SU/BOS/Science/497   **Date: 10/07/2023**

To,

The Principal, All Concerned Affiliated Colleges/Institutions Shivaji University, Kolhapur	The Head/Co-ordinator/Director All Concerned Department (Science) Shivaji University, Kolhapur.

Subject: Regarding syllabi of M.Sc. Part-II (Sem. III & IV) as per NEP-2020 degree programme under the Faculty of Science and Technology.

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the revised syllabi, nature of question paper and equivalence of M.Sc. Part-II (Sem. III & IV) as per NEP-2020 degree programme under the Faculty of Science and Technology.

M.Sc.Part-II (Sem. III & IV) as per NEP-2020		
1.	Microbiology (HM)	8.	Food Science & Nutrition
2.	Pharmaceutical Microbiology (HM)	9.	Food Science & Technology
3.	Microbiology	10.	Biochemistry
4.	Computer Science	11.	Biotechnology
5.	Computer Science (Online Mode)	12.	Medical Information Management
6.	Data Science	13.	Environmental Science
7.	Information Technology (Entire)	14.	Physics

This syllabus, nature of question and equivalence shall be implemented from the academic year 2023-2024 onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website **www.unishivaji.ac.in**)

The question papers on the pre-revised syllabi of above-mentioned course will be set for the examinations to be held in October /November 2023 & March/April 2024. These chances are available for repeater students, if any.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Dy Registrar
Dr. S. M. Kubal

Copy to:

1	The Dean, Faculty of Science & Technology	8	P.G. Admission/Seminar Section
2	Director, Board of Examinations and Evaluation	9	Computer Centre/ Eligibility Section
3	The Chairman, Respective Board of Studies	10	Affiliation Section (U.G.) (P.G.)
4	B.Sc. Exam/ Appointment Section	11	Centre for Distance Education

SHIVAJI UNIVERSITY, KOLHAPUR

NAAC "A++" Grade with CGPA 3.52

Choice Based Credit System with Multiple Entry and Multiple Exit Option (NEP-2020)

Syllabus for

Master of Science
In
Computer Science

(Under Faculty of Science and Technology)

PART II SEMESTER III & IV

(Syllabus to be implemented from Academic year 2023-24)

Choice Based Credit System with Multiple Entry and Multiple Exit Option (NEP-2020)
M.Sc.ProgramStructure
M.Sc.Part–II(Level-9)

			TeachingScheme			ExaminationScheme					
			TheoryandPractical			UniversityAssessment(UA)			InternalAssessment(IA)		
	Sr. No.	CourseCode	Lectures (Per week)	Hours(Perweek)	Credit	Maximum Marks	Minimum Marks	Exam.Hours	Maximum Marks	MinimumMarks	Exam. Hours
CGPA	1	CC-301:Artificial Intelligence	4	4	4	80	32	3	20	8	1
	2	CC-302:Advanced Web Technology	4	4	4	80	32	3	20	8	1
	3	CC-303:PHP	4	4	4	80	32	3	20	8	1
	4	CCS-304: 1.Software Quality Assurance 2.AdvanceDataScience 3.Network Security Analyst 4.Internet of Things	4	4	4	80	32	3	20	8	1
	5	CCPR-305: Advanced Web Technology Lab	--	6	4	100	40	3	--	--	*
	6	CCPR-306: PHPLab	--	6	4	100	40	3	--	--	*
	7	CCPR-307:Project	--	6	4	100	40	3	--	--	*
	Total(C)		16	34	28	620	--	--	80	--	
Non-CGPA	1	AEC-308: Communicative English-II	2	2	2	--	--	--	50	20	2
	2	EC(SWMMOOC)-309:	Number of Lectures and credit shall be specified on SWAYAM MOOC								

SEMESTER-III(Duration-SixMonth)

CGPA		Course									
SEMESTER-IV(Duration-SixMonth)											
CGPA	1	CCPR-401:Research Seminar		06	4				100	40	*
	2	CCPR-402:Research/Industrial Project		06	16	300	120	--	100	40	*
		Total(D)	--	12	20	300	--	--	200	--	--
	1	GE-403:	2	2	2	--	--	--	50	20	2
		Total(C+D)			48	920	--	--	280	--	--

