Department of Information Technology

Syllabus of B.Sc. in Information Technology (Big Data Analytics)

(Effective from academic session 2019-20)

Semester-VI

Name of the Course: B.Sc. in Information Technology (Big Data Analytics) **Subject:** Statistical Simulation and Data Analysis & Statistical Simulation and Data Analysis Lab			
Course Code: BITBDA601 & :BITBDA691		**Semester: VI**	
Duration: 36 Hrs.		**Maximum Marks: 100+100**	
Teaching Scheme		**Examination Scheme**	
Theory: 3 hrs./week		End Semester Exam: 70	
Tutorial: 0		Attendance : 5	
Practical:4 hrs./week		Continuous Assessment:25	
Credit: 3+2		Practical Sessional internal continuous evaluation:40	
		Practical Sessional external examination:60	
Aim:			
Sl. No.			
1.	Basic statistical analysis techniques for experimental data generation and collection, aiming at design, analytic modeling and implementation of systems. Covers basics from the areas of statistics, simulation, event queueing		
Objective:			
Sl. No.			
1.	Identification of relevant variables		
2.	Data screening and coding		
3.	Visualisation data by plot		
Pre-Requisite:			
Sl. No.			
1.	Introductory Statistics/Probability theory Calculus		
2.	Prior training in R/Python		
Contents		**Hrs./week**	
Chapter	**Name of the Topic**	**Hours**	**Marks**
01	Simulation of random variables from discrete, continuous, multivariate distributions and stochastic processes, Graphical representation of data by histograms, frequency polygon, Pie chart, ogives, boxplot and stem-leaf.	**8**	**15**
02	Measures of central tendency, dispersion, measures of skewness and kurtosis.	**6**	**15**
03	Fitting of polynomials, exponential curves and plotting of probability distributions,Regression analysis, scatter plot, residual analysis.	**8**	**15**
04	Correlation and regression. Test of significance (t and F tests).	**6**	**10**
05	Random number generation, ANOVA both one way and two way, Graphical representation of multivariate data, Cluster analysis,	**8**	**15**

	Principal component analysis for dimension reduction		
	Sub Total:	**36**	**70**
	Internal Assessment Examination & Preparation of Semester Examination	**4**	**30**
	Total:	**40**	**100**

Practical:

Skills to be developed:

Intellectual skills:

Upon completion of the course students will be able to

1. Choose methods adequately corresponding to the objectives of a research project
2. Collect, store, process and analyze data according to high standards
3. Conduct empirical research in management and marketing using modern analytic software tools
4. Develop and apply new research methods
5. Solve economic and managerial problems using best practices of data analysis using modern computational tools

List of Practical:

Hand on practical based on theory paper

Assignments:

Based on the curriculum as covered by subject teacher.

List of Books

Text Books:

Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the Publisher
Gardener, M	Beginning R: The Statistical Programming Language		Wiley Publications ,2012
Reference Books:			
Braun W J, Murdoch D J	A First Course in Statistical Programming with R		Cambridge University Press. New York,2007

List of equipment/apparatus for laboratory experiments:

Sl. No.	
1.	**Computer**
2.	**Software Python/R**

End Semester Examination Scheme. Maximum Marks-70. Time allotted-3hrs.

Group	**Unit**	**Objective Questions** (MCQ only with the correct answer)		**Subjective Questions**			
		No of question to be set	Total Marks	No of question to be set	To answer	Marks per question	Total Marks

A **B** **C**	**1 to 5** **1 to 7** **1 to 7**	**10**	**10**	**5** **5**	**3** **3**	**5** **15**	**60**

- Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.
- Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.

Examination Scheme for end semester examination:

Group	Chapter	Marks of each question	Question to be set	Question to be answered
A	**All**	**1**	**10**	**10**
B	**All**	**5**	**5**	**3**
C	**All**	**15**	**3**	**3**

Examination Scheme for Practical Sessional examination:

Practical Internal Sessional Continuous Evaluation

Internal Examination:

Continuous evaluation			**40**

External Examination: Examiner-

Signed Lab Note Book	**10**	
On Spot Experiment	**40**	
Viva voce	**10**	**60**

Name of the Course: B.Sc. in Information Technology (Big Data Analytics) **Subject:** Cloud Computing & Cloud Computing Lab	
Course Code: BITBDA602 & BITBDA602	**Semester: VI**
Duration: 36 Hrs.	**Maximum Marks: 100+100**
Teaching Scheme	**Examination Scheme**
Theory: 3 hrs./week	End Semester Exam: 70
Tutorial: 0	Attendance : 5
Practical:4 hrs./week	Continuous Assessment:25
Credit: 3+2	Practical Sessional internal continuous evaluation:40
	Practical Sessional external examination:60

