B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19

Autonomous Institute, Affiliated to VTU

DEPARTMENT OF CSE

Academic Year	**Aug-Dec 2020/Jan-May 2021**	**Sem.**	**6th**
Course Title:	**Machine Learning**		
Course Code:	**20CS6PCMAL**		
L-T-P:	**3-0-1**	**Total Credits:**	**4**

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	**Introduction:** Well Posed Learning Problems, Designing a Learning system, Perspectives and Issues in Machine Learning **Concept Learning:** Concept Learning as search, Find-S, Version Spaces and Candidate Elimination Algorithm, Inductive bias. **Decision Tree Learning:** Decision Tree Representation, Decision Tree Learning Algorithm, Hypothesis Space Search.	**7**	**Text Book 1:** **Chapter 1: 1.1, 1.2, 1.3** **Chapter 2: 2.3, 2.4,2.5,2.7** **Chapter 3: 3.3, 3.4,3.5**
2	**Evaluating Hypothesis:** Motivation, Estimating hypothesis accuracy, Basics of sampling theorem, General approach for deriving confidence intervals, Difference in error of two hypothesis, Comparing learning algorithms.	**8**	**Text Book 1:** **Chapter 5: 5.1, 5.2, 5.3, 5.4, 5.5, 5.6**
3	**Bayesian Learning:** Bayes Theorem and Concept Learning, Maximum Likelihood, Minimum Description Length Principle, Bayes Optimal Classifier, Gibbs Algorithm, Naïve Bayes Classifier, Bayesian Belief Network, EM Algorithm.	**8**	**Text Book 1:** **Chapter 6: 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.11, 6.12**
4	**Instance Based Learning:** K-Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case Based Reasoning, Lazy and Eager learning.	**8**	**Text Book 1:** **Chapter 8: 8.2, 8.3, 8.4, 8.5, 8.6**
5	**Learning Set Of Rules:** Sequential covering algorithms, Learning Rule Sets, Learning First Order Rules, Learning Sets of First Order Rules, Induction as Inverted Deduction, Inverting Resolution.	**8**	**Text Book 1:** **Chapter 10: 10.2, 10.3, 10.4, 10.5, 10.6, 10.7**

Prescribed Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Machine Learning	M M. Mitchell	Indian Edition	Mc Graw Hill	2013

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Introduction to Machine Learning with Python	Andreas C Muller & Sarah Guido	First	Shroff Publishers	2019
2.	Thoughtful Machine learning	Mathew Kirk	First	Shroff Publishers	2019

E-Book						
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**	**URL**
1.	Hands-On Machine Learning With Scikit-learn and Tensorflow	Aureliene Geron	First	Oreilly	2017	https://www.kaggle.com/general/95287
2.	The Elements of Statistical Learning	Trevor Hastie, Robert Tibshirani, Jerome H. Friedman	Second	----	2009	https://web.stanford.edu/~hastie/Papers/ESLII.pdf

MOOC Course				
Sl. No.	**Course name**	**Course Offered By**	**Year**	**URL**
1.	Machine Learning	Coursera	----	https://www.coursera.org/learn/machine-learning
2.	Introduction to Machine learning	NPTEL	2016	https://swayam.gov.in/nd1_noc20_cs29/preview

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to **apply** the different learning algorithms.
CO2	Ability to **analyze** the learning techniques for given dataset.
CO3	Ability to **design** a model using machine learning to solve a problem.
CO4	Ability to **conduct** practical experiments to solve problems using appropriate machine learning techniques.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	**3**														
CO2		**1**													
CO3			**3**												**2**
CO4				**3**											**3**

D Assessment Plan (for 50 marks of CIE)

Tool	**Remarks**	**Marks**
Internals	**TWO**	**20**
QUIZ	**ONE**	**5**
Lab Component	**Two Lab Tests + Continuous Evaluation**	**25**
Alternate Assessment Tool	**--**	**--**
Total		**50**

E **Tutorial Plan** *(if applicable)*

F **Laboratory Plan** *(if applicable)*

Instructions:

a) Design, develop and implement the specified algorithms for the following problems using Python Language in LINUX / Windows environment. But preferably on LINUX environment.
b) Data sets can be taken from standard repositories.
c) Lab Record - Handwrite the Algorithm and attach the printout of the Program and the output.

