

DAV University, Jalandhar
Department of Computer Science & Applications
Proceedings of Meeting

Date: 29/2/2020

The meeting of the Board of Studies in the Department of Computer Science and Applications was held on 29th Feb, 2020 at 12.00 p.m. in Committee Room (Administration Block), DAV University, Jalandhar.

Following members were present in the meeting:

1. Prof. Gurpreet Singh Lehal (External Expert) *Gurpreet Singh 29/2/2020*
2. Dr. Hiteshwari Sabrol (Assistant Professor) *H Sabrol 29/2/2020*
3. Dr. Sanjeev Kumar Sharma (Assistant Professor) *Sanjeev 10/5/20*
4. Dr. Manik Sharma (Assistant Professor) *Manik 10/5/20 29/2/2020*

Following agenda was discussed and resolved:

Agenda Item-I

It was discussed and unanimously resolved to approve the proposed outline of scheme, syllabi and courses of reading for the following programs of Batch 2020:

- a) B.Sc. Computer Science
- b) M.Sc. Computer Science
- c) BCA
- d) MCA
- e) MCA (Lateral Entry)

Agenda Item-II

It was discussed and unanimously resolved to approve the proposed outline of scheme, syllabi and courses of reading for 2019 Batch of B.Sc. Computer Science (Third semester onwards).

Agenda Item-III

A. Introducing "Workshop on Photoshop and Corel Draw (CSA112) [0 0 4 2]" in place of Office Automation Lab (CSA104) [0 0 4 2] in BSc. Computer Science (1st Semester)

The Workshop on Photoshop and Corel Draw (CSA112) [0 0 4 2] course will assist students to enhance their skills in graphics designing such as editing photos, poster making, etc. As Office Automation concepts are the part of "Computer Fundamentals and C Programming Laboratory (CSA172)", So course code CSA104 is replaced with course code CSA112.

B. Introducing “Numerical Methods (MTH 225A) [4 0 0 4]” and “Numerical Methods laboratory (MTH 226) [0 0 4 2]” in BSc. Computer Science (4th Semester).

The Course Numerical Methods (MTH 225A) [4 0 0 4] and Numerical Methods laboratory (MTH 226) [0 0 4 2] will make the students familiar with numerical analysis techniques and their implementation.

C. Introducing “Discipline Specific Electives I (CSA3XX) [4 0 0 4]” in BSc. Computer Science (5th Semester) and BCA (5th Semester).

DSE (Discipline Specific Electives)-I

S.No	Paper Code	Course Title	L	T	P	Cr
1	CSA314*	Data Warehousing and Mining	4	0	0	4
2	CSA320	Basics of Artificial Intelligence	4	0	0	4
3	CSA321	Introduction to Internet of Things	4	0	0	4

(C)* As per the choice based credit system, the discipline electives are given to students to choose any course as per their interest. So, they can explore more about emerging technologies of information technology (DSE I). The syllabuses are enclosed in Annexure I.

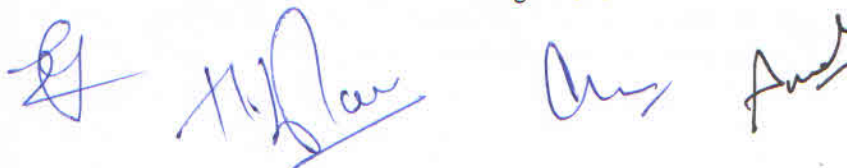
CSA314 (shifted from Core to DSE)

Agenda Item-IV

A. Introducing “Computer Fundamentals and Programming in C (CSA502) [4 0 0 4]” in place of Java Programming (CSA572) [4 0 0 4]” and “Computer Fundamentals and Programming in C Laboratory (CSA506) [0 0 4 2]” in place of Java Programming Laboratory (CSA574) [0 0 4 2] in MSc. Computer Science (1st Semester)

The “Computer Fundamentals and Programming in C (CSA502) [4 0 0 4]” introduces the fundamental concepts of computer science and structured programming includes software development methodology, data types, control structures, functions, array and techniques of running, testing and debugging. The course “Java Programming (CSA572) [4 0 0 4]” is shifted to MSc. Computer Science (2nd Semester) with the name “Object Oriented Programming using Java (CSA514) [4 0 0 4]”.

B. Introducing “Computer Oriented Numerical and Statistical Methods (CSA511) [4 0 0 4]” in place of Theory of Computer Science (CSA580) [4 0 0 4]” in MSc. Computer Science (2nd Semester). The Theory of Computer Science (CSA580) [4 0 0 4]” is moved to MSc. Computer Science (4th Semester).



