

**E.M.G. YADAVA WOMEN'S COLLEGE , MADURAI – 625 014.**

*(An Autonomous Institution – Affiliated to Madurai Kamaraj University)*

Re-accredited (**3<sup>rd</sup> Cycle**) with Grade **A+ & CGPA 3.51** by NAAC

## **DEPARTMENT OF COMPUTER SCIENCE**



### **CBCS SYLLABUS**

### **BACHELOR OF SCIENCE**

**PROGRAMME CODE - S**

### **COURSE STRUCTURE**

(w.e.f. 2021 – 2022 Batch onwards)



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## **CRITERION - I**

### ***1.2.2 Details of Programmes offered through Choice Based Credit System (CBCS) / Elective Course System***

**Syllabus copies with highlights of contents focusing on  
Elective Course System**



#### **To be Noted:**

<b>HIGHLIGHTED</b>	<b>COURSE</b>
	<b>Elective</b>

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**COURSE STRUCTURE - SEMESTER WISE**

Sem	Part	Sub Code	Title of the paper	Teaching hrs (per week)	Exam Duration (hrs)	Marks Allotted			Credits
						CIA	SE	Total	
V	III	21S51	Core : Operating Systems	5	3	25	75	100	4
	III	21S52	Core : Software Engineering	5	3	25	75	100	4
	III	21S53	Core : Programming in Python	5	3	25	75	100	4
	III	21S5P	Core : Programming in Python Lab	6	3	40	60	100	3
	III		Elective I	5	3	25	75	100	5
	IV	21SES5P	SBE: Computer Graphics Lab	2	3	40	60	100	2
	IV	214EV5	Environmental Studies	2	3	25	75	100	2
VI	III	21S61	Core : Data Communication and Networking	5	3	25	75	100	4
	III	21S62	Core : Web Programming	5	3	25	75	100	4
	III	21S6P	Core : Web Programming Lab	6	3	40	60	100	3
	III		Elective II	5	3	25	75	100	5
	III	21SEPR6	Elective III (Project)	5	3	20	80	100	5
	IV	21SES6P	SBE: Linux Lab	2	3	40	60	100	2
	IV	214VE6	Value Education	2	3	25	75	100	2
	PART V	21SNS4/ 21SPE4	Extension Activities NSS / Physical Education	-	3	25	75	100	1

**Electives:****Semester - V****Elective - I - (Choose any one)**

1. Computer Graphics - 21SE5A
2. Internet of Things - 21SE5B

**Semester - VI****Elective – II - (Choose any one)**

1. Data Mining and Big Data Analysis - 21SE6A
2. Artificial Intelligence - 21SE6B

**Elective III**

1. Project - 21SEPR6

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<b>Title of the Paper</b>	<b>: Computer Graphics</b>	
<b>Semester</b>	<b>: V</b>	<b>Contact Hours: 5</b>
<b>Sub Code</b>	<b>: 21SE5A</b>	<b>Credits : 5</b>

**Objectives:**

To imbibe the knowledge in graphics in order to enable them to draw desired figures

**Unit – I**

**A Survey of Computer Graphics:** Computer-Aided Design – Presentation Graphics – Computer Art- Entertainment- Education and Training – Visualization – Image Processing – Graphical User Interface. **Overview of Graphics Systems:** Video Display Devices- Raster-Scan Systems-Random-Scan Systems-Input Devices-Graphics software.

**Unit – II**

**Output Primitives:** Point and Lines. **Line-Drawing Algorithms:-**DDA Algorithm- Bresenham's Line algorithm – Circle-Generating Algorithm – Character Generation. **Attributes of Output Primitives:** Line Attributes – Curve Attributes – Area-Fill Attributes – Character Attributes – Bundled Attributes.

**Unit - III**

**Two-Dimensional Geometric transformations:** Basic Transformations - Matrix Representations – Composite Transformations. **Two-Dimensional Viewing:** Two Dimensional Viewing Functions – Clipping Operations – Point Clipping - Line Clipping- Polygon Clipping – Curve Clipping – Text Clipping – Exterior Clipping.

