and Non- Primitive, Linear and Nonlinear; Linked List : Limitations of array implementation, Memory Management: Static (Stack) and Dynamic (Heap) Memory Allocation, Memory management functions. Definition, Representation, Types: Singly Linked List. Linked list as a data Structure, Inserting and removing nodes from a list, Linked implementations of stacks, Header nodes, Array implementation of lists.	14
Unit-2	
Data structure Operations, Stack: Definition, Representation, Operations and Applications: Polish and reverse polish expressions, Infix to postfix conversion, evaluation of postfix expression, infix to prefix, postfix to infix conversion.	14
Unit-3	
Recursion: Definition , types & implementation. Queue: Definition, Representation, Queue Variants: Circular Queue, Priority Queue, Double Ended Queue; Applications of Queues. Programming Examples.	14

Textbooks

1. Data Structures Using C and C++ by YedidyahLangsam and Moshe J. Augenstein and Aaron MTenanbanum, 2nd Edition, Pearson Education Asia, 2002.
2. An Introduction to Data Structures with Applications, Jean-Paul Tremblay & Paul G. Sorenson Publisher, Tata McGraw Hill

References

1. Data Structures using C & C++ , Ten Baum Publisher ,Prenctice-Hall International.
2. Fundamentals of Computer Algorithms, Horowitz, Sahni,Galgotia,Pub. 2001 ed.
3. Fundamentals of Data Structures in C++,By Sartaj Sahani.

Course code : CCDS1T3	Course Title : Cloud Computing Fundamentals
Course Credits : 03	Hours/Week : 03
Total Contact Hours : 42	Formative assessment marks : 40
Exam Marks : 60	Exam Duration : 02

Course Outcomes (COs):

- Introduction to the types of clouds and it's applications
- Understanding the best way to evaluate of how to choose a cloud for service utilization
- Understanding the processes and technologies required for deploying a web service

Content	Hours
Unit-1	
Introduction to cloud computing, Cloud computing architecture, Service Management in Cloud computing, Data Management in cloud computing	14
Unit-2	
Resource Management in cloud, Cloud Security, Open source and commercial clouds, Cloud Simulator	14
Unit-3	
Research Trend in cloud computing, fog Computing, VM resource allocation, Management and monitoring, Cloud-Fog-edge enable analytics, Serverless computing and FAAS Model, Case Studies and recent advancements.	14

REFERENCES

1. Enterprise Cloud Computing Technology Architecture Applications, Gautam Shroff, Cambridge University Press; 1 edition, [ISBN: 978-0521137355], 2010.
2. Cloud Computing, A Practical Approach, Velte, Anthony Velte, Robert Elsenpeter, McGraw-Hill Osborne Media.
3. Cloud Computing Strategies, Dimitris N. Chorafas.
4. https://nptel.ac.in/courses/106105167

Course code : CCDS1L1	LAB : Computer concepts and C Programming
Course Credits : 02	Hours/Week : 04
Total Contact Hours : 52	Formative assessment marks : 25
Exam Marks : 25	Exam Duration : 03 Hours

Programming Lab

Part A:

1. Program to read radius of a circle and to find area and circumference
2. Program to read three numbers and find the biggest of three
3. Program to demonstrate library functions in math.h
4. Program to check for prime
5. Program to generate n primes
6. Program to read a number, find the sum of the digits, reverse the number and check it for palindrome
7. Program to read numbers from keyboard continuously till the user presses999 and to find the sum of only positive numbers
8. Program to read percentage of marks and to display appropriate message(Demonstration of else-if ladder)
9. Program to find the roots of quadratic equation (demonstration of switchCase statement)
10. Program to read marks scored by n students and find the average of marks(Demonstration of single dimensional array)
11. Program to remove Duplicate Element in a single dimensional Array
12. Program to perform addition and subtraction of Matrices

Part B:

1. Program to find the length of a string without using built in function
2. Program to demonstrate string functions.
3. Program to demonstrate pointers in C
4. Program to check a number for prime by defining is prime( ) function
5. Program to read, display and to find the trace of a square matrix
6. Program to read, display and add two m x n matrices using functions
7. Program to read, display and multiply two m x n matrices using functions
8. Program to read a string and to find the number of alphabets, digits, vowels, consonants, spaces and special characters.

9. Program to Reverse a String using Pointer
10. Program to Swap Two Numbers using Pointers
11. Program to demonstrate student structure to read & display records of students.
12. Program to demonstrate the difference between structure & union.