The “Computer Oriented Numerical and Statistical Methods (CSA511) [4 0 0 4]” course helps students to: Solve system of linear equations. Understand various methods of modeling. Apply Mathematical Modeling and for Engineering Problem Solving. Solve Mathematical Equations by various methods. Find Best Curve fitting for given data. Apply Numerical Integration, Understand Statistical Methods for Data Analysis and sampling techniques. The level of the course “Theory of Computer Science (CSA580) [4 0 0 4]” is difficult for students to learn in 2nd Semester, it is recommended to be move the course in MSc. Computer Science (4th Semester).

C. Introducing “Object Oriented Programming using Java (CSA514) [4 0 0 4]” in the place of Computer Graphics (CSA579) [4 0 0 4]” and “Object Oriented Programming using Java Laboratory (CSA515) [0 0 4 2]” in place of Computer Graphics Laboratory (CSA582) [0 0 4 2] in MSc. Computer Science (2nd Semester). The Computer Graphics (CSA580) [4 0 0 4]” and “Computer Graphics Laboratory (CSA582)” are moved to MSc. Computer Science (3rd Semester) with (CSA603A) [3 0 0 3] and (CSA610B) [0 0 2 1] and MCA (3rd Semester) respectively.

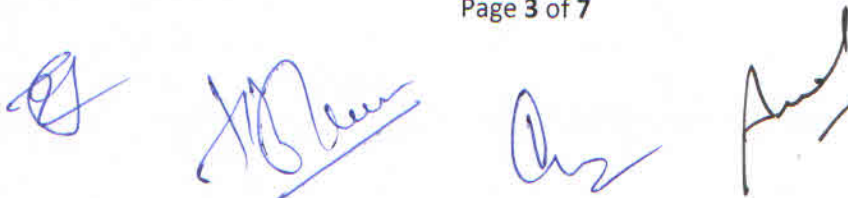
This Object Oriented Programming using Java (CSA514) [4 0 0 4]”course will introduce students to some of the most powerful programming concepts in Java, including: objects, inheritance and collections. They will learn how to use these object-oriented programming concepts in code examples, discover how these concepts are used in applications that require user input, and understand the benefits of mastering these concepts in Java. The course Computer Graphics (CSA580) [4 0 0 4]” and “Computer Graphics Laboratory (CSA579) [0 0 4 2]” are moved to MSc. Computer Science (3rd Semester) with (CSA603A) [3 0 0 3] and (CSA610B) [0 0 2 1] for introducing “Object Oriented Programming using Java” in MSc. Computer Science (2nd Semester).

D. Introducing “ASP.NET using C# Programming (CSA628) [4 0 0 4]” in the place of .NET Framework and C# (CSA623) [4 0 0 4]” and “ASP.NET using C# Programming Laboratory (CSA629) [0 0 4 2]” in place of .NET Framework and C# Laboratory (CSA624) [0 0 4 2] in MSc. Computer Science (3rd Semester) and MCA (3rd Semester).

The aim of the course “ASP.NET using C# Programming (CSA628) [4 0 0 4]” is to make the students would be very strong on basics of C# language and its application as Object Oriented Programming Language (OOPs). They would get to develop a WebSite in ASP.Net which includes problem definition, requirements analysis, system design, C# coding and testing. The syllabus is enclosed in Annexure II.

E. Introducing “Advanced Software Engineering (CSA619) [4 0 0 4]” in MSc. Computer Science (3rd Semester) in the place of Data Mining and Data Warehousing (CSA605) [4 0 0 4] in MSc. Computer Science (3rd Semester) which is moved to Discipline Elective I.

The “Advanced Software Engineering (CSA619) [4 0 0 4]” is provide an advanced understanding and knowledge of the software engineering techniques, techniques to collect software requirements from client and CASE tools and to understand the importance of these case tools in software development. To get knowledge about software development process, the same course introduced. Then, the course “Data Mining and Data Warehousing (CSA605) [4 0 0 4]” is moved to Discipline Elective I of MSc. Computer Science (3rd Semester).



F. Introducing “Dissertation (CSA692) [0 0 16 8]” in option with “Major Project (CSA689) [0 0 16 8]” in MSc. Computer Science (4th Semester).

The “Dissertation (CSA692) [0 0 16 8]” is given as option with Major Project for those students who want to do research work. The course will provide you with guidance and support throughout the writing of your dissertation. From discussing your initial ideas of your dissertation through the process of actually writing the document, this course will provide you with the information and support required from both the teaching staff and your allocated dissertation supervisor. The syllabus is enclosed in Annexure V.

