KL UNIVERSITY

Pre-Ph.D Examination

WEB SERVICES AND GIS

SYLLABUS

UNIT –I

Introduction to web services: Fundamentals of XML, XML Syntax, XML Document Structure, Schema languages-DTD,XML Schema, Presentation technologies – XSL – XFORMS – XHTML –Transformation – XSLT – XLINK – XPATH – Xquery. Developing Web services-Objectives, Web service standards ,SOAP-The Processing model, Faults, Data representation and RPC, Protocol binding, WSDL-Interface Descriptions, Binding description, service description, UDDI-Descriptions ,Discovery.

UNIT-II

Semantic Web-Architecture of Semantic Web-Components of Semantic Web stack –Resource Description Framework-RDF Schema-Web Ontology language-Rule Interchange Format-Semantic web Rule Language-SPARQL-Knowledge representation and reasoning –Ontology-Ontology components.

UNIT-III

Vectors-Raw materials-Raster Data-Vector Data-Types of Vector Data-know your file formats-Anatomy of a shape file-Downloading a viewer-Styling your layers-saving your map in ArcExplorer-Projections-The Round Earth-Cartesian Planes-Coordinate Reference systems-Reprojection utilities-Rasters-Mosaics and Tessellation-Temporal analysis-Panchromatic Vs multispectral-Scale and Resolution-Orthorectification-Downloading Free Rasters.

UNIT-IV

Spatial Databases-Why bother with a spatial Database-Installing Postgre SQL and PostGIS-Adding spatial Fields-Inserting spatial Data-Querying spatial Data-Introspection of spatial Data-Importing spatial Data-Manipulating Data-Exporting Data-Indexing Data-Spatial Queries-Visualising Data

UNIT-V

Creating OGC Webservices-Sharing the wealth-OGC SOA for GIS-Installing Geoserver-Adding shapefiles Using the GUI-Adding Shapefiles manually-Adding PostGIS Layers-Styling with SLD-Using OGC Web services-Understanding WMS-WMS Get Capabilities-WMS Get MAP-Understanding WFS-WFS GetCapabilities-WFS DescribeFeatureType-Filtering WFS GetFeature Requests.

TEXT BOOKS:

1.Xml and Webservices Unleashed,Ron Schmelzer,Travis Vandersypen,Madhu siddalingaiah,Diane kennedy,Pearson Edition,2011,ISBN 978-81-317-1869-8.

2. GIS For WebDevelopers by Scott Davis , ISBN-13: 978-0-9745140-9-3

REFERENCES:

1. Foundations of the Semantic Web: XML, RDF & Ontology by Rajendra Akerkar, ISBN-13-9788173199851.
2. An Introduction to XML and Web Technologies by Anders Moller,Michael Schwartzbach,Pearson Edition, ISBN 978-81-317-2607-5.

KL UNIVERSITY

Pre-Ph.D Examination

WEB SERVICES AND GEOGRAPHIC INFORMATION SYSTEMS (GIS)

MODEL QUESTION PAPER

Time:3hrs **Max Marks:100**

ANSWER ANY FIVE QUESTIONS

1. a) Explain the XML Representation technologies using XSLT and XLink.

   b) Explain the terms

      i) SOAP ii) UDDI iii) WSDL

2. a) Explain briefly about RDF Data Model.

   b) Explain the Architecture of Semantic Web.

3 . a)Write short notes on

   i) Vector Data
   ii) Raster Data.

   b) what is a projection ? what are the different types of Distortion.

4.a) Explain about Basic Mapping Technology.

   b) Explain Co-ordinate Reference systems.

5. Explain scale and Resolution in the analog world and Digital world.

6. a) Explain the concept of Querying the Spatial Data.

   b)Explain the Introspection of Spatial Data.

7.a) Write a short notes on Importing and exporting the spatial Data.

   b) Explain OGC SOA for GIS.

