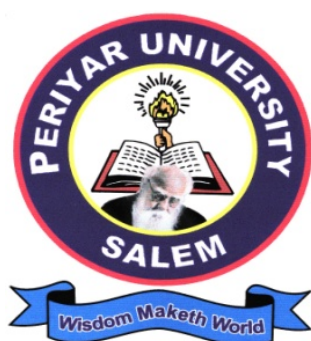


# **PERIYAR UNIVERSITY**

**PERIYAR PALKALAI NAGAR**

**SALEM - 11**



**DEGREE OF MASTER OF PHILOSOPHY**

**CHOICE BASED CREDIT SYSTEM**

**SYLLABUS FOR M.PHIL. COMPUTER SCIENCE**

**FOR THE STUDENTS ADMITTED FROM THE**

**ACADEMIC YEAR 2012 – 2013 ONWARDS**

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

**Regulations**

**Full Time / Part Time**

**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 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		
				S. A	E.E	Total
<b>Semester-I</b>						
<b>Course-01</b> Research Methodology	4	4	3	25	75	100
<b>Course-02</b> Advanced Computing	4	4	3	25	75	100

Techniques						
<b>Course-03</b> Specialization Course	4	4	3	25	75	100
<b>Semester-II</b>						
<b>Course-04</b> Dissertation and Viva-Voce	8+4			50	50+ 100*	200
Total no. of Credits <b>Core course</b> <b>Elective course</b>	20 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 Sessional Assessment and /External Examination will be 25% and 75% respectively. The Sessional 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 course on 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:**

Fuzzy Sets: Introduction – Basic Definitions and terminology – Set-theoretic operations – MF formulation and parameterization – More in fuzzy union, intersection and complement. Fuzzy rules and fuzzy reasoning: Introduction - extension principle and fuzzy relations – fuzzy If-Then rules – fuzzy reasoning. Fuzzy Inference Systems: Introduction – Mamdani fuzzy models – Sugeno fuzzy models – Tsukamoto fuzzy models – Other considerations.

**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).

#### **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. Vijaya lakshmi Pai, '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. Oded Maimon, Lior Rokach, '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. János Abonyi, Balazs feil, 'Cluster Analysis for Data Mining and system identification', Birkhäuser Verlag AG , 2007

## **Course 02 Advanced Computing Techniques 4 Credits**

### **Unit I:**

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 II:**

A gentle introduction to genetic algorithms – What are genetic algorithms? – Robustness of traditional optimization and search methods – The goals of optimization – How are genetic algorithms different from traditional methods – A simple genetic algorithm – Genetic algorithms at work – A simulation by hand – Grist for the search mill – Important similarities – Similarity templates (Schemata) – Learning the lingo. Genetic algorithms revisited: Mathematical foundation – who shall live and who shall die? The fundamental theorem – Schema processing at work: An example by hand revisited – The two armed and k-armed bandit problem – Computer implementation of a genetic algorithm – Data structures – Reproduction, Crossover and mutation – A time to reproduce, a time to cross – Get with the main program – Mapping objective functions to fitness form – Codings.

## **Unit III:**

Rough sets – Information systems – Indiscernibility and set approximation – reducts – Dependency rule generation – Linguistic representation of patterns and fuzzy granulation – Rough –fuzzy case generation methodology – Thresholding and rule generation – Mapping dependency rules to cases – Case retrieval – Rough –fuzzy clustering- CEMMiSTRI: Clustering using EM, Minimal spanning tree and Rough-fuzzy initialization- Mixture model estimation via EM algorithm – Rough set initialization of mixture parameters- Mapping reducts to mixture parameters- Graph – theoretic clustering of Gaussian components.

## **UNIT IV:**

ANFIS: Adaptive Neuro-Fuzzy Inference Systems: Introduction – ANFIS architecture – Hybrid learning algorithm – Learning methods that cross-fertilize ANFIS and RBFN – ANFIS as a universal approximator – Simulation examples – Coactive Neuro-fuzzy Modeling: Towards Generalized ANFIS: Introduction – Framework – Neuron functions for adaptive networks – Neuro-Fuzzy spectrum – Analysis of adaptive learning capability

## **UNIT V:**

SVM: Introduction – Need for SVMs - Support Vector Machine classifiers – Classification of heart Disease database using Learning Vector Quantization - Artificial Neural Network: Vector quantization Learning Vector Quantization (LVQ) -Data representation scheme – Sample of heart diseases data sets – LVQ program -Input format - Output format - Simulation results .

## **Text Books:**

1. Ant colony optimization, Marco Dorigo and Thomas Stutzle, PHI, 2005.  
(Chapters: 1.1 – 1.3, 2.2, 3.1 – 3.4, 3.8)
2. Genetic Algorithms in Search Optimization and Machine Learning, David E.Goldberg, Pearson Education, 2007. (Chapters: 1, 2, 3)
3. Pattern Recognition Algorithms for Data Mining , Sankar K.Pal and Pabitra Mitra , CHAMPMAN & HALL/CRC 2004. (Chapters: 5.3, 5.4, 5.5, 6.1, 6.4)
4. Neuro Fuzzy Soft Computing , Jang sun, Mizutani, Pearson Education, 2005.  
(Chapters: 12, 13)
5. S.N.Sivanandam, S.Sumathi, S.N.Deepa - Introduction to Neural Networks using Matlab 6.0 TMH., 2008- Chapters (12.13 , 15.5)

## **Reference Books:**

1. Yegnanarayana, "Artificial Neural Networks", PHI, 2008.
2. Bart Kosko, "A dynamical system approach to Machine Intelligence, PHI, 1992.
3. George J.Klirl Bo Yuen, "Fuzzy sets and Fuzzy Logic Theory and Application", PHI, 1995.
4. Limin Fu, "Neural Network in Computer Intelligence", TMH 2003.
5. Mitra, Datte Perhim and Michai lido – "Introduction to Machine Learning and Bioinformatics" –CRC – 2000.
6. Naresh H.sinha, Madan M. Gupta, "Soft Computing & Intelligent System – Theory & Application" - Academic press serving in Engineering- 1999.
7. Donoso, Tabregat, "Multi objective optimization in Computer Networking" meta heuristic auerbuch publication – Taylor & Francis group.-2007.

### **Course 03 Specialization course 4 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