Aim: The main aim of this subject to enhance student knowledge with following concept

Sl. No.	
1.	Core concepts of the cloud computing
2.	Concepts in cloud infrastructures
3.	Concepts of cloud storage
4.	Cloud programming models

Objective:

Sl. No.	
1.	To learn how to use Cloud Services.
2.	To implement Virtualization
3.	To implement Task Scheduling algorithms.
4.	Understand the impact of engineering on legal and societal issues involved and different security aspect.

Pre-Requisite:			
Sl. No.			
1.	Knowledge of computer systems, programming and debugging, with a strong competency in at least one language (such as Java/Python), and the ability to pick up other languages as needed.		
Contents		**Hrs./week**	
Chapter	**Name of the Topic**	**Hours**	**Marks**
01	**Definition of Cloud Computing and its Basics** Defining a Cloud, Cloud Types – NIST model, Cloud Cube model, Deployment models (Public , Private, Hybrid and Community Clouds), Service Platform as a Service, Software as a Service with examples of services/ service providers, models – Infrastructure as a Service, Cloud Reference model, Characteristics of Cloud Computing – a shift in paradigm Benefits and advantages of Cloud Computing, A brief introduction on Composability, Infrastructure, Platforms, Virtual Appliances, Communication Protocols, Applications, Connecting to the Cloud by Clients, IaaS – Basic concept, Workload, partitioning of virtual private server instances, Pods, aggregations, silos PaaS – Basic concept, tools and development environment with examples SaaS - Basic concept and characteristics, Open SaaS and SOA, examples of SaaS platform Identity as a Service (IDaaS) Compliance as a Service (CaaS)	**6**	**15**
02	**Use of Platforms in Cloud Computing** Concepts of Abstraction and Virtualization Virtualization technologies : Types of virtualization (access, application, CPU, storage), Mobility patterns (P2V, V2V, V2P, P2P, D2C, C2C, C2D, D2D) Load Balancing and Virtualization: Basic Concepts, Network resources for load balancing, Advanced load balancing (including Application Delivery Controller and Application Delivery Network), Mention of The Google Cloud as an example of use of load balancing Hypervisors: Virtual machine technology and types, VMware vSphere Machine Imaging	**14**	**20**

	(including mention of Open Virtualization Format – OVF) Porting of applications in the Cloud: The simple Cloud API and AppZero Virtual Application appliance,Concepts of Platform as a Service, Definition of services, Distinction between SaaS and PaaS (knowledge of Salesforce.com and Force.com), Application development Use of PaaS Application frameworks, Discussion of Google Applications Portfolio – Indexed search, Dark Web, Aggregation and disintermediation, Productivity applications and service, Adwords, Google Analytics, Google Translate, a brief discussion on Google Toolkit (including introduction of Google APIs in brief), major features of Google App Engine service., Discussion of Google Applications Portfolio – Indexed search, Dark Web, Aggregation and disintermediation, Productivity applications and service, Adwords, Google Analytics, Google Translate, a brief discussion on Google Toolkit (including introduction of Google APIs in brief), major features of Google App Engine service, Windows Azure platform: Microsoft's approach, architecture, and main elements, overview of Windows Azure AppFabric, Content Delivery Network, SQL Azure, and Windows Live services,		
03	**Cloud Infrastructure** Cloud Management: An overview of the features of network management systems and a brief introduction of related products from large cloud vendors, Monitoring of an entire cloud computing deployment stack – an overview with mention of some products, Lifecycle management of cloud services (six stages of lifecycle). Concepts of Cloud Security: Cloud security concerns, Security boundary, Security service boundary Overview of security mapping Security of data: Brokered cloud storage access, Storage location and tenancy, encryption, and auditing and compliance Identity management (awareness of Identity protocol standards)	**8**	**20**

04	**Concepts of Services and Applications** Service Oriented Architecture: Basic concepts of message-based transactions, Protocol stack for an SOA architecture, Event-driven SOA, Enterprise Service Bus, Service catalogs, Applications in the Cloud: Concepts of cloud transactions, functionality mapping, Application attributes, Cloud service attributes, System abstraction and Cloud Bursting, Applications and Cloud APIs Cloud-based Storage: Cloud storage definition – Manned and Unmanned Webmail Services: Cloud mail services including Google Gmail, Mail2Web, Windows Live Hotmail, Yahoo mail, concepts of Syndication services	**8**	**15**
	Sub Total:	**36**	**70**
	Internal Assessment Examination & Preparation of Semester Examination	**4**	**30**
	Total:	**40**	**100**

Practical:

Skills to be developed:

Intellectual skills:

1. Students are able to develop different algorithms related to Cloud Computing.
2. Students are able to assess cloud Storage systems and Cloud security, the risks involved, its impact and develop cloud application.

