

**PERIYAR UNIVERSITY  
SALEM 636 011**



**MASTER OF PHILOSOPHY IN COMPUTER SCIENCE**

**(M.Phil – Computer Science)**

**REGULATIONS AND SYLLABUS  
(under CBCS for University Department)**

**(Effective from the Academic year 2011-2012 and thereafter)**

**PERIYAR UNIVERSITY, SALEM - 11**  
**MASTER OF PHILOSOPHY IN COMPUTER SCIENCE**  
**M.Phil – Computer Science**

**Regulations**

**Full Time / Part Time**  
**Effective from the academic year 2011 - 2012**

**1. OBJECTIVE OF THE PROGRAMME**

It is a pre-research degree in Computer Science for PostGraduate in Computer Science/Computer Applications/Software Science/Computer Communication/Information Technology/Software Engineering/Theoretical Computer Science/Computer Technology/ or any other equivalent programme recognized by this University. It is aimed to explore the various research areas in Computer Science and Applications.

**2. ELIGIBILITY**

Candidates who have qualified their Postgraduate degree in Computer Science/Computer Applications/Software Science/Computer Communication/Information Technology/Software Engineering/Theoretical Computer Science/Computer Technology/Information Science and Management/ Information Technology and Management under 10+2+3 system of this University or any other University recognized by the Syndicate as equivalent thereto shall be eligible to register for the Degree of Master of Philosophy (M.Phil.) in Computer Science and undergo the prescribed course of study in an approved institution or Department of this University.

Candidates who have qualified their postgraduate degree on or after 1 January 1991 shall be required to have obtained a minimum of 55% of marks in their respective postgraduate degrees to become eligible to register for the Degree of Master of Philosophy (M.Phil.) and undergo the prescribed course of study in an approved institution or department of this University.

For the candidates belonging to SC/ST community and those who have qualified for the Master's degree before 01.01.1991 the minimum eligibility marks shall be 50% in their Master's Degree.

**3. DURATION**

The M. Phil. Programme spans over a period of one year from the commencement of the programme comprising of two semesters.

#### 4. COURSE OF STUDY

There are three courses for semester I and Dissertation and viva-voce for semester II. The third course in the first semester shall be a **specialization related to the Dissertation**. The student in consultation with the research supervisor must select the third course and the research supervisor should frame the syllabus.

#### 5. SCHEME OF EXAMINATIONS

Courses	Number of Credits	Hours Per Week	Examination Duration (hrs)	Marks							
				I. A	ESE	Total					
<b>Semester-I</b>											
<b>11URCSC0C01</b> Research Methodology	4	4	3	25	75	100					
<b>11URCSC0C02</b> Advanced Computing Techniques	4	4	3	25	75	100					
<b>11URCSC0E01</b> Specialization Course	4	4	3	25	75	100					
<b>Semester-II</b>											
<b>11URCSC0C03</b> Dissertation and Viva-Voce	8+4			50	50+ 100*	200					
Total no. of Credits	<table style="display: inline-table; vertical-align: middle;"> <tr> <td rowspan="2" style="font-size: 2em; vertical-align: middle;">}</td> <td><b>Core course</b></td> <td>20</td> </tr> <tr> <td><b>Elective Course</b></td> <td>04</td> </tr> </table>		}	<b>Core course</b>	20	<b>Elective Course</b>	04				
}	<b>Core course</b>	20									
	<b>Elective Course</b>	04									
Grand Total	24										
Total Marks						500					

+ Evaluation by external examiner 100 Marks

\* Joint viva-voce 50 Marks  
( Research supervisor 25 Marks + External 25 Marks)

The distribution of marks for Internal Assessment and End Semester External Examinations will be 25% and 75% respectively. The Internal Assessment is distributed to tests, seminar and attendance as 10%, 10% and 5% respectively.

The Examination for courses I, II and III shall be held at the end of the first semester.

The Examination for specialization course will be conducted by the controller of examination along with courses I and II. Two different sets of question papers

should be sent to the controller of examinations along with the syllabus for specialization course by the respective research supervisors.

### **Semester II - Dissertation and Viva Voce**

The area of the Dissertation, which should be relevant to the specialization course, shall be intimated to the office of the controller of examinations within a month from the date of the commencement of the second semester. Candidates shall submit two copies of the Dissertation to the controller of examination through the Supervisor and Head of the Department concerned at the end of the second semester. The supervisor should submit a panel of four examiners along with the dissertation for the evaluation of specialization course, dissertation and to conduct the viva voce. The respective supervisors shall be an internal examiner. The viva board should consist of the research supervisor, head of the department and external examiner.

The Examiners who value the Dissertation shall report on the merit of Candidates as “Highly Commended”(75% and Above) or “Commended” (50% and Above and Below 75%) or “Not Commended” (Below 50%).

Submission or re-submission of the dissertation will be allowed twice a year.

### **6. PASSING MINIMUM**

A Candidate shall be declared to have passed if he/she secures not less than 50% of the marks in each course.

