Krantiguru Shyamji Krishna Verma Kachchh University
Master of Science (Information Technology)
Semester: II

Paper Code: CCCS201		**Total Credit :** 4
Title of Paper: Advanced Java Programming		**Total Marks :** 70 **Time :** 3 Hrs
Unit	**Description**	**Weighting**
I	Introduction to J2EE Platform and Architecture The J2EE Platform, The J2EE Architecture Containers, J2EE Technologies, Developing J2EE Applications, Introducing Java Mail and JMS	**20%**
II	Database Programming ODBC and JDBC Drivers, Connecting to Database with the java.sql Package, Using JDBC	**20%**
III	*Servlets* Introduction to Servlets and architecture , Servlet Life Cycle, Servlet based Applications, type of servlet, Servlet and HTML, Session management *JSP* Introduction to JSP, JSP implicit objects, JSP based Applications, Session Management	**20%**
IV	*Remote Method Invocation (RMI)* The RMI Architecture, RMI Exceptions Developing Applications With RMI, Parameter Passing in RMI *XML* XML syntax and semantics, Writing Document Type Definitions (DTDs), XML based applications	**20%**
V	*Java Beans* An overview of Java Beans Requirement, Development and Scope of Java Beans Design consideration and Naming conventions of Java Beans and Guideline. *Enterprise Java Beans (EJB)* Introduction to EJB Entity Beans Session Beans	**20%**
Basic Text & Reference Books :-		
1.	Professional Java Server Programming by Subrahmanyam Allamaraju	
2.	J2EE Bible by Justin Couch and Deniel H. Steinberg	
3.	Professional Java Server Programming Volume I and II, Wrox Publication.	
4.	J2EE Unleashed by Joseph J. Bambara, BPB publications	
5.	Enterprise JAVA J2EE 1.3 complete, BPB publications	

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Master of Science (Information Technology)
Semester: II

Paper Code: CCCS201			**Total Credit :** 4 **Total Marks :** 70 **Time :** 3 Hrs
Title of Paper: Advanced Java Programming			
Unit	**Description**		**Total Marks**
I	Q.1 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.1 (B) Medium / Long Questions. (With Internal Option)	08	
II	Q.2 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.2 (B) Medium / Long Questions. (With Internal Option)	08	
III	Q.3 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.3 (B) Medium / Long Questions. (With Internal Option)	08	
IV	Q.4 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.4 (B) Programs. (With Internal Option)	08	
V	Q.5 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.5 (B) Programs. (With Internal Option)	08	

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Paper Code: CCCS202		**Total Credit :** 4
Title of Paper: Cryptography		**Total Marks :** 70 **Time :** 3 Hrs
Unit	**Description**	**Weighting**
I	**Introduction** Security Trends, OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, History and Overview of Cryptology	**20%**
II	**Symmetric Ciphers** Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines / Enigma, Steganography Block Ciphers: Principles, Data Encryption Standard/ 3DES, DES Operation, DES Strength, Block Cipher Design Principles	**20%**
III	**Asymmetric Ciphers** Prime Numbers, Principles of Public Key Cryptosystems, The RSA Algorithm, Diffie-Hellman Key Exchange, Pseudorandom Number Generation, Cryptographic Hash Functions, Secure Hash Algorithm, Message Authentication Codes, Digital Signatures	**20%**
IV	**Network and Internet Security** Key Distribution, X.509 Certificates, Public Key Infrastructure, Web Security Issues, Secure Sockets Layer (SSL), Transport Layer Security (TLS), HTTPS, Secure Shell (SSH), Wireless Network Security Overview, Email Security: PGP, S/MIME, DKIM.	**20%**
V	**Scams and Cyber Laws** DoS and DDoS attacks, CAPTCHA, Spam, Phishing, Ponzi Schemes, Indian IT Act 2000 with Subsequent Amendments.	**20%**
Basic Text & Reference Books :-		
1.	Cryptography and Network Security, William Stallings, Pearson	

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Semester: II

Paper Code: CCCS202			**Total Credit :** 4 **Total Marks :** 70 **Time :** 3 Hrs
Title of Paper: Cryptography			
Unit	**Description**		**Total Marks**
I	Q.1 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.1 (B) Medium / Long Questions. (With Internal Option)	08	
II	Q.2 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.2 (B) Medium / Long Questions. (With Internal Option)	08	
III	Q.3 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.3 (B) Medium / Long Questions. (With Internal Option)	08	
IV	Q.4 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.4 (B) Medium / Long Questions. (With Internal Option)	08	
V	Q.5 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.5 (B) Medium / Long Questions. (With Internal Option)	08	