Note: Student has to execute a minimum of 10 programs in each part to complete the Lab course

Assessment Criteria		Marks
Program – 1 from Part A	Flowchart / Algorithm	02
	Writing the Program	04
	Execution and Formatting	04
Program -2 from Part B	Flowchart/Algorithm	02
	Writing the Program	04
	Execution and Formatting	04
Viva Voce based on C Programming		02
Practical Record		03
Total		**25**

Course Code: CCDS1L2	LAB: Data Structures and Problem Solving
Course Credits: 02	Hours/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 25
Exam Marks: 25	Exam Duration: 03

Part A:

1. Program to display Pascal Triangle using binomial function
2. Program to generate n Fibonacci numbers using recursive function.
3. Program to calculate factorial of a number using recursive function
4. Program to implement Towers of Hanoi.
5. Program to implement dynamic array, find smallest and largest element of the array.
6. Program to insert or delete an element at a given position in an array..
7. Program to print sparse matrix using an array..
8. Program to read the names of cities and arrange them alphabetically.
9. Program to sort the given list using selection sort technique.
10. Program to sort the given list using bubble sort technique.

Part B:

1. Write a C program to Implement the following searching techniques
a. Linear Search b. Binary Search.
2. Write a C program to implement the following sorting algorithms using user defined functions: a. Quick sort (Ascending order) b. Merge sort (Descending order).
3.Write a C Program implement STACK with the following operations
a. Push an Element on to Stack b. Pop an Element from Stack
4. Implement a Program in C for converting an Infix Expression to Postfix Expression.
5. Implement a Program in C for evaluating an Postfix Expression.
6. Write a C program to simulate the working of a singly linked list providing the following operations: a. Display & Insert b. Delete from the beginning/end c. Delete a given element
7. Obtain the Topological ordering of vertices in a given graph with the help of non-primitive data structure.

Assessment Criteria		Marks
Program – 1 from Part A	Flowchart / Algorithm	02
	Writing the Program	04
	Execution and Formatting	04
Program -2 from Part B	Flowchart/Algorithm	02
	Writing the Program	04
	Execution and Formatting	04
Viva Voce based on C Programming		02
Practical Record		03
Total		**25**

Semester II

Course code : CCDS2T1	Course Title : Object Oriented Programming with JAVA
Course Credits : 03	Hours/Week : 03
Total Contact Hours : 42	Formative assessment marks : 40
Exam Marks : 60	Exam Duration : 02

Course Outcomes (Cos):

- After successful completion of the course, the students are able to
- Use the syntax and semantics of java programming language and basic concepts of OOP.
- Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.
- Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes
- Design event driven GUI and web related applications which mimic the real word scenarios.

Content	hours
Unit-1	
Introduction: Introduction to java, java buzzword, data types, dynamic initialization, scope and life time, operators, control statements, arrays, type conversion and casting, finals & blank finals. Classes and Objects: Concepts, methods, constructors, usage of static, access control, this key word, garbage collection, overloading, parameter passing mechanisms, nested classes and inner classes. Inheritance: Basic concepts, access specifiers, usage of super key word, method overriding, final methods and classes, abstract classes, dynamic method dispatch, Object class. Interfaces: Differences between classes and interfaces, defining an interface, implementing interface, variables in interface and extending interfaces. Packages: Creating a Package, setting CLASSPATH, Access control protection, importing packages	14
Unit-2	
Exception Handling: Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes. Strings: Exploring the String class, String buffer class, Command-line arguments. Library: Date class, Wrapper classes. Multithreading: Concepts of Multithreading, differences between process and thread, thread life cycle, Thread class, Runnable interface,creating multiple threads, Synchronization, thread priorities, inter thread communication, daemon threads, deadlocks. I/O Streams: Streams, Byte streams, Character streams, File class, File streams.	14

Unit-3	
Applets: Concepts of Applets, life cycle of an applet, creating applets, passing parameters to applets, accessing remote applet, Color class and Graphics Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling events. AWT: AWT Components, windows, canvas, panel, File Dialog boxes, Layout Managers, Event handling model of AWT, Adapter classes, Menu, Menu bar.	14

Text Book:

1. Java The Complete Reference 9th Edition, Herbert Schildt, McGraw Hill Education (India) Private Limited, New Delhi.

Reference Books:

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI.
2. Introduction to Java programming, By Y.DanielLiang,Pearson Publication

Course code : CCDS2T2	Course Title : Cloud Infrastructure and Services
Course Credits : 03	Hours/Week : 03
Total Contact Hours : 42	Formative assessment marks : 40
Exam Marks : 60	Exam Duration : 02

Course Outcomes (CO's) :

