Tel. No.: 2419700/2419567
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Email: registrar@uni-mysore.ac.in
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UNIVERSITY OF MYSORE

Estd.1916

Vishwavidyanilaya Karyasoudha
Crawford Hall, Mysuru- 570 005

(Re-accredited by NAAC at 'A')

(NIRF-2023 Ranked 44 in University Category & 71 in Overall Category)

No.: PMEB-1/Spl./10/2023-24 **Date: 18-07-2024**

NOTIFICATION

Sub.: Syllabus and Examination pattern of **BCA (Cloud Computing & Digital Science) & BCA (Internet of Things) courses** under Specialized Programmes from the academic year 2024-25-reg.

Ref.: 1. Decision of the BOS Meetings held on 20-01-2024.
2. Decision of the Faculty of Science & Technology meeting held on 19-06-2024.
3. Decision of the Academic Council meeting held on 28-06-2024.

******

The Board of Studies in **BCA (Cloud Computing & Digital Science) & BCA (Internet of Things) (UG)** at its meeting held on 20-01-2024 has recommended the approval of the 3rd year Syllabus of **BCA (Cloud Computing & Digital Science) & BCA (Internet of Things)** courses in University of Mysore under specialized/specified programs from the academic year 2024-25 as per NEP-2020.

The Faculty of Science & Technology and the Academic Council at their meetings held on 19-06-2024 and 28-06-2024 respectively, have also approved the above proposal and the same is hereby notified.

The 3rd year syllabus of **BCA (Cloud Computing & Digital Science) & BCA (Internet of Things)** courses may be downloaded from the University website **https://uni-mysore.ac.in/PMEB/.**

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 Mathematics, Manasagangotri, 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.

Science

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

University of Mysore

DEPARTMENT OF STUDIES IN COMPUTER SCIENCE

No. MG/CS/ 341 /2023-2024 dt- 01/02/2024

MANASAGANGOTRI,
MYSORE-570 006
Dated: 20-01-2024

Dr. D S GURU
Professor
Chairman, BoS in BCA (CC&DS) (UG)

ಪಿ.ಜಿ.ಸಿ.ಇ.ಬಿ. ಕಛೇರಿ
ಮೈ. ವಿ. ವಿ ಮೈಸೂರು
ಇಂದ ಸಂ.....313.....
ದಿನಾಂಕ...09/02/24.....

To
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. PMEB-5/Spl.-31/2022-2023 dt 02-01-2024

With reference to the above, I am herewith submitting a copy of the proceeding 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

(D S Guru)

Dr. D. S. GURU
M.Sc.,Ph.D.,PostDoc(USA)
Fellow of BOYSCAST(2005)
Professor
Department of Studies in Computer Science
University of Mysore
Manasagangothri, Mysuru-570 006
Karnataka, INDIA
E-mail: dsg@compsci.uni-mysore.ac.in

Copy To:
(a) The Registrar, UoM
(b) Syndicate Section.

Proceedings of the meeting of the members of the Board of Studies in BCA (Cloud Computing and Digital Science) (UG) held on 20-01-2024 at 10.30 AM at the Department of Studies in Computer Science, Manasagagotri, Mysore.

Ref: 1. No. UA2/159(4)/2017-2018 dt 18-03-2021
2. No. PMEB-5/Spl.-31/2022-23 dt 02-01-2024

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 Department of Studies in Computer Science on Saturday the 20-01-2024 at 10.30 AM. The following members have attended the meeting.

1. Dr. Meenakshi H N Member
2. Dr. Chethana Kumara B M Member
3. Dr. Vinay Kumar V Member
4. Dr. Rakesh H M Member
5. Dr. D S Guru Chairman

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 (Hons.) (Cloud Computing and Digital Science). The draft of the restructured scheme, titles of the courses and the respective syllabi for only third 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 (7th and 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 (Hons.) (Cloud Computing and Digital Science) 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 syllabi for third year (5th and 6th Semester) of the program are attached in ANNEXURE – A: BCA (Hons.) (Cloud Computing and Digital Science).
4. The board has resolved to follow the same list of examiners approved for general BCA program for this specialized program also.

26/1/24

D S Guru
CHAIRMAN

Dr. D. S. GURU
M.Sc.,Ph.D.,PostDoc(USA)
Fellow of BOYSCAST(2005)
Professor
Department of Studies in Computer Science
University of Mysore
Manasagangothri, Mysuru-570 006
Karnataka, INDIA
E-mail: dsg@compsci.uni-mysore.ac.in

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.

ದೂರವಾಣಿ ಸಂಖ್ಯೆ: 2419700/2419567
ಫ್ಯಾಕ್ಸ್: 0821-2419363/2419301

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www.uni-mysore.ac.in

ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ

ಸ್ಥಾಪನೆ: 1916

ವಿಶ್ವವಿದ್ಯಾನಿಲಯ ಕಾರ್ಯಸೌಧ,
ಕ್ರಾಫರ್ಡ್ ಭವನ, ಮೈಸೂರು–570005

(Re-accredited by NAAC at "A" Grade)
(overall Ranking 71st and Universities 44th in NIRF Ranking 2023)

ಸಂಖ್ಯೆ: ಪಿ.ಎಂ.ಇ.ಬಿ.–5/Spl.-31/2022–23 ದಿನಾಂಕ: 02.01.2024

ಇವರಿಗೆ;

ಅಧ್ಯಯನ ಮಂಡಳಿಯ ಅಧ್ಯಕ್ಷರು/ಸದಸ್ಯರುಗಳು
Specialized Programme
ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು

ಮಾನ್ಯರೆ,

ವಿಷಯ: ಅಧ್ಯಯನ ಮಂಡಳಿಯ ವಾರ್ಷಿಕ ಸಭೆಯನ್ನು ಏರ್ಪಡಿಸುವ ಬಗೆಗೆ

* * * * *

ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯದ Specialized Programme ಅಡಿಯಲ್ಲಿ ರಚಿತವಾಗಿರುವ ಅಧ್ಯಯನ ಮಂಡಳಿಗಳು ವಾರ್ಷಿಕ ಸಭೆಗಳನ್ನು ದಿನಾಂಕ **30.01.2024**ರೊಳಗೆ ಏರ್ಪಡಿಸಿ, Specialized Programmeನಡಿ ಮಾನ್ಯತೆ ಪಡೆದ ಕೋರ್ಸ್‌ಗಳ ಪಠ್ಯಕ್ರಮಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ತಮ್ಮ ಶಿಫಾರಸ್ಸುಗಳಿದ್ದಲ್ಲಿ, ಸದರಿ ಶಿಫಾರಸ್ಸುಗಳನ್ನು ಸಭೆಯ ನಡಾವಳಿ ಪತ್ರದೊಂದಿಗೆ ಈ ಕಛೇರಿಗೆ (ಪಿ.ಎಂ.ಇ.ಬಿ.) ಜರೂರಾಗಿ ಮುಂದಿನ ಕ್ರಮಕ್ಕಾಗಿ ಸಲ್ಲಿಸುವಂತೆ ತಿಳಿಸಲಾಗಿದೆ.

ವಾರ್ಷಿಕ ಸಭೆಯಲ್ಲಿ ಪಾಲಿಸಬೇಕಾದ ನಿಯಮಗಳು:

1. ಯು.ಜಿ.ಸಿ. ಮಾರ್ಗಸೂಚಿಯನ್ವಯ ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯದಲ್ಲಿ ಬೋಧಿಸಲ್ಪಡುತ್ತಿರುವ ಎಲ್ಲಾ ವಿಷಯಗಳ ಪಠ್ಯಕ್ರಮವನ್ನು ಪ್ರತಿ 03 ವರ್ಷಗಳಿಗೊಮ್ಮೆ ಪರಿಷ್ಕರಿಸುವುದು.
2. ಕರ್ನಾಟಕ ರಾಜ್ಯ ವಿಶ್ವವಿದ್ಯಾನಿಲಯಗಳ ಕಾಯ್ದೆ 59(2)ರನ್ವಯ ಯಾವುದೇ ಹೊಸ ಕೋರ್ಸ್‌ಗಳು/ಡಿಪ್ಲೊಮೊಗಳನ್ನು ಪ್ರಾರಂಭಿಸುವ ಮುನ್ನ ಸಂಬಂಧಪಟ್ಟ ಪ್ರಾಧಿಕಾರಗಳಿಂದ (ಉದಾ: NCTE, ICAR ಮುಂತಾದವು) ಅನುಮತಿಯನ್ನು ಕಡ್ಡಾಯವಾಗಿ ಪಡೆದುಕೊಳ್ಳಬೇಕಾಗಿರುತ್ತದೆ. ಈ ಅಂಶವನ್ನು ಗಮನಿಸುವುದು.
3. 2024–25ನೇ ಸಾಲಿನಿಂದ ಜಾರಿಗೊಳಿಸಬೇಕಾದ ಪಠ್ಯಕ್ರಮಗಳ ಬದಲಾವಣೆಗಳು ಏನಾದರೂ ಇದ್ದಲ್ಲಿ.
4. 2024–25ನೇ ಸಾಲಿನಿಂದ ಜಾರಿಗೊಳಿಸಬೇಕಾದ ಸ್ನಾತಕೋತ್ತರ/ಸ್ನಾತಕ ಪದವಿ/ ಡಿಪ್ಲೊಮೊ/ ಸರ್ಟಿಫಿಕೇಟ್ ಇತ್ಯಾದಿ ಹೊಸ ಶಿಕ್ಷಣಗಳ ಬಗ್ಗೆ ಶಿಫಾರಸ್ಸು ಇದ್ದಲ್ಲಿ ಹಾಗೂ ಕರ್ನಾಟಕ ರಾಜ್ಯ ಉನ್ನತ ಶಿಕ್ಷಣ ಪರಿಷತ್, ಬೆಂಗಳೂರುರವರು ಕಾಲಕಾಲಕ್ಕೆ ಪಠ್ಯಕ್ರಮಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ನೀಡುವ ನಿರ್ದೇಶನದಂತೆ ಕ್ರಮವಹಿಸುವುದು.
5. ಸಭೆಯ ಸೂಚಿಪತ್ರ ಮತ್ತು ಕಾರ್ಯಸೂಚಿ (Meeting Notice and Agenda) ಇತ್ಯಾದಿಗಳನ್ನು ಸಂಬಂಧಪಟ್ಟವರಿಗೆ Certificate of Posting/Courier ಮುಖಾಂತರ ಕಳುಹಿಸಿ, ಅಗತ್ಯ ಸ್ವೀಕೃತಿ ಪಡೆಯುವುದು. ಸಭೆಯ ಸೂಚಿಪತ್ರ ಮತ್ತು ಕಾರ್ಯಸೂಚಿಯ ಒಂದು ಪ್ರತಿಯನ್ನು ಈ ಕಛೇರಿಗೆ ಮಾಹಿತಿಗಾಗಿ ಕಳುಹಿಸಬಹುದಾಗಿದೆ.
6. ಸಭೆಯಲ್ಲಿ ತೆಗೆದುಕೊಂಡ ನಿರ್ಣಯಗಳನ್ನು ಒಳಗೊಂಡಂತೆ ದಾಖಲಿಸಿದ ನಡಾವಳಿಯನ್ನು ಸಿದ್ಧಪಡಿಸಿ, ಸಭೆಯಲ್ಲಿ ಹಾಜರಿರುವ ಎಲ್ಲಾ ಸದಸ್ಯರ ಸಹಿ ಪಡೆಯಬೇಕು. ಸಭೆಯಲ್ಲಿ ಹಾಜರಿದ್ದ ಮತ್ತು ಹಾಜರಿಲ್ಲದ ಸದಸ್ಯರ ಹೆಸರುಗಳನ್ನು ನಡವಳಿಯಲ್ಲಿ ದಾಖಲಿಸಬೇಕು.

ಪು.ತಿ.ನೋ.

7. ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಲ್ಲಿ ನಡೆಯುವ ಪರೀಕ್ಷೆಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಸಿದ್ಧಪಡಿಸಲಾದ ಪರೀಕ್ಷಕರ ಪಟ್ಟಿಯನ್ನು (Panel of Examiners)ಕುಲಸಚಿವ(ಪರೀಕ್ಷಾಂಗ), ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು ಇವರಿಗೆ ಮೊಹರಾದ ಲಕೋಟೆಯಲ್ಲಿ ನೇರವಾಗಿ ಸಲ್ಲಿಸುವುದು.
8. ಅಧ್ಯಯನ ಮಂಡಳಿಗಳ ಶಿಫಾರಸ್ಸುಗಳನ್ನು ನಿಕಾಯಗಳ ಸಭೆಯ ಮುಂದೆ ಮಂಡಿಸಬೇಕಾಗಿರುವುದರಿಂದ, ಆದಷ್ಟು ಬೇಗ ನಡಾವಳಿಯನ್ನು ಕಳುಹಿಸುವುದು. ಒಂದು ವೇಳೆ ದಿನಾಂಕ 30.01.2024ರೊಳಗಾಗಿ ನಡವಳಿಯನ್ನು ಕಳುಹಿಸದಿದ್ದಲ್ಲಿ, ಸಂಬಂಧಪಟ್ಟ ಅಧ್ಯಯನ ಮಂಡಳಿಯ ಅಧ್ಯಕ್ಷರು ನೇರ ಹೊಣೆಗಾರರಾಗಿರುತ್ತಾರೆ ಮತ್ತು ಅಂತಹವರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯವು ಕೈಗೊಳ್ಳಬಹುದಾದ ಕ್ರಮಕ್ಕೆ ಬದ್ಧರಾಗಿರಬೇಕಾಗಿರುತ್ತದೆ. ಆದುದರಿಂದ ಸಕಾಲದಲ್ಲಿ ನಡಾವಳಿಯನ್ನು ಕಳುಹಿಸುವ ಮೂಲಕ ತಮ್ಮೆಲ್ಲರ ಸಹಕಾರವನ್ನು ಕೋರಲಾಗಿದೆ.

