

# **SADAKATHULLAH APPA COLLEGE**

**(AUTONOMOUS)**

**(Reaccredited by NAAC at an 'A' Grade with a CGPA of 3.40 out of 4.00 in the III cycle An ISO 9001:2008 Certified Institution)**

**RAHMATH NAGAR, TIRUNELVELI- 11.**

**Tamilnadu**

## **PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE (Unaided)**



### **CBCS SYLLABUS**

**For**

### **M.Phil. Computer Science**

**(Applicable for students admitted in June 2015 and onwards)**

**(As per the Resolutions of the Academic Council  
Meeting held on 23.02.2016)**



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**SADAKATHULLAH APPA COLLEGE (AUTONOMOUS)**  
**PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE**  
**M.Phil. Computer Science Syllabus**  
**(Applicable for students admitted in June 2015 and onwards)**  
**COURSE STRUCTURE**

I SEMESTER			II SEMESTER		
COURSE	H/W	C	COURSE	H/W	C
Core 1	6	5	Elective (Area paper)	6	5
Core 2	6	5	Dissertation and Viva - voce	6	15
<b>TOTAL</b>	<b>12</b>	<b>10</b>	<b>TOTAL</b>	<b>12</b>	<b>20</b>

**DISTRIBUTION OF HOURS, CREDITS, NO. OF PAPERS, & MARKS**

SUBJECT	HOURS	CREDITS	NO. OF PAPERS	MARKS
Core	12	10	2	<b>200</b>
Elective (Area paper)	6	5	1	<b>100</b>
Dissertation and Viva-voce	6	15	1	<b>200</b>
<b>TOTAL</b>	<b>24</b>	<b>30</b>	<b>4</b>	<b>500</b>

**TITLE OF THE PAPERS**

**M. PHIL. COMPUTER SCIENCE (2015 - 2018)**

(The candidate should select any one of the Area Papers in the second semester related to their proposed topics of research)

SEM	P	TITLE OF THE PAPER	SUB. CODE	H/W	C	MARKS		
						I	E	T
I	C1	Research Methodology	15MCSC11	6	5	25	75	100
	C2	Digital Image Processing	15MCSC12	6	5	25	75	100
II	E	A) Virtual Reality	15MCSE2A	6	5	25	75	100
		B) Data Warehousing and Mining	15MCSE2B					
	D	Dissertation and Viva-voce	15MCSD21	6	15	--	200	200
<b>TOTAL</b>				<b>24</b>	<b>30</b>	<b>75</b>	<b>425</b>	<b>500</b>

**M. PHIL. COMPUTER SCIENCE SYLLABUS**  
**(Applicable for students admitted in June 2015 and onwards)**

<b>I SEMESTER</b>			
<b>C1</b>	<b>RESEARCH METHODOLOGY</b>	<b>15MCSC11</b>	
<b>Hrs/Week: 6</b>	<b>Hrs/ Sem: 90</b>	<b>Hrs/Unit: 18</b>	<b>Credits: 5</b>

**UNIT I**

Basic Research Methodology: Objective and Motivation in Research – Types of Research – Approaches and Significance of Research – Research Methodology versus Research Methods – Research Process–Finding a Research Advisor/Guide – What to Look for in a Potential Research Advisor/Guide – How to Find an Advisor/Guide – The Advisor–Advisee Relationship; Finding a Topic and Beginning Research – Getting Research Ideas – How to be an Active Reader and Listener – Getting Exposed to Research – Directed Study; Formulating the Research Problem: Develop the Nucleus of an Idea – Extensive Literature Survey: A Trap to Avoid – Choosing an Idea – Stay Active – Measure of Good Research – Common Problems for Researchers.

**UNIT II**

Overview of the Theory of Science and COMPUTER SCIENCE of Scientific Research – Overview of Research Methodology for Computing Research – Science versus Engineering – Distinct Perspective of Goals Research Methodology for Circuit Branches: Formulating the Research Problem – Research Design – Evolution of Computing Research

**UNIT III**

Research Methods for Computing Research – COMPUTER SCIENCE of Ideas in Computing – Measurements based Research Methods in Computer – Measurements based Research Methods in Signal and Image Processing – Graphics – Vision and Pattern Recognition – Deductive Methods in Computing Science.

## **UNIT IV**

Introduction: Basic Concepts of Pattern Recognition– Fundamental problems in Pattern Recognition– System Design– Design Concepts and Methodologies – Examples of Automatic Pattern Recognition Systems.