After completing this course satisfactorily, a student will be able to:

- Understand the infrastructure of AWS
- Understand the services of AWS
- Understand the API's of AWS
- Understand the AWS computing and marketplace

Content	hours
Unit-1	
Introduction to AWS: AWS history, AWS Infrastructure, AWS services, AWS ecosystem. Programming, management console and storage on AWS: Basic Understanding APIs - AWS programming interfaces, Web services, AWS URL naming, Matching interfaces and services, Elastic block store - Simple storage service, Glacier - Content delivery platforms.	14
Unit-2	
AWS identity services, security and compliance: Users, groups, and roles - Understanding credentials, Security policies, IAM abilities and limitations, AWS physical security - AWS compliance initiatives, Understanding public/private keys, Other AWS security capabilities.	14
Unit-3	
AWS computing and market place: Elastic cloud compute - Introduction to servers, Imaging computers, Auto scaling, Elastic load balancing, Cataloging the marketplace, AMIs, Selling on the marketplace. AWS networking and databases: Virtual private clouds, Cloud models, Private DNS servers (Route 53), Relational database service – DynamoDB, ElastiCache, Redshift.	14

Reference Books:

1. Cloud Computing Bible. Barrie Sosinsky. John Wiley & Sons. ISBN-13: 978-0470903568.
2. Amazon Web Services For Dummies For DummieS, Bernard GoldeN, ISBN-13: 978-1118571835
3. Cloud Computing: Principles and Paradigms, Rajkumar Buyya, John Wiley & Sons, First Edition

Course code : CCDS2T3	Course Title : Discrete Mathematics
Course Credits : 03	Hours/Week : 03
Total Contact Hours : 42	Formative assessment marks : 40
Exam Marks : 60	Exam Duration : 02

Course Outcomes (CO's) :

After completing this course satisfactorily, a student will be able to:

- Study and solve problems related to connectives, predicates and quantifiers under different situations.
- Develop basic knowledge of matrices and to solve equations using Cramer's rule.
- Finding the rank of any given matrix
- Understand the basic concepts of mathematical reasoning, sets and functions.

Content	hours
Unit-1	
Basic concepts of set theory: Mathematical logic introduction-statements Connectives-negation, conjunction, disjunction- statement formulas and truth tables- conditional and bi Conditional statements- tautology contradiction equivalence of formulas-duality law-Predicates and Quantifiers, Arguments	14
Unit-2	
Operations on sets: power set- Venn diagram Cartesian product-relations - functions- types of functions - composition of functions. **Matrix algebra:** Introduction-Types of matrices-matrix operations- transpose of a matrix -determinant of matrix - inverse of a matrix- Cramer's rule	14
Unit-3	
Matrix: finding rank of a matrix - normal form-echelon form. **Graphs**: Graphs and Graph models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring.	14

Text Book :

1. Discrete Mathematics and its Applications, Kenneth H. Rosen: Seventh Edition, 2012.

References:

1. Discrete Mathematical Structure, Bernard Kolman, Robert C, Busby, Sharon Ross, 2003.
2. Graph Theory with Applications to Engg and Comp.Sci: Narsingh Deo-PHI 1986.
3. Discrete and Combinatorial Mathematics Ralph P. Grimaldi, B.V. Ramatta, Pearson, Education, 5 Edition.
4. Discrete Mathematical Structures, Trembley and Manohar.

Course code : CCDS2L1	LAB : Object Oriented Programming with JAVA
Course Credits : 02	Hours/Week : 04
Total Contact Hours : 52	Formative assessment marks : 25
Exam Marks : 25	Exam Duration : 03

Programming Lab:

Part A:

1. Write a java program to demonstrate command line arguments.
2. Write a java program to demonstrate else-if ladder.
3. Write a java program to compute the 'power of 2' using for loop.
4. Write a java program to demonstrate method overloading.
5. Write a java program to sort a list of numbers.
6. Write a java program to demonstrate manipulation of strings (Any 5 functions).
7. Write a java program to demonstrate single inheritance.
8. Write a java program to demonstrate Array index out of bounds and arithmetic Exceptions.
9. Write a java program to create threads using the thread class.

Part B:

1. Write a java program to calculate simple interest using wrapper class methods.
2. Write a java program to demonstrate access control using packages.
3. Write a java program to display the result of a student using interface.
4. Write a java applet program to display the sum of two digits.
5. Write a java program to draw line, rectangle, circle, oval, and polygon with the help of java graphic class.
6. Write a java applet to demonstrate animation using threads.
7. Write a java program using I-O streams to count the number of words in a file.
8. Write a java program to copy characters from one file into another.