List of Practical: Hands-on experiments related to the course contents

Assignments:

Based on the curriculum as covered by subject teacher.

List of Books

Text Books:

Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the Publisher
Barrie Sosinsky	Cloud Computing Bible	2013	Wiley India Pvt. Ltd
Rajkumar Buyya ,Christian Vecchiola, S. Thamarai Selvi	Mastering Cloud Computing	2013	McGraw Hill Education (India) Private Limited

Reference Books:

Anthony T. Velte	Cloud computing: A practical approach		Tata Mcgraw-Hill
Dr. Kumar Saurabh	Cloud Computing		Wiley India
Moyer	Building applications in cloud:Concept, Patterns and Projects		Pearson

List of equipment/apparatus for laboratory experiments:

Sl. No.	
1.	**Computer with moderate configuration with high speed internet connection**
2.	**Python , java,**

End Semester Examination Scheme. Maximum Marks-70. Time allotted-3hrs.

Group	Unit	Objective Questions (MCQ only with the correct answer)		Subjective Questions			
		No of question to be set	Total Marks	No of question to be set	To answer	Marks per question	Total Marks

A	**1 to 4**	**10**					
			10				**60**
B	**1 to 4**			**5**	**3**	**5**	
C	**1 to 4**			**5**	**3**	**15**	

- Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.
- Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.

Examination Scheme for end semester examination:

Group	**Chapter**	**Marks of each question**	**Question to be set**	**Question to be answered**
A	**All**	**1**	**10**	**10**
B	**All**	**5**	**5**	**3**
C	**All**	**15**	**3**	**3**

Examination Scheme for Practical Sessional examination:

Practical Internal Sessional Continuous Evaluation

Internal Examination:

Continuous evaluation			**40**

External Examination: Examiner-

Signed Lab Note Book	**10**	
On Spot Experiment	**40**	
Viva voce	**10**	**60**

Name of the Course: B.Sc. in Information Technology (Big Data Analytics) **Subject:** Deep Learning			
Course Code: BITDS603A		**Semester: VI**	
Duration: 36 Hrs.		**Maximum Marks: 100**	
Teaching Scheme		**Examination Scheme**	
Theory: 3 hrs./week		End Semester Exam: 70	
Tutorial: 0		Attendance : 5	
Practical: 0		Continuous Assessment:25	
Credit: 3		Practical Sessional internal continuous evaluation: NA	
		Practical Sessional external examination: NA	
Aim:			
Sl. No.			
1.	To improve the performance of a Deep Learning model		
2.	to the reduce the optimization function which could be divided based on the classification and the regression problems		
Objective:			
Sl. No.			
1.	To acquire knowledge on the basics of neural networks.		
2.	To implement neural networks using computational tools for variety of problems.		
3.	To explore various deep learning algorithms.		
Pre-Requisite:			
Sl. No.			
1.	Calculus, Linear Algebra		
2.	Probability & Statistics		
3.	Ability to code in R/Python		
Contents		**Hrs./week**	
Chapter	**Name of the Topic**	**Hours**	**Marks**
01	**Introduction** Various paradigms of earning problems, Perspectives and Issues in deep learning framework, review of fundamental learning techniques.	**3**	**5**
02	**Feed forward neural network** Artificial Neural Network, activation function, multi-layer neural network, cardinality, operations, and properties of fuzzy relations.	**6**	**10**
03	**Training Neural Network** Risk minimization, loss function, backpropagation, regularization, model selection, and optimization.	**6**	**15**
04	**Conditional Random Fields** Linear chain, partition function, Markov network, Belief propagation, Training CRFs, Hidden Markov Model, Entropy.	**9**	**15**

05	**Deep Learning** Deep Feed Forward network, regularizations, training deep models, dropouts, Convolution Neural Network, Recurrent Neural Network, Deep Belief Network.	**6**	**15**
06	**Deep Learning research** Object recognition, sparse coding, computer vision, natural language	**6**	**10**
	Sub Total:	**36**	**70**
	Internal Assessment Examination & Preparation of Semester Examination	**4**	**30**
	Total:	**40**	**100**

Assignments:
Based on the curriculum as covered by subject teacher.