G. Introducing “Internet of Things (CSA631) [4 0 0 4]” in Discipline Elective I of MSc. Computer Science (3rd Semester) and “Software Testing and Quality Assurance (CSA618) [4 0 0 4] in Discipline Elective II of MSc. Computer Science (4th Semester).

The “Internet of Things (CSA631) [4 0 0 4]” course provides advanced data collection, connectivity, and analysis of information collected by computers everywhere—taking the concepts of Machine-to-Machine communication farther than ever before. This course gives a foundation in the Internet of Things, including the components, tools, and analysis by teaching the concepts behind the IoT and a look at real-world solutions. The syllabus is enclosed in Annexure III.

The “Software Testing and Quality Assurance (CSA618) [4 0 0 4]” course provides methods and procedures for software development that can scale up for large systems and that can be used to consistently produce high-quality software at low cost and with a small cycle time, Student learn systematic approach to the development, operation, maintenance, and retirement of software, Student learn how to use available resources to develop software, reduce cost of software and how to maintain quality of software, Methods and tools of testing and maintenance of software’s.

H. Moved “Natural Language Processing (CSA691) [4 0 0 4]” to Discipline Elective I of MSc. Computer Science (3rd Semester).

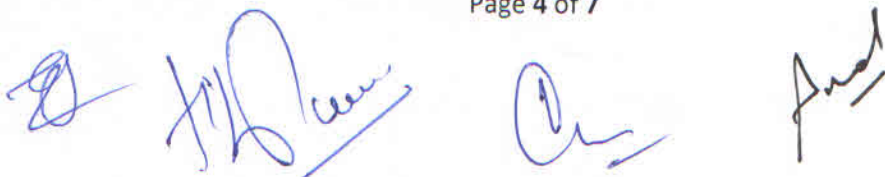
I. The course code of “Mobile Computing (CSA672)” is replaced with CSA606, “Emerging Trends in IT (CSA673)” is replaced with CSA607 and Information System (CSA674) is replaced with CSA609 in Discipline Elective I of MSc. Computer Science (3rd Semester).

J. The course name and course code of “System Simulation (CSA681)” is replaced with “System Simulation and Modeling (CSA616)”, Discipline Elective II of MSc. Computer Science (4th Semester).

Agenda Item-V

A. Introducing “Workshop on E-Marketing (CSA221) [0 0 4 2]” in BCA (3rd Semester).

The primary objective of “Workshop on E-Marketing (CSA221) [0 0 4 2]” is to examine and explore the role and importance of digital marketing in today’s rapidly changing business environment. It also focuses on how digital marketing can be utilized by organizations and how its effectiveness can measure. It



Illustrate how the effectiveness of a digital marketing campaign can be measured. Demonstrate advanced practical skills in common digital marketing tools such as SEO, SEM, Social media and Blogs. The syllabus is enclosed in Annexure IV.

B. Introducing “Workshop on App Development (CSA319) [0 0 4 2]” in BCA (5th Semester).

The “Workshop on App Development (CSA319) [0 0 4 2]” course is designed to quickly get you up to speed with writing apps for mobile devices. The student will be able to write simple GUI applications, use built-in widgets and components, work with the database to store data locally, and much more. The syllabus is enclosed in Annexure V.

C. Introducing “Discipline Specific Elective II (CSA3XX) [4 0 0 4]” in BCA (6th Semester).

Discipline Specific Elective II

S.No	Paper Code	Course Title	L	T	P	Cr
1	CSA321	Digital Image Processing	4	0	0	4
2	CSA322	Machine Learning	4	0	0	4
3	CSA323	Cloud Computing	4	0	0	4

In Discipline Specific Elective II, three courses are introduced: Digital Image Processing, Machine Learning and Cloud Computing. The students can opt any of the one course as per their choice.

- The “Digital Image Processing” course describes and explains basic principles of digital image processing. Design and implement algorithms that perform basic image processing (e.g. noise removal and image enhancement).
- The focus of the second course “Machine Learning” is to introduce students to methods and modern programming tools and frameworks aimed for data analysis. Special attention is given to methods for handling massive datasets.
- The objective of “Cloud Computing” course is to provide students with the comprehensive and in-depth knowledge of Cloud Computing concepts, technologies, architecture and applications by introducing and researching state-of-the-art in Cloud Computing fundamental issues, technologies, applications and implementations. Another objective is to expose the students to frontier areas of Cloud Computing and information systems, while providing sufficient foundations to enable further study and research.
- The syllabuses are enclosed in Annexure VI.