8. Explain about Web Map Service in detail.

KL UNIVERSITY
Pre-Ph.D EXAMINATION
WIRELESS SENSOR NETWORKS
SYLLABUS

UNIT I

Basics of Wireless Sensors and Applications, The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications

UNIT II

Data Retrieval in Sensor Networks, Classification of WSNs, MAC Layer, Routing Layer, High-Level Application Layer Support, Adapting to the Inherent Dynamic Nature of WSNs.

UNIT III

Sensor Network Platforms and Tools, Sensor Network Hardware, Sensor Network Programming Challenges, Node-Level Software Platforms.

UNIT IV

Operating System: TinyOS, Imperative Language: nesC, Dataflow Style Language: TinyGALS, Node-Level Simulators, ns-2 and its Sensor Network Extension, TOSSIM.

UNIT V

Sensor Network Databases : Challenges ,Query Interfaces, High level Database Organization,In-Network Aggregation, Data-centric Storage, Temporal Data.

TEXT BOOKS:

1. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science Imprint, Morgan Kauffman Publishers, 2005, rp2009.

REFERENCES:

1. Adhoc Wireless Networks: Architectures and Protocols, C.Siva Ram Murthy, B.S.Murthy, Pearson Education, 2004
2. Wireless Sensor Networks: Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach Book, CRC Press, Taylor & Francis Group, 2010
3. Wireless Ad hoc Mobile Wireless Networks: Principles, Protocols and Applications, Subir Kumar Sarkar et al., Auerbach Publications, Taylor & Francis Group, 2008.
4. Wireless Sensor Networks: Signal Processing and Communications Perspectives, Ananthram Swami et al., Wiley India, 2007, rp2009.

KL UNIVERSITY
Pre-Ph.D EXAMINATION
WIRELESS SENSOR NETWORKS
MODEL PAPER

Time:3hrs **Max Marks:100**

ANSWER ANY FIVE QUESTIONS

1 .a) Explain the required mechanisms for WSN.

b) Explain the applications and design issues of WSN's.

2. a) Explain the data retrieval concepts in sensor networks.

b) Explain about inherent dynamic nature of WSN's.

3. a) Briefly explain about sensor network hardware.

b) Write about sensor network programming challenges.

4. a) Explain about clustering of sensors.

b) Explain about MAC layer.

5.a) Explain the terms

i) TinyOS ii) NesC iii) TOSSIM.

6. a) Discuss Datacentric Storage in WSN.

7. a) Explain Clustering of sensors.

b) Explain about In-network aggregration in WSN.

8. a) Explain about Energy consumption in WSN.

b) Explain the applications of WSN.

K L University
Pre-Ph.D Examination
PARALLEL COMPUTING
Syllabus

PARALLEL COMPUTER MODELS: Parallel Hardware and Parallel Software, Modifications to the Von Neumann Model, Parallel Hardware, Parallel Software, Input and Output, Performance, Parallel Program Design, Writing and Running Parallel Programs, Distibuted-Memory Program with The State of Computing, Multiprocessors and Multicomputers, Multivector and SIMD Supercomputers, PRAM and VLSI Models

PROGRAM AND NETWORK PROPERTIES: Conditions of Parallelism, Program Partitioning,Program Flow Mechanisms, System Interconnect Architectures. Performance Metrics and Measures, Parallel Processing Applications, Speedup performance Laws

MULTIPROCESSORS AND MULTICOMPUTERS: Multiprocessor System Interconnects, Cache Coherence and Synchronization Mechanisms, Message -Passing Mechanisms, Latency - Hiding Techniques, Principles of Multithreading, Scalable and Multithreaded Architectures, Dataflow Computers.