Pattern Classification by Distance Functions: Minimum Distance Pattern Classification – Cluster Seeking – Unsupervised Pattern Recognition Case Studies in Pattern Recognition: Clustering – Artificial Neural Networks – Image Analysis

## **UNIT V**

Searching for Scientific Papers – Writing and Presentation of a Research Paper for a Conference or Journal – Review and Opposition of Engineering/Scientific Research Papers – Writing a Good Thesis – Research Report Writing – Converting your Research thesis into a Monograph – Research Education – The Research Society and Research Policy.

### **REFERENCE BOOKS:**

1. Lecture Notes by Prof. Dr. Krishnan Nallaperumal on “Engineering Research Methodology – A Computer Science and Engineering and Information Technology Perspective.
2. Earl Gose, Richard Johnsonbaugh and Steve Jost, “Pattern Recognition and Image Analysis”, Prentice Hall, New Delhi, 2005.
3. Wolff D D Parsons M L, “Pattern Recognition Approach To Data Interpretation”, Plenum Press, 1983.
4. Julius T. Tou and Rafael C. Gonzalez, "Pattern Recognition Principles", Addison Wesley, New Delhi, 1974

<b>I SEMESTER</b>			
<b>C2</b>	<b>DIGITAL IMAGE PROCESSING</b>		<b>15MCSC12</b>
<b>Hrs/Week: 6</b>	<b>Hrs/ Sem: 90</b>	<b>Hrs/Unit: 18</b>	<b>Credits: 5</b>

### **UNIT-I**

Digital Image Processing: Origins of Digital Image Processing - Steps in Digital Image Processing - Digital Image Fundamentals: Elements of Visual Perception - Light and the Electromagnetic Spectrum - Image Sensing and Acquisition - Image Sampling and Quantization - Basic Relationships between Pixels - Mathematical Tools used in Digital Image Processing.

### **UNIT-II**

Image Transformation & Filters: Basic Intensity Transformation Functions - Histogram Processing - Fundamentals of Spatial Filtering - Smoothing Spatial Filter - Sharpening Spatial Filters - Combining Spatial Enhancement methods - Fuzzy techniques for Intensity Transformation and Spatial Filtering. Filtering in the Frequency Domain: Preliminary Concepts - Sampling and the Fourier Transforms of Sampled Functions - The Discrete Fourier Transform (DFT) - Properties of the 2-D DFT - Filtering in the Frequency Domain - Image Smoothing and Sharpening using Frequency Domain Filters - Selective Filtering.

### **UNIT-III**

Image Restoration - Reconstruction - Image Degradation/Restoration process - Noise Models - Restoration in the presence of Noise only-Spatial Filtering - Periodic Noise Reduction by Frequency Domain Filtering - Linear - Position-Invariant Degradations - Estimating the Degradation Functions - Inverse Filtering - Wiener Square Error Filtering - Constrained Least Square Filtering - Geometric Mean Filter - Image Reconstruction from Projections.

### **UNIT-IV**

Image Compression: Fundamentals (Coding Redundancy - Interpixel Redundancy-Psycho visual Redundancy-Fidelity Criteria) - Image Compression Models (Source Encoder and Decoder) - Error Free Compression (Variable Length Coding - LZW Coding - Bit Plane Coding) -Lossy Compression (Transform Coding - Wavelet Coding) - Image Compression Standards (Continuous Tone Still Image - Video Compression Standards) -Wavelets and Multi resolution Processing: Multi resolution Expansion - Wavelet Transforms in One Dimension - The Fast Wavelet Transforms - Wavelet Transforms in Two



Dimensions - Wavelet Packets. Image Compression: Fundamentals - Basic Compression Methods - Digital Image Watermarking

#### **UNIT-V**

Image Segmentation: Point - Line and Edge Detection - Thresholding - Region-Based Segmentation - Segmentation Using Morphological Watersheds - Use of Motion in Segmentation. Object Recognition: Patterns and Pattern Classes - Recognition Based on Decision-Theoretic Methods - Structural Methods.

#### **Text Books:**

1. Rafael C. Gonzalez - Richard E. Woods - "Digital Image Processing" - 3rd Edition - Pearson Education - 2008.
2. Rafael C. Gonzalez - Richard E. Woods - "Digital Image Processing using MATLAB" -2nd Edition - Prentice Hall of India - 2002.
3. A.Jain -"Fundamentals of Digital Image Processing" - Prentice Hall of India.