ವಿಶೇಷ ಸೂಚನೆ:

ಎಲ್ಲಾ ಅಧ್ಯಯನ ಮಂಡಳಿಗಳ ಸಭೆಯನ್ನು ದಿನಾಂಕ 30.01.2024ರೊಳಗೆ ನಡೆಸಿ ವಿಶ್ವವಿದ್ಯಾನಿಲಯಕ್ಕೆ ಸಲ್ಲಿಸುವಂತೆ ಸೂಚಿಸಿರುವುದರಿಂದ ಯಾವುದೇ ಕಾರಣ ನೀಡದೆ ಸಭೆಯ ನಡಾವಳಿಯನ್ನು ನಿಗದಿತ ದಿನಾಂಕದೊಳಗೆ ಕಡ್ಡಾಯವಾಗಿ ಪಿ.ಎಂ.ಇ.ಬಿ. ವಿಭಾಗಕ್ಕೆ ಸಲ್ಲಿಸಲು ಸೂಚಿಸಿದೆ.

ನಿಮ್ಮ ನಂಬುಗೆಯ

18/1/2024

ಕುಲಸಚಿವರು
ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ
ಮೈಸೂರು-570 005

ಪ್ರತಿ:

1) Specialized Programme ಅಡಿಯಲ್ಲಿ ಮಾನ್ಯತೆ ಪಡೆದ ಸಂಸ್ಥೆಯ ನಿರ್ದೇಶಕರು/ಪ್ರಾಂಶುಪಾಲರುಗಳಿಗೆ.
2) ವಿಜ್ಞಾನ ಮತ್ತು ತಂತ್ರಜ್ಞಾನ, ಕಲಾ, ವಾಣಿಜ್ಯ, ಹಾಗೂ ಶಿಕ್ಷಣ ನಿಕಾಯದ ಡೀನರುಗಳಿಗೆ.
3) ಕುಲಸಚಿವರು(ಪರೀಕ್ಷಾಂಗ), ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು.
4) ಉಪಕುಲಸಚಿವರು(ಪ್ರಾಧಿಕಾರ), ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು.
5) ನಿರ್ದೇಶಕರು, ಐ.ಸಿ.ಡಿ., ಗಣಕವಿಜ್ಞಾನ ಅಧ್ಯಯನ ವಿಭಾಗ, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು – ವಿಶ್ವವಿದ್ಯಾನಿಲಯದ ವೆಬ್‌ಸೈಟ್‌ನಲ್ಲಿ ಪ್ರಕಟಿಸಲು ಕೋರಿದೆ.
6) ಮಾನ್ಯ ಕುಲಪತಿಗಳು/ಕುಲಸಚಿವರು/ಕುಲಸಚಿವ (ಪರೀಕ್ಷಾಂಗ)ರವರ ಆಪ್ತ ಸಹಾಯಕರು, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು.
7) ಕಛೇರಿ ಪ್ರತಿ.

Annexure A - BCA (CCDS) Scheme

NEP 2020 CURRICULUM

Proposed Syllabus for

Bachelor of Computer Application

(Cloud Computing and Digital Science)

SCHEME OF TEACHING & EVALUATION FOR BCA CCDS

Semester	Course No.	Theory/ Practical	Credits	Paper Title	Marks	
					S.A.	I.A.
V	DSC13	Theory	4	Web Application Development	60	40
	DSC13-Lab	Practical	2	Web Application Development Lab	25	25
	DSC14	Theory	4	Statistical Computing and R Programming	60	40
	DSC14-Lab	Practical	2	R Programming Lab	25	25
	DSC15	Theory	4	Data Science	60	40
	DSE-E1	Theory	3	A. Software Engineering B. Machine Learning	60	40
	Voc-1	Theory	3	Digital Marketing	60	40
	SEC-4	Theory/Practical	3	Cyber Security	25	25
VI	DSC16	Theory	4	Cloud Architecture and Web Services	60	40
	DSC16-Lab	Practical	**2**	Cloud Architecture and Web Services Lab	**25**	**25**
	DSC17	Theory	4	Data Mining	60	40
	DSC17-Lab	Practical	2	Data Mining Lab	25	25
		Project	4	Project Work	60	40
	DSE-E2	Theory	3	A.Software Testing B. Information Security	60	40
	Voc-2	Theory	3	Web Content Management System	60	40
	SEC-5	Theory/Practical	2	Internship	25	25

Course Code: DSC 13	**Course Title:** Web Application Development
Course Credits: 04	Hours/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5 hours

Course Content

Content	Hours
Unit 1	
Basics of Internet and Web The basics of Internet, World Wide Web, Web page, Home page, Web site, Static, Dynamic and Active web page, Overview of Protocols – Simple Mail Transfer Protocol, Gopher, Telnet, Emails, TFTP, Simple Network Management Protocol, Hyper Text Transfer Protocol, Client server computing concepts.	**10**
Unit 2:	**10**
HTML5 and CSS Content: HTML5: Semantic Elements, Forms and Input Types, Graphics (Canvas and SVG), Media Elements (Audio and Video), New API's (Geolocation, Drag-and-Drop, Local Storage), Responsive Web Design.	
Unit 3:	**08**
CSS: Flexbox, Grid Layouts, Media Queries, Animations and Transitions, Preprocessors (SASS/SCSS), Responsive Design Principles, Frameworks (Bootstrap, Tailwind CSS).	
Unit 4	
JavaScript and Front-End Development Content: ES6+ Features (Arrow Functions, Promises, Async/Await), Document Object Model (DOM) Manipulations, Event Handling, AJAX and Fetch API, Front-End Frameworks (React.js Basics), State Management, Introduction to TypeScript.	**10**
Unit 5	
Node.js, Express.js, and MySQL Node.js: Introduction to Node.js, Asynchronous Programming, Working with File System, Modules and NPM, Express.js Framework Basics. Express.js and MySQL: Setting up Express.js, Routing, Middleware, Building RESTful APIs, Connecting to MySQL Database, CRUD Operations, Authentication and Authorization.	**14**

Text Book:

1. Eloquent JavaScript: A Modern Introduction to Programming" by Marijn Haverbeke, 3rd Edition
2. Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5" by Robin Nixon, 5th Edition
3. Node.js, MongoDB, and Angular Web Development: The definitive guide to using the MEAN stack to build web applications" by Brad Dayley, Brendan Dayley, and Caleb Dayley, 2nd Edition

Reference Books:

1. Internet & World Wide Web How to Program by Paul Deitel, Harvey Deitel, Abbey Deitel, 5th Edition, Pearson Education / PHI, 2012.
2. Learning PHP, MySQL, JavaScript, CSS & HTML5 by Robin Nixon, 3rd Edition, O'Reilly 2014

Course Code: DSC 13 - Lab	**Course Title:** Web Application Development Lab
Course Credits: 02	Hours/Week: 04
Total Contact Hours: 4 hours/week	Formative Assessment Marks: 25
Exam Marks: 25	Exam Duration: 2.5 hours

Programming Lab

PART - A: Front-End Development

1. HTML5 and CSS3 Basics: Develop a webpage using HTML5 elements (like <section>, <article>, <header>, <footer>) and CSS3 styles (including Flexbox and Grid layouts).
2. Responsive Web Design: Create a responsive college timetable using HTML5 and CSS3 media queries.
3. CSS Preprocessors: Use a CSS preprocessor (like SASS) to style a webpage.
4. JavaScript Basics: Write JavaScript code to calculate and display the first n Fibonacci numbers, given n from a user prompt.
5. JavaScript for Data Presentation: Generate a dynamic table displaying numbers from 1 to n and their squares, based on user input.
6. ES6 Features: Use ES6 features like Arrow Functions, Promises, and Template Literals in a small project.
7. Interactive Forms with JavaScript: Create a form and use JavaScript for client-side validation (e.g., validate an email address format).
8. DOM Manipulation: Write JavaScript to dynamically change the content and style of elements on a webpage (e.g., convert the first letter of a word to uppercase)

PART - B: Back-End Development with Node.js, Express.js, and MySQL

1. Node.js Basics: Write a Node.js script to read a file and display its contents.
2. Express.js Introductory Project: Create a simple Express.js server that responds to HTTP requests.
3. MySQL Database Integration: Connect a Node.js application to a MySQL database and perform basic CRUD operations.
4. RESTful API with Express.js: Develop a RESTful API using Express.js that interacts with a MySQL database.
5. User Authentication: Implement user authentication in an Express.js application.
6. Session and Cookie Management: Manage sessions and cookies in a Node.js application.
7. Data Validation and Sanitization: Use server-side validation and sanitization for form inputs in an Express.js application.
8. Error Handling in Node.js: Implement error handling in a Node.js application.
9. File Upload and Download: Create functionality to upload and download files in a Node.js application.
10. Deployment Basics: Introduction to deploying a Node.js and Express.js application.

Course Code: DSC 14	**Course Title:** Statistical Computing and R Programming
Course Credits: 04	Hours/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5 hours

Course Content

Content	Hours
Unit 1	
Introduction to R - Overview, Importance of R, Data Types and Variables in R, Operators in R, Conditional Statements in R, Loops in R, R script, Functions in R, Exception, Timing and Visibility. **R Data Structures** – R Vectors, Lists, Matrices, Arrays, Data Frames, Factors, Classes and Coercion, Basic Plotting.	**12**
Unit 2	
Reading and writing files, Programming, Calling Functions, Conditions and Loops: stand-alone statement with illustrations in exercise 10.1, stacking statements, coding loops, Writing Functions, Exceptions, Timings, and Visibility.	**10**
Unit 3	
Statistics And Probability, basic data visualization, probability, common probability distributions: common probability mass functions, Bernoulli, binomial, Poisson distributions, common probability density functions, uniform, normal, student's t-distribution	**10**
Unit 4	
Statistical testing and modelling, sampling distributions, hypothesis testing, components of hypothesis test, testing means, testing proportions, testing categorical variables, errors and power, Analysis of variance.	**10**
Unit 5	
Simple linear regression, multiple linear regression, linear model selection and diagnostics. Advanced graphics: plot customization, plotting regions and margins, point and click coordinate interaction, customizing traditional R plots, specialized text, and label notation. Defining colors and plotting in higher dimensions, representing and using color, 3D scatter plots.	**10**

Textbook:

1. Tilman M. Davies, "The book of R: A first course in programming and statistics", San Francisco, 2016.
2. Vishwas R. Pawgi, "Statistical computing using R software", Nirali Prakashan publisher, e1edition, 2022.

Course Code: DSC 14 - Lab	**Course Title:** Statistical Computing and R Programming lab
Course Credits: 02	Hours/Week: 04
Total Contact Hours: 4 hours/week	Formative Assessment Marks: 25
Exam Marks: 25	Exam Duration: 2.5 hours

R Programming Lab

PART - A

Sl No	Program
1.	Write a Program to demonstrate Basic data types in R.
2.	Write R program the creation of different data structures in R and print it.
3.	R program to demonstrate basic matrix operations such as addition, multiplication, and transposition.
4.	R program to demonstrate the working with data frames.
5.	R program that demonstrates the use of different operators in R.
6.	R program that demonstrates various types of loops, including for, while & repeat loops
7.	Program to demonstrates the creation and use of functions in R.
8.	Program to demonstrate Reading and writing data in R.
9.	R program for cumulative sums and products maxima minima and calculus.
10.	R program to demonstrate Data manipulation with dplyr

PART – B

Sl No	Program
1.	R program that demonstrates how to clean a dataset by removing missing values and outliers
2.	R program to demonstrate Data visualization with ggplot2
3.	Program to demonstrate generating and visualizing random numbers from different probability distributions using the ggplot2 package for visualization
4.	R program to demonstrate Descriptive statistics
5.	R program to demonstrate Hypothesis testing
6.	R program to demonstrate the chi-squared goodness of fit test
7.	R program to demonstrate simple linear regression.
8.	R program to demonstrate graphics and tables
9.	R program to demonstrate R Markdown for generating reports
10.	R program to scrape data from a website using the rvest or httr package

Course Code: DSC 15	**Course Title:** Data Science
Course Credits: 04	Hours/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5 hours

Course Content

Content	Hours
Unit 1	
Introduction: What is Data Science? Big Data and Data Science Hype – and Getting Past The Hype, Why Now? – Datafication, Current Landscape of Perspectives, Skill Sets, Needed Statistical Inference: Populations and Samples, Statistical Modeling, Probability distribution, Fitting a Model. **Exploratory Data Analysis and the Data Science Process**: Basic Tools(Plots, Graphs and Summary Statistics) of EDA, Philosophy of EDA, The Data Science Process, Case Study: Real Direct(Online Real estate Firm), Three Basic Machine Learning Algorithms: Liner Regression, K- Nearest Neighbors(K-NN), K-Means.	12
Unit 2	
Feature Generation and Feature Selection (Extracting Meaning from Data): Motivating Application: User(customer) Retention, Feature Generation (Brainstorming, Role of Domain Expertise, and Place for Imagination), Feature Selection Algorithms, Filters, Wrappers, Decision Trees, Random Forests, Recommendation Systems, Building a User-Facing Data Product, Algorithm Ingredients of a Recommendation Engine, Dimensionality Reduction, Singular Value Decomposition, Principal Component Analysis	12
Unit 3	
Data Warehouse: Introduction, Definition, Multidimensional Data Model, Data Cleaning, Data Integration and transformation, Data reduction, Discretization	08
Unit 4	
Mining Social-Network Graphs: Social Networks As Graphs, Clustering Of Graphs, Direct Discovery Of Communities In Graphs, Partitioning Of Graphs, Neighborhood Properties In Graphs, Data Visualization: Basic Principles, Ideas and Tools for Data Visualization, Data Science and Ethical Issues, Discussions on Privacy, Security Ethics, Next- Generation Data Scientists.	12

Unit 5	
Clustering: Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Evaluation of Clustering	**08**

Text Books:

1. Linear Algebra and its Applications, Davis C Lay. Steven R, Ley and J.J. McDonald Pearson Education Ltd, 5th, Edition 2015.