Note: The faculty in charge of Machine Learning course of all the sections must come up with appropriate applications for each of the lab programs. The students are expected to choose suitable datasets and apply the specified algorithm to implement the given application. Depending on the output generated by the student the evaluation for the week must be done.

Lab Program	Unit #	Program Details
1	**1**	Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples.
2	**1**	For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.
3	**1**	Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
4	**3**	Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets
5	**3**	Write a program to construct a Bayesian network considering training data. Use this model to make predictions.
6	**3**	Apply k-Means algorithm to cluster a set of data stored in a .CSV file.
7	**3**	Apply EM algorithm to cluster a set of data stored in a .CSV file. Compare the results of k-Means algorithm and EM algorithm.
8	**4**	Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions.
9	**4**	Implement the Linear Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.
10	**4**	Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

G **Alternate Assessment Tool Plan** *(if applicable)*

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H SEE Exam Question paper format

Unit-1	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-2	Mandatory	One Question to be asked for 20 Marks
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Mandatory	One Question to be asked for 20 Marks

Bloom's Level	**Percentage of Questions to be Covered**
Remember / Understand	20%
Apply / Analyze	60%
Create / Evaluate	20%

B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19

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DEPARTMENT OF CSE

Academic Year	**Aug-Dec-2020/Jan-May 2021**	**Sem.**	**6th**
Course Title:	**Cryptography and Network Security**		
Course Code:	**20CS6PCCNS**		
L-T-P:	**3-1-0**	**Total Credits:**	**4**

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	Introduction to Cryptography and security goals Cryptography and cryptanalysis, Classical Cryptography, different type of attack: CMA, CPA, CCA etc., Shannon perfect secrecy, OTP, Pseudo random bit generators, stream ciphers and RC4. Mathematics of Symmetric Key Cryptography: Groups, Rings, Fields, Extended Euclidean algorithm, Finite Field, GF(2^n) fields.	**7**	**Text Book 1** **Chapter 1: 1.1, 1.2** **Chapter 3: 3.1, 3.2, 3.3, 3.4** **Chapter 4: 4.1, 4.2**
2	Introduction to modern block ciphers and modern stream ciphers. Block ciphers: Modes of operation, DES and its variants, finite fields (2n), AES, linear and differential cryptanalysis.	**8**	**Text Book 1** **Chapter 5: 5.1, 5.2** **Chapter 6: 6.1, 6.2, 6.3, 6.4, 6.5** **Chapter 7: 7.1, 7.2, 7.3, 7.4, 7.6**
3	Number Theory: Fermat's theorem, Cauchy 's theorem, Chinese remainder theorem, Primality testing algorithm, Quadratic residues, Legendre symbol, Jacobi symbol.	**8**	**Text Book 1** **Chapter 2: 2.1** **Chapter 9: 9.1, 9.2, 9.3, 9.4, 9.5**
4	One-way function, trapdoor one-way function, Public key cryptography, RSA cryptosystem, Diffie-Hellman key exchange algorithm, ElGamal Cryptosystem, Elliptic Curve cryptosystems.	**8**	**Text Book1** **Chapter 10: 10.1, 10.2, 10.3, 10.4, 10.5**
5	Cryptographic hash functions, secure hash algorithm, Message authentication, digital signature, RSA digital signature.	**8**	**Chapter 12: 12.1** **Chapter 13: 13.1, 13.2, 13.4, 13.5- 13.5.1, 13.5.2**

