PERIYAR UNIVERSITY

SALEM 636 011

MASTER OF PHILOSOPHY IN COMPUTER SCIENCE

(M. Phil – Computer Science)

REGULATIONS AND SYLLABUS
(under CBCS for University Department)

(Effect from the Academic year 2016-2017 and thereafter)

PERIYAR UNIVERSITY, SALEM - 11

MASTER OF PHILOSOPHY IN COMPUTER SCIENCE
M. Phil – Computer Science

Regulations

Full Time / Part Time
Effect from the academic year 2016 - 2017

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/TheoreticalComputer Science/Computer Technology/Information Science and Management/ Information Technology and Management under 10+2+3 systemof 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. 11URCSC0COF 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**
Semester-I						
16URCSC0C01 Research Methodology	4	4	3	25	75	100
16URCSC0C02 Advanced Computing Techniques	4	4	3	25	75	100
16URCSC0E__	4	4	3	25	75	100
Semester-II						
16URCSC0C03 Dissertation and Viva-Voce	8+4			50	50+ 100*	200

Total no. of Credits — **Core course**	20					
Elective Course	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 specializationcourse by the respective research supervisors.

Semester II - Dissertation and Viva Voce

The area of the Dissertation, whichshould be relevant to the specialization course, shall be intimated to the office of the controller of examinations within amonth 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.

Course 16URCSC0C01 RESEARCH METHODOLOGY 4 Credits

Course Objectives

i) To understandard the importance of writing skills
ii) To learn the method of documentation
iii) To learn different types of methods for data analysis
iv) To understandard the importance of computational tools

Unit 1:Technical Writing

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 2: Near Set Theory

Introduction – Object Description – Sample Behaviour Description – Nearness of Objects – Near Sets – Near Sets and Verisimilitude – Fundamental Approximation Space –Lower Approximation of a Set – Upper Approximation of a Set – Boundary Region – Nearness Approximation Spaces – Sample Families of Neighbourhoods – Feature Selection Method – Overlap Function – Approach to Near Set Theory – Modification of our Approach to Near Sets – Medical Application.

Unit 3: Rough set Theory

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 4: Soft set Theory

Soft sets – Operations on Soft sets – Union, Intersection,AND operation – OR operation –Properties on soft set operations – Matrix representation of soft sets – Operations on Soft Matrices –Parameter reduction of Soft sets and its algorithm- Multi-soft sets – Decomposition of Multi-valued Information Systems – Soft Set Approach for Conflict Analysis

Unit 5: Analytical Methods (Omit Theorems and Proof)

Correlation Analysis

Introduction – types of correlation – scatter diagram method – correlation graph method – coefficient of correlation – Spearman's Rank Correlation Coefficient - coefficient of concurrent deviation – correlation coefficient by the method of least square – Error of the coefficient of correlation – coefficient of determination .

Regression Analysis

Introduction – graphic methods for studying regression – algebraic method of studying regression – Regression equation in case of correlation table –standard error of estimate – ratio of estimate.

Text Books

Unit – 1:

B.N. Basu, "Technical Writing", PHI, Pvt., Ltd., New Delhi, 2007.
(Chapters: 4, 5, 6, 7, 8)

Unit – 2:

1. James F. Peters, "Near Sets: General Theory about Nearness of Objects", Applied Mathematical Sciences, Vol.1, No. 53, PP 2609-2629, 2007.
2. M.E. Abd El-Monsef, H.M. Abu-Donia, and E.A. Marei, "Special Approach to Near Set Theory", Hindawi Publishing Corporation, Mathematical Problems in Engineering, Vol. 2011, Article ID 168501, 10 pages, 2011.

Reference Books:

1. Christopher Henry and James F. Peters, "Arthritic Hand-Finger Movement Similarity Measurements: Tolerance Near Set Approach", Hindawi Publishing Corporation, Computational and Mathematical Methods in Medicine, Vol. 2011, Article ID 569898, 14 Pages, 2011.
2. James F. Peters, "Fuzzy Sets, Near Sets, and Rough Sets for your Computational Intelligence Toolbox", Foundations of Computational Intelligence Volume 2, Volume 202 Foundations of Computational Intelligence, Springer, PP 3-25, 2009.

Unit – 3:

1. Aboul Ella Hassanien, ZbigniewSuraj, Dominik Slezak andPawanlingras, Rough Computing, Theories, Technologies, and Applica

2. Dan A. Simovici ,ChabaneDjeraba, " Mathematical Tools for Data Mining" Springer,2008(Unit IV - Chapter 9).tions, Information Science reference, New York, 2008.