• Student contact hours per week:**46** Hours(Min.)	• Total Marks for MSc.-II : **1200**
• Theory and Practical Lectures:**60** Minutes Each	• Total Credits for MSc.-II (Semester III&IV):**48**
• CC-Core Course • CCS-Core Course Specialization • CCPR-Core Course Practical and Project • DSE-Discipline Specific Elective • AEC-Mandatory Non-CGPA compulsory Ability Enhancement Course • SEC-MandatoryNon-CGPA compulsory Skill Enhancement Course • EC (SWMMOOC)-Non-CGPAElectiveCourse • GE-Multidisciplinary Generic Elective	• **Practical Examination is Semester wise after theory examination.**Examination for CCPR-305 and CCPR-306 shall be based on Semester III Practical. • Examination for CCPR-401 and CCPR-402s hall be based on SemesterIV Practical. • *****Duration of Practical Examination as per respective BOS guidelines • *Separate passing is mandatory or Theory,Internal and Practical Examination*
• **Requirement for Entry at Level9:** **Completed all requirements of the relevant Post Graduate Diploma in ComputerScience (Level8)**	
• **Exit at Level9:**Students will exit after Level9 with **Master's Degree in Computer Science** if he/she complete the courses equivalent to minimum Of 96 credits.	

	M.Sc.II	Total
Marks	**1200**	**2400**
Credits	**48**	**96**

Course Outcomes:

1 Apply problem solving by intelligent search approach.
2 Represent knowledge using AI knowledge representation techniques.
3 Design Machine Learning solution to real life problems.
4 Derive solutions for problems with uncertainty using Fuzzy theory.
5 Define a NLP problem and find a suitable solution to it.
6 To develop a good understanding of all aspects of Natural Language Processing
(NLP) and Genetic algorithm.

UNIT-I   **15hrs**
Introduction of AI and Problem Solving:

Artificial Intelligence, AI Problems, AI Techniques, The Level of the Model, Criteria For Success.
Defining the Problem as a State Space Search, Problem Characteristics , Search and Game
Playing:Breadth first search,depth first search,hill climbing,heuristic search,Bestfirst search,
A*algorithm, AO* algorithm, Min max& game trees, refiningminmax, Alpha −Betapruning,constraint
satisfaction

UNIT-II   **15hrs**
Knowledge Representation

Introduction, Propositional Logic,Syntaxa nd Semantics,Interpretations,Properties,Predicate
Calculus,WFF,Free and Bound Variables, Normal Forms, Inference Techniques,Resolution,
Unification, Modes Pones, Frames, Frame Representation Language Conceptual Dependency,CD
Theory,Script,Semantic Net,Conceptual Graph,Rule Based Representation,Forward and Backward
Reasoning

UNIT-III   **15hrs**
Neural Networks:

Introduction, Basic Concepts of Neural Networks, Model of an ArtificialNeuron, Activation Functions,
Feedforward Network, Recurrent Network, Learning Methods,deep learning and deep neural
network.Fuzzy Set Theory,Fuzzy Membership,Fuzzy Operations,Fuzzy Logic Systems.

UNIT-IV   **15hrs**

Natural Language Processing:
Introduction,Syntactic,Processing,Semantic,Analysis,Discourseand Pragmatic
Processing.
Genetic Algorithm:
Genetic Algorithm (GA), Genetic Representations, (Encoding) Initialization and
Selection, Different Operators of GA, Analysis of Selection Operations, the Hypothesis
Of Building Blocks,Schema The oremand Convergence of Genetic Algorithm.

ReferenceBook

1 Elaine Richand Kelvin Knight,**Artificial Intelligence**,Tata Mc GrawHill,2002.

2 Nils.J.Nilson,**Artificial Intelligence:A new Synthesis**,MorganKaufmann Publishers,Inc.,San Francisco,California,2000.

3 R.Akerkar,**Introduction toArtificial Intelligence**,Prentice-HallofIndia,2005

4 WinstonP.H,"ArtificialIntelligence",AddisionWesley(1993)

5 B.Yegnanarayana,**Artificial Neural Networks**,Prentice-HallofIndia,2006

6 NeuralNetworks,Fuzzy Logic and Genetic Algorithms:Synthesis and Applications,S.Rajasekaran,G.A.VijayalakshmiPai,Prentice-HallofIndia,2003

7 Artificial Intelligence:A Modern Approach, 2 ndedition,byRussell and Norvig,Prentic Hall

Course Outcomes:

1. Students will be able to develop application using MVC
2. Students will be able to understand Entity Framework
3. Students will be able to understand Web API
4. Students will be able to understand and use azure services
5. Students will be able to understand the use of bootstrap.