<b>II SEMESTER</b>			
<b>E A</b>	<b>VIRTUAL REALITY</b>		<b>15MCSE2A</b>
<b>Hrs/Week: 6</b>	<b>Hrs/ Sem: 90</b>	<b>Hrs/Unit: 18</b>	<b>Credits: 5</b>

### **UNIT I**

Introduction to the Formats – such as VRML – X3D – MPEG4 – and other formats

### **UNIT II**

The VRML Consortium and ISO Standardization

- VRML 97
- Java 3D

### **UNIT III**

Programming languages and editors for VRML

- VRMLpad
- X-VRML
- VRML ++

### **UNIT IV**

Viewing and building VRML worlds

- Optimization a Bump mapping
- Multitexturing

### **UNIT V**

#### **Cyberspace and Virtual communities**

- Alpha Worlds
- Augmented Reality

#### **Uses of Virtual Reality for 40**

- Gaming environments
- CAVE systems
- Product advertising
- Manufacturing Optimization
- Calculation results visualization
- Operative mission planning in civil protection with GIS
- Simulation
- Internet Communities

## **REFERENCE BOOKS:**

1. The VRML 2.0 Handbook by Jed Hartman - Josie Wernecke - and Silicon Graphics (Paperback - Oct 10 - 1996)
2. Building VrmI Worlds by Claire Sanders - Charlie Scott - Paul Wolfe - and Sebastian Hassinger (Paperback - Dec 1996)
3. The Annotated VRML 2.0 Reference Manual by Rikk Carey and Gavin Bell (Paperback - Jun 6 - 1997)
4. Reality Architecture: Building 3D Worlds In Java and VRML by Mccarthy and Carty (Paperback - Feb 5 - 1998)
5. The VrmI Sourcebook by Andrea L. Ames - David R. Nadeau - and John L. Moreland (Paperback - Jan 1996)
6. VrmI: Browsing and Building Cyberspace by Mark Pesce (Paperback - Sep 1995)

<b>II SEMESTER</b>			
<b>E B</b>	<b>DATA WAREHOUSING AND MINING</b>	<b>15MCSE2B</b>	
<b>Hrs/Week: 6</b>	<b>Hrs/ Sem: 90</b>	<b>Hrs/Unit: 18</b>	<b>Credits: 5</b>

### **UNIT – I**

Data Warehousing Introduction – Definition-Architecture-Warehouse Schema-Warehouse server-OLAP operations. Data Warehouse technology – Hardware and operating system-Warehousing Software – Extraction tools – Transformation tools – Data quality tools – Data loaders – Data Access and retrieval tools – Data Modelling tools – Fact tables and dimensions Data warehousing case studies : Data warehousing in Government - Tourism - Industry - Genomics data.

### **UNIT - II**

Data Mining definition – DM Techniques – current trends in data mining - Different forms of Knowledge – Data selection - cleaning - Integration - Transformation - Reduction and Enrichment. Data: Types of data - Data Quality - Data Preprocessing - Measures of similarity and dissimilarity. Exploration: Summary statistics – Visualization.

### **UNIT – III**

Association rules: Introduction – Methods to discover association rule – Apriori algorithm Partition Algorithm – Pincher search algorithm – Dynamic Item set algorithm – FP Tree growth algorithm. Classification: Decision Tree classification – Bayesian Classification – Classification by Back Propagation.

### **UNIT - IV**

Clustering Techniques: Introduction – Clustering Paradigms – Partitioning Algorithms – K means & K Mediod algorithms – CLARA – CLARANS – Hierarchical clustering – DBSCAN – BIRCH – Categorical Clustering algorithms – STIRR – ROCK – CACTUS. Introduction to machine learning – Supervised learning – Unsupervised learning – Machine learning and data mining. Neural Networks: Introduction – Use of NN – Working of NN Genetic Algorithm: Introduction –Working of GA.

### **UNIT - V**

Web Mining: Introduction –Web content mining – Web structure mining –Web usage mining –Text mining –Text clustering - Temporal mining –Spatial mining –Visual data mining – Knowledge mining – Various tools and techniques for implementation using (weka - Rapidminer and Matlab).

**Text Books:**

1. Arun K Pujari - "Data Mining Techniques" - University press - Edition 2001.
2. Jaiwei Han -MichelinneKamber - "Data Mining : Concepts and Techniques"
3. Pang-Ning Tan - Michael Steinbach -Vipin Kumar - "Introduction to Data Mining" - 2007.
4. T.Sushmita mitra -Tir ku Acharaya - "Data Mining Multimedia - Softcomputing& Bioinformatics" - Wiley Interscience publications - 2004.
5. Michal J A Berry - Gordon Linoff - "Mastering Data Mining" - John Wiley & Sons - 2000.
6. Alex Berson - Stephen J.Smith - "Data Warehousing - Data Mining & OLAP " - Tata McGrawhill
7. C S R Prabhu - "Data Warehousing – concepts - techniques and applications " - 2nd Edition - Prentice Hall of India - 2002.