List of Books

Text Books:

Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the Publisher
Goodfellow, I.,Bengio,Y., and Courville A.,	Deep Learning		MIT Press
Satish Kumar	Neural Networks: A Classroom Approach		Tata McGraw-Hill

Reference Books:

Bishop, C. ,M.	Pattern Recognition and Machine Learning		Springer
Yegnanarayana, B.	Artificial Neural Networks		PHI Learning Pvt. Ltd
Golub, G.,H., and Van Loan,C.,F.	Matrix Computations		JHU Press

End Semester Examination Scheme. Maximum Marks-70. Time allotted-3hrs.

Group	Unit	Objective Questions (MCQ only with the correct answer)		Subjective Questions			
		No of question to be set	Total Marks	No of question to be set	To answer	Marks per question	Total Marks
A	**1 to 6**	**10**	**10**				**60**
B	**1 to 6**			**5**	**3**	**5**	
C	**1 to 6**			**5**	**3**	**15**	

- Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.
- Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.

Examination Scheme for end semester examination:

Group	Chapter	Marks of each question	Question to be set	Question to be answered
A	All	1	10	10
B	All	5	5	3
C	All	15	3	3

Name of the Course: B.Sc. in Information Technology (Big Data Analytics) **Subject:** Soft Computing			
Course Code:BITBDA603B		**Semester: VI**	
Duration: 36 Hrs.		**Maximum Marks: 100**	
Teaching Scheme		**Examination Scheme**	
Theory: 3 hrs./week		End Semester Exam: 70	
Tutorial: 0		Attendance : 5	
Practical:		Continuous Assessment:25	
Credit: 3		Practical Sessional internal continuous evaluation:NA	
		Practical Sessional external examination:NA	
Aim:			
Sl. No.			
1.	Enumerate the theoretical basis of soft computing		
2.	Explain the fuzzy set theory		
3.	Discuss the neural networks and supervised and unsupervised learning networks		
4.	Demonstrate some applications of computational intelligence		
5.	Apply the most appropriate soft computing algorithm for a given situation		
Objective:			
Sl. No.			
1.	Enumerate the strengths and weakness of soft computing		
2.	Illustrate soft computing methods with other logic driven and statistical method driven approaches		
3.	Focus on the basics of neural networks, fuzzy systems, and evolutionary computing		
4.	Emphasize the role of euro-fuzzy and hybrid modeling methods		
5.	Trace the basis and need for evolutionary computing and relate it with other soft computing approaches		
Pre-Requisite:			
Sl. No.			
1	Mathematical knowledge		
Contents		**Hrs./week**	
Chapter	**Name of the Topic**	**Hours**	**Marks**
01	Introduction: Introduction to soft computing; introduction to fuzzy sets and fuzzy logic systems; introduction to biological and artificial neural network; introduction to Genetic Algorithm.	**2**	**5**
02	Fuzzy sets and Fuzzy logic systems: Classical Sets and Fuzzy Sets and Fuzzy relations : Operations on Classical sets, properties of classical sets, Fuzzy set	**11**	**20**

	operations, properties of fuzzy sets, cardinality, operations, and properties of fuzzy relations. Membership functions : Features of membership functions, standard forms and boundaries, different fuzzification methods. Fuzzy to Crisp conversions: Lambda Cuts for fuzzy sets, fuzzy Relations, Defuzzification methods. Classical Logic and Fuzzy Logic: Classical predicate logic, Fuzzy Logic, Approximate reasoning and Fuzzy Implication Fuzzy Rule based Systems: Linguistic Hedges, Fuzzy Rule based system – Aggregation of fuzzy Rules, Fuzzy InferenceSystem-Mamdani Fuzzy Models – Sugeno Fuzzy Models. Applications of Fuzzy Logic: How Fuzzy Logic is applied in Home Appliances, GeneralFuzzy Logic controllers, BasicMedical Diagnostic systems and Weather forecasting		
03	Neural Network Introduction to Neural Networks: Advent of Modern Neuroscience, Classical AI and Neural Networks, BiologicalNeurons and Artificial neural network; model of artificial neuron. Learning Methods : Hebbian, competitive, Boltzman etc., Neural Network models: Perceptron, Adaline and Madaline networks; single layer network; Back-propagation and multi layer networks. Competitive learning networks: Kohonenself organizing networks, Hebbian learning; Hopfield Networks. Neuo-Fuzzy modelling: Applications of Neural Networks: Pattern Recognition and classification	**11**	**20**
04	Genetic Algorithms: Simple GA, crossover and mutation, Multi-objective Genetic Algorithm (MOGA). Applications of Genetic Algorithm: genetic algorithms in search and optimization, GA based clustering Algorithm, Imageprocessing and pattern Recognition	**8**	**15**
05	Other Soft Computing techniques: Simulated Annealing, Tabu	**4**	**10**