Prescribed Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	"Cryptography and Network Security"	Behrouz A. Forouzan and Debdeep Mukhopadhyay	2nd edition	Tata McGraw Hill	2013
2.	"Cryptography and Network Security Principles and practice"	W. Stallings	5th edition	Pearson Education Asia	2013

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	"Cryptography: Theory and Practice"	Stinson. D.	3rd edition	Chapman & Hall/CRC	2012
2.	"Cryptography and Network Security"	Atul Kahate		Tata McGraw-Hill	2003

E-Book						
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**	**URL**
1.	Cryptography and Network Security. Principles and Practice	William Stallings	3rd edition	Pearson Education	2007	http://williamstallings.com/Cryptо3e.html
2.	Handbook of Applied Cryptography	Menez, van Oorschot, Vanstone	ISBN: 0-8493-8523-7	CRC Press	2001	http://www.cacr.math.uwaterloo.ca/hac/

MOOC Course				
Sl. No.	**Course name**	**Course Offered By**	**Year**	**URL**
1.	Cryptography and Network Security	NPTEL	2017	http://nptel.ac.in/courses/106105031/
2.	Cryptography 1	Coursera	2019	https://www.coursera.org/course/crypto

B Course Outcomes

At the end of the course the student will be able to

CO1	**Apply** number theory concepts to the field of cryptography.
CO2	**Analyze** various symmetric and asymmetric cryptosystems and types of attacks on these cryptosystems.
CO3	**Apply** the field of cryptography while **designing** security applications.
CO4	**Demonstrate** cryptography encryption and decryption techniques using CrypTool.

C CO-PO-PSO mapping

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	**2**														
CO2		**3**													
CO3			**1**												**1**
CO4				**2**	**3**										

D Proposed Assessment Plan (for 50 marks of CIE)

Tool	**Remarks**	**Marks**
Internals	**TWO**	40
QUIZ	**--**	--
Lab Component	**--**	**--**
Alternate Assessment Tool	**ONE**	**10**
Total		**50**

E Tutorial Plan *(if applicable)*

Tutorial #	Topic
1	**Open SSL Library Features and Application in Cryptography** **https://www.openssl.org/docs/**
2	**Introduction to CrypTool and Installation** **Demonstration of basic features available in CrypTool**
3	**Demonstration of Caesar cipher** In the message to decode, any punctuation is left unchanged in the encoded message, as too are any numbers. To change this **Options > Text Options** and from here you can select what attributes of a message the cipher will alter and which it will leave unchanged. Experiment encrypting the same message with the Caesar cipher with different settings selected from the text options. Decipher each message after doing so and see if the deciphered message still has the same punctuation, spacing etc.
4	**Demonstration of Vigenere cipher** Animal is a tool within the CrypTool that displays the concepts behind a cipher in a user friendly fashion, by the means of an animation. Demonstrate the use of animal tool for the above cipher.
5	**Demonstration of DES** Open a new file and type a plaintext message. Next click from the menu **Crypt/Decrypt > Symmetric (modern) > DES (ECB)…** This presents a key selection window, this key must be 64 bits long, which equates to 16 hexadecimal figures. For simplicity use the default key of: 00 00 00 00 00 00 00 00 Select **Encrypt** and there should be presented a window showing the data encrypted in hexadecimal form and its corresponding ASCII representation. To decrypt the message again select **Crypt/Decrypt > Symmetric (modern) > DES (ECB)…** Use the same key and select **Decrypt**, and the original message will be displayed in hexadecimal representation. Selecting **View > Show as text** displays it in ASCII; you may also notice some of the formatting is lost in the process or some padding is added. Encrypt the same message using the same process as above only selecting **Crypt/Decrypt > Symmetric (modern) > DES (CBC)…** instead. Compare the two encrypted messages.
6	**Compare ECB versus CBC mode of operation for the following applications:** **a) An online bank statement** **b) An encrypted VoIP session** **c) Viewing of a website using TCP/IP**
7	**Demonstrate DES encryption and decryption using Animal.**
8	**Demonstration of RSA** Now, encrypt a message of your choice using the values: $p = 59$, $q = 71$, $e = 13$ Observe the results. Encrypt the same message with the values: $p = 673$, $q = 619$, $e = 13$
9	**Demonstrate RSA encryption and decryption using Animal.**
10	**Demonstrate RSA implementation using PKI.**
11	**1963497163 is the product of two prime numbers, use tools within the CrypTool to find these two prime numbers. Mention what tools you used to do this.**
12	**Demonstrate hybrid encryption** Combine aspects of AES and RSA algorithm and demonstrate encryption of different plaintext.
13	**Demonstration of** OWASP vulnerabilities