Agenda Item-VI

A. Introducing “Workshop on Graphics Designing (CSA517) [0 0 4 2]” in MCA (1st Semester)

The “Workshop on Graphics Designing (CSA517) [0 0 4 2]” course will assist students to enhance their skills in graphics designing such as editing photos, poster making, etc. The syllabus of “Workshop on Graphics Designing (CSA517) [0 0 4 2]” is enclosed in Annexure VII.

B. Introducing “Workshop on Digital Marketing (CSA630) [0 0 4 2]” in MCA (4th Semester).

The primary objective of “Workshop on Digital Marketing (CSA630) [0 0 4 2]” is to examine and explore the role and importance of digital marketing in today’s rapidly changing business environment. It also focuses on how digital marketing can be utilized by organizations and how its effectiveness can measure. It illustrate how the effectiveness of a digital marketing campaign can be measured. Demonstrate advanced practical skills in common digital marketing tools such as SEO, SEM, Social media and Blogs. The syllabus is enclosed in Annexure VIII.

C. Introducing “Advanced Software Engineering (CSA619) [4 0 0 4]” in MCA (3rd Semester) as core course.

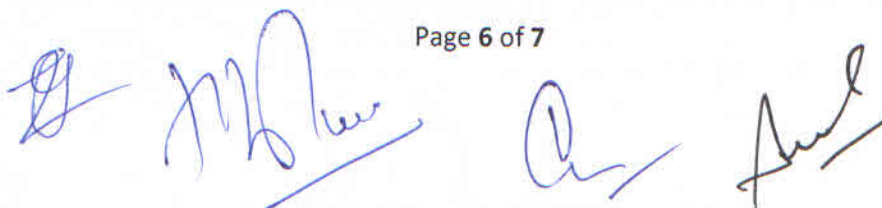
The “Advanced Software Engineering (CSA619) [4 0 0 4]” is provide an advanced understanding and knowledge of the software engineering techniques, techniques to collect software requirements from client and CASE tools and to understand the importance of these case tools in software development process. So, it is recommended that the course should be core course in MCA (3rd Semester).

D. “Python Programming (CSA625) [4 0 0 4]” and “Python Programming Laboratory (CSA626) [0 0 4 2] are moved to MCA (4th Semester).

H. Interchanging “Digital Image Processing (CSA701)[4 0 0 4] to core course with Linux and Shell Programming (CSA709) [4 0 0 4]” to Discipline Elective IV of MCA(5th Semester) . Interchanging “Digital Image Processing Laboratory (CSA714)[0 0 4 2] to core course with Linux and Shell Programming Laboratory (CSA715) [0 0 4 2]” to Discipline Elective V of MCA(5th Semester) .

I. Introducing “Data Science with Python (CSA726)[4 0 0 4]”, “Open Source Based Web Development(CSA728)[4 0 0 4]” in Discipline Elective IV of MCA(5th Semester). Introducing “Data Science with Python Laboratory (CSA727)[0 0 4 2]”, “Open Source Based Web Development Laboratory(CSA729)[0 0 4 2]” in Discipline Elective V of MCA(5th Semester).

The Data Science with Python (CSA726)[4 0 0 4]” course will give knowledge about how to build Numpy arrays, and perform interesting calculations, Create and customize plots on real data, Supercharge your scripts with control flow, and get to know the Pandas Data Frame. The “Open Source Based Web Development(CSA728)[4 0 0 4]” provides basic idea of Open source technology, their software development process so as to understand the role and future of open source software in the industry along



with the impact of legal, economic and social issues for such software. The syllabuses are enclosed in Annexure IX.

J. Introducing “Workshop on App Development (CSA725) [0 0 4 2]” in MCA (4th Semester).

The “Workshop on App Development (CSA725) [0 0 4 2]” course is designed to quickly get you up to speed with writing apps for mobile devices. The student will be able to write simple GUI applications, use built-in widgets and components, work with the database to store data locally, and much more. The syllabus is enclosed in Annexure X.

K. Introducing “Dissertation (CSA720) [0 0 52 26]” in option with “Industrial Training (CSA720) [0 0 48 24]” in MCA (6th Semester).


The “Dissertation (CSA720) [0 0 52 26]” is given as option with “Industrial Training (CSA720) [0 0 48 24]” for those students who want to do research work. The course will provide you with guidance and support throughout the writing of your dissertation. From discussing your initial ideas of your dissertation through the process of actually writing the document, this course will provide you with the information and support required from both the teaching staff and your allocated dissertation supervisor.

