BEM-C403
DISCRETE MATHEMATICS

MM: 100 **Sessional: 30**
Time: 3 hrs **ESE: 70**
L T P **Credits 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain 10 objective type questions of one mark each and student shall be required to attempt all questions. Sec.-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec.-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Questions shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Sets and Propositions: Review of set theory, Combination of sets, Finite and Infinite sets, Uncountable Infinite sets, Mathematical Induction, Principle of Inclusion and Exclusion. Propositions.

UNIT II

Relations and Functions: Relation, Properties of primary relations, Equivalence relations and partitions, Partial ordering relations and lattices. Functions and the Pigeonhole principle.

UNIT III

Graphs and Planar Graphs: Basic terminology, Multigraphs and weighted graphs, Paths and circuits, shortest paths in weighted graphs. Eulerian paths and circuits, Hamiltonian paths and circuits, Planar graphs.

UNIT IV

Trees and Cut Sets: Trees, Rooted trees, Path lengths in rooted trees, Prefix codes, spanning trees and cut sets. Minimum spanning trees.

UNIT V

Generating Functions and Recurrence Relations: Introduction. Manipulation of numeric Functions, Generating functions, Recurrence relations, Linear recurrence relations with constant coefficients. Homogeneous solutions, Particular solutions, Total solutions. Solution by the method of generating functions.

Text Books / References

1. Rosen Kenneth H., "Discrete Mathematics and its Applications", McGraw Hill, 1988.
2. Liu, C. L(2/e)., Elements of Discrete Mathematics, TMH, New Delhi, 2000
3. Tremblay J.P. and Manohar R., Discrete Mathematical Structures with Application to Computer Science, McGraw, Singapore, 1988
4. Kolman B & Busby Robert C (3/e), Discrete Mathematical Structures for Computer Science, PHI, New Delhi, 2001



BCE-C408
DATABASE MANAGEMENT SYSTEM

MM: 100 **Sessional: 30**
Time: 3 hrs **ESE: 70**
L T P **Credits 3**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain 10 objective type questions of one mark each and student shall be required to attempt all questions. Sec.-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec.-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Questions shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: An overview of Database Management System, Database System Vs File System, Database system concept and architecture, data models schema and interfaces, data definitions language, DML, Overall Database Structure. Data Modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagram to tables, extended ER model, relationship of higher degree.

UNIT II

Relational Data Model and Language: Relational Data Model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain Constraints, relational algebra, relational calculus, tuple and domain calculus.

Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Tables, views and indexes, Queries and sub-queries, Aggregate functions, Insert, update and delete operations, Joins, Union, Intersection, Minus.

UNIT III

Data Base Design & Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependencies, loss less join decomposition, normalization using FD, MVD and JDs, alternative approaches to database design.

UNIT IV

Transaction Processing Concepts: Transaction system, Testing of serializability, Serializability of schedules, conflict & view Serializable schedule, recoverability, Recovery from transaction failures, log-based recovery, deadlock handling.

UNIT V

Concurrency Control Techniques: Concurrency Control, Locking Techniques for Concurrency control, Time stamping protocols for concurrency control, validation-based protocol, multiple granularities, multi-version schemes, Recovery with concurrent transaction, Transaction processing in Distributed system, Data fragmentation, Replication and allocation techniques for distributed system, overview of concurrency control and recovery in distributed database.

Text Books / References

1. Date C.J., An Introduction to Database System, Addision Wesley.
2. Korth, Silbertz, Subaeshan, Database Concepts, McGraw Hill.
3. Elmasri, Navathe, Fundamentals of Database Systems, Addision Wesley.
4. Paul Beynon Davies, Database System, Palgrave Macmillan.