F Laboratory Plan *(if applicable)*

G Alternate Assessment Tool Plan *(if applicable)*

PLAN:

Students are supposed to develop a Cryptographic algorithm/Digital Signature (using C/C++ preferably) without using libraries or built-in functions. Code demonstration along with a report has to be submitted.

Example: Implement of RSA Digital Signature, Elgamal Digital Signature, Diffie Hellman Signature, Modified RSA algorithm for practical purpose, Hybrid encryption schemes.

Sl. No	Week	Activity
1	1st and 2nd	Formation of groups. Note: Student groups of size 2 members only
2	3rd	AAT topic selection by each group
3	4th	Presentation: Student team and topic introduction by each group
4	5th, 6th	Design the workflow along with Front-end Design
5	7th	Presentation on Front-end Design of the application
6	8th, 9th, 10th	Design and Development of the actual algorithm and testing it for various test cases.
7	11th	Complete code demonstration
8	12th	AAT Report Preparation

Rubrics used for evaluation:

Criteria	Exemplary	Proficient	Partially Proficient	Points
User Interface / Front End Design	(1) The designed application has an exceptional design, attractive and usable interface. It is easy to locate all important elements.	(0.75) The designed application has an attractive design and usable interface. It is easy to locate all important elements.	(0.5) The designed application has a usable design interface, but may appear busy or boring. It is easy to locate most of the important elements.	___ / 1
Implementation of the Algorithm	(4) Implementation of the algorithm has been done accurately without the usage of any library functions.	(2.5) Implementation of the algorithm has been done appropriately without the usage of any library functions.	(1.5) Implementation of the algorithm has been done with usage of few library functions.	___ /4
Testing for various cases	(1) The implemented algorithm works for any given valid input.	(0.75) The implemented algorithm works for almost all valid inputs.	(0.5) The implemented algorithm works for any some valid inputs.	___ /1

Application/Relevance	(1) The designed algorithm has several applications and is relevant in the area of cryptography.	(0.75) The designed algorithm has few applications and is relevant in the area of cryptography.	(0.5) The designed algorithm has few applications and is not very relevant in the area of cryptography.	___ /1
Report	(1) Clear and Effective writing and adherence to appropriate style guidelines	(0.75) Writing that is clear and effective for the most part and minor errors in adherence to appropriate style guidelines	(0.5) Unclear and ineffective writing and multiple errors in adherence to appropriate style guidelines	___/1
Oral communication (presentation)	(1) Clear and effective communication	(0.75) Communication is clear	(0.5) Unclear communication	___/1
Participation in Discussions	(1) Provided many good ideas; inspired others; clearly communicated ideas, needs, and feelings.	(0.75) Participated in discussions; on some occasions, made suggestions.	(0.5) Listened mainly; Rarely spoke up, and ideas were off the mark.	___/1
Total				__/ **10**

H SEE Exam Question paper format

Unit-1	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-2	Mandatory	One Question to be asked for 20 Marks
Unit-3	Mandatory	One Question to be asked for 20 Marks
Unit-4	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-5	Mandatory	One Question to be asked for 20 Marks

Bloom's Level	**Percentage of Questions to be Covered**
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%