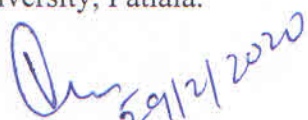
Agenda Item-VI


The revisions in MCA (2nd and 3rd year) are equally applicable to MCA (Lateral Entry).


→ A handwritten sheet of suggestions has been attached.

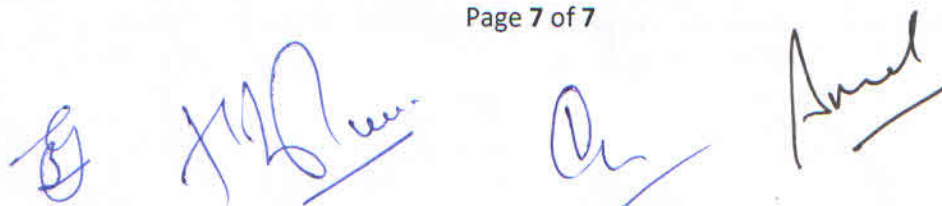
Signatures of members present:


29/2/2020
Dr. Gurpreet Singh Lehal
Professor, Department of Computer Science,
Punjabi University, Patiala.


29/2/2020
Dr. Sanjeev Kumar Sharma
Assistant Professor, Department of Computer
Science and Applications,
DAV University, Jalandhar


29/2/2020
Dr. Hiteshwari Sabrol
Assistant Professor, Department of Computer
Science and Applications,
DAV University, Jalandhar



10/4/20
Dr. Manik Sharma
Assistant Professor, Department of Computer
Science and Applications,
DAV University, Jalandhar



Suggestions

- 1 The syllabus of AI need to be revised as per latest trends.
- 2 MCA (Two years) need to be started
- 3 Total course ^{hours} need to be adjusted.
- 4 A course related to Adobe Premiums may be started.
- 5 While designing the syllabus, the latest books should be followed and referenced.
- 6 overlapping in BCA and MCA need to be checked particularly after 3rd semester of MCA.
- 7 Seminars need to be incorporated in the MCA syllabus.

1 Geetpreet Singh
29/2/2020

2 Dr. Sanjeev Kumar Sharma  29/2/2020

3

4  29/2/2020

Annexure I

Course Title: Basics of Artificial Intelligence
Course Code: CSA320
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective The objective of this course is to familiarize students with concepts of AI, its tools & technologies.

UNIT – A

15 Hours

Introduction

- Background and History
- Overview of AI applications Areas

Knowledge Representation

- Network Representation-Associative Network & Conceptual Graphs
- Structured Representation- Frames & Scripts

UNIT – B

15 Hours

Search Strategies

- Strategies For State Space Search-Data Driven And Goal Driven Search
- Search Algorithms- Uninformed Search (Depth First, Breadth First, Depth First With Iterative Deepening) And Informed Search (Hill Climbing, Best First, A* Algorithm, etc)

Expert Systems

- Introduction, Examples
- Characteristics Architecture, People Involved and Their Role in Building an Expert Systems

UNIT – C

15 Hours

Natural Language Processing

- Introduction to Natural Language Processing
- Component Steps of Communication
- Contrast Between Formal and Natural Languages in the Context of Grammar

Introduction to AI languages

- Introduction to LISP and Prolog

UNIT-D

15 Hours

Planning

- Basic Representation for Planning
- Symbolic-Centralized Vs. Reactive-Distributed

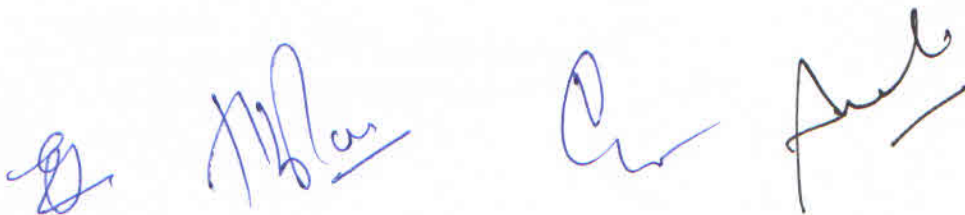
Pattern Recognition

- Introduction
 - Recognition & Classification Process
 - Learning classification patterns and clustering



Reference Books:

1. Elaine Rich, Kevin Knight and Nair Shiva Shankar B., *Artificial Intelligence*, Third Edition, New Delhi: Tata-McGraw Hill, 2008.
2. Winston, P.H. and Horn, B.K.P., *LISP*, Pearson, 1993.
3. Rajasekharan, S. and Vijayalakshmi Pai, G. A., *Neural Networks, Fuzzy Logic and Genetic Algorithms*, New Delhi: Prentice Hall of India, 2003.
4. Luger George F., *Artificial Intelligence*, 5th edition, Pearson Education.
5. Patterson Dan W., *Introduction to Artificial Intelligence and Expert systems*, New Delhi: PHI, 2005.
6. Bharti & Chaitany, *Natural Language Processing*, New Delhi: PHI, 2006.