BCE-C406
OBJECT ORIENTED PROGRAMMING WITH JAVA

MM: 100 **Sessional: 30**

Time: 3 hrs **ESE: 70**

L T P **Credits 3**

3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain 10 objective type questions of one mark each and student shall be required to attempt all questions. Sec.-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec.-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Questions shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Creation of Java, importance of Java to internet, byte code, OOP Principles, Encapsulation, Inheritance and Polymorphism, data types, variables, declaring variables, dynamic initialization, scope and life time of variables, arrays, operators, control statements, type conversion and casting, compiling and running of simple Java program.

Classes and Objects: Concepts of classes and objects, class fundamentals Declaring objects, assigning object reference variables, introducing methods, constructors, usage of static with data and methods, usage of final with data, access control, this key word, garbage collection, overloading methods and constructors, parameter passing – call by value, recursion, nested classes and inner classes, exploring the String class.

UNIT II

Inheritance: Basic concepts, member access rules, usage of super key word, forms of inheritance, method overriding, abstract classes, dynamic method dispatch, using final with inheritance, the Object class.

Packages and Interfaces: Defining, Creating and Accessing a Package, understanding class path, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT III

Exception Handling and Multithreading: Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes, Concepts of Multithreading, differences between process and thread, thread life cycle, creating multiple threads using Thread class, Runnable interface, Synchronization.

UNIT IV

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

JDBC: The connectivity Model, JDBC/ODBC Bridge, java.sql package, connectivity to remote database, navigating through multiple rows retrieved from a database, selection, insertion, updating and deletion in database using JDBC.

UNIT V

Networking and Java Library: Basics of Networking, Inetaddress, TCP/IP sockets , datagrams, using sockets and datagram sockets to transfer data.

Servlets : Background, Life cycle of a servlet, Reading servlet parameters, Cookies and Session Handling, Database handling using servlets, Sharing data between different servlets.

Text Books / References

1. Herbert Schildt, The Complete Reference Java J2SE 5th Edition, TMH Publishing Company Ltd.
2. Cay Horstmann, ig Java 2nd Edition, John Wiley and Sons.
3. H.M.Dietel and P.J.Dietel, Java How to Program, Pearson Education/PHI
4. Cay.S.Horstmann and Gary Cornell, Core Java 2, Vol 1, Fundamentals, Pearson Education.
5. Cay.S.Horstmann and Gary Cornell, Core Java 2- Advanced Features, Pearson Education.
6. Iver Horton, Beginning in Java 2, Wrox Publications.
7. Marty and Hall, Core Servlets and JSP, Prentice Hall and Sun Microsystems Press.
8. Deiltel & Deitel, Advanced Java, TMH

BCE-C407
OPERATING SYSTEM

MM: 100 **Sessional: 30**
Time: 3 hrs **ESE: 70**
L T P **Credits 3**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain 10 objective type questions of one mark each and student shall be required to attempt all questions. Sec.-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec.-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Questions shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Operating System, Single Processor systems, Multiprocessor Systems, Clustered Systems, Mainframe Systems, Desktop Systems, Distributed Systems, Real Time Systems, System Components, Handheld Systems, Operating System Services, System Calls, System Programs, System Structure, Operating System Design and Implementation.

UNIT II

Process Management: Process Concept, Process Scheduling, Cooperating Processes, Inter-process Communication, Threads, Overview of Multithreading Models, CPU Scheduling, Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling, Real Time Scheduling, Algorithm Evaluation.

UNIT III

Process Synchronization & Deadlocks: The Critical Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Deadlocks, System Model, Deadlock Characterization, Methods for handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

UNIT IV

Memory Management & Virtual Memory: Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Virtual Memory, Demand paging, Page Replacement, Thrashing, Allocation of Frames

UNIT V

File System & Secondary Storage Structure: File Concepts, Access Methods, Directory Structure, File System Mounting, File Sharing, Protection, File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free Space Management, Recovery, Disk Structure, Disk Scheduling, Disk Management, Swap Space management.

Text Books / References

1 Silberschatz, Galvin, Gagane, Operating System Concepts. Wiley India Edition.
2 William Stallings, Operating System, Pearson Prentice Hall.
3 D.M.Dhamdhere, Operating Systems, TMH.