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DEPARTMENT OF CSE

Academic Year	**Aug-Dec 2020/Jan-May 2021**	**Sem**	**6th**
Course Title:	**Object Oriented Modelling and Design**		
Course Code:	**20CS6PCOMD**		
L-T-P:	**3-0-1**	**Total Credits:**	**4**

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	**Introduction, Modeling Concepts, Class Modeling:** What is Object Orientation? What is OO development? OO themes, Evidence for usefulness of OO development, OO modelling history, Modeling as Design Technique, Modeling, Abstraction, The three models. **Class Modeling:** Object and class concepts, Link and associations concepts, Generalization and inheritance, A sample class model, Navigation of class models.	**7**	**Text Book 1** **Chapter 1: 1.1, 1.2, 1.3, 1.4, 1.5** **Chapter 2: 2.1, 2.2, 2,2.3** **Chapter 3: 3.1,3.2, 3.3,3.4,3.5**
2	**Advanced Class Modeling, State Modeling:** Advanced object and class concepts, Association ends, N-ary associations, Aggregation, Abstract classes; Multiple inheritance, Metadata, Reification, Constraints, Derived data, Packages, Practical tips. **State Modeling:** Events, States, Transitions and Conditions, State diagrams, State diagram behaviour.	**7**	**Text Book 1** **Chapter 4: 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12** **Chapter 5: 5.1, 5.2, 5.3, 5.4, 5.5**
3	**Advanced State Modeling, Interaction Modeling: Advanced State Modeling:** Nested state diagrams, Nested states, Signal generalization, Concurrency, A sample state model; Relation of class and state models. **Interaction Modeling**: Use case models, Sequence models, Activity models. Use case relationships, Procedural sequence models, Special constructs for activity models.	**7**	**Text Book 1** **Chapter 6: 6.1, 6.2, 6.3, 6.4, 6.5, 6,6** **Chapter 7: 7.1, 7.2, 7.3** **Chapter 8: 8.1, 8.2, 8.3**
4	**Process Overview, System Conception, Domain Analysis, Application Analysis:** **Process Overview:** Development stages, Development life cycle. **System Conception**: Devising a system concept, Elaborating a concept, Preparing a problem statement. **Domain Analysis:** Overview of analysis, Domain class model; Domain state model, Domain interaction model, Iterating the analysis. **Application Analysis:** Application interaction model, Application class model, Application state model, Adding operations.	**9**	**Text Book 1** **Chapter 10: 10.1, 10.2** **Chapter 11: 11.1, 11.2,11.3** **Chapter 12: 12.1, 12.2, 12.3, 12.4, 12.5** **Chapter 13: 13.1,13.2, 13.3, 13.4**

5	**System Design, Class Design, Implementation Modeling:** Overview of system design, Estimating performance, Making a reuse plan, Breaking a system in to sub-systems, Identifying concurrency, Allocation of sub-systems, Management of data storage, Handling global resources, Choosing a software control strategy, Handling boundary conditions, Setting the trade-off priorities, Common architectural styles, Architecture of the ATM system as the example. **Class Design:** Overview of class design, Bridging the gap, Realizing use cases, Designing algorithms, Recursing downwards, Refactoring, Design optimization, Reification of behaviour, Adjustment of inheritance, Organizing a class design, ATM example. **Implementation Modeling:** Overview of implementation, Fine-tuning classes, Fine-tuning generalizations, Realizing associations, Testing.	**9**	**Text Book 1** **Chapter 14: 14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.7, 14.8, 14.9, 14.10, 14.11, 14.12, 14.13** **Chapter 15- 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 15.10, 15.11** **Chapter 17: 17.1, 17.2, 17.3, 17.4, 17.5**

Prescribed Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	"Object-Oriented Modeling and Design with UML"	Michael Blaha, James Rumbaugh	Second Edition	Pearson Education	2005