2. Numerical Methods for Scientific and Engineering Computation M K Jain, S.R.K Lyengar, R L. Jain, New Age International, 8th Edition, 2014.

Reference Books:

1. Probability: Statistics and Random Process, T. Veera Ranjan, Tata Mc-Grew Hill Co, 3rd Edition, 2016

Course Code: DSC – E1	**Course Title:** Software Engineering
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5hrs

Course Content

Content	Hours
Unit 1	
Introduction: Introduction to software and Software Engineering, Characteristics, Software Engineering Ethics, Need for Software, Software Metrics Software Engineering Models: Waterfall model, Incremental Model, and Spiral Model, Process Activities, Agile Software Development: Agile Methods, Plan Driven and Agile Development.	**10**
Unit 2	
Requirement Engineering: Requirements Engineering Processes, Functional and Non-Functional Requirements, Software Requirements Document, Requirement Specification, Requirements Validation, Requirements Management.	**07**
Unit 3	
System Models: Context models; Interaction models- Use case modeling, Sequence diagrams; Structural models- Class diagrams, Generalization, Aggregation; Behavioral models- Data-driven modeling, Event-driven modeling; Model-driven engineering..	**07**
Unit 4	
Architecture Design And Implementation: Object-oriented design using the UML-System context and interactions, Architectural design, Object class identification, Design models, Interface specification; Design patterns; Implementation issues. **Coding - Programming Language and Development tools. Selecting Languages and Tools, Good Programming Practices**	**10**
Unit 5:	
SOFTWARE TESTING: Development testing- Unit testing, Choosing unit test cases, Component testing, System testing. Test-driven development; Release testing; User testing- Alpha, Beta, Acceptance testing	**08**

Text Book:

1. Ian Somerville, "Software Engineering" 8th Edition, Pearson Education, 2009.

Reference Book:

1. Waman S Javadekar, "Software Engineering Principles and Practice", Tata McGraw- Hill, 2004.
Roger S. Pressman, "A Practitioners Approach",7th Edition, McGraw-Hill, 2007. 3 P Jalote, "An Integrated Approach to Software Engineering", Narosa Publ

Course Code: DSE – E1	**Course Title:** Machine Learning
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5 hours

Course Content

Content	Hours
Unit 1	
Introduction to machine learning: Definition, applications, and importance. Types of machine learning: Supervised learning, unsupervised learning, and reinforcement learning. Basic terminology: Features, labels, training, and testing data. Data Pre-processing: Data cleaning and handling missing values; Feature scaling and normalization; Handling categorical data.	**10**
Unit 2	
Supervised Learning Algorithms: Linear Regression; Logistic Regression; Decision Trees, Random Forests and Support Vector Machines. Model Evaluation and Metrics: Cross-validation; Confusion matrix, precision, recall, F1 score; ROC curves and AUC.	**08**
Unit 3	
Unsupervised Learning: Clustering: Partitional Clustering - K-means, K-Medoids, and Hierarchical clustering – Single linkage, Complete linkage, and average linkage; Dimensionality reduction: Principal Component Analysis (PCA). Evaluation Metrics: Silhouette Score, Rand-Index, Correct Rand Index. Reinforcement Learning: Introduction and applications	**10**
Unit 4	
Genetic Algorithm: Representing hypothesis, genetic operators and fitness function and selection. Simple applications of the genetic algorithm, applications of GA in decision tree Genetic algorithm based learning	**04**
Unit 5	
Neural Networks and Deep Learning: Basics of neural networks; Deep learning architectures: Feedforward, convolutional, and recurrent neural networks; Introduction to Tensor Flow or PyTorch. Feature Engineering and Model Deployment: Feature engineering techniques; Model deployment basics; Ethics and considerations in machine learning.	**10**

Text Book:

1. "Machine Learning" by Tom M Mitchell
2. "Pattern Recognition and Machine Learning" by Christopher M. Bishop.
3. "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron.
4. "Introduction to Machine Learning with Python: A Guide for Data Scientists" by Andreas C. Müller and Sarah Guido.
5. Relevant research articles.

Course Code: DSC 16	**Course Title:** Cloud Architecture and Web services
Course Credits: 04	Hours/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5 hours

Course Content:

Unit 1	
Evolution and Emergence of Web Services Evolution of distributed computing. Core distributed computing technologies – client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, the role of J2EE and XML in distributed computing, the emergence of Web Services and Service Oriented Architecture (SOA). Principles of SOA and its components. Brief Overview of XML – XML Document structure, XML namespaces, Defining structure in XML documents, Reuse of XML schemes, Document navigation and transformation. Web service security considerations Network-level security mechanisms, Application level security topologies, XML security standards, Semantics and Web Services, The semantic interoperability problem, The role of metadata, Service metadata,	**14**
Unit 2	
Overview of .NET and J2EE, SOA and Web Service Management, Managing Distributed Systems, Enterprise management Framework, Standard distributed management frameworks, Web service management, Richer schema languages, WS-Metadata Exchange	**06**
Unit 3	
Introduction to SOAP and WSDL SOAP: Simple Object Access Protocol, Inter-application communication and wire protocols, SOAP as a messaging protocol, Structure of a SOAP message, SOAP envelope, Encoding, Service Oriented Architectures, SOA revisited, Service roles in an SOA, Reliable messaging, The enterprise Service Bus, SOA Development Lifecycle, SOAP HTTP binding, SOAP communication model, Error handling in SOAP. Describing Web Services – WSDL introduction, non-functional service description, WSDL1.1 Vs WSDL 2.0, WSDL document, WSDL elements, WSDL binding, WSDL tools, WSDL port type, limitations of WSDL.	**10**
Unit 4	
Registration and discovery of Web services the role of service registries, Service discovery, Universal Description, Discovery, and Integration, UDDI Architecture, UDDI Data Model, Interfaces, UDDI Implementation, UDDI with WSDL, UDDI specification, Service Addressing and Notification, Referencing and addressing Web Services, Web Services notification.	**10**
Unit 5	
SOA planning, analysis, design, and implementation Stages of the SOA lifecycle, SOA Delivery Strategies, service-oriented analysis, Capture and assessment of business and IT issues and drivers, determining non-functional requirements, business-centric SOA and its benefits, Service modeling, Basic modeling building blocks, service models for legacy application integration and enterprise integration, Enterprise solution assets (ESA). The service-oriented design process, design activities, determining services and tasks based on the business process model, designing service integration environment (e.g., ESB, registry), Tools available for appropriate designing, implementing SOA, security implementation, implementation of integration patterns, services enablement, quality assurance	**12**

Text Book:

1. Web Services & SOA Principles and Technology, Second Edition, Michael P. Papazoglou .2. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.
3. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education.

Course Code: DSC 16 - Lab	**Course Title:** Cloud Architecture and Web Services lab
Course Credits: 02	Hours/Week: 04
Total Contact Hours: 4hrs/week	Formative Assessment Marks: 25
Exam Marks: 25	Exam Duration: 2.5 hours

Course Objective:

- To provide students with the fundamentals and essentials of Cloud web Computing.
- To provide students a sound foundation of the Cloud Computing so that they are able
- to start using and adopting Cloud web services and tools in their real-life scenarios.
- To enable students exploring some important cloud computing driven commercial
- systems and applications.
- To expose the students to frontier areas of Cloud Computing and information systems,
- while providing sufficient foundations to enable further study and research.
- Programming lab

PART - A

1. Write a JavaScript program to validate user name and password and display a welcome page after login.
2. Write a JavaScript program to perform simple arithmetic operations
3. Write a JavaScript program to display the local system date and time
4. Write a JavaScript program to search for a number from 1 to 10.
5. Write a JavaScript program to convert Lower Case to Upper Case using Button
6. Write a JavaScript program to check whether the number is even or odd
7. Write a JavaScript program to move a ball from one position to another.
8. Write a JavaScript program to change a square shape to a circle.
9. Write a JavaScript program to Draw a human.
10. Write HTML and JavaScript to create a basic web service that returns a text.

PART - B

1. Write a JavaScript program to validate user name and password and display a welcome page after login.
2. Write a JavaScript program to perform simple arithmetic operations
3. Write a JavaScript program to display the local system date and time
4. Write a JavaScript program to search for a number from 1 to 10.
5. Write a JavaScript program to convert Lower Case to Upper Case using Button
6. Write a JavaScript program to check whether the number is even or odd
7. Write a JavaScript program to move a ball from one position to another.
8. Write a JavaScript program to change a square shape to a circle.
9. Write a JavaScript program to Draw a human.
10. Write HTML and JavaScript to create a basic web service that returns

Course Code: DSC 17	**Course Title:** Data Mining
Course Credits: 04	Hours/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5 Hours

Course Content:

Content	Hours
Unit 1	
Data Mining overview, Data Warehouse and OLAP Technology, Data Warehouse Architecture, Steps for the Design and Construction of Data Warehouses, A Three-Tier Data Warehouse Architecture, OLAP, OLAP queries, metadata repository, Data Preprocessing – Data Integration and Transformation, Data Reduction, Data Mining Primitives: What Defines a Data Mining Task? Task- Relevant Data, The Kind of Knowledge to be Mined, KDD. Mining Association Rules in Large Databases, Association Rule Mining, and Market Basket Analysis: Mining a Road Map, The Apriori Algorithm: Finding Frequent Item Sets Using Candidate Generation, Generating Association Rules from Frequent Item sets, improving the Efficiently of A priori, Mining Frequent Item sets without Candidate Generation,	**12**
Unit 2	
Multilevel Association Rules, Approaches to Mining Multilevel Association Rules, Mining Multidimensional Association Rules for Relational Database and Data Warehouses, Multidimensional Association Rules, Mining Quantitative Association Rules, Mining Distance-Based Association Rules, From Association Mining to Correlation Analysis. What is Classification? What Is Prediction? Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Bayes Theorem, Naï ve Bayesian Classification, Classification by Backpropagation, A Multilayer Feed-Forward Neural Network, Defining a Network Topology.	**10**

Unit 3 Classification Based on Concepts from Association Rule Mining, Other Classification Methods, k-nearest Neighbor Classifiers, Genetic Algorithms, Rough Set Approach, Fuzzy Set Approaches, Prediction, Linear and Multiple Regression, Nonlinear Regression, Other Regression Models, Classifier Accuracy. What Is Cluster Analysis, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Classical Partitioning Methods: k- Means and k-Medoids, Partitioning Methods in Large Databases: From k-Medoids to CLARANS, Hierarchical Methods, Agglomerative and Divisive Hierarchical Clustering, Density-Based Methods, Wave Cluster: Clustering Using Wavelet Transformation, CLIQUE: Clustering High-Dimensional Space, Model-Based Clustering Methods, Statistical Approach, Neural Network Approach	**12**
UNIT - IV Data Mining Techniques – a Statistical Perspective on data mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.	**09**
UNIT - V Clustering Tree – Based Algorithms – Neural Network Based Algorithms – Rule Based Algorithms – Combining Techniques: Introduction – Similarity and Distance Measures – Outliers Hierarchical Algorithms. Partitioned Algorithms.	**09**

Text Books:

Han, J., Kamber, M., Pei, J. (2009). Data mining: Concepts and techniques (3rd ed.). Morgan Kaufmann. Data mining, inference, and prediction (2nd ed.). Springer-Verlag.