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Master of Science (Information Technology)
Semester: II

Paper Code: CCCS203	**Total Credit :** 4
Title of Paper: Artificial Intelligence	**Total Marks :** 70 **Time :** 3 Hrs

Unit	Description	Weighting
I	**Artificial Intelligence and Knowledge-Based Systems** Natural and Artificial Intelligence – Characteristics and Definitions of AI AI based systems, Testing the Intelligence with Turing Test, and Chinese Room Experiment, Application Areas of Artificial Intelligence, Data Pyramid and Computer Based Systems Production Systems and AI based Searches like Hill Climbing and Heuristic Search Introduction & Objectives of KBS, Components of KBS Categories of the KBS like Expert Systems, Database Management Systems in Conjunction with an Intelligent User Interface, Linked Systems, CASE Based Systems, Intelligent Tutoring Systems, etc. Issues and limitations of KBS General structure of KBS, Conflict Resolution Strategies for Rule Based Systems Knowledge Base Shell Advantages, limitations and applications of Knowledge-Based Systems	**20%**
II	**Development of Knowledge-Based Systems** Development of Knowledge-Based System, Difficulties in KBS Development Knowledge-Based Systems Development Model, Knowledge Acquisition Process and Techniques, Knowledge Sharing, Dealing with Multiple Experts, Issues in Knowledge Acquisition, Knowledge Update Characteristics of Good Knowledge Representation Scheme Factual and Procedural Knowledge Representation Applications and Users of KBS Tools for KBS development and Case Studies	**20%**
III	**Fuzzy Logic** Introduction to fuzzy logic Fuzzy logic and fuzzy sets, Membership Functions, Fuzzification and Defuzzification, Operations on Fuzzy Sets Fuzzy Functions and Linguistic Variables Fuzzy Relationships, Propositions and Connectives Fuzzy Inference Fuzzy Rules, Fuzzy Control System and Fuzzy Rule Based Systems	**20%**
IV	**Neural Network** Neural Networks: Introduction, Advantages and Disadvantages of Neural Networks Biological Neuron and Artificial Neuron Neural Network Architectures Applications of Neural Network	**20%**
V	**Genetic Algorithm** Introduction to Genetic Algorithm Basic Terminology, Genetic Algorithm, GA Cycle Basic Operator of GA, Function Optimization Introduction to Prolog Prolog Application and Programs	**20%**

Basic Text & Reference Books :-

1.	Elain Rich: “Artificial Intelligence”, McGraw Hill, Third Edition, 2001.
2.	R. Akerkar: “Introduction to Artificial Intelligence”, Prentice Hall of India, 2005.
3.	R. Akerker and P. S. Sajja: “Knowledge-Based Systems”, Jones and Bartlettes, MIT, 2010

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Semester: II

Paper Code: CCCS203			**Total Credit :** 4 **Total Marks :** 70 **Time :** 3 Hrs
Title of Paper: Artificial Intelligence			
Unit	**Description**		**Total Marks**
I	Q.1 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.1 (B) Medium / Long Questions. (With Internal Option)	08	
II	Q.2 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.2 (B) Medium / Long Questions. (With Internal Option)	08	
III	Q.3 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.3 (B) Medium / Long Questions. (With Internal Option)	08	
IV	Q.4 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.4 (B) Medium / Long Questions. (With Internal Option)	08	
V	Q.5 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.5 (B) Prolog Programs. (With Internal Option)	08	

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Semester: II

Paper Code: CCCS204	**Total Credit :** 4
Title of Paper: Practical Based on CCCS201	**Total Marks :** 70 **Time :** 3 Hrs

Description

1. Understanding J2EE Architecture
2. Demonstration of JDBC connectivity.
3. Understanding Java Mail and JMS.
4. Understanding Servlet Architecture
5. Understanding JSP and JSP objects
6. Demonstration of Session Management
7. Understanding RMI Architecture
8. Understanding RMI with XML.
9. Demonstration of XML based applications
10. Understating EJB