### **7. RESTRICTION IN NUMBER OF CHANCES**

No Candidate shall be permitted to reappear for the written examination in any 11URCSC0Con more than two occasions or to resubmit a Dissertation more than once. Candidates shall have to Qualify for the Degree passing all the theory courses and Dissertation within a period of four years from the date of commencement of the programme.

### **8. CONFERMENT OF DEGREE:**

No Candidate shall be Eligible for conferment of the M.Phil Degree unless he/she is declared to have passed all the courses of the Examination as per the Regulations.

### **9. Eligibility for research supervisors conducting the M.Phil. Programme:**

As per the regulations of Periyar University.

**UNIT I:**

Basic Elements: Thesis Elements – Paper Elements – Order of Thesis and Paper Elements – Concluding Remarks – Identification of the Author and His Writing: Author's Name and Affiliation – Joint Authorship of a Paper: Genuine Authorship and Order of Authors. Identification of Writing: Title, Keyboards, synopsis, preface and abstract – Typical Examples. Chapters and Sections: Introductory Chapters and Section – Core Chapters and Sections. Text-Support materials: Figures and Tables – Mathematical Expressions and Equations – References – Appendixes and Annexure – Listing of Materials. Numbering of elements: Pagination – Numbering of Chapters, Sections and Subsections – Numbering of figures and Tables – Equation Numbering – Appendix Numbering – Reference Numbering.

**UNIT II:**

An introduction to fuzzy logic - Operations on fuzzy sets - Fuzzy relations - The theory of approximate reasoning - An introduction to fuzzy logic controllers - Aggregation in fuzzy system modeling - Fuzzy screening systems - Applications of fuzzy systems.

**UNIT III:**

Introduction to Artificial Neural Networks: Introduction – Artificial neural networks – Historical development of neural networks – Biological neural networks – Comparison between the brain and the computer – Comparison between artificial neural networks – Artificial Neural Networks (ANN) terminologies. Fundamental Models of Artificial Neural Networks: Introduction – McCulloch-Pitts neuron model – Learning rules – Hebb Net. Perceptron Networks: Introduction – Single layer perceptron – Brief introduction to multilayer perceptron networks.

**UNIT IV**

Feed forward networks: Introduction – Back Propagation Network (BPN) – Radial Basis Function Network (RBFN). Self Organizing Feature Map: Introduction – Methods used for determining the Winner - Kohonen Self Organizing Feature maps (SOM) – Learning Vector Quantization – Max Net – Mexican Hat – Hamming Net.

**UNIT- V**

Statistical Decision Making: Introduction – Bayes's Theorem – Multiple Features – Conditionally Independent Features – Decision Boundaries – Unequal Costs of Error – Estimation of Error Rates – The Leaving – One – Out Technique – Characteristic Curves – Estimating the Composition of Populations – Problems – Clustering: Introduction – Hierarchical Clustering – Partitional Clustering - Problems.

### **Text Books:**

1. B.N. Basu, "Technical Writing", PHI, Pvt., Ltd., New Delhi, 2007.  
(Chapters: 4, 5, 6, 7, 8)
2. J.S.R. Jang, C.T. Sun, E. Mizutani, „Neuro – Fuzzy and Soft Computing A Computational Approach a Learning and Machine Intelligence“, Pearson education, 2007. (Chapters: 2, 3, 4)
3. S.N Sivanandam, S. Sumathi, S.N.Deepa, „Introduction to Neural Networks using MatLab 6.0“, TMH, 2008. (Chapters: 2, 3, 4, 8, 9)
4. Earl Gose, Richard Johnson Laugh, Steve Jost „Pattern Recognition and Image Analysis“, – PHI – 1997. (Chapters: 3, 5).
5. Robert Fuller, “Neural Fuzzy Systems”, Abo Akademi University, 1995,  
(Ch.1.1 to 1.8)

### **Reference Books:**

1. Anderson, Durston, Poole, „Thesis and Assignment Writing“, Wiley Eastern University Edition, 1970.
2. Donald H. McBurney, „Research Methods“, Thomson Asia Pte Ltd., 2002.
3. George J. Klir, Bo Yuan. „Fuzzy sets and Fuzzy Logic Theory and Application“, PHI, 1995.
4. George J. Klir, Tina A. Folger, „Fuzzy sets, Uncertainty and Information“, PHI, 2007.
5. Richard O. Duda, Peter E. Hart, David G. Stork, „Pattern Classification“, John Wiley & Sons Inc. 2001.
6. Naresh K. Sinha, Madan M. Gupta, „Soft Computing & Intelligent Systems Theory and Applications“, Elsevier, 2000.
7. Philip D.Wasserman, „Neural Computing Theory and Practice“, Anza Research Inc.
8. Earl Cox, „Fuzzy modeling and genetic algorithms for data mining and exploration“, Elsevier Inc, 2005.
9. S. Rajasekaran, G.A. VijayalakshmiPai, „Neural Networks, Fuzzy Logic, and Genetic Algorithms Synthesis and Applications“, PHI, 2006.
10. N.P. Padhy, „Artificial Intelligence and Intelligent Systems“, Oxford University Press, 2005.
11. OdedMaimon, LiorRokach, „The Data Mining and Knowledge Discovery hand book“, Springer Science + Business Media, Inc. 2005.
12. Alex A. Freitas, „Data Mining and Knowledge discovery with Evolutionary Algorithms“, Springer International Edition, 2008.
13. JánosAbongyi, Balazsfeil, „Cluster Analysis for Data Mining and system identification“, BirkhäuserVerlag AG , 2007