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Project Management for Business, Engineering and Technology	Nicholas, J. and Steyn	Second Edition	H., ELSEVIER.	2004
2.	Project Planning, Analysis, Selection, Implementation and Review	Prasanna Chandra	Ninth Edition	New Delhi, Tata McGraw Hill Publications	2000

E-Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Object-Oriented Analysis and Design with Applications	Grady Booch et al	3rd Edition	Pearson Edition	2005	https://zjnu2017.github.io/OOAD/reading/Object.Oriented.Analysis.and.Design.with.Applications.3rd.Edition.by.Booch.pdf
2.	Object-Oriented Analysis, Design, and Implementation	Brahma Dathan, Sarnath Ramnath	2nd Edition	University press	2009	https://link.springer.com/book/10.1007/978-3-319-24280-4

MOOC Course				
Sl. No.	**Course name**	**Course Offered By**	**Year**	**URL**
1.	Object oriented analysis and design	Swayam NPTEL	2019	https://swayam.gov.in/nd1_noc19_cs48/preview
2.	Object-Oriented Design	Coursera	2020	https://www.coursera.org/learn/object-oriented-design?action=enroll

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to apply the knowledge of class, State & Interaction Modelling using Unified Modeling Language to solve a given problem.
CO2	Ability to analyze a System for a given requirement using Unified Modeling language.
CO3	Ability to design a given system using high level strategy.
CO4	Ability to conduct practical experiment to solve a given problem using Unified Modeling language.

C CO-PO-PSO mapping

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
CO1	**3**														
CO2		**3**											**3**		
CO3			**3**												
CO4				**3**	**3**								**3**		

D Assessment Plan (for 50 marks of CIE)

Tool	**Remarks**	**Marks**
Internals	Two	20
QUIZ	One	5
Lab Component	Lab Test + Continuous Evaluation	25
Self-Study Component	---	---
AAT	---	---
Total		**50**

E Tutorial Plan *(if applicable)*

F Laboratory Plan *(if applicable)*

Lab Plan

Instructions to Students to be followed in each OOMD lab:

1. Each Student should write down the work carried out and the outputs in the observation book and get it evaluated by the respective lab faculty in-charge.

2. Each Student Should bring the lab record with the programs and output written for the programs completed in their respective previous week and gets it evaluated by the lab faculty in-charge.

3. Design UML diagram for the following applications. SRS for the applications should be provided to the students by the faculty in charge except question no. 6 and 11.

Experiment #	Name of Experiment
1	Coffee Vending machine
2	Hotel Management system
3	Graphics Editor
4	Credit card processing
5	Library Management system
6	The Student should prepare SRS for the project completed under Project work 2 (19CS4PWPW2) and design UML diagram
7	Stock maintenance system
8	Passport automation system
9	Railway reservation system
10	Online Shopping system
11	Banking system
12	The Student should prepare SRS for the project completed under Project work 3 (20CS5PWPW3) and design UML diagram

The continuous evaluation for the lab is done as follows:

- The faculty should evaluate each lab program for 10 marks in every lab.
- Final continuous evaluation marks will be calculated for 25 marks: (10 marks lab programs + 15 marks for lab test)

Note: Open ended question should be given to the students during lab test

G Alternate Assessment Tool Plan *(if applicable)*

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Mandatory	One Question to be asked for 20 Marks

Bloom's Level	**Percentage of Questions to be Covered**
Remember / Understand	15%
Apply / Analyze	35%
Create / Evaluate	50%

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DEPARTMENT OF CSE

Academic Year	**Aug-Dec 2020/Jan-May 2021**	**Sem.**	**6th**
Course Title:	**Management and Entrepreneurship**		
Course Code:	**20CS6HSMGE**		
L-T-P:	**3-0-0**	**Total Credits:**	**3**