	search, Ant colony optimization (ACO), Particle Swarm Optimization (PSO).		
	Sub Total:	**36**	**70**
	Internal Assessment Examination & Preparation of Semester Examination	**4**	**30**
	Total:	**40**	**100**

Assignments:
Based on the curriculum as covered by subject teacher.

List of Books
Text Books:

Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the Publisher
Timothy J. Ross	Fuzzy logic with engineering applications		John Wiley and Sons.
S. Rajasekaran and G.A.V.Pai,	Neural Networks, Fuzzy Logic and Genetic Algorithms		PHI
Reference Books:			
S N Sivanandam, S. Sumathi	Principles of Soft Computing		John Wiley & Sons
David E. Goldberg	Genetic Algorithms in search, Optimization & Machine Learning		Pearson/PHI
Samir Roy &Udit Chakraborty	A beginners approach to Soft Computing		Pearson
Kumar Satish	Neural Networks: A Classroom Approach,1/e		TMH

End Semester Examination Scheme. Maximum Marks-70. Time allotted-3hrs.

Group	**Unit**	**Objective Questions** (MCQ only with the correct answer)		**Subjective Questions**			
		No of question to be set	Total Marks	No of question to be set	To answer	Marks per question	Total Marks
A	**1 to 5**	**10**	**10**				**60**
B	**1 to 5**			**5**	**3**	**5**	

C	**1 to 5**			**5**	**3**	**15**	

- Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.
- Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.

Examination Scheme for end semester examination:

Group	Chapter	Marks of each question	Question to be set	Question to be answered
A	**All**	**1**	**10**	**10**
B	**All**	**5**	**5**	**3**
C	**All**	**15**	**3**	**3**

Examination Scheme for Practical Sessional examination:

Name of the Course: B.Sc. in Information Technology (Big Data Analytics) **Subject:** Embedded Systems			
Course Code: BITBDA603C		**Semester: VI**	
Duration: 36 Hrs.		**Maximum Marks: 100**	
Teaching Scheme		**Examination Scheme**	
Theory: 3 hrs./week		End Semester Exam: 70	
Tutorial: 0		Attendance : 5	
Practical:0		Continuous Assessment:25	
Credit: 3		Practical Sessional internal continuous evaluation:NA	
		Practical Sessional external examination:NA	
Aim:			
Sl. No.			
1.	Design the software and hardware components in embedded system		
2.	Describe the software technology		
3.	Use interrupt in effective manner		
4.	Use keil IDE for programming		
5.	Program using embedded C for specific microcontroller		
6.	Design the embedded projects		
Objective:			
Sl. No.			
1.	To introduce the design of embedded computing systems with its hardware and software architectures.		
2.	To describe entire software development lifecycle and examine the various issues involved in developing software for embedded systems		
3.	To analyze the I/O programming and Embedded C coding techniques		
4.	To equip students with the software development skills necessary for practitioners in the field of embedded systems.		
Pre-Requisite:			
Sl. No.			
1.	Programming in C		
2.	Knowledge in Linux OS		
Contents		**Hrs./week**	
Chapter	**Name of the Topic**	**Hours**	**Marks**
01	**Fundamentals of Embedded System** Core of the embedded system, Memory, Sensors (resistive, optical, position, thermal) and Actuators (solenoid valves, relay/switch, opto-couplers), Communication Interface, Embedded firmware (RTOS, Drivers, Application programs), Power-supply (Battery technology, Solar), PCB and Passive components, Safety and	**12**	**25**

