# M.Phil in Computer Science

# SYLLABUS
## (For the students joining in 2018 - 2019 and afterwards)



**DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS**
**THE GANDHIGRAM RURAL INSTITUTE**
**(Deemed to be University)**
**Gandhigram - 624 302**
**Dindigul District**
**Tamil Nadu**

# THE GANDHIGRAM RURAL INSTITUTE – DEEMED TO BE UNIVERSITY
## DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS

## M.Phil in COMPUTER SCIENCE

### SUBJECTS OF STUDY AND SCHEME OF EXAMINATION
(For the students joining in 2018– 2019 and afterwards)

| Code No. | Course Title | Credits | Lecture Hrs/ Week | Evaluation | | Total |
|---|---|---|---|---|---|---|
| | | | | CFA | ESE | |
| **SEMESTER - I** | | | | | | |
| 18MCSM0101 | Research Methodology | 4 | 4 | 50 | 50 | 100 |
| 18MCSM0102 | Computing Techniques and Tools | 4 | 4 | 50 | 50 | 100 |
| 18MCSM01SX | Specialization Course* | 4 | 4 | 50 | 50 | 100 |
| | **Total Credits** | **12** | | | | |
| **SEMESTER - II** | | | | | | |
| 18MCSM0201 | Dissertation ** | **12** | - | 75 | 75+50 | 200 |
| **Total Credits for M.Phil Programme** | | **24** | | | | |

CFA – Continuous Formative Assessment (Internal Evaluation)
ESE – End Semester Examination (External Evaluation)

** Evaluated for 200 marks as below:
   75 marks for the valuation of the Dissertation by the Internal Examiner
   75 marks for the valuation of the Dissertation by the External Examiner
   50 marks for the Viva-Voce jointly by the Internal and External Examiners

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| 18MCSM0101 | RESEARCH METHODOLOGY | CREDITS: 4 |
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**OBJECTIVES:**
- To introduce the basic concepts and methods of Scientific and Computer Science Research.
- To inculcate writing skills and make them write good scientific documents like articles, reviews and thesis
- To make the students aware of the various ethical issues and professional conducts

**LEARNING OUTCOMES:**
- Understand the basic concepts and methods of scientific and computer research
- Abie to analyze a research problem and make a design
- Acquire skills to write scientific documents
- Exposed to ethical issues and intellectual property rights

### UNIT I: Introduction to Scientific and Computer Science Research

Objectives-Significance-Motivation of Research, Types and Approaches, Quantitative Research Methods, Research Methods versus Methodology, Research Process, Criteria of Good Research. Significance & Status of Research in Computer Science. Steps in Research: Having grounding in Computer Science, Major Journals & Publication in Computer Science, Major Research Areas of Computer Science. Identification, Selection & Formulation of Research Problem. Developing a Research Proposal, Planning your Research, The Wider Community, Resources and Tools

### UNIT II: Research Problem and Design

Meaning and Selection of Research Problem, Meaning of Research Design, Need for a Research Design, Features of a Good Design. Important Concepts relating to Research Design. Different Research Designs, Basic Principles of Experimental Designs, Important Experimental Designs

### UNIT III: Research Data and Literature Survey

What is Data?, Mathematical Statistics and Computer Science views on Data Analysis, Methods for Finding Associations: Regression and Pattern Recognition, Method for Aggregation and Data Visualization tools and Techniques, Finding out about your Research Area, Literature Search Strategy, Writing Critical Reviews, Identifying Venues for Publishing your Research

### UNIT IV: Writing Papers, Thesis and Review Process

Preparing and Presenting your Paper, The Conference View Process, Making use of the Referees' Reports, The Journal Review Process, Group Exercise in Reviewing Research Papers, Planning the Thesis, Writing the Thesis, Thesis Structure, Writing up Schedule, The Oral Examination and Viva Voce

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**UNIT V: Ethical Issues and Intellectual Property**

Ethics in General, Professional Ethics, Ethical Issues that Arise from Computer Technology, General Moral Imperatives, More Specific Professional Responsibilities, Organizational Leadership Imperatives. Intellectual Property Rights, Legislations covering Intellectual Property Rights in India

**REFERENCE BOOKS:**

1. C.R. Kothari, Gaurav Garg, "Research Methodology Methods and Techniques", 3rd Edition, New Age International Publishers, Lucknow, 2014.
2. Francis C.Dane, "Research Methods", Brooks/Cole Publishing Company, California, 1990.
3. Juliet Corbin, Anselm Strauss, "Basic of Qualitative Research", 3rd Edition, Sage Publications, New Delhi, 2008.
4. Angela Brew, Routledge Falmer, "The Nature of Research: Inquiry in Academic Context", Psychology Press, New York, 2001.
5. Allen B.Tucker, jr. (Ed.),"The Computer Science and Engineering Handbook", CRC Press, Boca Raton, 1997.
6. Robin Levin Penslar (Ed.),"Research Ethics Cases and Materials", Indiana University Press, Bloomington, 1995.