UNIT-I **(15hrs)**

Introduction to MVC, Benefits of using ASP.NET MVC, Role of Model, View, and Controller,ASP.NET MVC Works, Naming conventions, Creating views, Defining controllers, Defining a data model, Creating strongly-typed views,
Razor View Engine:Razor Basics,Razor design goals, Implementation of Razorview,Razorsyntax,Accessing Mode lD atain Razor views

UNIT-II **(15hrs)**

Using Entity Framework: Crud Operations,Crud Operation Using BO Class,Crud Operations Using Generic BO Class.Authentication and Authorization:Windows Authentication,FormsAuthentication,Role Based Authentication,Working with URLs and Routing:Understanding the Routing Mechanism,Adding a RouteEntry,Using Parameters,Using Defaults,Using Constraints

UNIT-III **(15hrs)**

ASP.NET Web API with MVC:Overview of the ASP.NET Web API, Building servers andclients,Contentnegotiation,Validation,DependencyInjection MVC State Management: Using hidden fields, Session and Application State, Custom model bindings Azure Services:Cloud Computing, Cloud Characteristics,Cloud Computing Service Models, Introduction to Azure, Benefits of Azure, Azure Hosting Models, Azure Services,Azure Portals.

UNIT-IV **(15hrs)**

Introduction to Bootstrap:History of Bootstrap, Advantages of Bootstrap Framework,Responsive webpage,Bootstrap Grid,Container,Offset Column,Reordering Columns,Bootstrap Typography,Bootstrap Tables,Bootstrap Form Layout,Bootstrap Components,Glyphicons Component

Reference Books:
1. ProfessionalASP.NETMVC5,byJon Galloway,Brad Wilson,K.Scott Allen,David Matson
2. ASP.NETMVC4 and theWebAPI:Buildinga REST Service from Startto Finish by Jamie Kurtz
3. Mastering Bootstrap 4 by Benjamin Jakobusand Jason Marah
4. Mastering Microsoft Azure Infrastructure Services by John Savill

Course Outcomes:

1. Students can get the knowledge of Basics of PHP language ,Object-oriented PHP and PHP connection with MYSQL.

2. They will create Website and Web Application Development using Open Source Language PHP.

3. They will Learn php Framework and Create CRUD application with Framework.

UNIT I   (15 HOURS)

Introduction of PHP: Embedding PHP with HTML, Enhancing further, PHP Language Basics: Using variable in PHP, understanding Data types, operator and expressions. Making decisions: simple decision with if statements, switch, ternary operator, do while loop, for statement, break, nested loop. Arrays: creating and accessing array elements, looping through arrays, multidimensional array, manipulating array. Function: calling functions, working with variable functions, own functions references, recursive functions. Strings: creating and accessing strings, searching strings, replacing text within strings and formatting strings.

UNIT II   (15 HOURS)

Handling HTML forms with PHP: HTML forms work, capture form data with PHP, multivalue fields, web forms with PHP, storing PHP variables in forms, create file upload forms, redirecting PHP. Introducing Database and SQL: Deciding how to store data, quick play with MYSQL,connecting to MYSQL from PHP, retrieving data from MYSQL with PHP. PHP CRUD with MYSQL.

UNIT III   (15 HOURS)

Cookies , PHP File Upload , Session: Creating, Storing and Destroying Sessions. Classes& Object –OO Concepts, Define Class, Class Attributes, An Object, Creating an Object, Object Properties & Methods, Object constructors and destructors, Static Method, Class Inheritance, Abstract Class, Implement Inheritance.

UNIT IV

                                                                           (15 HOURS)

PHP Framework: Introduction of Framework, Features of Framework, Models, Views, Controllers, Framework installation, creating app .