Annexure-I

Course Title: Introduction to Internet of Things
Course Code: CSA321
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objectives

- Vision and Introduction to IoT.
- Data and Knowledge Management and use of Devices in IoT Technology.
- Understand State of the Art – IoT Architecture.

UNIT-A

Introduction to IoT (12Hours)
Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs

UNIT-B

IoT & M2M (15Hours)
Machine to Machine, Difference between IoT and M2M, Software Defined Network

Network & Communication aspects

Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination

UNIT-C

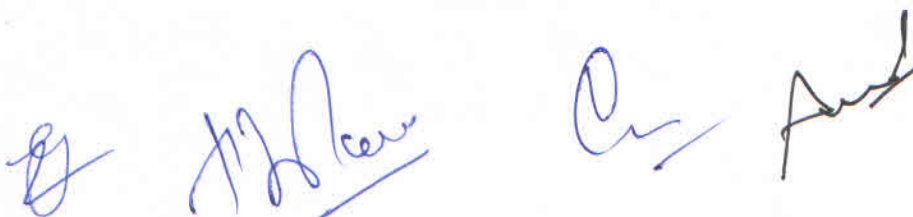
Challenges in IoT (8 Hours)
Design challenges, Development challenges, Security challenges, Other challenges

UNIT-D

Domain specific applications of IoT (10 Hours)
Home automation, Industry applications, Surveillance applications, Other IoT applications.

REFERENCES:

1. Vijay Madiseti, Arshdeep Bahga, "Internet of Things: A Hands On Approach."
2. WalteneusDargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice."



Annexure IV

Course Title: Workshop on E-Marketing
Course Code: CSA221

L	T	P	Credits	Marks
0	0	4	2	50

- Introduction to digital marketing
- Digital Strategy and Planning
- Website marketing tools
- Digital content – website, blogs, email, webinars, videos, podcasts, e-zines, PPC advertising
- Social Media and Social Bookmarking – Facebook, Twitter, Pinterest, Instagram, YouTube and YouTube channels and emerging social medias
- Search Engine Marketing – What it is, how it works and how to make it work
- Search Engine Optimisation -What it is, how it works and how to make it work
- Measuring Digital media performance • Ecommerce, Tcommerce and Mcommerce
- Implementing the digital marketing plan • Website design /development for digital marketing
- Mastering Google - AdWords Advertising, Analytics & Applications

Reference Books

1. Blanchard O. (2014) Social Media ROI: Managing and Measuring Social Media Efforts in Your Organization
2. Pulizzi, J. (2013) Epic Content Marketing Marketing on Facebook – Best practice guide (2015) Facebook Marketing Press
3. Chaffey, D., & Ellis-Chadwick, F. (2012) Digital Marketing: Strategy, Implementation and Practice, 5/E, Pearson
4. Tapp, A., & Whitten, I., & Housden, M. (2014) Principles of Direct, Database and Digital Marketing, 5/E, Pearson
5. Tasner, M. (2015) Marketing in the Moment: The Digital Marketing Guide to Generating More Sales and Reaching Your Customers First, 2/E, Pearson

Websites

www.smartinsights.com
www.hubspot.com
www.mashable.com
www.emarketer.com
www.socialmediaexaminer.com
www.brandrepublic.com
www.allfacebook.com
www.insidefacebook.com
www.ipassexam.com
www.wordstream.com
www.seomoz.org/
www.searchengineland.com
www.searchenginewatch.com



Annexure V

Course Title: Workshop on App Development
Course Code: CSA319
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
0	0	4	2	50

Unit A

Introduction and its Significance

- What is Android, History of Android, Importance of Java Language for Android apps, other mobile OS-es, Android versions and different development tools.
- Installing software's and Setup Eclipse.

UI Widgets and Activity, Intent & Fragment

- Working with Button, Toast, Custom Toast, Toggle Button, SwitchButton, ImageButton, CheckBox, AlertDialog, Spinner, AutoCompleteTextView, RatingBar, DatePicker, TimePicker, ProgressBar, Quick Contact Budge, Analog Clock and Digital Clock Working with hardware Button File Download.