Unit – 4:

1. Onyeozili, I. A., Gwary T. M, "A Study of the Fundamentals of Soft Set Theory", International Journal of Scientific & Technology Research Volume 3, Issue 4, April 2014.
2. Edi Sutoyo*, MungadMungad, Suraya Hamid, TututHerawan, "An Efficient Soft Set-Based Approach forConflict Analysis, PLoS ONE,11(2), 2016
3. ZhiKonga, LiqunGaoa, LifuWanga, Steven Li, "The normal parameter reduction of soft sets and its algorithm", Computers and Mathematics with Applications 56 (2008) 3029-3037.
4. M. Irfan Ali, Feng Feng, Xiaoyan Liu, Won Keun Min, M. Shabir,"On some new operations in soft set theory",Computers and Mathematics with Applications,57 (2009) 1547-1553.

Unit – 5:

K. R. Gupta, Statistics – Volume 1, Atlantic Publishers and Distributers, 2014.

(Chapters 8 and 9).

Reference Books

1. Daniel T. Larose , Chantal D. Larose, Data mining and Predictive analytics, Second Ed., Wiley Publication, 2015
2. Jason Bell, Machine Learning:Hands-On for Developers and Technical Professionals, Wiley Publication, 2015.
3. Johannes Ledolter, DATA MINING AND BUSINESS ANALYTICS WITH *R,* Wiley & Sons, 2015.

Course 16URCSC0C02 ADVANCED COMPUTING TECHNIQUES 4 Credits

Course objectives

i) To understand the importance of computing methods
ii) To learn the computing techniques from nature
iii) To understand the importance of evolutionary computing
iv) To learn the importance of optimization methods

Unit 1:Particle Swarm Optimization

Basic PSO – Social network structures – Basic variations – PSO parameters – Single solution PSO – ACO meta heuristic – Applications: Travelling Salesman Problem

Unit 2 : Evolutionary Computing Methods

Introduction: Generic evolutionary algorithm – Representation : The chromosome – Initial population – Fitness function – Selection – Reproduction operators - Stopping conditions – Evolutionary vs Classical optimization – Canonical genetic algorithm – Cross over – Mutation – Control parameters – GA variants – Evolutionary programming: Basic programming – Operators – Strategy parameters – Evolutionary programming implementations- Evolutionary strategies: (1+1) - ES – Evolutionary Strategy algorithm – Parameters and Adaptation – Operators - Basic differential evolution.

Unit 3: Deep Learning

Definitions and background – A three-way categorization – Deep networks for unsupervised or generative learning – Deep networks for supervised learning – Hybrid deep networks.

Unit 4: Deep Autoencoders -Unsupervised Learning

Introduction – Use of deep autoencoders to extract speech features – Stacked denoising autoencoders – Transforming autoencoders – Pre-Trained Deep Neural Networks – A Hybrid:Restricted Boltzmann machines – Unsupervised layer-wise pre-training – Interfacing DNNs with HMMs.

Unit 5:Mobile Computing

Mobility Models in Adhoc Networks – Introduction - Random-Based Mobility Models - The Random Waypoint Model - Stochastic Properties of Random Waypoint Model - Mobility Models With Geographic Restriction - Pathway Mobility Model - Obstacle Mobility Model. Routing in Mobile Adhoc Networks – Proactive Routing Protocols – DSDV – GSR – FSR -Reactive Routing Protocols–DSR-AODV.

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Text Books

Unit – 1:

Andries P Engelbrecht, "Computational Intellignece – An Introduction" Second Edition, John Wiley & Sons, Ltd, 2007

Chapters – 16.1 to 16.5, 17.1, 17.5.1

Unit 2:

Andries P Engelbrecht, "Computational Intellignece – An Introduction" Second Edition, John Wiley & Sons, Ltd, 2007

Chapters - 8, 9 .1 to 9.5, 11.1 to 11. 4, 12.1 to 12.4, 13.1

Unit 3 and Unit 4:

Text Book:

Li Deng, Dong Yu, Deep Learning: Methods and Applications, Foundations and Trends in Signal Processing, Volume 7, Microsoft Research Publication, ISSN: 1932-8346. Chapters: 1,3,4,5

Unit 5:

Text Books

1. Fan Bai and Ahmed Helmy, "A survey of Mobility Models", University of Southern California,U.S.A.(Chapter 1)
2. Misra, Woungang, "Guide to Wireless Ad Hoc Networks", Springer International Edition, 2011, (Chapter 4)

References

1 Blum, Christian, Merkle and Daniel, Swarm Intelligence Introduction and Applications, 2008
2 Maurice Clerc, Particle Swarm Optimization, ISTE, 2013
3 Andrea E. Olsson, PSO – Theory, Techniques and Applications, 2011
4 Aleksandar Lazinica, Particle Swarm Optimization, Intech Publisher, 2011
5 Konstantinos E. Parsopoulos and Michael N Vrahatis, PSO and Intelligence : Advances and Applications, IGI Global – Premier Reference Source, 2010
6 Dan Simon, Evolutionary Optimization Algorithms – Biologically Inspired and Population based approaches to computational intelligence, Wiley Publications, 2013

Course 11URCSC0E03SPECIALIZATION 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