References:

1. Matt Doyle, Beginning PHP 5.3,Wiley India Edition,2012 .

2. PHP6 and MySQL, Steve Suehring, Tim Converse and Joyce Park, Wiley India 2010, Second Edition.

3. VikramVaswani, PHP: A Beginners guide,TataMcgraw Hill,2009.

4. Core PHP Programming" by Atkinson Leon, SuraskiZeev, Pearson Publication

5. Larry Ullman, PHP 6 and MySQL 5,Pearson Education,2008.

6. Laravel: Up & Running: A Framework for Building Modern PHP Apps by Matt Stauffer OREILLY.

7. CodeIgniter for Rapid PHP Application Development - David Upton ,packtpub

8. Professional CodeIgniter- Thomas Myer, Wrox Press Ltd

Course Outcomes:
1. Understand the basic tenets of software quality andq uality factors.
2. Be exposed to theSoftware Quality Assurance(SQA) architecture and the details of SQA components.
3. Understand of how the SQA components can be integrated into the project life cycle.

Unit-I   **(15Hours)**

Software Quality and SQ Aarchitecture.
The software, Software errors, faults and failures, Classification of causes of software errors,Software quality-definition,Need,Software quality factors-McCall's quality model,Software Quality Assurance (SQA)-definition and objectives.,SQA system and architecture,Software Project life cycle Components-Reviews,Expertopinions,Software testing,Software maintenance components,Assurance of the quality of the external participant's work

Unit-II   **(15Hours)**

SQA components in the project life cycle.
SQA components in the project tlife cycle-Formal design reviews,Peer reviews,Expertopinions,Software testing.Integrating quality activities in the project life cycle: classic and other software development t methodologies,Factors affecting intensity of quality assurance activities in the development process,verification,validation and qualification.

Unit-III   **(15Hours)**

Review-Objectives-Direct ,indirect,Reviewing Methods-Formal design reviews-The participants in a DR, Preparations for a DR, The DR session ,Post-review activities,Peerreviews (inspections and walkthroughs)- Participants of peer reviews, Preparations for a peerreview session, The peer review session, Post-peer review activities, The efficiency of peerreviews,Peerreview coverage,Expertopinions

Unit-IV   **(15Hours)**

Software testing strategies and SQA maintenance components.
Testing-Definition and objectives-direct,indirect,Software testing strategies,Software test classifications-according to testing concept and requirements,White box testing,black box testing,The testing process,Test case design,Automated testing,Alpha and beta site testing.SQAmaintenance-components-Corrective maintenance,Adaptive maintenance,Functionality improvement maintenance,Software maintenance Q Aactivities:objectives,Thefoundations of high quality-foundation1and2,Pre-maintenance software quality components-Maintenance contract review and plan,Maintenance software quality assurance tools.

Textbook:

1.DanielGalin,"Software Quality Assurance",Pearson Publication,2009.

ReferenceBooks:

1. AlanC.Gillies,"SoftwareQuality:Theory and Management",International Thoms on Computer Press,1997.
2. MordechaiBen-Menachem"Software Quality:Producing Practical Consistent Software",International Thomps on Computer Press,1997.

Course Outcomes:

1. Introduce major deep learning algorithms,the problem settings,and their applications to solve real world problems.
2. Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains.
3. Implement deep learning algorithms and solve real-world problems.

Unit-I   **15hrs**

Numerical Computation:

Overflow and Underflow,Poor Conditioning,Gradient-Based Optimization,Constrained Optimization,Stochastic Gradient Descent **Deep Networks**:Challenges Motivating Deep Learning,Deep Feed forward Networks,Example:Learning XOR, Gradient-Based Learning, Hidden Units, Architecture Design,Back-Propagation and Other Differentiation Algorithms

Unit-II   **15hrs**

Regularization for Deep Learning:

Parameter Norm Penalties,Norm Penaltiesas Constrained Optimization, Regularization and Under-Constrained Problems,Dataset Augmentation, Noise Robustness , Semi-Supervised Learning , Multi-Task Learning , Early Stopping,Parameter Tyingand Parameter Sharing, Sparse Representations,Bagging and Other Ensemble Methods, Dropout, Adversarial Training , Tangent Distance, Tangent Prop,and Manifold Tangent Classifier

Unit-III   **15hrs**

Optimization for Training Deep Models:

How Learning Differs from Pure Optimization,ChallengesinNeuralNetworkOptimization,BasicAlgorithms,ParameterInitializationStrategies, Algorithms with Adaptive Learning Rates, Approximate Second-Order Methods,Optimization Strategies and Meta-Algorithms

Unit-IV   **15hrs**

Convolutional Networks:

TheConvolution Operation,Motivation,Pooling,Convolution and Poolingas an Infinitely Strong Prior,Variants of theBasicConvolution Function,Structured Outputs,DataTypes,Efficient Convolution Algorithms,Random or Unsupervised Features,TheNeuroscientific Basis for Convolutional Networks.

