PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Phil., COMPUTER SCIENCE

(Students admitted during 2018 – 2019 Onwards)

(Under CBCS with Outcome Based Education (OBE) Pattern)

SYLLABUS

H.H. THE RAJAH'S COLLEGE

(Government Autonomous Co-educational Institution,

Affiliated to Bharathidasan University, Trichy)

PUDUKKOTTAI – 622 001.

H.H. THE RAJAH'S COLLEGE(AUTONOMOUS)

PUDUKKOTTAI – 622 001.

DEPARTMENT OF COMPUTER SCIENCE

M.Phil. Computer Science(Full Time Programme)

(For the candidates admitted from the academic year 2018-2019 onwards)

Semeste	Title of the Course	Marks			Credits
		IA	UE	Total	
Semester - I					
Course – I	Research Methodology	40	60	100	4
Course – II	Advanced paper in Computer Science	40	60	100	4
Course – III	Paper on Topic of Research. (Guide will prepare the syllabus and it will be sent to the COE)	40	60	100	4
Course – IV	Teaching and Learning skills (Common Paper)	40	60	100	4
Semester – II					
	Dissertation and Viva – Voce Viva Voce – 50 Marks Dissertation - 150 Marks			200	8

For each Course other than the Dissertation
Continuous Internal Assessment   - 40 Marks
End Semester Examination   -60 Marks
Total   -100 Marks

Question paper pattern for Course I-IV Internal Choice Type 5 X 12= 60 Marks
Question 1a (or) 1b – 1 Unit , 1a (or) 2b – II Unit, 3a (or) 3b – III Unit, 4a (or) 4b – IV Unit 5a (or) 5b – V Unit

CIA Components
Tests (2 X 10) -   20 Marks
Term Paper   -   10 Marks
Seminar   -   10 Marks

PROGRAMME OBJECTIVES:

- To prepare Scholars for successful career in academic and research institutes.

- Scholars are oriented towards becoming globally competent.

- To develop the ability amongst the scholars to apply industry and research.

- To enable scholars to work in a team with multidisciplinary approach.

- To provide scholars with fundamental strength in analyzing, designing and solving research and industry related problems.

- To promote and inculcate ethics and code of professional practice among students.

PROGRAMME OUTCOMES:

PO1. After successful completion of Master of Philosophy in Computer Science, the students will be able to demonstrate basic knowledge in Computer Science.

PO2. The scholars will be able to use research tools used by researchers in their chosen area of specialization.

PO3. Scholars pursuing this course will show ability in the critical evaluation of research techniques and methodologies.

PO4. The scholars will acquire basic knowledge of research and skills to solve problems, analyze data and interpret the results.

PO5. The students will be able to communicate effectively and demonstrate professional and ethical responsibilities.

COURSE I – RESEARCH METHODOLOGY

Objectives:
- To understand the types of research and thesis writing.
- To learn to use tools related to research in Computer Science.
- To learn to calculate the computing time of algorithms and ideas related to NPCompleteness.
- To learn Formal Language of Computer Science, its grammar and its applications
- To learn and use probability and applications of probability in areas such as System Reliability.
- To understand the concepts of Logic and Natural Deduction Systems.

UNIT- I : Thesis Writing: Research types – objectives and approaches – Literature collection, Web browsing – Software tools – Writing review and journal articles – manuscript publication Planning a thesis – general format – page and chapter format – footnotes – tables and figures – references and appendices

Unit- II : Analysis of algorithm: The role of algorithm in computing – Insertion sort – Analyzing and designing algorithms – growth of functions – introduction to NP – completeness

Unit- III : Formal Languages and Finite Automata: Context free grammars – Derivation trees – Simplification of context free Grammars – Chomsky normal form – Greiback normal form – The pumping lemma for context free languages
Finite state systems – Basic definitions – Non deterministic finite automata – Finite automata with epsilon moves – Regular expressions – Applications of finite Automata (Stress on theorem statement and problems only, no proof for theorems)

Unit-IV : Probability and Statistical Analysis: Probability – Fail time data analysis – Hazard models – Conditional probability – Bayes rule – System reliability – Stochastic process

Unit- V: Logics – Relations and Functions: Propositions – Precedence rules for operators – Laws of equivalence – Natural deduction system – Developing natural deduction system proofs
Relation properties – Matrix and Graph – Graph Notations for relations – Partition and covering – Equivalence relation – Compatibility relations – Partial ordering – Functions – Components – Composition of function – Inverse functions – Binary and n-ary operations 3