Assessment Criteria		Marks
Program – 1 from Part B	Flowchart / Algorithm	02
	Writing the Program	04
	Execution and Formatting	04
Program -2 from Part B	Flowchart/Algorithm	02
	Writing the Program	04
	Execution and Formatting	04
Viva Voce based on C Programming		02
Practical Record		03
Total		**25**

Course code : CAC2L2	LAB : Cloud Infrastructure and Services
Course Credits : 02	Hours/Week : 04
Total Contact Hours : 52	Formative assessment marks : 25
Exam Marks : 25	Exam Duration : 03

Part – A

1. Run a simple application on the virtual server of AWS i,e EC2
2. Launch Amazon Web service resources into a virtual network using virtual private cloud
3. Run code in serverless compute service that permits to run code without controlling the servers using AWS Lambda
4. Deploy a Kubernetes application with Amazon Elastic Container Service for kubernetes

Part – B

1. Creating and adding a database using RDS in Amazon Web Service console and deploy a bucket using S3 for end to end web development
2. Deploy a complete website using the EC2 service of AWS
3. Create a student database on Amazon web services using Dynamo DB

Assessment Criteria		Marks
Activity – 1 from Part A	Write up on the activity/ task	5
	Demonstration of the activity/ task	5
Activity-2 from Part B	Write up on the activity/ task	5
	Demonstration of the activity/ task	5
Viva Voce based on Lab Activities		2
Practical Records		3
Total		**25**

Course Code:	Course Title: Digital Operational skill
Course Credits: 02	Hours/Week: Theory 01 hour + Practical's 02 Hours
Total Contact Hours: 45	Formative Assessment Marks: 20
Exam Marks: 30	Exam Duration: 1

Content	Hours
Unit-1	
Operating Systems, types of operating systems, major functions of operating systems, types of user interface, examples of operating systems: MS-DOS, Windows, Mac OS, Linux, Solaris, Android. Office automation tools: word processor, power point, and spread sheet.	5
Unit-2	
Introduction to Computer Networks, Evolution of Networking, types of networks, Network devices – Modem, Ethernet card, RJ45, Repeater, Hub, Switch, Router, and Gateways, Identification of Nodes in a Networked communication, Internet, Domain Name Systems. Security Aspects – Threats and Prevention, Malware – virus, Worms, Ransomware, Trojan, spyware, adware, key loggers, Modes of Malware distribution, Antivirus, HTTP vs HTTPS, Firewall, Cookies, Hackers and Crackers.	5
Unit-3	
Introduction to e-learning platforms such as Swayam, and MOOC. Virtual Meet: Technical Requirements, Scheduling a meeting, joining virtual meet, recording the meeting, Online Forms: Creating questionnaire, Publishing Questionnaire, Conducting online responses, Analysis the responses, copying graphics into PowerPoint, Downloading the response to spreadsheet. Introduction to societal impacts, Digital Foot prints, Digital Society and Netizen, Data Protection, E-waste, Impact on Health.	5

Laboratory Activities: (Only for practicing but not for lab exam) **[30 Hours]**
Identifying the configuration of a computer system, laptop, and a mobile phone, Identifying the version and the configuration of the operating system of a computer, laptop, and a mobile phone, Identifying the network components like patch cord, switch, RJ 45 Jack, Socket, and wireless router, creating a hotspot from a mobile phone, and allowing others to use the hotspot, creating a Google form, and send it to five users, scheduling a virtual meet and invite three people to join the Google meet, record the virtual Meet, Creating an account in the railway reservation website, IRCTC, and finding trains from Tumkur to Hubli, creating

a one minute video of your choice in your native tongue, and upload the video to YouTube, composing word document, creating tables, creating charts, preparing power point slides, simple computation using spread sheet.

Web Resources:

Operating Systems - https://ftms.edu.my/v2/wp-content/uploads/2019/02/csca0101_ch06.pdf

Database Concepts - https://ncert.nic.in/textbook/pdf/keip107.pdf

Computer Networks - https://ncert.nic.in/textbook/pdf/lecs110.pdf

Security Aspects - https://ncert.nic.in/textbook/pdf/lecs112.pdf

Societal Impact - https://ncert.nic.in/textbook/pdf/leip106.pdf

Google Meet Tutorial - https://edvance.hawaii.hawaii.edu/wp-content/uploads/Google-Meet Tutorial-Getting-Started-and-Recording-a-Lecture.pdf

Google Forms - https://pdst.ie/sites/default/files/Google%20Drive_1.pdf