**Unit –IV**

**Graphical User Interfaces and Interactive Input Methods:** Input of Graphical Data–**Three-Dimensional Concepts:** Three- Dimensional Display Methods – Three-

Dimensional Graphics Packages. **Three-Dimensional Object Representations:** Polygon Surfaces – Curved Lines and Surfaces – Quadric Surfaces – Super quadrics.

## Unit - V

**Color Models:** Properties of Light – RGB Color Model – YIQ Color Models – CMY Color Model – HSB Color Model – Color Selection and Applications. **Computer Animation:** Design of Animation Sequences – General Computer Animation – Raster animations – Computer Animation languages – Key-Frame System.

## Text Books:

Donald Hearn & Pauline Baker M, *Computer Graphics C Version*, Pearson Education, India, 2<sup>nd</sup> Edition, 2009.

## Chapters:

**Unit I** : 1, 2.1, 2.2, 2.3, 2.5, 2.7

**Unit II** : 3.1, 3.2, 3.5, 3.14, 4.1 to 4.6

**Unit III** : 5.1 to 5.4, 6.4 to 6.11

**Unit IV** : 8.2, 9.1, 9.2, 10.1 to 10.4

**Unit V** : 15.1, 15.4 to 15.7, 15.10, 16.1 to 16.5

## Reference Books:

1. Dr. Jeffrey & McConnell J, *Computer Graphics Theory into practice*, Jones & Bartlett publishers, Sudbury, 1<sup>st</sup> Edition, 2006.
2. Parslow R D & Prowse R W, *Computer Graphics: Techniques and Applications*, Richard Elliot Green, USA, 7<sup>th</sup> Edition, 2001.
3. Peter Shirley, *Fundamentals of Computer graphics*, A.k.Peters Ltd, Wellesley, United States, 2<sup>nd</sup> Edition, 2002.
4. Steven Harrington, *Computer Graphics: A programming Approach*, Tata McGraw-Hill, India 4<sup>th</sup> Edition, 2005.
5. William Newman M & Robert Sproull F, *Principles of Interactive Computer Graphics*, Tata McGraw-Hill Education, India, 4<sup>th</sup> Edition, 2000.

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<b>Title of the Paper</b>	<b>: Internet of Things</b>	
<b>Semester</b>	<b>: V</b>	<b>Contact Hours: 5</b>
<b>Sub Code</b>	<b>: 21SE5B</b>	<b>Credits : 5</b>

**Objectives:**

To acquire knowledge about electronic circuits and number systems used in computers.

**Unit – I**

**Introduction to Internet of Things:** Introduction – Physical Design of IoT – Logical Design of IoT – IoT Enabling Technologies.

**Unit – II**

**Domain Specific IoTs :** Introduction – Home Automation – Cities –Environment – Energy – Retail – Logistic – Agriculture – Industry – Health & Lifestyle.

**Unit –III**

**IoT and M2M:** Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT. **IoT System Management with NETCONF-YANG:** Need for IoT Systems Management – NETCONF – YANG.

**Unit –IV**

**IoT Platforms Design Methodology:** Introduction – IoT Design Methodology – Motivation for Using Python.

**Unit–V**

**IoT Physical Devices & Endpoints:** What is an IoT Device – Exemplary Device: Raspberry Pi – Raspberry Pi Interfaces – Other IoT Devices.

**Text Books:**

1.VijayMadisetti, ArshdeepBahga, *Internet of Things: A Hands - On Approach*, Universities Press (INDIA) Private Limited, 1<sup>st</sup> Edition, 2014.