Data Mining : Charu C. Aggarwal

Course Code: DSC 17 - Lab	Course Title: Data Mining Lab
Course Credits: 02	Hours/Week: 04
Total Contact Hours: 4 hours/week	Formative Assessment Marks: 25
Exam Marks: 25	Exam Duration: 2.5 Hours

Lab
1. Create a data set using python programming 2. On the above data set, experiment statistical calculations (such as: mean, median mode, standard deviation, central tendency, etc) using python programming. 3. Perform data pre-processing tasks on a specific data sets. 4. Demonstrate performing association rule mining on data sets. 5. Generate frequent item sets using Apriori Algorithm in python and also generate association rules for any market basket data. 6. Demonstrate the following Similarity and Dissimilarity Measures using python. Pearson's Correlation, Cosine Similarity, Jaccard Similarity, Euclidean Distance, Manhattan Distance 7. On the same data set, demonstrate Naïve Bayesian Classification. 8. On the same data set, demonstrate Decision Tree Induction 9. Create a data set and demonstrate on Multilayer Feed-Forward Neural Network. 10. Demonstrate performing Regression on data sets 11. Apply K- Means clustering algorithm on any dataset. 12. Apply Hierarchical Clustering algorithm on any dataset. 13. Experiment on the same data set and compare the results between different clustering models.

Course Code: DSE - E2	Course Title: Software Testing
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5 hrs

Course content

Content	Hours
Unit 1	
Basics of Software Testing and Examples: Basic definitions, Test cases, Insights from a Venn diagram, Identifying test cases, Error and fault taxonomies, and Levels of testing. Examples: Generalized pseudo code, The triangle problem, The Next Date function, The commission problem, and The SATM (Simple Automatic Teller Machine) problem. Decision Table-Based Testing: Decision tables, Test cases - triangle problem, Next Date function, commission problem, Guidelines, and observations. Data Flow Testing: Definition-Use testing, Slice-based testing, Guidelines and observations. Levels of Testing: Traditional view of testing levels, Alternative life-cycle models,	**10**
Unit 2	
The SATM system, Separating integration and system testing. Integration Testing: A closer look at the SATM system, Decomposition-based, call graph-based, Path-based integrations, Case study. System Testing: Threads, Basic concepts for requirements specification, Finding threads, Structural strategies and functional strategies for thread testing, SATM test threads, System testing guidelines, ASF (Atomic System Functions) testing example	**08**
Unit 3	
Interaction Testing: Context of interaction, A taxonomy of interactions, Interaction, Composition, and determinism, Client/Server Testing. Issues in Object-Oriented Testing: Units for object-oriented testing, Levels of object-oriented testing, GUI testing, Dataflow testing for object-oriented software, Examples. Class Testing: Methods as units, Classes as units	**10**
Unit 4	
Object-Oriented Integration Testing: UML support for integration testing, MM- paths for object-oriented software, and A framework for object-oriented dataflow integration testing. GUI Testing: The currency conversion program, Unit testing, Integration Testing, and System testing for the currency conversion program. Object-Oriented System Testing: Currency converter UML description, UML- based system testing, State chart-based system testing.	**10**
Unit 5	
SOFTWARE TESTING: Development testing- Unit testing, Choosing unit test cases, Component testing, System testing. Test-driven development; Release testing; User testing- Alpha, Beta, Acceptance testing.	**04**

Text Book:

1 Paul C. Jorgensen: Software Testing, A Craftsman's Approach, 3rd Edition, Auerbach Publications, 2012.

1. Aditya P Mathur: Foundations of Software Testing, Pearson, 2008.
2. Mauro Pezze, Michal Young: Software Testing and Analysis – Process, Principles and Techniques, 1st edition, John Wiley & Sons, 2011.
3. Srinivasan Desikan, Gopalaswamy Ramesh: Software testing Principles and practices,1st Edition, Pearson, 2012.
4. Brian Marrick: The Craft of Software Testing, 1st edition, Pearson, 2012.

Course Code: DSE - E2	**Course Title:** Information Security
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5 hours

Course Content

Content	Hours
Unit 1	
Overview of Security: Protection versus security; aspects of security–data integrity, data availability, privacy; security problems, user authentication, Security Threats: Program threats, worms, viruses, Trojan horse, trap door, stack and buffer overflow	**10**
Unit 2	
System threats- System threats- intruders; communication threats- tapping and piracy. Cryptography: Substitution, transposition ciphers, symmetric-key algorithms, Congruences – Chinese Remainder theorem – Modular exponentiation,	**10**
Unit 3	
Data Encryption Standard Data Encryption Standard, advanced encryption standards, public key encryption - RSA; Diffie-Hellman key exchange, ECC cryptography, Message Authentication-MAC, hash functions. Digital signatures: Symmetric key signatures, public key signatures,	**10**
Unit 4	
Authentication applications Authentication applications – Kerberos, X.509, PKI – Electronic Mail security – PGP, S/MIME – IP security – Web Security – SSL, TLS, SET, public key infrastructures. Security Mechanisms, Intrusion detection, auditing and logging, tripwire, system-call monitoring;	**12**

Text Book:

1. W. Stallings, *Cryptography and Network Security Principles and Practices,* 4th Ed., Prentice-Hall of India, 2006.
2. C. Pfleeger and SL. Pfleeger, *Security in Computing*, 3rd Ed., Prentice-Hall of India, 2007.
3. D. Gollmann, *Computer Security*, John Wiley and Sons, NY, 2002.
4. J. Piwprzyk, T. Hardjono and J. Seberry, *Fundamentals of Computer Security*, Springer-Verlag Berlin, 2003.
5. J.M. Kizza, *Computer Network Security*, Springer, 2007.
6. M. Merkow and J. Breithaupt, *Information Security: Principles and Practices*, Pearson Education, 2006.

List of Examiners in Computer Science (UG) for the Specialized Program in BCA (Internet of Things) & BCA (Cloud Computing and Digital Science)

List of Examiners (UG) in Computer Science (UGC)

Sl. No	Name of the Valuators	Address of the College
1	Dr. Linganna N	GFGC, Kuvempu Nagar, Mysore
2	Dr. Ganesh Babu V	Govt College for Women, Maddur
3	Dr. Kouser	GFGC, Gundlupet
4	Dr. Manjunath K S	Maharanis Science College for Women, Mysore
5	Dr. Nagendranath Giri	Govt College for Women, Hassan
6	Dr. Sheela T	Maharanis Science College for Women, Mysore
7	Dr. Siddaraju K	Maharanis Science College for Women, Mysore
8	Geetha C B	GFGC, Pandavapura
9	Balakrishna M	Maharanis Science College for Women, Mysore
10	Prakash Raje Urs	Maharanis Science College for Women, Mysore
11	Santhosh Kumar B N	Maharanis Science College for Women, Mysore
12	Gopala Krishna Murthy H R	GFGC, Nanjangud
13	Josmi Joseph	Sri DDUrs College, Hunsur
14	Shilpa P	GFGC, Padavalahippe
15	Sripavithra C K	Maharanis Science College for Women, Mysore
16	Nagalakshmi H S	GFGC, Hunsur
17	Nirmala M S	Maharanis Science College for Women, Mysore
18	Pushpalatha M	Maharanis Science College for Women, Mysore
19	Thenarasi V	GFGC, Siddhartha Nagar, Mysore

List of Examiners (UG) in Computer Science (NON-UGC)

Sl No	Name of the Valuators	Address of the College
20	Abhilasha	Govt. Science College, Hassan
21	Anjum Taj	St. Joseph's College, Hunsur
22	Anjum Banu	GSC, Hassan
23	Aravinda G	Gopalswamy College of Professional Studies, Mysore (MIT)
24	Avanthi	St.Joseph's College, Mysore (Satagalli)
25	Bharath G G	GHSC, Hassan
26	Chaithra M C	GFGC, Pandavapura
27	Chinna Swamy	Bharathi College, Bharathinagara (K.M Doddi), MandyaDist
28	Chithra V S	De Paul College, Mysore
29	Deepali M S	JSS College of Arts, Commerce and Science, Nanjangud

20/1/24

30	Devika M N	Teresian College, Mysore
31	Dr. Chandrajit	Gopalswamy College of Professional Studies, Mysore (MIT)
32	Dr. Jagadeesh Krishna	Sharadavilas College, Mysore
33	Dr.Poornima Y	Maharaja College, Mysore
34	Dr.Rajesh K M	JSS College for Women, Chamarajanagar
35	Gayathri K	Bharathi College, Bharathinagara (K.M Doddi), MandyaDist
36	Geetha N L	CRESTA College, Bannur Road, Mysuru 570028
37	Gunavathi	Sri Adichunchanagiri College of Arts and Commerce, Nagamangala
38	H J Preethi	GFGC, T. Narasipura
39	Hareesha C	BGS First Grade College, Mysore
40	Hemalatha B N	De Paul College, Belagola, Mandya
41	Hemanth Kumar	Vidyavikas College, Mysore
42	Hemavathi	MSCW, Mysore
43	Jayaram N	NIE College of Science, Mysore
44	Jyothilaksmi Kava	MMD and SDM MahilaMahaVidyalaya, Krishnamurthypuram, Mysore
45	Karthik P	Marimallappa college, Mysore
46	Kavya R	Sharadavilas College, Mysore
47	Kiran	Gopalswamy College of Professional Studies, Mysore (MIT)
48	Kiran Kumar	NDRK College, Hassan
49	Kumuda K C	GWC, K R Pet
50	Kusuma K	GFGC, Kollegal
51	Lakshmi Krishna	Sharadavilas College, Mysore
52	Lenard P	SBRR Mahajana First Grade College, Mysore
53	Lohith	Marimallappa College, Mysore
54	Lokesh	NDRK College, Hassan
55	M. Nandini	GFGC, T. Narasipura
56	Mahaboob Ali M Kunnur	GFGC, Nanjangud
57	Mahender	JSS College for Women, Chamarajanagar
58	Manjunath D	Government First Grade College, Kuvempunagar, Mysore- 570 023
59	Manjunath T	GFGC, K R Nagar
60	Manjunatha K S	SBRR Mahajana First Grade College, Mysore
61	Manu M S	PES College, Mandya
62	Monica S V	Govt. Science College, Hassan
63	Mruthula Sojan	Shesharipuram College, Mysore
64	Muruli manohar M R	Gopalswamy College of Professional Studies, Mysore (MIT)
65	Naimisha	Gopalswamy College of Professional Studies, Mysore (MIT)

20/1/24

66	Nandeesh P	JSS College for Women, Chamarajanagar
67	Navya D	GCW, Hassan
68	Nayana M P	MMK and SDM MahilaMahaVidyalaya, Krishnamurthypuram, Mysore
69	Pavithra raju	GFGC, Kollegal
70	Poornima K	St.Joseph's College, Mysore
71	Prathap	Maharani's College, Mysore
72	Praveen S	GCW, Maddur
73	Princy Joy	Teresian College, Mysore
74	Priya M R	NIE College of Science, Mysore
75	Priyanka M	SBRR Mahajana First Grade College, Mysore
76	Radhesh	SBRR Mahajana First Grade College, Mysore
77	Ragavendra	St.Joseph's College, Mysore
78	Raghu Ram P S	De Paul College, Belagola, Mandya
79	Rajesh M	NIE College of Science, Mysore
80	Rajitha V	MMK and SDM MahilaMahaVidyalaya, Krishnamurthypuram, Mysore
81	Rakesh K	GFGC, Kuvempu Nagar, Mysore
82	Rakshith K R	GFGCW, Holenarasipura
83	Ramya S K	MMK and SDM MahilaMahaVidyalaya, Krishnamurthypuram, Mysore
84	Ramya V J	CRESTA College, Bannur Road, Mysuru 570028
85	Ranjani S	CRESTA College, Bannur Road, Mysuru 570028
86	Rashmi Kiran	St.Joseph's College, Mysore
87	Rashmi M S	JSS College for Women, Chamarajanagar
88	Ravikumar D A	GFGC, Pandavapura
89	Ravindra V	Maharaja's College, Mysuru
90	Razina Praveen	JSS College for Women, Chamarajanagar
91	Reena Sebastin	Christ College, Srirampura, Mysore
92	Rekha B J	GFGC, Pandavapura
93	Rohitha K.C	GFGC, Hunsur
94	Roshan M R	CRESTA College, Bannur Road, Mysuru 570028
95	Rudhresh Y R	Shesharipuram College, Mysore
96	Santhosha M	GFGC, Gundalpet
97	Sapana Koushik	NIE College of Science, Mysore
98	Sathish Kumar M	JSS College of Arts, Commerce and Science, Nanjangud
99	Savitha K V	Hindustan College, Mysore
100	Seema N	GSC, Hassan
101	Shalini M K	Shesharipuram College, Mysore

20.1.24

102	Shobha A N	AVK College for Women, Hassan - 573 202
103	Shewetha Kumary	Vidhyashram First Grade College, Mysore
104	Shruthi	Govt, First Grade College, Gundlupet
105	Shruthi G G	Govt. Science College, Hassan
106	Shruthi Poonacha	SBRR Mahajana First Grade College, Mysore
107	Shubha L N	JSS College for Women, Chamarajanagar
108	Shwetha M	MMK and SDM MahilaMahaVidyalaya, Krishnamurthypuram, Mysore
109	Shyam	Depaul College, Belagola
110	Shylaja H N	AVK College for Women, Hassan - 573 202
111	Sowjanya J	AVK College for Women, Hassan - 573 202
112	Sowmya J	AVK College for Women, Hassan - 573 202
113	Sowmya P N	GFGC, Bilikere
114	Suhas Bharadwaj	Sheshadripuram Degree college, Musuru
115	Sukrutha K S	MMK and SDM MahilaMahaVidyalaya, Krishnamurthypuram, Mysore
116	Sukshma	Hindustan College, Mysore
117	Sushma H M	AVK College for Women, Hassan - 573 202
118	Swetha nandhini	JSS College for Women, Chamarajanagar
119	Tejaswini M	AVK College for Women, Hassan - 573 202
120	Usha K	Maharani's Science College for Women, JLB Road, Mysore - 570 005
121	Vasanthi	Gopalswamy College of Professional Studies, Mysore (MIT)
122	Vedavathi	MSCW, Mysore
123	Vidya Lakshmi N V	NIE Science College, Mysore
124	Vidya M V	NIE College of Science, Mysore
125	Vidya Bheemaiah	BharathMatha FGC, Koppa, Periyapattana
126	Vinay Kumar V P	JSS College for Women, Chamarajanagar
127	Vinay M	Sheshadripuram Degree college, Mysuru
128	Vinay R U	GFGC, Nanjangud
129	Kasif Hussain	Sapient College, Mysore

20/1/14

Dr. D. S. GURU
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91-821-2419331

University of Mysore

DEPARTMENT OF STUDIES IN COMPUTER SCIENCE

No. MG/CS/ 342 /20~~23~~-2024 dt 01/02/2024

MANASAGANGOTRI,
MYSORE-570 006
Dated: 20-01-2024

Dr. D S GURU
Professor
Chairman, BoS in BCA (IOT) (UG)

ಪಿ.ಜಿ.ಸಿ.ಎ.ಬಿ. ಕಛೇರಿ
ಮೈ. ವಿ. ವಿ ಮೈಸೂರು
ಇಂದ ಸಂ.....315.....
ದಿನಾಂಕ....09/02/24.....