SHARED-MEMORY PROGRAMMING WITH Pthreads: Process, Threads and Pthreads; Hello, World; Matrix-Vector Multiplication, Critical Sections, Busy-Waiting, Mutexes, Producer-Consumer Synchronization and Semaphores, Barriers and Condition Variables, Read-Write Locks, Caches, Cache Coherence and False Sharing, Thread-Safety

SHARED-MEMORY PROGRAMMING WITH OpenMP: Getting Started, The Trapezoidal Rule, Scope of Variables, The Reduction Clause, The Parallel for Directive, More about Loops in OpenMP: Sorting, Scheduling Loops, Producers and Consumers, Caches, Cache Coherence and False Sharing, Thread-Safety

Parallel Program Development: Two n-Body Solvers, Tree Search, A word of Caution, Which API?

Text Books:

1. Peter S. Pacheco, ” Introduction to Parallel Programming”; Morgan Kaufmann
2. Kai Hwang, “Advanced Computer Architecture”; TMH
3. D.A.Patterson and J.L.Hennessey, “Computer Architecture a quantitative approach”, Morgan Kaufmanns, 3rd Edition(An imprint of Elsevier)

Reference Books:

1. Kai Hwang and A.Briggs,”computer architecture and parallel processing” International edition McGraw-Hill.

K L University
Pre-Ph.D Examination
PARALLEL COMPUTING
Model Question Paper

Time:3hrs **Max Marks:100**

Answer **any FIVE** questions.

All questions carry equal marks.

1. (a) Differentiate between sequential computer and parallel computer

   (b) Explain about writing and running parallel programs

2. (a) Explain about Multi vector and SIMD Supercomputers

   (b) Explain the parallel program design.

3. (a) Explain Performance Metrics and Measures.

   (b) Explain Parallel Processing Applications

4. (a) Explain about message passing mechanisms

   (b) Explain the principles of multithreading.

5. (a) Define process. Explain about each state of the process

   (b) Explain about threads and pthreads.

6. (a) Explain producers and consumers problem in shared memory programming with openMP.

   (b) Explain about thread-safety in shared memory programming with openMP.

7. Explain about tree search in parallel program development.

8. (a) Explain about cache coherence and false sharing in shared memory programming with openMP.

   (b) Explain the amdahl's law for measuring speed up performance with the help of an example.

K L University
Pre-Ph.D Examination
Computer System Architecture
Syllabus

Digital Logic Circuits: Logic Gates, Boolean algebra, Map Simplification, Combinational Circuits, Flip-flops, Sequential Circuits, **Digital Components**: Integrated Circuits. Decoders, Multiplexers, Registers, Shift Registers, Binary Counters, Memory Unit, **Data Representation**: Data Types, Complements, Fixed-point Representation, Floating-point Representation, Other Binary Codes, Error Detection Codes **Register Transfer & Micro-operations**: Register Transfer Language, Register Transfer, Bus & memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic Shift Unit.

Basic Computer Organization and Design: Introduction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction cycle, Memory-Reference Instruct ion, Input-Output and Interrupt, Design of Basic Computer, Design of Accumulator Logic. Microprogrammed Control: Control Memory, Address Sequencing, Micro-Program example, Design of Control Unit.

Central Processing Unit: General registers Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer **Computer Arithmetic**: Addition and Subtraction, Multiplication Algorithms, Division Algorithms Floating-point Arithmetic operations

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector processing, Array Processors, Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor, Serial Communication.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associative Men Cache Memory, Virtual Memory, Memory Management hardware.

Multiprocessors: Characteristics of Multiprocessors, Interconnection Structures, Time-shared common Bus, Multiport Memory, Crossbar Switch, Multistage Switching Network, Hypercube Interconnection, Interprocessor Arbitration , System Bus, Serial Arbitration Procedure, Parallel Arbitration Logic, Dynamic Arbitration Algorithms, InterProcessor Communication and Synchronization, InterProcessor Synchronization, Mutual Exclusion With a Semaphore

Text Book:

. Morris M. Mano, 'Computer Systems Architecture', 3rd Edition

Reference Books :

1. John P Hayes, 'Computer Architecture and Organisation' 2nd edition.
2.V.Carl Hamacher et.al, 'Computer Organization' 2nd edition.