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Semester: II

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Total Marks : 70
Time : 3 Hrs</td></tr>
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<tr><td colspan="4"></td></tr>
<tr><td>Unit</td><td colspan="2">Description</td><td>Total Marks</td></tr>
<tr><td rowspan="2">I</td><td>Q.1 (A) Viva – Voce</td><td>20</td><td rowspan="2">70</td></tr>
<tr><td>Q.1 (B) Practical</td><td>50</td></tr>
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Semester: II

Paper Code: CCCS205	**Total Credit :** 4
Title of Paper: Practical Based on CCCS203	**Total Marks :** 70 **Time :** 3 Hrs
Description	
1. Understanding Turbo Prolog: Installing, Running Programs, Saving and Loading Files 2. Understanding Prolog Syntax and Semantics. 3. Understanding Branching. 4. Understanding Looping. 5. Understanding Functions and Parameters. 6. Understanding List 7. Understanding various objects. 8. Understanding Recursion.	

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Total Marks : 70
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<tr><td colspan="4"></td></tr>
<tr><td>Unit</td><td colspan="2">Description</td><td>Total Marks</td></tr>
<tr><td rowspan="2">I</td><td>Q.1 (A) Viva – Voce</td><td>20</td><td rowspan="2">70</td></tr>
<tr><td>Q.1 (B) Practical</td><td>50</td></tr>
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Semester: II

Paper Code: CECS203		**Total Credit :** 4
Title of Paper: Software Testing and Quality Assurance		**Total Marks :** 70 **Time :** 3 Hrs
Unit	**Description**	**Weighting**
I	**Testing Environment and Test Processes** World-Class Software Testing Model – Building a Software Testing Environment - Overview of Software Testing Process – Organizing for Testing – Developing the Test Plan – Verification Testing – Analyzing and Reporting Test Results – Acceptance Testing – Operational Testing – Post Implementation Analysis	**20%**
II	**Testing Techniques** Using White Box Approach to Test design, Static Testing Vs. Structural Testing, Code Functional Testing, Coverage and Control Flow Graphs, Using Black Box Approaches to Test Case Design, Random Testing, Requirements based testing, Decision tables, State-based testing, Cause-effect graphing, Error guessing, Compatibility testing, Levels of Testing, Unit Testing, Integration Testing, Defect Bash Elimination. System Testing, Usability and Accessibility Testing, Configuration Testing, Compatibility Testing, Case study for White box testing and Black box testing techniques.	**20%**
III	**Incorporating Specialized Testing Responsibilities** Testing Client/Server Systems, Rapid Application Development Testing, Testing in a Multiplatform Environment, Testing Software System Security, Testing Object-Oriented Software, Object Oriented Testing, Testing Web based systems, Web based system, Web Technology Evolution, Traditional Software and Web based Software, Challenges in Testing for Web-based Software, Testing a Data Warehouse, Case Study for Web Application Testing.	**20%**
IV	**Test Automation** Selecting and Installing Software Testing Tools, Software Test Automation, Skills needed for Automation, Scope of Automation, Design and Architecture for Automation – Requirements for a Test Tool, Challenges in Automation, Tracking the Bug, Debugging, Case study using Bug Tracking Tool	**20%**
V	**Software Testing and Quality Matrices** Testing Software System Security, Six-Sigma, TQM, Complexity Metrics and Models, Quality Management Metrics, Availability Metrics, Defect Removal Effectiveness, FMEA, Quality Function. Deployment, Taguchi Quality Loss Function, Cost of Quality. Case Study for Complexity and Object, Oriented Metrics	**20%**
Basic Text & Reference Books :-		
1.	William Perry, "Effective Methods of Software Testing", Third Edition,Wiley Publishing 2007	
2.	Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices",Pearson Education, 2007	
3.	Naresh Chauhan , "Software Testing Principles and Practices " Oxford University Press , NewDelhi , 2010.	
4.	Stephen Kan, "Metrics and Models in Software Quality", Addison – Wesley, Second Edition,2004.	
5.	Boris Beizer, " Software Testing Techniques" – 2nd Edition, Van Nostrand Reinhold, New York,1990	

Krantiguru Shyamji Krishna Verma Kachchh University
Master of Science (Information Technology)
Semester: II