BET-C411
MICROPROCESSOR AND INTERFACING

MM: 100 **Sessional: 30**

Time: 3 hrs **ESE: 70**

L T P **Credits 3**

3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one mark each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five questions. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to Microprocessors and assembly language, 8085 architectures, addressing modes of 8085, 8085 instruction set and programming techniques, timing diagrams, Counters & time delays.

UNIT II

Stacks and subroutines, basics of memory interfacing. Interfacing I/O Devices, programming of basic arithmetic operations: addition, subtraction, multiplication, division, code conversion etc., Interrupts.

UNIT III

Programmable Peripheral Interface (PPI) (8255), Programmable Interval Timer (8254), Programmable interrupt controller (8259), DMA & DMA controller (8237), ADC / DAC interfacing.

UNIT IV

8086 Processor: 8086 architectures, Pin configuration, 8086 in min/max mode, addressing modes, Instruction set of 8086, Assembler directives, basic assembly language programming.

UNIT V

Overview of Advanced Microprocessors- 80186,286,386,486, Pentium – I, Pentium – II, Pentium – III, Pentium – IV.

Text Book

1. Microprocessor, architecture, programming and applications with 8085 R.S Gaonkar.

Text Books / References

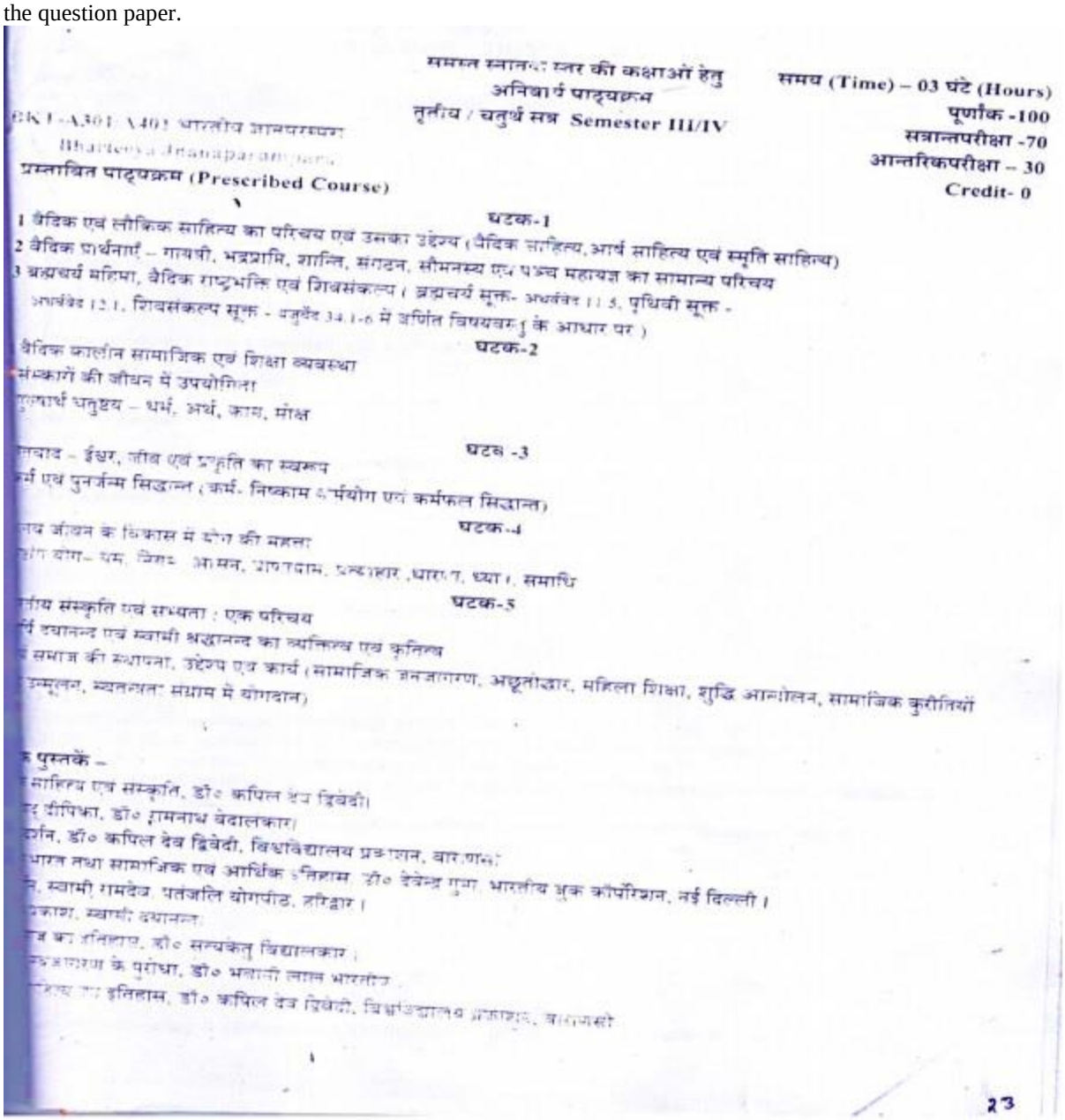
1. 8086 microprocessor: programming and interfacing the pc- K.J Ayala
2. 8051 microcontroller architecture programming and applications-K. J Ayala
3. Microprocessors and interfacing: Douglas hall.