K L University

Pre-Ph.D Examination

Computer System Architecture

Model Question Paper

Time:3hrs **Max Marks:100**

Answer **any FIVE** questions.All questions carry equal marks.

1. Briefly explain about the hard wired and micro programmed control.
2. (a) What are the functional units? What is bus and explain the different types of bus structures.

   (b)Explain the different types of addressing modes.
3. (a) Explain signed operand multiplication with Booth's algorithm.

   (b) Explain the concept of Integer division.
4. Explain cache memories and virtual memories
5. (a) What is pipelining? Explain the concept of data hazard and instruction hazards.

   (b) Explain the conditions of parallelism.
6. (a) Explain the cache coherence and synchronization mechanisms.

   (b) Explain the message passing mechanisms.
7. Discuss the scalable and multithreaded architectures and demand driven mechanisms.
8. (a)Describe the register organization in a general computer with a block diagram.

   (b) Explain the instruction formats and data manipulation instructions

K L University
Pre-Ph.D Examination
Software Engineering
Syllabus

Unit-I

Introduction to Software Engineering—The Evolving role of Software**,** Software, the changing nature of software,

Legacy software, software myths.

A Generic view of process—Software engineering – A layered technology, a process frame work, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models, process technology, product and process.

Process Models—Prescriptive model, the water fall model, the incremental process models, evolutionary process models, specialized process models, the unified process.

An agile view of process—what is agility? What is an agile process?, Agile process models.

Unit-II

Software Engineering Practices—Software Engineering Practice, Communication Practices, Planning Practices, Modeling Practices, Construction Practices, Deployment.

System Engineering—computer based systems, the system engineering hierarchy, business process engineering: An overview, product engineering: An overview, system modeling.

Requirements Engineering—A bridge to design a construction, requirements engineering tasks , initiating the requirements engineering process, eliciting requirements, developing Use- cases, Building the analysis model, Negotiating requirements, validating requirements.

UNIT-III

Building the Analysis Model—Requirements analysis, Analysis modeling approaches, data modeling concepts, Object-Oriented analysis, scenario-based modeling, Flow-oriented modeling, Class-Based modeling, Creating a behavior model.

Design Engineering—Design within the context of software engineering, Design process and Design quality, Design concepts, The design model, Pattern-based software design.

Testing Strategies—A Strategic approach to software testing, Strategic Issues, test strategies for conventional software, test Strategies for Object-oriented software, validation testing, System testing, The art of Debugging.

Testing tactics—Software testing fundamentals, Black-Box and White-Box testing, White-box testing, basis path testing, Control structure testing, Black-Box testing, Object-oriented testing methods, testing methods applicable of the class level, Inter class test case design, testing for specialized environments, Architecture, and Applications, testing of Client/server architectures, testing documentation and help facilities, Testing for Real-Time systems.

UNIT-IV

Project Management—The Management spectrum, The people, The product, The Process, the Project, The W^5 HH principle, Critical practices.

Metrics for process and Project—Metrics in the process and project domains, Software measurement, Metrics for software quality, Integrating Metrics within the software process, Metrics for small organizations, Establishing a software metrics program.

Estimation—Observations on estimation, The project planning process, Software scope and feasibility, resources, Software project estimation, Decomposition techniques, Empirical estimation models, Estimation for Object-oriented projects, Specialized estimation techniques, the make/buy decision.

UNIT-V

Quality management—Quality concepts, Software quality assurance, Software reviews, formal technical reviews, Formal Approaches to SQA, Statistical software quality assurance, Software reliability, The ISO 9000 quality standards, the SQA plan,

Formal Methods—Basic concepts, mathematical preliminaries, Applying mathematical notation foe formal specifications, Formal specification language, Object constraint language(OCL), The Z specification language, The ten commandments of formal methods, Formal methods- The road ahead

Clean room Software Engineering—the clean room approach, Functional specification, Clean room design, Clean room testing,

Prescribed Text Books:

Software Engineering , A Practitioner's Approach, by ROGRER S. PRESSMAN. Sixth Edition, McGRAW-HILL International Edition.