Text Books:
1. Kothari C. R. Research Methodology – methods and techniques, 2nd Edition, WishwaPrakashjan New Delhi 1999
2. Elis Horowtz and SartajSahni, „Fundamentals of Computer algorithms", Galgotia Publications, New Delhi 2000
3. John E. Hopcroft, Jeffery D. Ullman, „Introduction to Automata Theory Language and Computation", narosa Publishing House, 1979
4. L.S. Srinath, „Reliability Engineering", Third Edition, Affliated East, West press pvt. Ltd, New Delhi, 2005
5. David Gries, „The Science of Programming" Narosa Publishing House, 1981

Reference Books:

1. Berny H. Durston, M. Poole, „Thesis and Assignment writing", Wiley Eastern Ltd. ND 1970
2. Misra R.P. Research Methodology – A Hand Book, Concept publishing Company, New Delhi 1988
3. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest „Introduction to Algorithms", Prentice Hall of India, 1998
4. E. Balagurusamy, „Reliability Enginering", Tata Mc Graw Hill Publishing Ltd., New Delhi 2003
5. Leon S. Levy, ;Discrete structures of Computer Science", Wiley Eastern Ltd., 1980.

Course Outcomes:

Completion of this Course ensures the following.

CO1 Understanding of what scholarly writing is and development of the skills to write the same.
CO2 Learn to use tools related to research in Computer Science.
CO3 Learn to analyze the algorithms and compute their computing time.
CO4 Understanding of the basic concepts of NP-Complete and NP-Hard and problems of Computability.
CO5 Understand the formal language, context free grammar and the applications of finite automata.
CO6 Knowledge of Probability, Statistical Analysis and its application for System Reliability.
CO7 Appreciation of logic, natural deduction systems and relations based on partial ordering.

Mapping Course Outcomes with Programme Outcomes:

POs / COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	L
CO2	S	M	M	S	M
CO3	S	S	L	M	M
CO4	S	S	M	M	M
CO5	M	S	M	M	L

S: Strong;   **M**: Medium;   **L**: Low;

COURSE II–ADVANCE PAPER IN COMPUTER SCIENCE

Objectives
- To understand the basic ideas of Data Science and to analyze big data sets.
- To understand the Cloud Computing as an emerging area of public and scientific use and to learn to apply Cloud Computing in the current social and research contexts.
- To learn and apply the ideas of Virtualization and its various uses.
- To appreciate as a fast growing paradigm on Research in Computer Science and to use the same for research.
- To understand the basics of Machine Learning and its application in related areas such as Data Mining, ANN etc.
- To understand the use of Cryptography as a tool of security in the areas of Database, Program and Computer Networks.

Unit I : Security problems in Computing – Cryptography – program security – Database security – Security in Networks

Unit II : Grid Computing organization and their role – Grid computing anatomy – Merging the Grid service architecture with web services architecture

Unit III : Fundamental – Remote procedure cells – Distributed shared memory – Synchronization

Unit IV : Distributed Databases – Homogeneous and Heterogeneous databases – Distributed data storage – distributed transactions – commit protocols – concurrent control – availability – Distributed theory processing Heterogeneous distributed databases – Directory systems

Unit V : Fundamentals of Parallel processing – MIMD computers or Multiprocessor 4.1 – 4.2, 4.3

Text Books:
1. Chapter 1,2,3,6 & 7 – (Security in Computing, Charles P. Pfleeger, &
Shani Lawrence Pfeeger)
2. Joshy Joseph, GraigFelenstern „Grid Computing" – Pearsons 2004
3. Distributed file systems, Chapter 1,4,5,6 & 9
Distributed Operating Systems, Pradeep K. Sinha, PHI, 2004
4. Abraham fiberschatz& Hendry F. Korths "Data base systems concepts"
Mc Graw Hill International fifth edition, 2006
5. Distributed memory multiprocessors 5.1, 5.2, 5.3, 5.4, 5.5
Data dependence and parallelism – 7.1 – 7.2, 7.3, 7.4, 7.5
Implementing synchronization and data sharing 8.1, 8.2, 8.3, 8.4
Harry F. Jordan Gita Alaghband 5

Course Outcomes :

Completion of this Course ensures the following.

CO1 Understanding of basic ideas of Data Science and capacity to analyze big data sets.

CO2 Understanding the Cloud Computing as an emerging area of public and scientific use and applications of Cloud Computing in the current social and research contexts.

CO3 Knowledge of Virtualization and its various uses for practical applications.

CO4 Appreciation of IoT as a fast growing paradigm of Computer Science and it's uses.

CO5 To Understanding of the basics of Machine Learning and its application in related areas such as Data Mining, ANN etc.

CO6 Appreciation of Cryptography as a tool of security in the areas of Database, Program and Computer Networks and to pursue further learning of the same.