BKT-A403
BHARTIYA GYAN PARAMPARA (IKT)

MM: 100 **Sessional: 30**
Time: 3 hrs **ESE: 70**
L T P **Credits 0**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain 10 objective type questions of one mark each and student shall be required to attempt all questions. Sec.-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec.-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Questions shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.



समस्त स्नातक स्तर की कक्षाओं हेतु
अनिवार्य पाठ्यक्रम
तृतीय / चतुर्थ सत्र Semester III/IV

समय (Time) – 03 घंटे (Hours)
पूर्णांक -100
सत्रान्तपरीक्षा -70
आन्तरिकपरीक्षा – 30
Credit- 0

BKT-A301 / A401 भारतीय ज्ञानपरम्परा
Bharatiya Jnanaparampara

प्रस्तावित पाठ्यक्रम (Prescribed Course)

घटक-1

1 वैदिक एवं लौकिक साहित्य का परिचय एवं उसका उद्देश्य (वैदिक साहित्य, आर्ष साहित्य एवं स्मृति साहित्य)
2 वैदिक प्रार्थनाएँ – गायत्री, भद्रप्राप्ति, शान्ति, संगठन, सौमनस्य एवं पञ्च महायज्ञ का सामान्य परिचय
3 ब्रह्मचर्य महिमा, वैदिक राष्ट्रभक्ति एवं शिवसंकल्प (ब्रह्मचर्य सूक्त- अथर्ववेद 11.5, पृथिवी सूक्त -
अथर्ववेद 12.1, शिवसंकल्प सूक्त - यजुर्वेद 34.1-6 में वर्णित विषयवस्तु के आधार पर)

घटक-2

वैदिक कालीन सामाजिक एवं शिक्षा व्यवस्था
संस्कारों की जीवन में उपयोगिता
पुरुषार्थ चतुष्टय – धर्म, अर्थ, काम, मोक्ष

घटक -3

सवाद – ईश्वर, जीव एवं प्रकृति का स्वरूप
र्म एवं पुनर्जन्म सिद्धान्त (कर्म- निष्काम कर्मयोग एवं कर्मफल सिद्धान्त)

घटक-4

नव जीवन के विकास में योग की महत्ता
योग योग- यम, नियम आसन, प्राणायाम, प्रत्याहार, धारणा, ध्यान, समाधि

घटक-5

तीय संस्कृति एवं सभ्यता : एक परिचय
र्षि दयानन्द एवं स्वामी श्रद्धानन्द का व्यक्तित्व एवं कृतित्व
ा समाज की स्थापना, उद्देश्य एवं कार्य (सामाजिक जनजागरण, अछूतोद्धार, महिला शिक्षा, शुद्धि आन्दोलन, सामाजिक कुरीतियों
उन्मूलन, स्वतन्त्रता संग्राम में योगदान)