Paper Code: CECS203			**Total Credit :** 4 **Total Marks :** 70 **Time :** 3 Hrs
Title of Paper: Software Testing and Quality Assurance			
Unit	**Description**		**Total Marks**
I	Q.1 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.1 (B) Medium / Long Questions. (With Internal Option)	08	
II	Q.2 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.2 (B) Medium / Long Questions. (With Internal Option)	08	
III	Q.3 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.3 (B) Medium / Long Questions. (With Internal Option)	08	
IV	Q.4 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.4 (B) Medium / Long Questions. (With Internal Option)	08	
V	Q.5 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.5 (B) Medium / Long Questions. (With Internal Option)	08	

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Master of Science (Information Technology)
Semester: II

Paper Code: CECS204		**Total Credit :** 4
Title of Paper: Embedded Systems		**Total Marks :** 70 **Time :** 3 Hrs
Unit	**Description**	**Weighting**
I	**Introduction** What is IoT?, Examples of IoT, Appliances, Smart Health care, Oil & Gas Industry, Smart Places, IoT v/s Computer v/s Smartphone, Adoption and trends in IoT, Social benefits of IoT, Risk-Security-Privacy of IoT. Embedded Systems: An introduction to embedded systems, examples, generic structure of embedded system, sensors and actuators, Analog / Digital Conversion, basic devices.	**20%**
II	**Arduino Basics** IDE, Setting up Arduino Board, Arduino Sketch, Uploading and Running Blink Sketch, Creating and Saving Sketch, Structure of Sketch, Primitive Types, Functional Blocks, Conditions, Loops, Operators.	**20%**
III	**Arduino Communications** Sending Debug Information from Arduino to Your Computer, Sending Formatted Text and Numeric Data from Arduino, Receiving Serial Data in Arduino, Sending Multiple Text Fields from Arduino in a Single Message, Receiving Multiple Text Fields in a Single Message in Arduino, Sending Binary Data from Arduino, Receiving Binary Data from Arduino on a Computer, Sending Binary Values from Processing to Arduino, Sending the Value of Multiple Arduino Pins, How to Move the Mouse Cursor on a PC or Mac, Controlling Google Earth Using Arduino, Logging Arduino Data to a File on Your Computer, Sending Data to Two Serial Devices at the Same Time, Receiving Serial Data from Two Devices at the Same Time, Setting Up Processing on Your Computer to Send and Receive Serial Data.	**20%**
IV	**Input** Using a Switch, Using a Switch Without External Resistors, Reliably Detecting the Closing of a Switch, Determining How Long a Switch Is Pressed, Reading a Keypad, Reading Analog Values, Changing the Range of Values, Reading More Than Six Analog Inputs, Displaying Voltages Up to 5V, Responding to Changes in Voltage, Measuring Voltages More Than 5V (Voltage Dividers) Detecting Movement, Detecting Light, Detecting Motion (Integrating Passive Infrared Detectors), Measuring Distance, Measuring Distance Accurately, Detecting Vibration, Detecting Sound, Measuring Temperature, Reading RFID Tags, Tracking Rotary Movement, Using a Mouse, Getting Location from a GPS	**20%**
V	**Introduction to Raspberry Pi** A Tour of the Boards, The Proper Peripherals, The Case, Flash the SD Card, Booting Up, Configuring Your Pi, Shutting Down, Troubleshooting **Linux on the Raspberry Pi** Using the Command Line, Files and the Filesystem, More Linux Commands, Processes, Sudo and Permissions, The Network, /etc, Setting the Date and Time, Installing New Software, Python on Raspberry Pi **Programming Inputs and Outputs with Python** Installing and Testing GPIO in Python, Blinking an LED, Reading a Button **Working with Webcams** Testing Webcams, Installing and Testing SimpleCV, Displaying an Image.	**20%**
Basic Text & Reference Books :-		
1.	Arduino Cookbook, Michael Margolis, O'Reilly	
2.	Getting Started with Raspberry Pi, Matt Richardson, O'Reilly	

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Paper Code: CECS204			**Total Credit :** 4 **Total Marks :** 70 **Time :** 3 Hrs
Title of Paper: Embedded Systems			
Unit	**Description**		**Total Marks**
I	Q.1 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.1 (B) Medium / Long Questions. (With Internal Option)	08	
II	Q.2 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.2 (B) Medium / Long Questions. (With Internal Option)	08	
III	Q.3 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.3 (B) Medium / Long Questions. (With Internal Option)	08	
IV	Q.4 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.4 (B) Medium / Long Questions. (With Internal Option)	08	
V	Q.5 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.5 (B) Medium / Long Questions. (With Internal Option)	08	