<b>II SEMESTER</b>		
<b>D</b>	<b>DISSERTATION</b>	<b>15MCSD21</b>
<b>Hrs/Week: 6</b>	<b>Hrs/ Sem: 90</b>	<b>Credits: 15</b>

The following guidelines have to be followed by every candidate while preparing his/her M.Phil. Dissertation:

- The Dissertation should be in English.
- The candidate has to follow the instructions of the Sadakathullah Appa College COMPUTER SCIENCE Research Centre with regard to the format and content of the Dissertation.
- The first page, Declaration and certificate of the dissertation should be according to the model given at the end of this.
- Dissertation text should be typed in usual MS-Office font with size 12 / 13 on A4 size Executive bond quality paper with double line spacing. Each page should contain at least 20 lines.
- The Dissertation should be submitted in duplicate.
- The number of pages in M.Phil. Dissertation should be not less 100 pages inclusive of bibliography and Annexure.
- Two bound copies of the M.Phil. Dissertation duly signed by the Guide and Head of the Department should be submitted through the Research Centre along with the CD containing the softcopy of the Dissertation in PDF format.
- Candidates shall submit the dissertation to the Research Centre through the Supervisor and Head of the Department within 6 months but not earlier than 5 months from the date of start of the second semester.
- The M.Phil. scholars should attend at least one of the following – training programmes, Workshops, Seminars, Symposiums, etc., and that they should also have a paper either published or received for acceptance in an ISSN / Reputed Journal before submitting the Dissertation. **Scholars who fail to comply with the above are not eligible for the submission of their Dissertation.** Photo copy of the publication/Letter of acceptance for publication should be given as Annexure at the end of the Dissertation.

- Both the Internal as well as External Examiner award 200 marks each for the Dissertation. The distribution of mark will be **120 marks for the Dissertation and 80 marks for the Public Viva-voce Examination**. In the Public Viva-voce Examination the M.Phil. Scholars should present their Dissertation work with PowerPoint Presentation. The Division of marks for the Dissertation is as mentioned below:

<b>Particulars</b>	<b>Internal Examiner</b>	<b>External Examiner</b>
Wording of Title	10	10
Objectives/ Formulation including Hypothesis	10	10
Review of Literature	20	20
Relevance of Dissertation to Social Needs	10	10
Methodology/ Techniq/ Procedure Adopted	30	30
Summary/ Findings/ Conclusion	10	10
Bibliography/ Annexure/ Foot notes	20	20
Training/ Seminar/ Workshop	10	10
	<b>120</b>	<b>120</b>

The average mark of Internal and External Examiners is considered as marks of project report.

<b>SCHEME OF EXAMINATIONS UNDER CBCS</b>
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The medium of instruction in all PG courses is English and students shall write the CIA and Semester Examinations in English.

**DISTRIBUTION OF MARKS FOR CIA AND SEMESTER EXAMINATIONS**

<b>SUBJECT</b>	<b>TOTAL MARKS</b>	<b>CIA TEST</b>	<b>SEMESTER EXAM.</b>	<b>PASSING MINIMUM</b>		
				<b>CIA EXAM.</b>	<b>SEM. EXAM.</b>	<b>OVER ALL</b>
<b>Theory</b>	100	25	75	Nil	38	50
<b>Project</b>	200	Nil	Report - 120 marks Viva - 80 marks	Nil	---	100



### DIVISION OF MARKS FOR CIA TEST

<b>SUBJECT</b>	<b>MARKS</b>	<b>ASSIGNMENT FOR UG / ASSIGNMENT OR SEMINAR FOR PG</b>	<b>REGULARITY</b>	<b>RECORD NOTE</b>	<b>TOTAL MARKS</b>
<b>Theory</b>	20	5	--	--	<b>25</b>
<b>Practical</b>	30	--	5	5	<b>40</b>

1. The duration of each CIA Test is ONE hour and the Semester Examination is THREE hours.
2. Three CIA tests of 20 marks each will be conducted and the average marks of the best two tests out of the three tests will be taken.
3. The I test will be based on the first 1.5 units of the syllabus, the II test will be based on the next 1.5 units of the syllabus and the III test will be based on the next 1.5 units of the syllabus.
4. Two examiners for M.Phil. Courses.