	reliability, environmental issues. Ethical practice. Characteristics and quality attributes (Design Metric) of embedded system. Real time system's requirements, real time issues, interrupt latency. Embedded Product development life cycle, Program modeling concepts: DFG, FSM, Petri-net, UML		
02	**Embedded Hardware and Design** Introduction to ARM-v7-M (Cortex-M3), ARM-v7-R (CortexR4) and comparison in between them	**6**	**10**
03	**Embedded Serial Communication** Study of basic communication protocols like SPI, SCI (RS232, RS485), I2C, 10 CAN, Field-bus (Profibus), USB (v2.0), Bluetooth, Zig-Bee, Wireless sensor network	**6**	**10**
04	**Embedded Software, Firmware Concepts and Design** Embedded C-programming concepts (from embedded system point of view): Optimizing forSpeed/Memory needs, Interrupt service routines, macros, functions, modifiers, data types, device drivers, Multithreading programming. (Laboratory work on J2ME Java mobile application). Basic embedded C programs/applications for ARM-v7, using ARM-GCCtool-chain, Emulation of ARM-v7 (e.g. using QEMU), and Linux porting on ARM-v7 (emulation) board CASE STUDY: 1) Medical monitoring systems, 2) Process control system (temp, pressure) 3) Soft real time: Automated vending machines, 4) Communication: Wireless (sensor) networks. Real time operating system: POSIX Compliance , Need of RTOS in Embedded system software, Foreground/Background systems, multitasking, context switching, IPC, Scheduler policies, Architecture of kernel, task scheduler, ISR, Semaphores, mailbox, message queues, pipes, events, timers, memory management, RTOS services in contrast with traditional OS. Introduction to µCOS-II RTOS, study of kernel structure of µCOS-II, Synchronization in µCOS-II, Inter-task communication in µCOS-II, Memory management in µCOS-II, porting of RTOS on ARM-v7 (emulation) board, Application developments using µCOS-II. Introduction Linux OS, Linux IPC usage, basic device (drivers)	**12**	**25**

	usage.		
05			
	Sub Total:	**36**	**70**
	Internal Assessment Examination & Preparation of Semester Examination	**4**	**30**
	Total:	**40**	**100**

Assignments:
Based on the curriculum as covered by subject teacher.

List of Books
Text Books:

Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the Publisher
Shibu K. V.	Introduction to Embedded Systems		TMH.
F. Vahid	Embedded System Design – A unified hardware and software introduction		John Wiley
Reference Books:			
Rajkamal	Embedded Systems		TMH
S. Heath	Embedded System design		Elsevier
G. Osborn	Embedded microcontroller and processor design		Pearson
Jonathan W. Valvano; Cengage Learning	Embedded Microcomputer Systems – Real Time Interfacing	Third or later edition	

End Semester Examination Scheme. Maximum Marks-70. Time allotted-3hrs.

Group	**Unit**	**Objective Questions** (MCQ only with the correct answer)		**Subjective Questions**			
		No of question to be set	Total Marks	No of question to be set	To answer	Marks per question	Total Marks
A	**1 to 7**	**10**	**10**				**60**
B	**1 to 7**			**5**	**3**	**5**	
C	**1 to 7**			**5**	**3**	**15**	

- Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.
- Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.

Examination Scheme for end semester examination:

Group	Chapter	Marks of each question	Question to be set	Question to be answered
A	**All**	**1**	**10**	**10**
B	**All**	**5**	**5**	**3**
C	**All**	**15**	**3**	**3**

Name of the Course: B.Sc. in Information Technology (Big Data Analytics) **Subject:** Grand Viva Voce	
Course Code: BITBDA681	**Semester: VI**
Duration:	**Maximum Marks: 100**
Teaching Scheme	**Examination Scheme**
Theory: 0	**End Semester Exam: 100**
Tutorial: 0	**Attendance: 0**
Practical: 2 hrs./week	**Continuous Assessment: 0**
Credit: 1	**Practical Sessional internal continuous evaluation: NA**
	Practical Sessional external examination: NA
Contents	
Students will give a viva from all the subjects that they have covered in the course.	

Name of the Course: B.Sc. in Information Technology (Big Data Analytics) **Subject:** Major Project –II	
Course Code: BITBDA682	**Semester: VI**
Duration: 36 Hrs.	**Maximum Marks: 100**
Teaching Scheme	**Examination Scheme**
Theory: 0	**End Semester Exam: 100**
Tutorial: 0	**Attendance: 0**
Practical: 8 hrs./week	**Continuous Assessment: 0**
Credit: 4	**Practical Sessional internal continuous evaluation: 40**
	Practical Sessional external examination: 60
Contents	
Students will do projects on application areas of latest technologies and current topics of societal relevance.	