**Chapters:**

- Unit – I** : 1.1 to 1.4  
**Unit – II** : 2.1 to 2.10  
**Unit – III** : 3.1 to 3.4, 4.1, 4.4, 4.5  
**Unit – IV** : 5.1, 5.2, 5.4  
**Unit – V** : 7.1, 7.2, 7.5, 7.7

**Reference Books:**

1. Michael Miller, *The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World*, kindle version.
2. Francis daCosta, *Rethinking the Internet of Things: A Scalable Approach to Connecting Everything*, Apress Publications 2013, 1st Edition,
3. Jamil Y.Khan and Mehmet R.Yuce, *The Internet of Things, Systems and Applications*, Jenny Standard Publishing, 1<sup>st</sup> Edition 2019.
4. Adrian McEwen & Hakim Cassimally, *Designing, The Internet of Things*, Willey Publication, 1<sup>st</sup> Edition 2014.
5. Sean Smith, *The Internet of Risky Things:Trusting the Devices that Surround us*, O'Reilly Media, 1<sup>st</sup> Edition 2017.

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<b>Title of the Paper</b>	<b>: Data Mining and Big Data Analysis</b>	
<b>Semester</b>	<b>: VI</b>	<b>Contact Hours: 5</b>
<b>Sub Code</b>	<b>: 21SE6A</b>	<b>Credits : 5</b>

**Objectives:**

To acquire knowledge about retrieval of data from voluminous data in a desired manner.

**Unit - I**

**Data warehousing:** introduction- data warehouse architecture-dimensional modeling - OLAP operations-ROLAP- data marting - ETL- data cleaning ETL vs. ELT.

**Data mining:** Introduction — KDD vs. Data mining – DBMS vs. DM- DM techniques – Issues and Challenges in Data Mining – Data mining application areas-other related areas.

**Unit - II**

**Classification Technique:** Introduction – what is Decision Trees? - Tree Construction Principle - Decision Tree construction with presorting– CLOUDS-pruning technique. **Clustering techniques:** Clustering paradigms – K Medoid algorithms – CLARA – Hierarchical Clustering - DBSCAN – BIRCH – CURE. **Decision Trees:** Decision Tree Construction Algorithms – CART – ID3.

**Unit - III**

**Association Rules:** what is an association rule?- methods to discover association rules - A priori algorithm – Partition algorithm - Dynamic Item set Counting algorithm - FP-tree growth algorithm-Eclat and dEclat – border algorithm - generalized association rule – Association Rules with Item Constraints. **Other techniques:** Introduction- what is neural network? - Learning in NN – Unsupervised Learning – support vector machine.



## Unit - IV

**Genetic algorithm:** Introduction-Basic steps of GA-selection-crossover-mutation-data mining using GA. **Web mining:** Introduction – Web content mining – Web structure mining – Web usage mining. **Temporal and Spatial mining:** Introduction-what is temporal data mining? - temporal association rule - The GSP algorithm – SPADE-SPIRT-event prediction problem-time series analysis-spatial mining- Spatial mining tasks.

## Unit - V

**Introduction to big data:** characteristics of data-evolution of big data-definition of big data-challenge with big data-what is big data? - What is changing in the realms of big data? **Introduction to hadoop:** hadoop overview-hadoop distributed file system-processing data with hadoop-interacting with hadoop ecosystem. **Introduction to MAPREDUCE programming:** Introduction –mapper-reducer-combiner-partitioner-searching-sorting-compression.

### Text Books:

1. Arun k Pujari, *Data Mining Techniques*, Universities Press (India) Pvt Ltd, Hyderabad ,4<sup>th</sup>Edition, 2017.

### Chapters :

**Unit I** : 2.1-2.3, 2.10-22.11, 2.22-2.25, 3.1-3.7, 3.9-3.10.

**Unit II** : 6.1-6.3, 6.13, 6.16, 6.18, 5.1, 5.2, 5.4, 5.5, 5.7-5.10, 6.7 -6.9.

**Unit III** : 4.1-4.5, 4.7-4.9, 4.13-4.15, 9.1-9.4, 9.6.

**Unit IV** : 8.1-8.6, 11.1-11.5, 12.1-12.3, 12.5-12.7, 12.10-12.13

2. Seema Acharya, Subhashini Chellappan, *Big data and analytics*, Wiley India Pvt. Ltd, New Delhi,1<sup>st</sup> Edition,2015.