Mapping Course Outcomes with Programme Outcomes:

POs COs	PO1	PO2	PO3	PO4	PO5
CO1	S	L	M	M	L
CO2	S	S	M	L	S
CO3	M	M	M	S	L
CO4	S	M	S	L	M
CO5	M	S	S	L	L

S: Strong; **M**: Medium; **L**: Low;

COURSE – IV : TEACHING AND LEARNING SKILS

Objective :

➤ Acquaint different parts of computer system and their functions
➤ Understand the operations and use of computers and common accessories.
➤ Develop skills of ICT and apply them in teaching learning context and Research.
➤ Appreciate the role of ICT in teaching, learning and Research.
➤ Acquire the knowledge of communication sill with special reference to its elements, types , development and styles.

Unit I – Computer Application Skills
Computer system: Characteristics, Parts and their functions – Different generations of Computer – Operation of Computer: switching on / off / restart, Mouse control, Use of key board and some functions of key – Information and Communication Technology (ICT): Definition, Meaning, Features, Trends – Integration of ICT in teaching and learning – ICT applications: Using word processors, spread sheets, Power point slides in the classroom – ICT for Research: On-line journals, e-books, Courseware, Tutorials, Technical reports, Theses and Dissertations

Unit II – Communication Skills
Communication: Definitions – Elements of Communication: Sender, Message, Channel, Receiver, Feedback and Noise – Types of Communication: Spoken and written; Non-verbal communication – Intrapersonal, Interpersonal, Group and Mass communication – Barriers to 6

communication: Mechanical, Physical, Linguistic & Cultural – Skills of communication: Listening, Speaking, Reading and writing – Methods of developing fluency in oral and written communication – style, Diction and Vocabulary – Classroom communication and dynamics

Unit III – Communication Technology
Communication Technology: Bases, Trends and Developments – Skills of using Communication Technology – Computer Mediated Teaching: Multimedia, E-content – Satellite-based communication: EDUSAT and ETV channels, Communication through web: Audio and Video applications on the Internet, interpersonal communication through the web.

Unit IV – Pedagogy
Instructional Technology: Definition, Objectives and Types – Difference between Teaching and Instruction – Lecture Technique: Steps, Planning of a Lecture, Delivery of a lecture – Narration in tune with the nature of different disciplines – Lecture with power point presentation – Versatility of lecture technique – Demonstration, Characteristics, Principles, Planning Implementation and Evaluation – Teaching – Learning Techniques: Team Teaching, Group discussion, Seminar, Workshop, Symposium and Panel Discussion – Models of teaching: CAI, CMI and WBI

Unit V – Teaching Skills
Teaching skill: Definition, Meaning and Nature – Types of Teaching skills: Skill of Set Induction, Skill of Stimulus Variation, Skill of Explaining, Skill of Probing Questions, Skill of Black Board writing and Skill of Closure – Integration of Teaching Skills – Evaluation of Teaching Skills

References:
1. Bela Rani Sharma (2007), Curriculum Reforms and Teaching Methods, Sarup and sons, New Delhi
2. Don Skinner (2005), Teacher Training, Edinburgh University Press Ltd., Edinburgh
3. Information and Communication Technology in Education: A Curriculum for Schools and programme of Teacher development, Jonathan Anderson and Tom Van Weart, UNESCO, 2002
4. Kumar K.I (2008) Educational Technology, New Age International Publishers, New Delhi
5. Mangal, S.K. (2002) Essential of Teaching – Learning and Information Technology, Tandon Publications, Ludhiana
6. Michael D. and William (2000), Integrating Technology into Teaching and Learning: Concepts and Applications, Prentice Hall, New York
7. Pandey S.K. (2005) Teaching Communication, Commonwealth Publishers, New Delhi
8. Ram Babu A. and Dandapani S (2006) Microteaching (Vol.1&2) Neelakamal Publications, Hyderabad
9. Singh V.K. and Sudarshan K.N. (1996) Computer Education, Discovery Publishing Company, New York
10. Sharma R. A. (2006) Fundamentals of Educational Technology, Surya Publications, Meerut
11. Vanaja. M. and Rajasekar S. (2006) Computer Education, Neelkamal Publications, Hyderabad.

Course Outcomes :

After completing the course, the students will:

CO1 Develop skills of ICT and apply them in Teaching Learning context and Research.
CO2 Be able to use ICT for their professional development.
CO3 Leverage OERs for their teaching and research.
CO4 Appreciate the role of ICT in teaching, learning and Research.
CO5 Develop communication skills with special reference to Listening, Speaking, Reading and Writing.
CO6 Learn how to use instructional technology effectively in a classroom.
CO7 Master the preparation and implementation of teaching techniques.

Mapping Course Outcomes with Programme Outcomes:

POs COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	L
CO2	M	S	S	L	L
CO3	S	M	M	S	L
CO4	S	M	S	S	M
CO5	M	S	S	L	L

S: Strong;　　**M**: Medium;　**L**: Low;