**Web Resources:**

1. http://desrist.org/desrist/content/design-science-research-ininformation-systems.pdf
2. http://study.com/academy/lesson/research-methodology-approaches-techniques-quiz.html
3. https://www/    0deec5215604c11e41000000/Practical-Guide-to-Write-a-PhD-Thesis-and-publish-papers-based-on-the-thesis.pdf
4. https://www.bowiestate.edu/files/resources/the-fundamental-steps-to-writing-thesis.pdf
5. https://www.pdfdrive.net/research-methodology-books.html
6. https://www.pdfdrive.net/fundamental-of-research-methodology-and-statisticspdf-e10442087.html
7. https://www.pdfdrive.net/advanced-quantitative-research-methodology-e25608453.html
8. https://www.pdfdrive.net/introduction-1-research-methodology-11-the-concept-of-the-research-e870404.html
9. https://www.pdfdrive.net/research-methods-in-computer-science-e31324769.html

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| 18MCSM0102 | **COMPUTIMG TECHNIQUES AND TOOLS** | **CREDITS: 4** |
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**OBJECTIVE:**
- To familiarise the students with the recent research tools and techniques in computing

**LEARNING OUTCOMES:**
- Have an overview on SciLab, NS3, R Programming
- Understand the basics of Documentation techniques and tools
- Understand the basics of Techniques available in Computing Research

**Unit I  Computing Techniques**
Introduction to Computing Techniques: Soft computing- Genetic algorithms - Optimization algorithm- Swarm Intelligence – ACO – Artificial Intelligence – Evolutionary Computing – Machine Learning _ Deep Learning.

**Unit II  Image Processing Tool**
Scilab: Introduction – overview - getting started - basic elements- matrices - looping and branching - functions and plotting

**Unit III  Network Simulator**
Introduction – NetAnim – AODV – Building Module – Data Collection  - DSDV – DSR - Flow Monitor – Internet Module – Mobility – Network Module – OLSR - Wifi

**Unit IV  Big Data Tool : R Programming Language**
Overview of R – Data types, Operators ,functions – Lists & Data frames, Data Reshaping – Arrays & Matrices – R distributions – Visualization – Barchart,Piechart, Histogram, line graph, Scatter plot – Types of regressions, Decision tree, random forest, chi – square test.

**Unit V Documentation Tools and Techniques**
Technical writing using LaTeX: Scientific Writing : Exposure to LaTeX, Installation- MikTeX - TeXnicCenter - Creating Reports and Articles- Text Environment - Math Environment - , Figures, Tables, BibTeX - Reference Manager - Camera Ready Preparation.

**Reference Books**

1. Neuro - Fuzzy and Soft Computing, Jang J.S.R, Sun C.T, and Mizutani E., Prentice Hall India, Pearson Education,  2004.
2. Nature-Inspired Optimization Algorithms, Xin-She Yang, Elsevier, 2014
3. Baudin, Michael, "Introduction to scilab", *Consortium Scilab. pp. 1-93, January* (2010)
4. An Introduction to R Notes on R: A Programming Environment for Data Analysis and Graphics Version 3.5.0 (2018-04-23)
5. Advanced R- Hadley Wickham CRC Press –Taylor and Francis group, an informa business ,London, New York.2015

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**Web Resources:**

1. www.scilab.org
2. https://www.nsnam.org/
3. www.quora.com/What-is-R-programming-language
4. https://www.nsnam.org/
5. www.tutorialspoint.com/r/r_tutorial.pdf.

| 18MCSM01SX | SPECIALIZATION COURSE | CREDITS: 4 |
|---|---|---|

The students must select one Course from the List of Specializations. The syllabus along with two set of question papers and Panel of Examiners will be sent to the Controller of Examinations, GRI by the respective Research Supervisors.

**List of Specializations ***

| | |
|---|---|
| 18MCSM01S1 | Medical Image Processing |
| 18MCSM01S2 | Machine Learning Techniques and Tools |
| 18MCSM01S3 | Big Data Analytics |
| 18MCSM01S4 | Image Segmentation and Analysis |
| 18MCSM01S5 | Biometric Image Processing |
| 18MCSM01S6 | Information Security |
| 18MCSM01S7 | Data Compression |
| 18MCSM01S8 | Network Security |
| 18MCSM01S9 | Parallel Computing |
| 18MCSM01SA | Bioinformatics |

**\*Syllabus will be framed by the respective research supervisors**

**SEMESTER II**

| 18MCSM0201 | DISSERTATION | CREDITS: 12 |
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