Unit B

Android Menu and Layout Manager

- Option Menu, Context Menu and Popup Menu
- Relative Layout, Linear Layout, Table Layout and Grid Layout

Unit C

Android Service and Data storage

- Android Service, Android Service API, Android Started Service, Android Bound Service, Android Service Life Cycle and Android Service Example
- Shared Preferences Internal Storage and External Storage

SQLite, XML & JSON

- SQLite API, SQLite Spinner and SQLite List View
- XML Parsing SAX, XML Parsing DO, XML Pull Parser and JSON Parsing

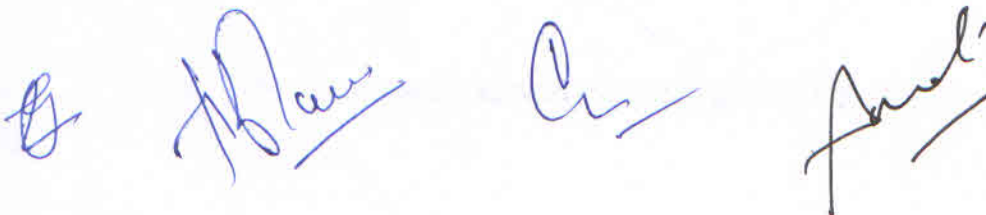
Unit D

Content Provider and Multimedia

- Content Provider Fundamental, Notification API, Creating Notification Builder, Playing Audio, Location API, Working with Camera, Motion Sensor, Android P2P Communication and Android Google Map

Reference Books:-

1. Os Swift, "Android App Development & Programming Guide: Learn in a Day", CreateSpace Independent Publishing Platform (October 2, 2015).



2. David Griffiths and Dawn Griffiths, "Head First Android Development: A Brain-Friendly Guide", Shroff (1 January 2015).
3. Ted Hagos "Learn Android Studio 3 with Kotlin: Efficient Android App Development", Apress media LLC, Newyork, 2018.
4. Zigurd Mednieks, G. Blake Meike, Laird Dornin, Masumi Nakamura, "Programming Android: Java Programming for the New Generation of Mobile Devices", 2nd Edition, Kindle Edition, O'Reilly Media; 2 edition (28 September 2012).

G. Meike *As* *Andri*

Course Title: Digital Image Processing

Course Code: CSA321

Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: To introduce basic image processing techniques, spatial and frequency domain, linear programming, color image processing, image compression, etc.

UNIT – A

15 Hours

Introduction

- A simple image model, Sampling and Quantization
- Imaging Geometry, Digital Geometry, Image Acquisition Systems, Different types of digital images.
- Bilevel Image Processing: Basic concepts of digital distances, distance transform, medial axis transform, component labeling, thinning, morphological processing, extension to grey scale morphology.

UNIT – B

15 Hours

Binarization and Segmentation of Grey level images

- Histogram of grey level images, Optimal thresholding using Bayesian classification, multilevel thresholding, Segmentation of grey level images, Water shade algorithm for segmenting grey level image.
- Detection of edges and lines in 2D images: First order and second order edge operators, multiscale edge detection, Canny's edge detection algorithm, Hough transform for detecting lines and curves, edge linking.

UNIT – C

15 Hours

Image Enhancement

- Point processing, Spatial Filtering, Frequency domain filtering, multi-spectral image enhancement, image restoration.
- Color Image Processing: Color Representation, Laws of color matching, chromaticity diagram, color enhancement, color image segmentation, color edge detection, color demosaicing.

Applications of Image Processing

- Picture Data Archival
- Machine Vision
- Medical Image Processing

UNIT-D

15 Hours

Image Registration and depth estimation

- Registration Algorithms, Stereo Imaging, Computation of disparity map.
- Image compression: Lossy and lossless compression schemes, prediction based compression schemes, vector quantization, sub-band encoding schemes, JPEG compression standard, Fractal

compression scheme, Wavelet compression scheme.

Reference Books:

1. Gonzalez Rafael C. and Woods Richard E., *Digital Image Processing*, New Delhi: Prentice-Hall of India, 2002.
2. Pratt William K., *Digital Image Processing: PIKS Inside*(3rd ed.), New Jersey: John Wiley & Sons, Inc., 2001.
3. Bernd Jahne, *Digital Image Processing*, (5th revised and extended edition), Springer, 2002
4. Annadurai S. and Shanmugalakshmi R., *Fundamentals of Digital Image Processing*, New Delhi: Pearson Education, 2007
5. Joshi M.A., *Digital Image Processing: An Algorithmic Approach*, New Delhi: Prentice-Hall of India, 2006

The image shows four handwritten signatures in blue ink, arranged horizontally from left to right. The first signature is a stylized 'S' with a horizontal line underneath. The second signature is 'M. Annadurai' written in a cursive style. The third signature is a stylized 'B. Jahne' with a horizontal line underneath. The fourth signature is 'Rafael C. Gonzalez' written in a cursive style.

Annexure VI

Course Title: Machine Learning
Course Code: CSA322
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: The main objective of this course is to acquaint students with an in-depth introduction to two main areas of Machine Learning: supervised and unsupervised. Some of the main models and algorithms for regression, classification, and clustering will be covered.

UNIT-A

15 Hours

Machine Learning: Meaning, definition and applications of machine learning
Introduction of data in machine Learning: Training data, Validation data, Testing data, Properties of data
History of machine learning, Steps involved in a machine learning project
Building a machine learning model: representing training examples, target function, representation of target function, learning algorithms

UNIT-B

12 Hours

Types of machine learning: supervised learning, unsupervised learning, reinforcement learning.
Supervised Learning: Basic concept of Classification, Regression, Types of regression techniques
Decision Tree Learning: Decision tree representation, appropriate problems for decision tree learning, building decision trees, principles of information gain and entropy. Instance based learning and feature selection, k-nearest neighbour algorithm.

UNIT-C

10 Hours

Unsupervised Learning : Clustering, different types of clustering algorithms(K-means clustering, K-means++ clustering, Density Based clustering algorithm)
Reinforcement Learning : Introduction, reinforcement learning algorithms
Introduction to pattern recognition

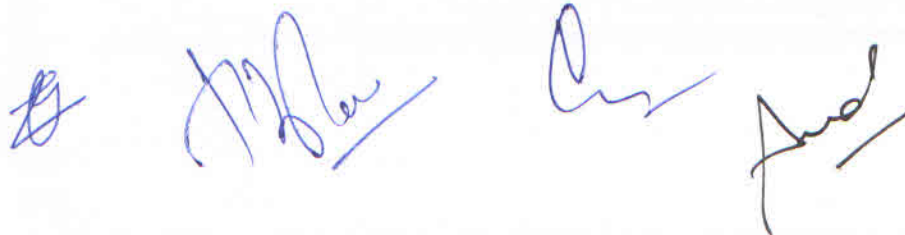
UNIT-D

8 Hours

Statistical methods for Pattern Recognition Bayes Decision Theory, Minimum Error and Minimum Risk Classifiers, Discriminant Function and Decision Boundary, Normal Density, Discriminant Function for Discrete Features, Parameter Estimation

Reference Books

1. Tom M. Mitchell, Machine Learning, McGraw Hill Education.
2. Ethem Alpaydin, Introduction to Machine Learning, PHI.
3. Shai Shalev-Shwartz, Understanding Machine Learning: From Theory to Algorithms, Cambridge University Press.



Course Title: Cloud Computing
Course Code: CSA323
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective:

- To understand the emerging area of "cloud computing" and how it relates to traditional models of computing.
- To gain competence in Map Reduce as a programming model for distributed processing of large datasets.

UNIT—A

15 Hours

Overview of Computing Paradigm

- Recent trends in Computing
- Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing

Evolution of cloud computing

- Business driver for adopting cloud computing
- Introduction to Cloud Computing
- Cloud Computing (NIST Model)
- Introduction to Cloud Computing, History of Cloud Computing, Cloud service providers
- Properties, Characteristics & Disadvantages
- Role of Open Standards

UNIT—B

15 Hours

Infrastructure as a Service(IaaS)

- Introduction to IaaS
- IaaS definition, Introduction to virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine(VM)

UNIT—C

15 Hours

Platform as a Service(PaaS)

- Introduction to PaaS
- What is PaaS, Service Oriented Architecture (SOA)
- Cloud Platform and Management

UNIT—D

15 Hours

Software as a Service(SaaS)

- Introduction to SaaS
- Web services
- Web 2.0

- Web OS
- Case Study on SaaS

Reference Books

1. Barrie Sosinsky, *Cloud Computing Bible*, New Delhi: Wiley-India, 2010
2. BuyyaRajkumar , BrobergJames , Goscinski Andrzej M., *Cloud Computing: Principles and Paradigms*, Wiley, 2011
3. Antonopoulos Nikos, GillamLee, *Cloud Computing: Principles, Systems and Applications*, Springer, 2012
4. KrutzRonald L, Vines Russell Dean, *Cloud Security: A Comprehensive Guide to Secure Cloud Computing*, New Delhi: Wiley-India, 2010