K L University
Pre-Ph.D Examination
Software Engineering
Model Question paper

Max. Time: 3Hrs **Max Marks: 100**

Answer any FIVE of the following

1. a). Discuss the changing nature of Software.
   b). Explain the Personal and Team Process Models.

2. a). Explain the various Evolutionary Process Models.
   b). Discuss What is Agility and Agile Process?

3. a). Discuss the Essence of Software Engineering Practice.
   b). Explain the System Engineering Hierarchy.

4. a). What is Use-Case? Discuss the method of developing Use-Cases.
   b). Explain the step by step process of creating a Data Flow Model.

5. a). Explain the Pattern-Based Software Engineering.
   b). Discuss the Test Strategies for Conventional Software.

6. a). What is Test Case? Prepare a Test case for factorial of a number.
   b). Discuss Object-Oriented Testing Methods.

7. a). What is Project Management? Discuss the Management Spectrum.
   b). What is quality Assurance? Discuss the various Formal Approaches to SQA.

8. a). What are Formal Methods? Discuss the various Formal Specification Languages.
   b). What is Cleanroom Engineering? Explain the concepts of Cleanroom Design.

K L University
Pre-Ph.D Examination
Software Reliability
Syllabus

Unit I

Problem, process and product: problem and solution, what is the software practitioner's biggest problem?, how does software reliability engineering approach it?, what's been the experience with SRE?, the software reliability engineering process, define the product. General instructions for all workshops, defining the product workshop. Testing acquired software, learning reliability concepts, software reliability and hardware reliability.

Implementing operational profiles: developing operational profiles, identifying the initiators of operations, creating the operations list, reviewing the operations list, obtaining occurrence rates, determining occurrence probabilities

Unit II

Engineering "Just Right" Reliability: defining failure for the product, choosing a common measure for all associated systems, setting system failure intensity objectives, determining user needs for reliability and availability, determining overall reliability and availability objectives, finding the common failure intensity objective, determining developed software failure intensity objectives, engineering software reliability strategies.

Unit III

Preparing for test: preparing test cases, planning number of test cases for current release, allocating new test cases, distributing new test cases among new operations, detailing test cases, preparing test procedures.

Executing test: planning and allocating test time for the current release, invoking test, identifying failures, analyzing test output for deviations, determining which deviations are failures, establishing when failures occurred.

Unit IV

Guiding test: Tracking reliability growth, estimating failure intensity, using failure intensity patterns to guide test, certifying reliability.

Unit V

Deploying SRE : persuading your boss, your coworkers and stakeholders. Executing the deployment. Using a consultant, understanding the consultee's viewpoint, understanding the consultant's viewpoint.

Text Bo ok:

1. "Software Reliability Engineering" by John D. Musa, TATA McGRAW HILL, 2nd Edition

Reference Book:

1. "Software Reliability " by Hoang Pham, Springer Publications

K L University
Pre-Ph.D Examination
Software Reliability Engineering
Model Question paper

Time: 3 Hrs. **Max.Marks.100**

Answer any FIVE of the following

1 a) Define Problem, Process and Product? Explain the relationship between process and product.
b) Determine the user needs for reliability and availability

2 a) Describe Software Engineering process
b) Determine developed software failure intensity objectives

3 a) Write short note on Software safety
b) How to predict basic failure intensity? Explain?

4 a) How do you deal with ultra reliable systems
b) Describe system and component reliabilities and failure intensities

5 How to prepare test procedure? Explain in detail with examples.

6 Describe about allocation and distribution of new test cases

7 How to analyze test output for deviations? How to determine which deviations ae failures

8 Explain how to plan and allocate test time for current release? How to identify failures

9 a) How to track the reliability growth?
b) Explain the execution of deployment?

10 a) How to estimate failure intensity? Explain
b) How to understand consultees and consultants view point?