References:

1 IanGoodfellow,YoshuaBengio,AaronCourville,"DeepLearning",www.deeplearningb ook.org
2 AdamGibsonandJoshPatterson,"DeepLearning:APractitioner'sApproach",O'ReillyMedia,Inc.
3 SantanuPattanayak,"ProDeepLearningwithTensorFlow:AMathematicalApproach",Apress.
4 DanielSlater,GianmarioSpacagna,and PeterRoelants,"PythonDeepLearning",Packt>
5 JohnD.Kelleher,BrendanTierney,"DataScience"(MITPressEssentialKnowledgeseries),

Course Outcomes:

1. Identify information security goals, classical encryption techniques and acquire fundamental knowledge on the concepts of network security.
2. Apply different verification techniques to achieve authentication and create secure applications
3. Apply network security basics, analyze different attacks on networks
4. Get introduced to port scanning, Sniffing , identity attacks etc.
5. Apply the knowledge of cryptographic utilities and authentication mechanisms to design secure applications
6. Understand different Kerberos versions and working of firewalls

UnitI: **15hrs**
Introduction: Security Attacks, Security Services, Integrity check, Secret Key Cryptography:Block Encryption,DESrounds,S-Boxes. IDEA: Overview, comparison with DES, Key expansion, IDEA rounds, Uses of Secret key Cryptography;ECB,CBC,OFB,CFB,Multiple encryptions DES.Hash Functions and Message Digests

UnitII: **15hrs**
Authentication:Password Based,Address Based,Cryptographic Authentication.Passwords in distributed systems, on-line vsoffline guessing,storing.
Cryptographic Authentication: password sas keys,protocols,KDC's Certification Revocation,Interdomain,groups,delegation.
Authentication of People:Verification techniques,passwords,length of passwords,password
distribution,smartcards,biometrics.Security Policies and Security Handshake Pitfalls: Protocol problems,assumptions,Shared secret protocols,public key protocols,mutual authentication, reflection attacks, use oftimestamps, nonce and sequence numbers,sessionkeys,one-and two way public key based authentication.

UNIT-III   **15hrs**
Network Security: IANA,Allotment of IPAddress,IPv4 and IPv6,IP Address–Basic,Detecting, Ping and Ping Sweep, Ping Sweeping tools, Nmap - common commands, Trace Router,Detecting Victim's OS,Detecting Firewall,Counter measures.
Port-Scanning: Type of Ports, Virtual Port numbers, Detecting Open Ports, Tools to carry outPortScanning,Anti-Port scanning tools,Port Manager,Counter measures.Overview of Wireshark.
Sniffing: Introduction,Basic Sniffing,Man-in-the-middleAttack.
Identity Attacks: Introduction,Staying Anonymous, Web Proxy, IP Proxy, Proxy Bouncing,Torbrowser,Add-ons,Steganography and Steganalysis,Steganography tools.

UnitIV   **15hrs**
Kerberos: purpose,authentication,serer and ticket granting server,keys and tickets,useo fAS and TGS, replicated servers. Kerberos V4: names, inter-realm authentication, Key versionnumbers. Kerberos V5: names, realms, delegation, forwarding and proxies, ticket lifetimes,revoking tickets,multiple Realms.Firewalls,Intrusion Detection

References:

1. Atul Kahate,Cryptography and Network Security,Mc Graw Hill.
2. Joseph Migga Kizza,Guideto Computer Network Security,Springer International Publishing AG2017
3. Kaufman,c.,Perlman, R.,and Speciner, M., Network Security, Private Communication in a publicworld,2nded.,Prentice Hall PTR.,2002.
4. Stallings,W.,.Cryptography and Network Security:Principles and Practice,3rded.,Prentice Hall PTR.,2003.
5. Cryptography and Network Security;Mc Graw Hill;Behrouz A Forouzan.
6. InformationSecurityIntelligenceCryptographicPrinciplesandApp.CalabreseThomson.