To
The Director, PMEB, University of Mysore

Dear sir / Madam

Sub: Submitting proceedings of the BoS Meeting in connection with Specialized BCA (Internet of Things) program.

Ref: Your letter No. PMEB-5/Spl.-31/2022-2023 dt 02-01-2024

With reference to the above, I am herewith submitting a copy of the proceeding of the meeting of the members of BoS in BCA (Internet of Things) along with the recommended list of courses and respective syllabi for your further needful action

Thanking you

Sincerely Your's

20/1/24

(D S Guru)

Dr. D. S. GURU
M.Sc.,Ph.D.,PostDoc(USA)
Fellow of BOYSCAST(2005)
Professor
Department of Studies in Computer Science
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dsg@compsci.uni-mysore.ac.in

2/2
PMEB-5

Copy To:
a) Syndicate Section
b) Registrar, UoM
c)

20/1/24

Proceedings of the meeting of the members of the Board of Studies in BCA (Internet of Things) (UG) held on 20-01-2024 at 12.30 PM at the Department of Studies in Computer Science, Manasagagotri, Mysore.

Ref: 1. No. UA2/159(3)/2017-2018 dt 18-03-2021
2. No. PMEB-5/Spl.-31/2022-23 dt 02-01-2024

With references to the above cited, a meeting of the members of the Board of Studies in BCA (Internet of Things) has been conducted at Department of Studies in Computer Science on Saturday the 20-01-2024 at 12.30 PM. The following members have attended the meeting.

1. Dr. K S Manjunatha	Member	20/1/24
2. Dr. N Vinay Kumar	Member	20/01/2024
3. Dr. Rakesh H M	Member	
4. Prof. D S Guru	Chairman	20/1/24

The following member were absent for the meeting.

1. Sri. S Shreyas	Member
2. Dr. Sheela T	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 (Hons.) (Internet of Things). The draft of the restructured scheme, titles of the courses and the respective syllabi for only third 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 (7^{th} and 8^{th} 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 (Hons.) (Internet of Things) 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 syllabi for third year (5th and 6th Semester) of the program are attached in ANNEXURE – A: BCA (Hons.) (Internet of Things).

4. The board has resolved to follow the same list of examiners approved for general BCA program for this specialized program also.

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20/1/24

Prof. Guru D S
Chairman

UNIVERSITY OF MYSORE

No. UA2/159(3)/2017-2018 Dated: 18-03-2021

NOTIFICATION

Sub: Constitution of the Board of Studies in **BCA (Internet Things) (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 (Internet Things) (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.N.Vinay Kumar Senior Data Scientist, NTT Data Services #29, Ground Floor, 3rd Main, 3rd Cross, Kalyan Nagar, Nagarbhavi Main Road, Bengaluru – 560 072	Member
5.	Dr.K.S.Manjunatha Associate Professor & HOD Department of Computer Science, Maharani's Science College for Women, JLB Road, Mysuru – 570 005	Member
6.	Dr.T.Sheela Assistant Professor, Dept. of Computer Science, Government First Grade College, Kuvempunagar, Mysuru – 570 023	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.

ದೂರವಾಣಿ ಸಂಖ್ಯೆ: 2419700/2419567
ಫ್ಯಾಕ್ಸ್: 0821-2419363/2419301

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www.uni-mysore.ac.in

ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ

ಸ್ಥಾಪನೆ: 1916

ವಿಶ್ವವಿದ್ಯಾನಿಲಯ ಕಾರ್ಯಸೌಧ,
ಕ್ರಾಫರ್ಡ್ ಭವನ, ಮೈಸೂರು–570005

(Re-accredited by NAAC at "A" Grade)
(overall Ranking 71st and Universities 44th in NIRF Ranking 2023)

ಸಂಖ್ಯೆ: ಪಿ.ಎಂ.ಇ.ಬಿ.–5/Spl.-31/2022–23 ದಿನಾಂಕ: 02.01.2024

ಇವರಿಗೆ;

ಅಧ್ಯಯನ ಮಂಡಳಿಯ ಅಧ್ಯಕ್ಷರು/ಸದಸ್ಯರುಗಳು
Specialized Programme
ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು

ಮಾನ್ಯರೆ,

ವಿಷಯ: ಅಧ್ಯಯನ ಮಂಡಳಿಯ ವಾರ್ಷಿಕ ಸಭೆಯನ್ನು ಏರ್ಪಡಿಸುವ ಬಗೆಗೆ

* * * * *

ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯದ Specialized Programme ಅಡಿಯಲ್ಲಿ ರಚಿತವಾಗಿರುವ ಅಧ್ಯಯನ ಮಂಡಳಿಗಳು ವಾರ್ಷಿಕ ಸಭೆಗಳನ್ನು ದಿನಾಂಕ **30.01.2024**ರೊಳಗೆ ಏರ್ಪಡಿಸಿ, Specialized Programmeನಡಿ ಮಾನ್ಯತೆ ಪಡೆದ ಕೋರ್ಸ್‌ಗಳ ಪಠ್ಯಕ್ರಮಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ತಮ್ಮ ಶಿಫಾರಸ್ಸುಗಳಿದ್ದಲ್ಲಿ, ಸದರಿ ಶಿಫಾರಸ್ಸುಗಳನ್ನು ಸಭೆಯ ನಡಾವಳಿ ಪತ್ರದೊಂದಿಗೆ ಈ ಕಛೇರಿಗೆ (ಪಿ.ಎಂ.ಇ.ಬಿ.) ಜರೂರಾಗಿ ಮುಂದಿನ ಕ್ರಮಕ್ಕಾಗಿ ಸಲ್ಲಿಸುವಂತೆ ತಿಳಿಸಲಾಗಿದೆ.

ವಾರ್ಷಿಕ ಸಭೆಯಲ್ಲಿ ಪಾಲಿಸಬೇಕಾದ ನಿಯಮಗಳು:

1. ಯು.ಜಿ.ಸಿ. ಮಾರ್ಗಸೂಚಿಯನ್ವಯ ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯದಲ್ಲಿ ಬೋಧಿಸಲ್ಪಡುತ್ತಿರುವ ಎಲ್ಲಾ ವಿಷಯಗಳ ಪಠ್ಯಕ್ರಮವನ್ನು ಪ್ರತಿ 03 ವರ್ಷಗಳಿಗೊಮ್ಮೆ ಪರಿಷ್ಕರಿಸುವುದು.
2. ಕರ್ನಾಟಕ ರಾಜ್ಯ ವಿಶ್ವವಿದ್ಯಾನಿಲಯಗಳ ಕಾಯ್ದೆ 59(2)ರನ್ವಯ ಯಾವುದೇ ಹೊಸ ಕೋರ್ಸ್‌ಗಳು/ಡಿಪ್ಲೊಮೊಗಳನ್ನು ಪ್ರಾರಂಭಿಸುವ ಮುನ್ನ ಸಂಬಂಧಪಟ್ಟ ಪ್ರಾಧಿಕಾರಗಳಿಂದ (ಉದಾ: NCTE, ICAR ಮುಂತಾದವು) ಅನುಮತಿಯನ್ನು ಕಡ್ಡಾಯವಾಗಿ ಪಡೆದುಕೊಳ್ಳಬೇಕಾಗಿರುತ್ತದೆ. ಈ ಅಂಶವನ್ನು ಗಮನಿಸುವುದು.
3. 2024–25ನೇ ಸಾಲಿನಿಂದ ಜಾರಿಗೊಳಿಸಬೇಕಾದ ಪಠ್ಯಕ್ರಮಗಳ ಬದಲಾವಣೆಗಳು ಏನಾದರೂ ಇದ್ದಲ್ಲಿ.
4. 2024–25ನೇ ಸಾಲಿನಿಂದ ಜಾರಿಗೊಳಿಸಬೇಕಾದ ಸ್ನಾತಕೋತ್ತರ/ಸ್ನಾತಕ ಪದವಿ/ ಡಿಪ್ಲೊಮೊ/ ಸರ್ಟಿಫಿಕೇಟ್ ಇತ್ಯಾದಿ ಹೊಸ ಶಿಕ್ಷಣಗಳ ಬಗ್ಗೆ ಶಿಫಾರಸ್ಸು ಇದ್ದಲ್ಲಿ ಹಾಗೂ ಕರ್ನಾಟಕ ರಾಜ್ಯ ಉನ್ನತ ಶಿಕ್ಷಣ ಪರಿಷತ್, ಬೆಂಗಳೂರುರವರು ಕಾಲಕಾಲಕ್ಕೆ ಪಠ್ಯಕ್ರಮಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ನೀಡುವ ನಿರ್ದೇಶನದಂತೆ ಕ್ರಮವಹಿಸುವುದು.
5. ಸಭೆಯ ಸೂಚಿಪತ್ರ ಮತ್ತು ಕಾರ್ಯಸೂಚಿ (Meeting Notice and Agenda) ಇತ್ಯಾದಿಗಳನ್ನು ಸಂಬಂಧಪಟ್ಟವರಿಗೆ Certificate of Posting/Courier ಮುಖಾಂತರ ಕಳುಹಿಸಿ, ಅಗತ್ಯ ಸ್ವೀಕೃತಿ ಪಡೆಯುವುದು. ಸಭೆಯ ಸೂಚಿಪತ್ರ ಮತ್ತು ಕಾರ್ಯಸೂಚಿಯ ಒಂದು ಪ್ರತಿಯನ್ನು ಈ ಕಛೇರಿಗೆ ಮಾಹಿತಿಗಾಗಿ ಕಳುಹಿಸಬಹುದಾಗಿದೆ.
6. ಸಭೆಯಲ್ಲಿ ತೆಗೆದುಕೊಂಡ ನಿರ್ಣಯಗಳನ್ನು ಒಳಗೊಂಡಂತೆ ದಾಖಲಿಸಿದ ನಡಾವಳಿಯನ್ನು ಸಿದ್ಧಪಡಿಸಿ, ಸಭೆಯಲ್ಲಿ ಹಾಜರಿರುವ ಎಲ್ಲಾ ಸದಸ್ಯರ ಸಹಿ ಪಡೆಯಬೇಕು. ಸಭೆಯಲ್ಲಿ ಹಾಜರಿದ್ದ ಮತ್ತು ಹಾಜರಿಲ್ಲದ ಸದಸ್ಯರ ಹೆಸರುಗಳನ್ನು ನಡವಳಿಯಲ್ಲಿ ದಾಖಲಿಸಬೇಕು.

ಪು.ತಿ.ನೋ.

7. ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಲ್ಲಿ ನಡೆಯುವ ಪರೀಕ್ಷೆಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಸಿದ್ಧಪಡಿಸಲಾದ ಪರೀಕ್ಷಕರ ಪಟ್ಟಿಯನ್ನು (Panel of Examiners)ಕುಲಸಚಿವ(ಪರೀಕ್ಷಾಂಗ), ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು ಇವರಿಗೆ ಮೊಹರಾದ ಲಕೋಟೆಯಲ್ಲಿ ನೇರವಾಗಿ ಸಲ್ಲಿಸುವುದು.
8. ಅಧ್ಯಯನ ಮಂಡಳಿಗಳ ಶಿಫಾರಸ್ಸುಗಳನ್ನು ನಿಕಾಯಗಳ ಸಭೆಯ ಮುಂದೆ ಮಂಡಿಸಬೇಕಾಗಿರುವುದರಿಂದ, ಆದಷ್ಟು ಬೇಗ ನಡಾವಳಿಯನ್ನು ಕಳುಹಿಸುವುದು. ಒಂದು ವೇಳೆ ದಿನಾಂಕ 30.01.2024ರೊಳಗಾಗಿ ನಡವಳಿಯನ್ನು ಕಳುಹಿಸದಿದ್ದಲ್ಲಿ, ಸಂಬಂಧಪಟ್ಟ ಅಧ್ಯಯನ ಮಂಡಳಿಯ ಅಧ್ಯಕ್ಷರು ನೇರ ಹೊಣೆಗಾರರಾಗಿರುತ್ತಾರೆ ಮತ್ತು ಅಂತಹವರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯವು ಕೈಗೊಳ್ಳಬಹುದಾದ ಕ್ರಮಕ್ಕೆ ಬದ್ಧರಾಗಿರಬೇಕಾಗಿರುತ್ತದೆ. ಆದುದರಿಂದ ಸಕಾಲದಲ್ಲಿ ನಡಾವಳಿಯನ್ನು ಕಳುಹಿಸುವ ಮೂಲಕ ತಮ್ಮೆಲ್ಲರ ಸಹಕಾರವನ್ನು ಕೋರಲಾಗಿದೆ.