### Chapters :

**Unit V** : 2.1-2.5, 2.13, 5.7, 5.10, 5.11, 5.13, 8.1-8.8

### Reference Books:

1. David J. Hand, Heikki Mannila, Padhraic Smyth, — *Principles of Data Mining*, Massachusetts Institute of Technology, 2001.
2. Gajendra Sharma, *Data Mining & Data Warehouse OLAP*, TMH publications,

New Delhi, 2<sup>nd</sup> Edition, 2006.

3. Jay Liebowitz, “*Big Data and Business Analytics*” Au erbach Publications, CRC press, 2013
4. Jiawei Han & Micheline kamber , *Data mining Concepts & Techniques*, Morgon, Kaufmann Publishers, San Francisco,USA,2<sup>nd</sup> Edition,2010.
5. Michael Minelli, Michele Chamboss, Ambiga Dhiraj , "*Big Data, Big Analytics*” John Wiley , 2014.

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<b>Title of the Paper</b>	<b>: Artificial Intelligence</b>	
<b>Semester</b>	<b>: VI</b>	<b>Contact Hours: 5</b>
<b>Sub Code</b>	<b>: 21SE6B</b>	<b>Credits : 5</b>

**Objectives:**

To impart knowledge on the various search techniques and the basic functioning of AI.

**Unit –I:**

Artificial Intelligence: The AI Problems – The Underlying Assumption – AI Technique – The level of the Model – Criteria for Success. Problems, Problem Spaces and Search: Defining the Problem as a State Space Search – Production Systems – Problems Characteristics – Production System Characteristics – Issues in the Design of Search Programs – Additional Problems

**Unit – II:**

Generate-and-Test – Hill Climbing – Best-First Search – Problem Reduction – Constraint Satisfaction – Means-Ends Analysis.

**Unit – III:**

Representing Knowledge using Rules: Procedural versus Declarative knowledge – Logic Programming – Forward versus Backward Reasoning –Representation issues: Representations and Mappings – Approaches to Knowledge Representation – Issues in Knowledge representation - The Frame Problem.

**Unit – IV:**

Using Predicate Logic: Representing Simple Facts in Logic – Representing instance and is a Relationships – Computable Functions and Predicates – Resolution – Natural Deduction.

**Unit – V:**

Game Playing: Overview – The Minimax Search Procedure. Natural Language Processing: Introduction. Connectionist Models: Introduction - Hopfield Networks – Learning in Neural Networks: Perceptrons.

**Text Books:**

Elaine Rich, Kevin Knight and Shivashankar B Nair, *Artificial Intelligence*, 3<sup>rd</sup> Edition, Tata McGraw-Hill publications, 2014 Reprint.

**Chapters:**

Unit I : 1-3

Unit II : 5,6

Unit III : 12.1, 12.2

Unit IV : 15

Unit V : 18.1, 18.2, 18.2.1

**Reference Books:**

1. Elaine Rich, *Artificial Intelligence*, Tata McGraw-Hill publications, 2008.
2. V.S.Janakiraman K. Sarukesi, P.Gopalakrishnan, *Foundations of Artificial I* Tata McGraw-Hill publications, 2017.
3. Stuart Russell and Peter Norvig, —*Artificial Intelligence: A Modern Approach*, Pearson Education, 2018.
4. David Pool, Alan Mackworth, —*Artificial Intelligence: Foundations of Computational agents*, Cambridge University, 2015.
5. Nils J. Nilsson, —*The Quest for Artificial Intelligence: A History of Ideas and achievements*, Cambridge University Press, 2010. Intelligence and Expert System Infinity Press, 1st Edition, 2016.

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**Title of the Paper : Project**  
**Semester : VI**  
**Sub Code : 21SEPR6**

**Contact Hours: 5**  
**Credits : 5**

The Students are allowed to develop their project within our campus with the help of the internal staff members.

In the first review the students submit their title of the project and synopsis, and also submit the determination of the modules.

In the second review 50% of the project is completed and demonstrate the project.

In the final review the students prepare the powerpoint presentation. The oral is must for the completion of the project.

This report will be evaluated 80 marks for external examiner and 20 mark for internal examiner.