M.Sc.-II Semester-III(ComputerScience)
Choice Based Credit System with Multiple Entry and Multiple Exit Option (NEP-2020)
Course Code:Elective-II: CE-304
Title of Course: Internet of Things
Implemented from Academic Year 2023-24

Course Outcomes:
1. Apply the concepts of IoT.
2. Identify the different technologies.
3. Apply IoT to different applications.
4. Analysis & evaluate protocols used in IoT.
5. Designs martcity in IoT.
6. Analysis data received through sensors in IoT.

Unit-I 15hrs
Basics of IoT:Characterization of IoT,Physica ldesign,IoT protocols, Functional blocks ,Communication model,Communication APIs,Enabling technologies,Wireless sensor networks,Big data analytics, Communication Protocols, Embedded Systems, M2M, Difference between IoTandM2M.IoT Smart-X applications:Home Automation,Cities,Environment,Energy,Logistics,Agriculture,Industry,Health & Lifestyle.

Unit-II 15hrs
Architecture for IoT: Domain model specification, Information Model Specification, Service specification,IoT Level specification,Functional view,Operational view,Device and Component Integration,User centered design,Open source development,Enduser programming,Tools forIoT.

Unit–III 15hrs
Towards web of things: Platform design methodologies,Servicing through uniform interface,Syndicating things,Webenabling,Constrained devices,Future Web of things.IoT physical devices and Endpoints:IoT devices,Raspberry Plinter faces,Arduino interfaces,programming Raspberry Pi with Python,Other IoT devices.

Unit–IV 15hrs
IoT Analytics-Business Processin IoT,Creative Thinking Techniques,Modification,Combination Scenarios,Decentralized and Interoperable,Approaches,Object–Information Distribution,Architecture,Object Naming Service(ONS),Service Oriented Architecture,Network ofI nformation.

References:

1)"Internet of Things: Principles and Paradigms" by Rajkumar Buyya, Amir Vahid Dastjerdi, and Bahman Bahmani.
2) "IoT Solutions in Microsoft's Azure IoT Suite: Data Acquisition and Analysis in the Real World" by Scott Klein and Manisha Yadav.
3)"Practical Internet of Things Security" by Brian Russell, Drew Van Duren, and John Sammons.
4)"Internet of Things: A Hands-On Approach" by Arshdeep Bahga and Vijay Madisetti.
5) "Raspberry Pi Cookbook: Software and Hardware Problems and Solutions" by Simon Monk.
"IoT Analytics: Tools and Techniques for Analyzing the Internet of Things" by John R. Talburt and Sha Yang.

Lab assignments based on Advanced Web Technology Course.

Lab assignments based on PHP Course.

Course outcomes:

1) Gain skills as they apply knowledge effectively in diverse contexts.

2) Analyse and model requirements and constraints for the purpose of designing and implementing software artefacts and IT systems

3) Design and implement software solutions that accommodate specified requirements and constraints,based on analysis or modeling or requirements specification

4) Presenta clear,coherent and independent exposition of software applications, alternative IT solutions,and decision recommendations to both ITand non-IT personnel via technical reports of professional standardand technical presentations.

5) Teamwork:Work effectively in different roles,to form,manage,and successfully produce outcomes from teams,whose members may have diverse cultural backgrounds and life circumstances,and differing level softechnical expertise.

At the end of fourth semester student shall deliver seminar on one of the advanced topic chosen in consultation with the guide after compiling the information from the latest literature and also internet.The concepts must be clearly understood and presented by student.Prior to presentation,he/she shall carry out the detailed literature survey from standard reference such as International & National journal sand periodical srecently published reference books etc.A hard copy of the report (A4 size,12 fonts,TimesNewRoman,Single spacing both side printed) should be submitted to the Department before delivering the seminar.This seminar will be evaluated internally for 100 marks by the respective guides.

1. Fourth semester Projectwork can be carried out as industrial training of four months in the Industry or in the Institute as Research project with prior permission of the Institute.

2. Project viva-voce by the University panel will be conducted at the end of semester.

3. The project report should be prepared in a format prescribed by the University,which also specifies the content sand methods of presentation.

4. Project work may bedone individually or in groups in case of bigger projects.

5. The major project work carry 50 marks for internal assessment and 150 marks forExternal viva.The external viva shall be conducted by a panel of external examiners.

   OR

1. The student will be allowed to formulate a proposal for start-up and the same willbe rated equivalent to an industrial project. A detailed problem statement show in ginnovation along with markability, business plan and cash flow will be part of theEvaluation criteria.

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