**QUESTION PAPER PATTERN FOR CIA TEST (THEORY)**

**Duration: 1 Hr**

**Maximum Marks: 20**

<b>Section</b>	<b>Question Type</b>	<b>No. of Questions &amp; Marks</b>	<b>Marks</b>
<b>A</b>	No Choice Answer should not exceed 75 words	2 Questions 2 marks each	2 x 2 = 4
<b>B</b>	Internal choice (Either or type) Answer should not exceed 200 words	2 Questions 4 marks each	2 x 4 = 8
<b>C</b>	Open Choice (Answer ANY ONE out of Two) Answer should not exceed 400 words	1 Question 8 marks	1 x 8 = 8
<b>TOTAL</b>			<b>20 MARKS</b>

**QUESTION PAPER PATTERN FOR SEMESTER EXAMINATION (THEORY)**

**Duration: 3 Hrs**

**Maximum Marks: 75**

<b>Section</b>	<b>Question Type</b>	<b>No. of Questions &amp; Marks</b>	<b>Marks</b>
<b>A</b>	No Choice Answer should not exceed 75 words	10 Questions - 2 marks each (2 Questions from each unit)	10 x 2 = 20
<b>B</b>	Internal choice (Either or type) Answer should not exceed 200 words	5 Questions with internal choice. Each carries 5 marks (Two questions from each unit)	5 x 5 = 25
<b>C</b>	Open Choice (Answer ANY THREE out of FIVE) Answer should not exceed 400 words	3 Questions out of 5 - 10 marks each (1 Question from each unit)	3 x 10 = 30
<b>TOTAL</b>			<b>75 MARKS</b>

(Model for the Title Page of the Dissertation)

# **TITLE OF THE DISSERTATION**

*Dissertation Submitted to the Sadakathullah  
Appa College (Autonomous) in partial fulfillment of the  
requirements for the award of the degree of*

**MASTER OF PHILOSOPHY (MAJOR)**

Submitted by

## **NAME OF THE CANDIDATE**

(REGISTER NO. XXXXXXXXX)

*Under the guidance of*

## **NAME OF THE GUIDE**

Designation of the Guide

Sadakathullah Appa College (Autonomous)

Tirunelveli – 627011



**PG & RESEARCH CENTRE IN (MAJOR)  
SADAKATHULLAH APPA COLLEGE (AUTONOMOUS)  
TIRUNELVELI – 627011  
MONTH, YEAR**

(Model for the Certificate of the Dissertation)

## **Name and Qualification of the Guide,**

Designation of the Guide,

Sadakathullah Appa College (Autonomous)

Rahmath Nagar,

Tirunelveli – 627011

## **CERTIFICATE**

Certified that the dissertation work with the title, **“TITLE OF THE DISSERTATION”** submitted by **NAME OF THE CANDIDATE** with the register number XXXXXXXX in partial fulfillment of the requirements for the award of the degree of **Master of Philosophy in (Major) at the PG & Research Centre in (Major), Sadakathullah Appa College (Autonomous)**, is a work done by the candidate during the period 20XX-XX, under my guidance and supervision and this dissertation or any part thereof has not been submitted elsewhere for any other Degree or Diploma.

Tirunelveli – 627011

DD-MM-YEAR

**(NAME OF THE GUIDE)**

**Forwarded**

(Model for the Declaration by the Candidate)

**Name of the candidate,**

M.Phil. Scholar, (Register No.: XXXXXXXX)

PG & Research Centre in XXXXXXXX,

Sadakathullah Appa College (Autonomous),

Rahmath Nagar, Tirunelveli – 627011

**DECLARATION BY THE CANDIDATE**

I hereby declare that, the dissertation with the title, **“TITLE OF THE DISSERTATION”** submitted in partial fulfillment of the requirements for the award of the degree of **Master of Philosophy in XXXXXXXX** at **the PG & Research Centre in XXXXXXXX , Sadakathullah Appa College (Autonomous)**, is my original work done under the guidance of **Name of the Guide, Designation of the Guide, Sadakathullah Appa College (Autonomous), Tirunelveli – 11** and this work has not been submitted elsewhere for any other Degree or Diploma.

Tirunelveli – 627011

DD-MM-YEAR

**(Signature of the Candidate)**

**Counter signed**

**(Signature and Seal of the Guide)**

Examiner 1:

Examiner 2: