BHAGWANT UNIVERSITY

Sikar Road, Ajmer

Rajasthan

Syllabus

Institute of Computer Application

M. Phil

(Computer Science)

M. Phil.- Computer Science

ANNUAL SCHEME OF EXAMINATION

1. Every candidate shall be required to offer three written papers and one dissertation (equivalent to one paper). Within this frame work the Board of Studies shall recommend the course of study for the M. Phil examination.
2. The course of study for the M. Phil degree shall extend over a period of one academic year. There shall be a continuous internal assessment and as external assessment. The proportion of internal and external assessment shall be 30:70. There will be no internal assessment in the dissertation. Total marks for M. Phil will be 400. Dissertation may be written by the candidates under the supervision of any teacher who is registered as M. Phil Supervisor. Supervisor can guide normally five dissertations. However, the maximum limit may be relaxed by the permission of Vice-Chancellor on the recommendation of Head. The internal Supervisor can guide five candidates and workload of six hours is admissible for each M. Phil course for dissertation. The Supervisor will sign and issue a certificate counter signed by the Head of department concerned.
3. The internal assessment may be evaluated on the basis of:
   (a) Mid Terms : 15 Marks
   (b) Assignments /Seminar Presentation /Group Discussion: 15 Marks
4. Each theory paper shall consist of 100 marks. The dissertation shall also consist of 100 marks. For a pass, a candidate shall be required to obtain (a) at least 40% marks in each paper separately (b) a minimum of 50% marks in the aggregate of all the papers prescribed for the examination. In the mark sheet, successful candidates shall be classified as under
   First Division 65% or more.
   Second Division 50-65%

6- A candidate will have to pass individually both in the Internal as well as external examination and it should be shown separately in the marks sheet.

7- The placement of every candidate under a Supervisor/Guide shall be decided within two months from the last date for admission.

8- A candidate who fails at the examination even in one paper/dissertation shall be required to reappear at the examination in a subsequent year in all the papers/dissertation prescribed for the examination, provided that a candidate who obtains at least 50% marks in dissertation shall be exempted from the submitting a fresh dissertation and the marks obtained by him shall be carried forward for working out his result.

9- For each theory paper 10 questions will be set for the final examination and the candidate will have to attempt at least five questions. All the questions will carry equal marks.

10- Workload distribution: There will be a teaching of four periods of one hour duration per week for each theory paper and six hours for dissertation.
   i.e. 4X3 = 12 hours for theory papers and six hours for dissertation per week.

M. Phil. - Computer Science

Subject Code	Subject Name	Teaching hours			Distribution of marks						
					Theory Papers				Practicals		
					Internal		External	Total	Int.	Ext.	Total
		L	T	P	Mid Terms marks	Assignments / Seminar Presentation / Group Discussion					
01MPL06101	Research Methodology Theory And Techniques	3	1	-	15	15	70	100	-	-	-
01MPL06102 OR 01MPL06103	ELECTIVE – I Advanced Computer Techniques OR High Performance Grid and Cluster Computing	3	1	-	15	15	70	100	-	-	-
01MPL06104 OR 01MPL06105	ELECTIVE – I Advanced Network System OR Digital Image Processing and Multimedia	3	1	-	15	15	70	100	-	-	-
01MPL06201	Dissertation	-	-	2	-	-	-	-	-	100	100
Total		9	3	2	45	45	210	300		100	400

Grand Total-400

01MPL06101 RESEARCH METHODOLOGY THEORY AND TECHNIQUES

Unit – 01

Research - definition - importance and meaning of research - Characteristics of research - types of research - steps in research -Identification, selection and formulation of research problem – research Questions - research design - formulation of hypothesis - review of Literature

Unit – 02

Sampling techniques: sampling theory - types of sampling - steps in sampling - sampling and non-sampling error sample size - advantages and limitations of sampling. Collection of data : primary data - meaning - data collection methods - secondary data - meaning - relevances, limitations and cautions.

Unit - 03

Statistics in research - measure of central tendency - dispersion -Skewness and kurtosis in research. Hypothesis - fundamentals of Hypothesis testing - standard error - point and interval estimates - Important non-parametric tests : sign, run, kruskal - wallis tests and mann-whitney test.

Unit - 04

Para metric tests: testing of significance - mean, proportion, variance and correlation - testing for significance of difference between means, proportions, variances and correlation co-efficient. Chi-square tests - anova - one-way and two-way.

Unit - 05

Research report : types of reports - contents - styles of reporting - Steps in drafting reports - editing the final draft - evaluating the final draft.

ELECTIVE – I

01MPL06102 ADVANCED COMPUTER TECHNIQUES

Unit - 01

Programming language : introduction, characteristics, uses -Programming language processor, hierarchies of computers - data -Elementary data types - structured data types – expression, statements -Procedures - functions - data control and storage management – data Abstraction, exception handling - data encapsulation – theoretical Models. The above features in c, c++, java.

Unit - 02

Introduction to software engineering, software project planning, Requirement analysis specification, software design- implementation Issues, software testing, verification and validation, software Maintenance and reliability.

Unit - 03

Introduction - lexical analysis - syntax analysis - types – storage Organization - storage allocation - parameter passing - symbol table -Language facilities for dynamic storage - allocation - dynamic storage Allocation techniques - intermediate code generation - code generation -Code optimization.

Unit - 04

Introduction : problem definition - search strategies - characteristics -Game playing - knowledge representation - expert system - roles of Expert system - knowledge acquisition, meta knowledge, heuristics Knowledge - interface : backward and forward chaining - fuzzy reasoning learning - adaptive learning - types of expert system : mysin, pip,Internist, dart, xoon, expert systems shells.

Unit - 05

Introduction - humans and computers - structure of the brain, learning in Machine – differences, pattern recognition - the basic neutron - Perception - limitation - multilayer perception, organising networks - Hopfield networks - associative memory.

OR

01MPL06103 HIGH PERFORMANCE GRID AND CLUSTER COMPUTING

Unit-01 Introduction and remote computing model

- Cluster to grid computing, grid models, mobile grid models applications
- Definitions of Grid Computing and its Taxonomy
- Anonymous remote computing model
- Issues in parallel computing on interconnected network, existing distributed computing approach,
- ARC model of computation, two tier Arc language constructs, Classifications Of Grids

Unit-02 Grid Service Architecture and Application

- The Open Grid Services Architecture (OGSA),
- Creating and Managing Grid Services,
- Web Services and Utility Computing, Grid-Enabling Software Applications
- Application Integration, Grid-Enabling Network Services
- Management of Grid Environments, Grid-enhanced Applications in Research And Industry

Unit-03 Design and implementation of the Grid model

- model, design and implementation of the model,
- Parallel simulated Annealing Algorithms, simulated annealing technique, clustering algorithm for simulated annealing Services and Protocols:
- Scheduling and Resource Management, Security, Data Handling, Quality Of Service, Monitoring, Information Services, Open Grid Services Architecture

Unit-04 Distributed and Cluster computing

- Distributed and Cluster (HPC/HTC) computing principles,
- Parallel computing models: Message passing, Remote procedure calls, Shared memory models.

Unit-05 Cluster computing

- Cluster computing: hardware and software configuration, job scheduling,
- MPI, Performance and benchmarking, standard parallel algorithms
- Parallel I/O storage technologies, Load balancing and scheduling
- Appropriate applications.

ELECTIVE - II

01MPL06104 ADVANCED NETWORK SYSTEMS

Unit - 01

Network architecture: layering & protocols- osi & internet architecture - network topology - link & medium access Protocols - ieee 802 standards - performance issues - network adaptors.
Network layer: circuit switching – packet Switching - internetworking - bridges - internet protocol - addressing -Routing protocols.End - to - end protocol: udp - tcp- congestion Control - presentation aspects

Unit - 02

Applications: Telnet, ftp - e-mail - dns - multimedia applications – security Network management: monitoring & control - snmp, v2, v3, rmon, rmon2

Unit - 03

File systems - database systems - database systems architecture – data Models - relational model - hierarchical model - network model – entity relationship Model - data dictionary - database administration and Control. Relational databases Codd`s rules - base tables - views - domains and key concept – integrity Rules - relational algebra - relational calculus - commercial query Languages Database system design File and storage structures - indexing and hashing - query processing -Database recovery - concurrency control - transaction processing -Security and integrity

Unit - 04

Distributed databases Client / server databases - distributed transactions - locking and commit Protocols - distributed concurrency control - security and reliability -Parallel databases.
Web databases the World Wide Web - html - architecture -xml, xml/ql – database Connectivity.

Unit - 05

Scripting language Java script programming - dynamic html - cascading style sheets – object Model and collections - event model - Filters and transitions - activex controls Java.
Java fundamentals - io streaming - object serialization - applications - Native interfaces – image processing Advanced java Remote method invocation - multicasting - jdbc - server side programming -Enterprise applications - automated solutions.

Unit - 06

Message authentication Hash functions - digest functions - digital signatures – authentication Protocols. Network security practice Authentication, applications - electronic mail security – ip security – web Security. System security Firewalls - current standards

Unit - 07

Network issues Mobile ip - dhcp - mobile transport layer - indirect tcp - snooping tcp - Mobile tcp - transmission / time-out freezing - selective retransmission -Transaction oriented tcp. Application issues Wireless application protocol - dynamic dns - file systems – Synchronization protocol - context-aware applications.

Unit - 08

Internetworking with atm Lan - ip over atm - multiprotocol over atm - frame relay over atm. Wireless networks The wireless channel - link level design - channel access - network design - standards.Recent trends Optical networks - cross connects - lans - voice over ip – multimedia Networks

OR

01MPL06105 DIGITAL IMAGE PROCESSING AND MULTIMEDIA

Unit-01 Digital Image fundaments and Image Transforms

- Introduction, An image model, sampling & quantization,
- Basic relation ships between Pixels, imaging geometry
- Properties of 2 – D Fourier transform,
- FFT algorithm and other separable image transforms.
- Walsh transforms. Hadamard, Cosine, Haar, Slant transforms,
- KL transforms and their properties.

Unit-02 Image Enhancement and Image filtering

- enhancement by point processing, histogram processing, Spatial filtering and enhancement in frequency domain, color image processing.
- Image filtering and restoration :Algebraic approach to restoration, inverse filtering,least mean squares and interactive restoration, geometric transformations.

Unit-03 Image compression and segmentation

- Image compression modes, error free compression, lossy compression, image compression standards.
- Detection of discontinuities, edge linking and boundary detection thresholding, region – oriented segmentation, use of motion in segmentation.
- Representation and description: Various schemes for representation, boundary descriptors and regional descriptors.
- Image reconstruction from Projections, Radon Transforms; Convolution/Filter back – Project Algorithms.

Unit-04 Multimedia System

- Project design: setting up, requirements, navigation, storage, delivery
- Authoring tools: history, comparison of different approaches, functionality and principles
- Case study: Adobe Flash - Applications (eg. kiosks, distance learning, web-based)

Unit-05 Auditory input and output

- Auditory input and output: standards and techniques - Quality of service and usability in sound

01MPL05201 **DISSERTATION**

A dissertation of about 80-100 typed pages on a topic of the candidate's choice. The topic for the dissertation is to be selected in consultation with the supervisor and with the approval of the Research Degree Committee. An External Examiner appointed by the University will evaluate the dissertation.

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