क पुस्तकें –
साहित्य एवं संस्कृति, डॉ० कपिल देव द्विवेदी।
र दीपिका, डॉ० रामनाथ वेदालंकार।
दानि, डॉ० कपिल देव द्विवेदी, विश्वविद्यालय प्रकाशन, वाराणसी।
भारत तथा सामाजिक एवं आर्थिक इतिहास, डॉ० देवेन्द्र गुप्ता, भारतीय बुक कॉर्पोरेशन, नई दिल्ली।
ि, स्वामी रामदेव, पतंजलि योगपीठ, हरिद्वार।
काश, स्वामी दयानन्द
ज का इतिहास, डॉ० सत्यकेतु विद्यालंकार।
जागरण के पुरोधा, डॉ० भगवती लाल भारतीय
रतीय का इतिहास, डॉ० कपिल देव द्विवेदी, विश्वविद्यालय प्रकाशन, वाराणसी

23

BCE-C455
DATABASE MANAGEMENT SYSTEM LAB

MM: 50 **Sessional: 15**

Time: 3 hrs **ESE: 35**

L T P **Credits 1**

0 0 2

List of Experiments:

1. Create table using sql commands.
2. Perform insertion, updation and deletion on tables.
3. Perform select queries on table.
4. Perform primary key, Candidate key and not null constraints.
5. Perform joins (Outer Joins).
6. Nested Queries.
7. Union, Intersection and except operations.
8. Foreign Key and Referential Integrity Constraints.
9. Create View of tables.
10. Grant and revoke permissions on tables.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.



BCE-C456
OBJECT ORIENTED PROGRAMMING WITH JAVA PROGRAMMING LAB

MM: 50 **Sessional: 15**

Time: 3 hrs **ESE: 35**

L T P **Credits 1**

0 0 2

Write Following Programs in Java

1. Classes and Objects: Programs to illustrate the concept of object and classes.
2. Inheritance packages and interface: Programs to illustrate the concepts of Inheritance, packages and interfaces.
3. Multithreading: programs to illustrate concepts of multithreading in Java.
4. Event Handling: programs in Java to handle Mouse and Keyboard events.
5. Java Database Connectivity: Programs to connect, control and manipulate database.
6. Servlets: Programs to write, read and delete cookies in Servlets.
7. Program to create a database application in Servlets.
8. Program to implement session tracking.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.



BET-C461
MICROPROCESSOR & INTERFACING LAB

MM: 50 **Sessional: 15**

Time: 3 hrs **ESE: 35**

L T P **Credits 1**

0 0 2

LIST OF EXPERIMENT:

1. Addition of 8 bit hexadecimal numbers without carry.
2. Addition of 8 bit hexadecimal numbers with carry.
3. To calculate 2's compliments of a 8 bit number.
4. Subtraction of two 8 bit hexadecimal number.
5. Interfacing with 8255 in I/O mode & BSR mode.
6. Verification of all interrupts.
7. Multiplication of 8 bit hexadecimal number by 2.
8. Division of 8 bit hexadecimal numbers.
9. Addition of two 8 bit decimal numbers.
10. Transfer the block from one memory location to another.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.



BCE-A460
SOFT SKILLS (MOOC COURSE)

MM: 50 **Sessional: 15**

Time: 3 hrs **ESE: 35**

L T P **Credits 1**

0 0 2

Note:

1. An online certification of soft skills has to be acquired by the students through any suitable online portal that provide a valid certificate for the course completion.
2. The course must be completed before the end of semester
3. The certificate will be verified by the coordinator faculty and will be submitted to the HOD after collecting all the certificates from the students for credit transfer
4. Internal assessment has to be taken by the faculty coordinator based on which the internal marks will be provided
5. External evaluation will be done as viva -voce/ presentation.