ವಿಶೇಷ ಸೂಚನೆ:

ಎಲ್ಲಾ ಅಧ್ಯಯನ ಮಂಡಳಿಗಳ ಸಭೆಯನ್ನು ದಿನಾಂಕ 30.01.2024ರೊಳಗೆ ನಡೆಸಿ ವಿಶ್ವವಿದ್ಯಾನಿಲಯಕ್ಕೆ ಸಲ್ಲಿಸುವಂತೆ ಸೂಚಿಸಿರುವುದರಿಂದ ಯಾವುದೇ ಕಾರಣ ನೀಡದೆ ಸಭೆಯ ನಡಾವಳಿಯನ್ನು ನಿಗದಿತ ದಿನಾಂಕದೊಳಗೆ ಕಡ್ಡಾಯವಾಗಿ ಪಿ.ಎಂ.ಇ.ಬಿ. ವಿಭಾಗಕ್ಕೆ ಸಲ್ಲಿಸಲು ಸೂಚಿಸಿದೆ.

ನಿಮ್ಮ ನಂಬುಗೆಯ

ಕುಲಸಚಿವರು 18/1/2024
ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ
ಮೈಸೂರು-570 005

ಪ್ರತಿ:

1) Specialized Programme ಅಡಿಯಲ್ಲಿ ಮಾನ್ಯತೆ ಪಡೆದ ಸಂಸ್ಥೆಯ ನಿರ್ದೇಶಕರು/ಪ್ರಾಂಶುಪಾಲರುಗಳಿಗೆ.
2) ವಿಜ್ಞಾನ ಮತ್ತು ತಂತ್ರಜ್ಞಾನ, ಕಲಾ, ವಾಣಿಜ್ಯ ಹಾಗೂ ಶಿಕ್ಷಣ ನಿಕಾಯದ ಡೀನರುಗಳಿಗೆ.
3) ಕುಲಸಚಿವರು(ಪರೀಕ್ಷಾಂಗ), ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು.
4) ಉಪಕುಲಸಚಿವರು(ಪ್ರಾಧಿಕಾರ), ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು.
5) ನಿರ್ದೇಶಕರು, ಐ.ಸಿ.ಡಿ., ಗಣಕವಿಜ್ಞಾನ ಅಧ್ಯಯನ ವಿಭಾಗ, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು – ವಿಶ್ವವಿದ್ಯಾನಿಲಯದ ವೆಬ್‌ಸೈಟ್‌ನಲ್ಲಿ ಪ್ರಕಟಿಸಲು ಕೋರಿದೆ.
6) ಮಾನ್ಯ ಕುಲಪತಿಗಳು/ಕುಲಸಚಿವರು/ಕುಲಸಚಿವ (ಪರೀಕ್ಷಾಂಗ)ರವರ ಆಪ್ತ ಸಹಾಯಕರು, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು.
7) ಕಛೇರಿ ಪ್ರತಿ.

Annexure A - BCA (IoT) Scheme

NEP 2020 CURRICULUM

Proposed Syllabus for

Bachelor of Computer Application

(Internet of Things)

SCHEME OF TEACHING & EVALUATION OF BCA IoT

Semester	Course No.	Theory/ Practical	Credits	Paper Title	Marks	
					S.A.	I.A.
V	DSC13	Theory	4	Web Application Development	60	40
	DSC13-Lab	Practical	2	Web Application Development Lab	25	25
	DSC14	Theory	4	IoT System Design	60	40
	DSC14-Lab	Practical	2	IoT System Design Lab	25	25
	DSC15	Theory	4	Data Representation for IoT	60	40
	DSE-E1	Theory	3	C. Software Engineering D. Machine Learning	60	40
	Voc-1	Theory	3	Digital Marketing	60	40
	SEC-4	Theory/Practical	3	Cyber Security	25	25
VI	DSC16	Theory	4	Embedded System	60	40
	DSC16-Lab	Practical	**2**	Embedded System Lab	**25**	**25**
	DSC17	Theory	4	Data Mining	60	40
	DSC17-Lab	Practical	2	Data Mining Lab	25	25
		Project	4	Project Work	60	40
	DSE-E2	Theory	3	A. Software Testing B. Information Security	60	40
	Voc-2	Theory	3	Web Content Management System	60	40
	SEC-5	Theory/Practical	2	Internship	25	25

Course Code: DSC 13	**Course Title:** Web Application Development
Course Credits: 04	Hours/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5 hours

Course Content

Content	Hours
Unit 1	
Basics of Internet and Web The basics of Internet, World Wide Web, Web page, Home page, Web site, Static, Dynamic and Active web page, Overview of Protocols – Simple Mail Transfer Protocol, Gopher, Telnet, Emails, TFTP, Simple Network Management Protocol, Hyper Text Transfer Protocol, Client server computing concepts.	10
Unit 2:	10
HTML5 and CSS Content: HTML5: Semantic Elements, Forms and Input Types, Graphics (Canvas and SVG), Media Elements (Audio and Video), New API's (Geolocation, Drag-and-Drop, Local Storage), Responsive Web Design.	
Unit 3:	08
CSS: Flexbox, Grid Layouts, Media Queries, Animations and Transitions, Preprocessors (SASS/SCSS), Responsive Design Principles, Frameworks (Bootstrap, Tailwind CSS).	
Unit 4	
JavaScript and Front-End Development Content: ES6+ Features (Arrow Functions, Promises, Async/Await), Document Object Model (DOM) Manipulations, Event Handling, AJAX and Fetch API, Front-End Frameworks (React.js Basics), State Management, Introduction to TypeScript.	10
Unit 5	
Node.js, Express.js, and MySQL Node.js: Introduction to Node.js, Asynchronous Programming, Working with File System, Modules and NPM, Express.js Framework Basics. Express.js and MySQL: Setting up Express.js, Routing, Middleware, Building RESTful APIs, Connecting to MySQL Database, CRUD Operations, Authentication and Authorization.	14

Text Book:

1. Eloquent JavaScript: A Modern Introduction to Programming" by Marijn Haverbeke, 3rd Edition
2. Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5" by Robin Nixon, 5th Edition
3. Node.js, MongoDB, and Angular Web Development: The definitive guide to using the MEAN stack to build web applications" by Brad Dayley, Brendan Dayley, and Caleb Dayley, 2nd Edition

Reference Books:

1. Internet & World Wide Web How to Program by Paul Deitel, Harvey Deitel, Abbey Deitel, 5th Edition, Pearson Education / PHI, 2012.
2. Learning PHP, MySQL, JavaScript, CSS & HTML5 by Robin Nixon, 3rd Edition, O'Reilly 2014

Course Code: DSC 13 - Lab	**Course Title:** Web Application Development Lab
Course Credits: 02	Hours/Week: 04
Total Contact Hours: 4 hours/week	Formative Assessment Marks: 25
Exam Marks: 25	Exam Duration: 2.5 hours

Programming Lab

PART - A: Front-End Development

1. HTML5 and CSS3 Basics: Develop a webpage using HTML5 elements (like <section>, <article>, <header>, <footer>) and CSS3 styles (including Flexbox and Grid layouts).
2. Responsive Web Design: Create a responsive college timetable using HTML5 and CSS3 media queries.
3. CSS Preprocessors: Use a CSS preprocessor (like SASS) to style a webpage.
4. JavaScript Basics: Write JavaScript code to calculate and display the first n Fibonacci numbers, given n from a user prompt.
5. JavaScript for Data Presentation: Generate a dynamic table displaying numbers from 1 to n and their squares, based on user input.
6. ES6 Features: Use ES6 features like Arrow Functions, Promises, and Template Literals in a small project.
7. Interactive Forms with JavaScript: Create a form and use JavaScript for client-side validation (e.g., validate an email address format).
8. DOM Manipulation: Write JavaScript to dynamically change the content and style of elements on a webpage (e.g., convert the first letter of a word to uppercase)

PART - B: Back-End Development with Node.js, Express.js, and MySQL

1. Node.js Basics: Write a Node.js script to read a file and display its contents.
2. Express.js Introductory Project: Create a simple Express.js server that responds to HTTP requests.
3. MySQL Database Integration: Connect a Node.js application to a MySQL database and perform basic CRUD operations.
4. RESTful API with Express.js: Develop a RESTful API using Express.js that interacts with a MySQL database.
5. User Authentication: Implement user authentication in an Express.js application.
6. Session and Cookie Management: Manage sessions and cookies in a Node.js application.
7. Data Validation and Sanitization: Use server-side validation and sanitization for form inputs in an Express.js application.
8. Error Handling in Node.js: Implement error handling in a Node.js application.
9. File Upload and Download: Create functionality to upload and download files in a Node.js application.
10. Deployment Basics: Introduction to deploying a Node.js and Express.js application.

Course code : DSC 14	**Course Title :** IOT System design
Course Credits : 04	Hours/Week : 04
Total Contact Hours : 52	Formative assessment marks : 40
Exam Marks : 60	Exam Duration : 2.5 Hours

Course content:

Content	Hours
Unit 1	
IoT Networking Core Technologies involved in IoT development, Internet web and Networking technologies, Infrastructure, Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards, Wireless networking equipment and configurations, accessing hardware and device file interactions. **M2M to IoT**: Role of M2M in IoT, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.	**12**
Unit 2	
IoT Architecture -State of the Art IoT reference Model and Architecture- Functional View, Information View, Deployment and Operational View, Other Relevant architectural views, Middleware Introduction-FiWare etc., Remote monitoring and sensing, remote controlling and performance analysis, layering concepts, communication pattern, 6LoWPAN, Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi / Intel Galileo/ARM Cortex/ Arduino)	**10**

Unit 3	
IoT Application Development Application protocols: MQTT, REST/HTTP, CoAP, MySQL, Back-end Application Designing Apache for handling HTTP Requests, MongoDB Object type Database, HTML, CSS & jQuery for UI Designing, JSON lib for data processing, Security & Privacy during development	**10**
Unit 4	
IoT Security and case studies : Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities.	**12**
Unit 5	
Industrial IoT : IIoT-Introduction, Industrial IoT: Business Model and Reference Architecture: IIoT-Business Models, Industrial IoT- Layers: IIoT Sensing, IIoT Processing, IIoT Communication, IIoT Networking	**08**

Course code : DSC 14 Lab	**Course Title :** IOT System design lab
Course Credits : 02	Hours/Week : 04
Total Contact Hours : 4 Hrs/week	Formative assessment marks : 25
Exam Marks : 25	Exam Duration : 2.5 Hours

Programming lab:

PART -A

1. Demonstrate a program gas sensor using ardunio.
2. Demonstrate a program Arduino Lie Detector using ardunio.
3. Demonstrate a program Arduino-Controlled RGB LED Infinity Mirror.
4. Demonstrate a program Hand Sanitizer Dispenser Using Arduino.
5. Demonstrate a program Arduino RFID Smart Lock.
6. Demonstrate a program of heart beat sensor using sensor.
7. Demonstrate a program IR Obstacle sensor using ardunio.
8. Demonstrate a program of fire sensor using ardunio.
9. Demonstrate a program of heart beat sensor using ardunio.
10. Demonstrate a program of keypad using ardunio.

PART –B

1. Demonstrate a program to Add a button to your Pi.
2. Demonstrate a program to Control LED lights.
3. Demonstrate a program an alarmed motion sensor.
4. Demonstrate a program to Add a power button.
5. Demonstrate a program to Make an old printer wireless.
6. Demonstrate a program to Make music with Sonic Pi.
7. Demonstrate a program to Build a network game server.
8. Demonstrate a program to Connect two 4K monitors to a Raspberry Pi 4 or 400.
9. Demonstrate a program to Create a crypto price ticker.
10. Demonstrate a program Raspberry Pi based Weather Reporting Over IOT.