### **UNIT I:Mobile Computing**

Mobility Models in Adhoc Networks – Introduction - Random-Based Mobility Models - The Random Waypoint Model - Stochastic Properties of Random Waypoint Model - Random Walk Model - Non-uniform Spatial Distribution and Random Direction Model - Mobility Models With Geographic Restriction - Pathway Mobility Model - Obstacle Mobility Model.

### **UNIT II: Genetic algorithm**

Introduction to Optimization: finding the Best solution – what is optimization – root finding versus optimization - categories of optimization – minimum –seeking algorithms – exhaustive search – analytical optimization – natural optimization methods - biological optimization: Natural selection – the genetic algorithm.

The binary genetic algorithm – genetic algorithms: Natural selection on a computer components of a binary genetic algorithm – selecting the variables and the cost function – variable encoding and decoding – the population – natural selection – selection – mating – mutations – the next generation – convergence – advanced applications: Travelling salesman problem.

### **UNIT III:AntColony Optimization Algorithm**

From Real to Artificial Ants: Ant’s foraging behavior and optimization – Double bridge experiments - A Stochastic model – Toward artificial ants - Artificial ants and minimum cost paths – S-ACO – The ACO metaheuristic – problem representation – Ants’ behaviour – The metaheuristic – Ant colony optimization(ACO) algorithms for the traveling salesman problem –Ant system and its direct successors – Extension of Ant system – Implementing ACO algorithm.

### **UNIT IV: Rough sets**

Introduction – Approximation spaces – Decision systems and Decision Trees – Closure operators and Rough sets. Rough set based Feature selection : - Introduction – Dependency function based approaches – Rough set based Attribute Reduction (RSAR) – VPRS (Variable Precision Rough sets (VPRS) –Dynamic Reducts - Entropy based reduction(EBR) – Discernibility Matrix based Approaches.

### **UNIT V:Fuzzy-Rough Set**

Fuzzy rough set – fuzzy equivalence classes fuzzy rough quick reduct – fuzzy entropy guided FRFs – fuzzy entropy based QUICK REDUCT – PSO based feature solution.

### **Text Books:**

1. Fan Bai and Ahmed Helmy, “A survey of Mobility Models”, University of Southern California, U.S.A. (Unit I - Chapter 1)
2. Randy L. Haupt, Sue Ellen Haupt, Practical Genetic Algorithms, Second Edition, WileyInterscience, A John Wiley & Sons, Inc., Publication 2004. (Unit II - Chapters 1,2& 6.1)
3. Ant colony optimization, Marco Dorigo and Thomas Stutzle, PHI, 2005. (Unit III - Chapters: 1.1 – 1.3, 2.2, 3.1 – 3.4, 3.8)
4. Dan A. Simovici, Chabane Djeraba, “Mathematical Tools for Data Mining” Springer, 2008 (Unit IV - Chapter 9).
5. Aboul Ella Hassanien, Zbigniew Suraj, Dominik Slezak & Pawan Lingras, Rough computing, Theories, Technologies, and Applications, Information science reference, New York, 2008. (Unit V - Chapter 2).

### **Reference Books:**

1. Bart Kosko, “A dynamical system approach to Machine Intelligence, PHI, 1992.
2. George J. Klir & Bo Yuen, “Fuzzy sets and Fuzzy Logic Theory and Application”, PHI, 1995.
3. Naresh H. Sinha, Madan M. Gupta, “Soft Computing & Intelligent System – Theory & Application” - Academic press serving in Engineering- 1999.
4. Donoso, Tabregat, “Multi objective optimization in Computer Networking” meta heuristic approach publication – Taylor & Francis group.-2007.
5. Genetic Algorithms in Search Optimization and Machine Learning, David E. Goldberg, Pearson Education, 2007.
6. Sankar K. Pal and Pabitra Mitra, “Pattern Recognition Algorithms for Data Mining”, CHAMPMAN & HALL/CRC 2004. (Chapters: 5.3, 5.4, 5.5, 6.1, 6.4)



**Course 11URCSC0E03SPECIALIZATIONCOURSE4 Credits**

The students must select the course from advanced research areas in computer science and the syllabus should be framed by the respective research supervisor. The syllabus along with two different sets of question papers may be communicated to the controller of examinations. The semester examination for specialization Course will be conducted by the controller of examinations along with courses I and II.

**M.PHIL-QUESTION PAPER PATTERN FOR COURSES, I, II, III**

Duration: 3 Hours

Max Marks: 75

Section – A

5 X 5 = 25

All questions carry equal marks.

Five questions either or type and one question from each unit

Section – B

5 X 10 = 50

All questions carry equal marks.

Five questions either or type and one question from each unit