Course Code: DSC 15	**Course Title:** Data Representation for IoT
Course Credits: 04	Hours/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5 hours

Course Content

Content	Hours
Unit 1	
Introduction to IoT and Data (8 hours) • Overview of the Internet of Things (IoT) • Characteristics of IoT data • Data generation, collection, and transmission in IoT • IoT communication protocols and data formats	**10**
Unit 2	
Data Representation Formats (12 hours) • Sensor data formats (e.g., JSON, XML, CSV) • Event logs and time series data formats • Stream data formats and representation • Image and video data formats in IoT	**10**
Unit 3	
Data Compression Techniques (8 hours) • Lossless and lossy compression algorithms • Data compression for sensor data and time series data • Network bandwidth optimizations through compression • Trade-offs between compression ratio and processing power	**10**
Unit 4	
Data Storage and Retrieval Strategies (12 hours) • Distributed data storage for IoT platforms • NoSQL databases for handling unstructured IoT data • Stream processing frameworks for real-time analysis • Indexing and querying techniques for efficient data retrieval	**08**
Unit 5	
Data Serialization and Deserialization (8 hours) • Introduction to data serialization and deserialization • Popular data serialization formats (e.g., JSON, Protocol Buffers) • Efficient data exchange between IoT devices and platforms • Security considerations in data serialization	**14**

Text Book:

- Designing the Internet of Things by Adrian McEwen and Hakim Darmouch
- Building an IoT Platform by Daniel R. Ciouffe
- Data Representation for the Internet of Things by Thomas C. Plagemann
- Big Data: A Revolution That Will Transform How We Live, Work, and Think by Viktor Mayer-Schonberger and Kenneth Cukier
- Learning Python for IoT by Pietro Pollicino

Course Code: DSC – E1	**Course Title:** Software Engineering
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5hrs

Course Content

Content	Hours
Unit 1	
Introduction: Introduction to software and Software Engineering, Characteristics, Software Engineering Ethics, Need for Software, Software Metrics Software Engineering Models: Waterfall model, Incremental Model, and Spiral Model, Process Activities, Agile Software Development: Agile Methods, Plan Driven and Agile Development.	**10**
Unit 2	
Requirement Engineering: Requirements Engineering Processes, Functional and Non-Functional Requirements, Software Requirements Document, Requirement Specification, Requirements Validation, Requirements Management.	**07**
Unit 3	
System Models: Context models; Interaction models- Use case modeling, Sequence diagrams; Structural models- Class diagrams, Generalization, Aggregation; Behavioral models- Data-driven modeling, Event-driven modeling; Model-driven engineering..	**07**
Unit 4	
Architecture Design And Implementation: Object-oriented design using the UML- System context and interactions, Architectural design, Object class identification, Design models, Interface specification; Design patterns; Implementation issues. **Coding - Programming Language and Development tools. Selecting Languages and Tools, Good Programming Practices**	**10**
Unit 5:	
SOFTWARE TESTING: Development testing- Unit testing, Choosing unit test cases, Component testing, System testing. Test-driven development; Release testing; User testing- Alpha, Beta, Acceptance testing	**08**

Text Book:

1. Ian Somerville, "Software Engineering" 8th Edition, Pearson Education, 2009.

Reference Book:

1. Waman S Javadekar, "Software Engineering Principles and Practice", Tata McGraw- Hill, 2004.
Roger S. Pressman, "A Practitioners Approach",7th Edition, McGraw-Hill, 2007. 3 P Jalote, "An Integrated Approach to Software Engineering", Narosa Publ

Course Code: DSE – E1	**Course Title:** Machine Learning
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5 hours

Course Content

Content	Hours
Unit 1	
Introduction to machine learning: Definition, applications, and importance. Types of machine learning: Supervised learning, unsupervised learning, and reinforcement learning. Basic terminology: Features, labels, training, and testing data. Data Pre-processing: Data cleaning and handling missing values; Feature scaling and normalization; Handling categorical data.	**10**
Unit 2	
Supervised Learning Algorithms: Linear Regression; Logistic Regression; Decision Trees, Random Forests and Support Vector Machines. Model Evaluation and Metrics: Cross-validation; Confusion matrix, precision, recall, F1 score; ROC curves and AUC.	**08**
Unit 3	
Unsupervised Learning: Clustering: Partitional Clustering - K-means, K-Medoids, and Hierarchical clustering – Single linkage, Complete linkage, and average linkage; Dimensionality reduction: Principal Component Analysis (PCA). Evaluation Metrics: Silhouette Score, Rand-Index, Correct Rand Index. Reinforcement Learning: Introduction and applications	**10**
Unit 4	
Genetic Algorithm: Representing hypothesis, genetic operators and fitness function and selection. Simple applications of the genetic algorithm, applications of GA in decision tree Genetic algorithm based learning	**04**
Unit 5	
Neural Networks and Deep Learning: Basics of neural networks; Deep learning architectures: Feedforward, convolutional, and recurrent neural networks; Introduction to Tensor Flow or PyTorch. Feature Engineering and Model Deployment: Feature engineering techniques; Model deployment basics; Ethics and considerations in machine learning.	**10**

Text Book:

1. "Machine Learning" by Tom M Mitchell
2. "Pattern Recognition and Machine Learning" by Christopher M. Bishop.
3. "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron.
4. "Introduction to Machine Learning with Python: A Guide for Data Scientists" by Andreas C. Müller and Sarah Guido.
5. Relevant research articles.

Course Code: DSC 16	**Course Title:** Embedded Systems
Course Credits : 04	Hours/Week : 04
Total Contact Hours : 52	Formative assessment marks : 60
Exam Marks : 40	Exam Duration: 2.5 hours

Course content:

Content	Hours
Unit 1	
INTRODUCTION TO EMBEDDED COMPUTING AND ARM PROCESSORS - Complex systems and microprocessors– Embedded system design process –Design example: Model train controller- Instruction sets preliminaries - ARM Processor – CPU: programming input and output supervisor mode, exceptions and traps – Coprocessors- Memory system mechanisms – CPU performance- CPU power consumption. **EMBEDDED COMPUTING PLATFORM DESIGN** - The CPU Bus-Memory devices and systems–Designing with computing platforms – consumer electronics architecture – platform-level performance analysis - Components for embedded programs- Models of programs- Assembly.	**14**
Unit 2	
EMBEDDED COMPUTING COMPILATION linking and loading – compilation techniques- Program level performance analysis– Software performance optimization – Program level energy and power analysis and optimization – Analysis and optimization of program size- Program validation and testing. **PROCESSES AND OPERATING SYSTEMS** -Introduction – Multiple tasks and multiple processes – Multirate systems- Preemptive real-time operating systems- Priority-based scheduling- Inter process communication mechanisms– Evaluating operating system performance- power optimization strategies for processes – Example Real time operating systems-POSIX- Windows CE	**14**

Unit 3 **SYSTEM DESIGN TECHNIQUES AND NETWORKS-** Design methodologies- Design flows - Requirement Analysis – Specifications- System analysis and architecture design – Quality Assurance techniques- Distributed embedded systems – MPSoCs and shared memory multiprocessors.	**08**
Unit 4	
CASE STUDY Data compressor Alarm Clock - Audio player - Software modem-Digital still camera - Telephone answering machine-Engine control unit – Video accelerator.	**06**
Unit 5	
OS BASED SOFTWARE DEVELOPMENT: Programming in higher level languages on embedded OS platform, Communication protocols and it's applications , Embedded Systems with Internet of Things (IoT) and Cloud support	**10**

Textbook:

1. Marilyn Wolf, "Computers as Components - Principles of Embedded Computing System Design", Third Edition "Morgan Kaufmann Publisher, 2012.
2. Jonathan W.Valvano, "Embedded Microcomputer Systems Real Time Interfacing", Third Edition, Cengage Learning, 2012.
3. David. E. Simon, "An Embedded Software Primer", 1st Edition, Addison Wesley Professional, 2007.
4. Raymond J.A. Buhr, Donald L.Bailey, "An Introduction to Real-Time
5. Systems- From Design to Networking with C/C++", Prentice Hall, 1999.

Course Code: DSC 16 - Lab	**Course Title:** Embedded Systems lab
Course Credits : 02	Hours/Week : 04
Total Contact Hours: 4 hours/week	Formative assessment Marks: 25
Exam Marks : 25	Exam Duration: 2.5 Hours

Course Outcomes (COs):

Programming lab

PART – A

1. Demonstrate Simple Assembly Program for Addition.
2. Demonstrate Simple Assembly Program for Subtraction.
3. Demonstrate Simple Assembly Program for Multiplication.
4. Demonstrate Simple Assembly Program for Division.
5. Demonstrate Simple Assembly Program in operating modes and system calls.
6. Demonstrate Simple Assembly Program of interrupts in loops.
7. Demonstrate Simple Assembly Program of interrupts in branches.
8. Write an Assembly programs to configure and control General Purpose Input/Output (GPIO) port pins.
9. Write an Assembly programs to read digital values from external peripherals and execute them with the Target board.
10. Program for reading and writing of a file 5. Program to demonstrate Time delay program using built in Timer / Counter feature on IDE environment.

PART – B

1. Program to demonstrates a simple interrupt handler and setting up a timer.
2. Program demonstrates setting up interrupt handlers. Press button to generate an interrupt and trace the program flow with debug terminal.
3. Program to Interface 8 Bit LED and Switch Interface.
4. Program to implement Buzzer Interface on IDE environment.
5. Program to Displaying a message in a 2 line x 16 Characters LCD display and verify the result in debug terminal.
6. Program to demonstrate I2C Interface on IDE environment.
7. Program to demonstrate I2C Interface – Serial EEPROM
8. Demonstration of Serial communication. Transmission from Kit and reception from PC using Serial Port on IDE environment use debug terminal to trace the program.
9. Generation of PWM Signal
10. Program to demonstrate SD-MMC Card Interface.

Course Code: DSC 17	**Course Title:** Data Mining
Course Credits: 04	Hours/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5 Hours

Course Content:

Content	Hours
Unit 1	
Data Mining overview, Data Warehouse and OLAP Technology, Data Warehouse Architecture, Steps for the Design and Construction of Data Warehouses, A Three-Tier Data Warehouse Architecture, OLAP, OLAP queries, metadata repository, Data Preprocessing – Data Integration and Transformation, Data Reduction, Data Mining Primitives: What Defines a Data Mining Task? Task- Relevant Data, The Kind of Knowledge to be Mined, KDD. Mining Association Rules in Large Databases, Association Rule Mining, and Market Basket Analysis: Mining a Road Map, The Apriori Algorithm: Finding Frequent Item Sets Using Candidate Generation, Generating Association Rules from Frequent Item sets, improving the Efficiently of A priori, Mining Frequent Item sets without Candidate Generation,	**12**
Unit 2	
Multilevel Association Rules, Approaches to Mining Multilevel Association Rules, Mining Multidimensional Association Rules for Relational Database and Data Warehouses, Multidimensional Association Rules, Mining Quantitative Association Rules, Mining Distance-Based Association Rules, From Association Mining to Correlation Analysis. What is Classification? What Is Prediction? Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Bayes Theorem, Naï ve Bayesian Classification, Classification by Backpropagation, A Multilayer Feed-Forward Neural Network, Defining a Network Topology.	**10**

Unit 3 Classification Based on Concepts from Association Rule Mining, Other Classification Methods, k-nearest Neighbor Classifiers, Genetic Algorithms, Rough Set Approach, Fuzzy Set Approaches, Prediction, Linear and Multiple Regression, Nonlinear Regression, Other Regression Models, Classifier Accuracy. What Is Cluster Analysis, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Classical Partitioning Methods: k- Means and k-Medoids, Partitioning Methods in Large Databases: From k-Medoids to CLARANS, Hierarchical Methods, Agglomerative and Divisive Hierarchical Clustering, Density-Based Methods, Wave Cluster: Clustering Using Wavelet Transformation, CLIQUE: Clustering High-Dimensional Space, Model-Based Clustering Methods, Statistical Approach, Neural Network Approach	**12**
UNIT - IV Data Mining Techniques – a Statistical Perspective on data mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.	**09**
UNIT - V Clustering Tree – Based Algorithms – Neural Network Based Algorithms – Rule Based Algorithms – Combining Techniques: Introduction – Similarity and Distance Measures – Outliers Hierarchical Algorithms. Partitioned Algorithms.	**09**

Text Books:

Han, J., Kamber, M., Pei, J. (2009). Data mining: Concepts and techniques (3rd ed.). Morgan Kaufmann. Data mining, inference, and prediction (2nd ed.). Springer-Verlag.

Data Mining : Charu C. Aggarwal

Course Code: DSC 17 - Lab	Course Title: Data Mining Lab
Course Credits: 02	Hours/Week: 04
Total Contact Hours: 4 hours/week	Formative Assessment Marks: 25
Exam Marks: 25	Exam Duration: 2.5 Hours

Lab

1. Create a data set using python programming
2. On the above data set, experiment statistical calculations (such as: mean, median mode, standard deviation, central tendency, etc) using python programming.
3. Perform data pre-processing tasks on a specific data sets.
4. Demonstrate performing association rule mining on data sets.
5. Generate frequent item sets using Apriori Algorithm in python and also generate association rules for any market basket data.
6. Demonstrate the following Similarity and Dissimilarity Measures using python.

   Pearson's Correlation, Cosine Similarity, Jaccard Similarity, Euclidean Distance, Manhattan Distance

7. On the same data set, demonstrate Naïve Bayesian Classification.
8. On the same data set, demonstrate Decision Tree Induction
9. Create a data set and demonstrate on Multilayer Feed-Forward Neural Network.
10. Demonstrate performing Regression on data sets
11. Apply K- Means clustering algorithm on any dataset.
12. Apply Hierarchical Clustering algorithm on any dataset.
13. Experiment on the same data set and compare the results between different clustering models.

Course Code: DSE - E2	Course Title: Software Testing
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5 hrs

Course content

Content	Hours
Unit 1	
Basics of Software Testing and Examples: Basic definitions, Test cases, Insights from a Venn diagram, Identifying test cases, Error and fault taxonomies, and Levels of testing. Examples: Generalized pseudo code, The triangle problem, The Next Date function, The commission problem, and The SATM (Simple Automatic Teller Machine) problem. Decision Table-Based Testing: Decision tables, Test cases - triangle problem, Next Date function, commission problem, Guidelines, and observations. Data Flow Testing: Definition-Use testing, Slice-based testing, Guidelines and observations. Levels of Testing: Traditional view of testing levels, Alternative life-cycle models,	**10**
Unit 2	
The SATM system, Separating integration and system testing. Integration Testing: A closer look at the SATM system, Decomposition-based, call graph-based, Path-based integrations, Case study. System Testing: Threads, Basic concepts for requirements specification, Finding threads, Structural strategies and functional strategies for thread testing, SATM test threads, System testing guidelines, ASF (Atomic System Functions) testing example	**08**
Unit 3	
Interaction Testing: Context of interaction, A taxonomy of interactions, Interaction, Composition, and determinism, Client/Server Testing. Issues in Object-Oriented Testing: Units for object-oriented testing, Levels of object-oriented testing, GUI testing, Dataflow testing for object-oriented software, Examples. Class Testing: Methods as units, Classes as units	**10**
Unit 4	
Object-Oriented Integration Testing: UML support for integration testing, MM- paths for object-oriented software, and A framework for object-oriented dataflow integration testing. GUI Testing: The currency conversion program, Unit testing, Integration Testing, and System testing for the currency conversion program. Object-Oriented System Testing: Currency converter UML description, UML- based system testing, State chart-based system testing.	**10**
Unit 5	
SOFTWARE TESTING: Development testing- Unit testing, Choosing unit test cases, Component testing, System testing. Test-driven development; Release testing; User testing- Alpha, Beta, Acceptance testing.	**04**

Text Book:

1 Paul C. Jorgensen: Software Testing, A Craftsman's Approach, 3rd Edition, Auerbach Publications, 2012.

1. Aditya P Mathur: Foundations of Software Testing, Pearson, 2008.
2. Mauro Pezze, Michal Young: Software Testing and Analysis – Process, Principles and Techniques, 1st edition, John Wiley & Sons, 2011.
3. Srinivasan Desikan, Gopalaswamy Ramesh: Software testing Principles and practices,1st Edition, Pearson, 2012.
4. Brian Marrick: The Craft of Software Testing, 1st edition, Pearson, 2012.

Course Code: DSE - E2	**Course Title:** Information Security
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 2.5 hours

Course Content

Content	Hours
Unit 1	
Overview of Security: Protection versus security; aspects of security–data integrity, data availability, privacy; security problems, user authentication, Security Threats: Program threats, worms, viruses, Trojan horse, trap door, stack and buffer overflow	**10**
Unit 2	
System threats- System threats- intruders; communication threats- tapping and piracy. Cryptography: Substitution, transposition ciphers, symmetric-key algorithms, Congruences – Chinese Remainder theorem – Modular exponentiation,	**10**
Unit 3	
Data Encryption Standard Data Encryption Standard, advanced encryption standards, public key encryption - RSA; Diffie-Hellman key exchange, ECC cryptography, Message Authentication-MAC, hash functions. Digital signatures: Symmetric key signatures, public key signatures,	**10**
Unit 4	
Authentication applications Authentication applications – Kerberos, X.509, PKI – Electronic Mail security – PGP, S/MIME – IP security – Web Security – SSL, TLS, SET, public key infrastructures. Security Mechanisms, Intrusion detection, auditing and logging, tripwire, system-call monitoring;	**12**

Text Book:

1. W. Stallings, *Cryptography and Network Security Principles and Practices,* 4th Ed., Prentice-Hall of India, 2006.
2. C. Pfleeger and SL. Pfleeger, *Security in Computing*, 3rd Ed., Prentice-Hall of India, 2007.
3. D. Gollmann, *Computer Security*, John Wiley and Sons, NY, 2002.
4. J. Piwprzyk, T. Hardjono and J. Seberry, *Fundamentals of Computer Security*, Springer-Verlag Berlin, 2003.
5. J.M. Kizza, *Computer Network Security*, Springer, 2007.
6. M. Merkow and J. Breithaupt, *Information Security: Principles and Practices*, Pearson Education, 2006.

List of Examiners in Computer Science (UG) for the Specialized Program in BCA (Internet of Things) & BCA (Cloud Computing and Digital Science)		
List of Examiners (UG) in Computer Science (UGC)		
Sl. No	**Name of the Valuators**	**Address of the College**
1	Dr. Linganna N	GFGC, Kuvempu Nagar, Mysore
2	Dr. Ganesh Babu V	Govt College for Women, Maddur
3	Dr. Kouser	GFGC, Gundlupet
4	Dr. Manjunath K S	Maharanis Science College for Women, Mysore
5	Dr. Nagendranath Giri	Govt College for Women, Hassan
6	Dr. Sheela T	Maharanis Science College for Women, Mysore
7	Dr. Siddaraju K	Maharanis Science College for Women, Mysore
8	Geetha C B	GFGC, Pandavapura
9	Balakrishna M	Maharanis Science College for Women, Mysore
10	Prakash Raje Urs	Maharanis Science College for Women, Mysore
11	Santhosh Kumar B N	Maharanis Science College for Women, Mysore
12	Gopala Krishna Murthy H R	GFGC, Nanjangud
13	Josmi Joseph	Sri DDUrs College, Hunsur
14	Shilpa P	GFGC, Padavalahippe
15	Sripavithra C K	Maharanis Science College for Women, Mysore
16	Nagalakshmi H S	GFGC, Hunsur
17	Nirmala M S	Maharanis Science College for Women, Mysore
18	Pushpalatha M	Maharanis Science College for Women, Mysore
19	Thenarasi V	GFGC, Siddhartha Nagar, Mysore
List of Examiners (UG) in Computer Science (NON-UGC)		
Sl No	**Name of the Valuators**	**Address of the College**
20	Abhilasha	Govt. Science College, Hassan
21	Anjum Taj	St. Joseph's College, Hunsur
22	Anjum Banu	GSC, Hassan
23	Aravinda G	Gopalswamy College of Professional Studies, Mysore (MIT)
24	Avanthi	St.Joseph's College, Mysore (Satagalli)
25	Bharath G G	GHSC, Hassan
26	Chaithra M C	GFGC, Pandavapura
27	Chinna Swamy	Bharathi College, Bharathinagara (K.M Doddi), MandyaDist
28	Chithra V S	De Paul College, Mysore
29	Deepali M S	JSS College of Arts, Commerce and Science, Nanjangud

30	Devika M N	Teresian College, Mysore
31	Dr. Chandrajit	Gopalswamy College of Professional Studies, Mysore (MIT)
32	Dr. Jagadeesh Krishna	Sharadavilas College, Mysore
33	Dr.Poornima Y	Maharaja College, Mysore
34	Dr.Rajesh K M	JSS College for Women, Chamarajanagar
35	Gayathri K	Bharathi College, Bharathinagara (K.M Doddi), MandyaDist
36	Geetha N L	CRESTA College, Bannur Road, Mysuru 570028
37	Gunavathi	Sri Adichunchanagiri College of Arts and Commerce, Nagamangala
38	H J Preethi	GFGC, T. Narasipura
39	Hareesha C	BGS First Grade College, Mysore
40	Hemalatha B N	De Paul College, Belagola, Mandya
41	Hemanth Kumar	Vidyavikas College, Mysore
42	Hemavathi	MSCW, Mysore
43	Jayaram N	NIE College of Science, Mysore
44	Jyothilaksmi Kava	MMD and SDM MahilaMahaVidyalaya, Krishnamurthypuram, Mysore
45	Karthik P	Marimallappa college, Mysore
46	Kavya R	Sharadavilas College, Mysore
47	Kiran	Gopalswamy College of Professional Studies, Mysore (MIT)
48	Kiran Kumar	NDRK College, Hassan
49	Kumuda K C	GWC, K R Pet
50	Kusuma K	GFGC, Kollegal
51	Lakshmi Krishna	Sharadavilas College, Mysore
52	Lenard P	SBRR Mahajana First Grade College, Mysore
53	Lohith	Marimallappa College, Mysore
54	Lokesh	NDRK College, Hassan
55	M. Nandini	GFGC, T. Narasipura
56	Mahaboob Ali M Kunnur	GFGC, Nanjangud
57	Mahender	JSS College for Women, Chamarajanagar
58	Manjunath D	Government First Grade College, Kuvempunagar, Mysore- 570 023
59	Manjunath T	GFGC, K R Nagar
60	Manjunatha K S	SBRR Mahajana First Grade College, Mysore
61	Manu M S	PES College, Mandya
62	Monica S V	Govt. Science College, Hassan
63	Mruthula Sojan	Shesharipuram College, Mysore
64	Muruli manohar M R	Gopalswamy College of Professional Studies, Mysore (MIT)
65	Naimisha	Gopalswamy College of Professional Studies, Mysore (MIT)

66	Nandeesh P	JSS College for Women, Chamarajanagar
67	Navya D	GCW, Hassan
68	Nayana M P	MMK and SDM MahilaMahaVidyalaya, Krishnamurthypuram, Mysore
69	Pavithra raju	GFGC, Kollegal
70	Poornima K	St.Joseph's College, Mysore
71	Prathap	Maharani's College, Mysore
72	Praveen S	GCW, Maddur
73	Princy Joy	Teresian College, Mysore
74	Priya M R	NIE College of Science, Mysore
75	Priyanka M	SBRR Mahajana First Grade College, Mysore
76	Radhesh	SBRR Mahajana First Grade College, Mysore
77	Ragavendra	St.Joseph's College, Mysore
78	Raghu Ram P S	De Paul College, Belagola, Mandya
79	Rajesh M	NIE College of Science, Mysore
80	Rajitha V	MMK and SDM MahilaMahaVidyalaya, Krishnamurthypuram, Mysore
81	Rakesh K	GFGC, Kuvempu Nagar, Mysore
82	Rakshith K R	GFGCW, Holenarasipura
83	Ramya S K	MMK and SDM MahilaMahaVidyalaya, Krishnamurthypuram, Mysore
84	Ramya V J	CRESTA College, Bannur Road, Mysuru 570028
85	Ranjani S	CRESTA College, Bannur Road, Mysuru 570028
86	Rashmi Kiran	St.Joseph's College, Mysore
87	Rashmi M S	JSS College for Women, Chamarajanagar
88	Ravikumar D A	GFGC, Pandavapura
89	Ravindra V	Maharaja's College, Mysuru
90	Razina Praveen	JSS College for Women, Chamarajanagar
91	Reena Sebastin	Christ College, Srirampura, Mysore
92	Rekha B J	GFGC, Pandavapura
93	Rohitha K.C	GFGC, Hunsur
94	Roshan M R	CRESTA College, Bannur Road, Mysuru 570028
95	Rudhresh Y R	Shesharipuram College, Mysore
96	Santhosha M	GFGC, Gundalpet
97	Sapana Koushik	NIE College of Science, Mysore
98	Sathish Kumar M	JSS College of Arts, Commerce and Science, Nanjangud
99	Savitha K V	Hindustan College, Mysore
100	Seema N	GSC, Hassan
101	Shalini M K	Shesharipuram College, Mysore

102	Shobha A N	AVK College for Women, Hassan - 573 202
103	Shewetha Kumary	Vidhyashram First Grade College, Mysore
104	Shruthi	Govt, First Grade College, Gundlupet
105	Shruthi G G	Govt. Science College, Hassan
106	Shruthi Poonacha	SBRR Mahajana First Grade College, Mysore
107	Shubha L N	JSS College for Women, Chamarajanagar
108	Shwetha M	MMK and SDM MahilaMahaVidyalaya, Krishnamurthypuram, Mysore
109	Shyam	Depaul College, Belagola
110	Shylaja H N	AVK College for Women, Hassan - 573 202
111	Sowjanya J	AVK College for Women, Hassan - 573 202
112	Sowmya J	AVK College for Women, Hassan - 573 202
113	Sowmya P N	GFGC, Bilikere
114	Suhas Bharadwaj	Sheshadripuram Degree college, Musuru
115	Sukrutha K S	MMK and SDM MahilaMahaVidyalaya, Krishnamurthypuram, Mysore
116	Sukshma	Hindustan College, Mysore
117	Sushma H M	AVK College for Women, Hassan - 573 202
118	Swetha nandhini	JSS College for Women, Chamarajanagar
119	Tejaswini M	AVK College for Women, Hassan - 573 202
120	Usha K	Maharani's Science College for Women, JLB Road, Mysore - 570 005
121	Vasanthi	Gopalswamy College of Professional Studies, Mysore (MIT)
122	Vedavathi	MSCW, Mysore
123	Vidya Lakshmi N V	NIE Science College, Mysore
124	Vidya M V	NIE College of Science, Mysore
125	Vidya Bheemaiah	BharathMatha FGC, Koppa, Periyapattana
126	Vinay Kumar V P	JSS College for Women, Chamarajanagar
127	Vinay M	Sheshadripuram Degree college, Mysuru
128	Vinay R U	GFGC, Nanjangud
129	Kasif Hussain	Sapient College, Mysore

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