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	**Introduction:** Definition of Management, Managing: Science or Art, Patterns of Management Analysis: A management theory jungle, The system approach to management process, The functions of managers.	**6**	**Text book no.-1** **Chap-1 Page No. 4-15** **16-27**
2	**Planning**: Essentials of Planning and Managing by Objectives. **Decision Making**. **Organizing**: Formal and informal organization, Organizational Division, Organizational Levels and the span of management, Reengineering the organization, Structure and process of organizing; Line/Staff Authority, Empowerment and Decentralization.	**9**	**Text book no.-1** **Chap-4 Page No. 96-111** **Chap-6 Page No. 138-151** **Chap-7 Page No. 174-179** **182-186** **Chap-9 Page No. 207-215**
3	**Staffing**: Definition of staffing, The system approach to human resource management: An overview of staffing function, Situational factors affecting staffing, the system approach to selection: An overview. **Leadership**: Defining Leadership, Ingredients of Leadership, Trait approaches to leadership, Leadership behaviour and styles	**8**	**Text book no.-1** **Chap-11 Page No.** **244-259** **Chap-15 Page No.** **351-362**
4	**Entrepreneurship**: Importance of entrepreneurship, concepts of entrepreneurship, characteristics of a successful entrepreneur, classification of entrepreneurs, myths of entrepreneurship, entrepreneurial development models, problems faced by entrepreneurs and capacity building for entrepreneurship. **Women Entrepreneurs:** Women entrepreneurship defined, women entrepreneurship environment, challenges in the path of women entrepreneurship, strategies for development of women entrepreneurs.	**8**	**Text book no.-2** **Chap-2 Page No** **49-86** **Chap-3 Page No** **99-109**
5	**Creativity and business idea**: Ideas from Trends analysis: Trends, sources of new ideas, methods of generating ideas. **Innovation:** Entrepreneurial innovation, opportunity recognition, product planning and development process, e-Commerce and business start-up. **The Business plan**: What is business plan, who should write the plan, scope and value of business plan, Writing the business plan, Using and implementing the business plan.	**8**	**Text book no. -3** **Chap-4 Page No** **99-114** **Page No 121-138** **Chap-7 Page No** **224-235, 243-256**

Prescribed Text Book					
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**
1.	Management: A Global and Entrepreneurial Perspective	Heinz weihrich,Mark V Cannice, Harold Koontz	13th Edition	Tata McGraw Hill,	2011
2	Entrepreneurship Development-Small Business Enterprises.	Poornima M. Charantimath,	--	Pearson Education	2009
3	ENTREPRENEURSHIP	Robert D Hisrich, Mathew J Manimala, Michael P Peters, Dean A Shepherd	9th Edition	Tata McGraw Hil	2014

Reference Text Book					
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**
1.	Principles of Management	P.C.Tripathi, P.N.Reddy	4th Edition,	Tata McGraw Hill	2010
2.	Dynamics of Entrepreneurial Development & Management	Vasant Desai	--	Himalaya Publishing House	2011
3.	Entrepreneurship Development	S.S. Khanka, S Chand & Co	--	---	2007

E-Book						
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**	**URL**
1.	--	---	---	---	---	---

MOOC Course				
Sl. No.	**Course name**	**Course Offered By**	**Year**	**URL**
1.	Entrepreneurship Specialization	Coursera	2020	https://www.coursera.org/specializations/wharton-entrepreneurship
2	Business Management innovation-entrepreneurship	edx	2020	https://www.edx.org/course/subject/business-management/innovation-entrepreneurship

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to apply Engineering knowledge to effectively exhibit managerial skills at different levels of management in a global context
CO2	Ability to demonstrate the critical awareness of the principles and importance of entrepreneurship
CO3	Ability to Examine the process of creating and managing a new business venture and prepare a business plan for any identified business problem

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3												3		
CO2		3													
CO3			3						2	3	2	2			

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	Two	40
QUIZ	Two	10
Lab Component	--	--
Alternate Assessment Tool	--	--
Total		**50**

E Tutorial Plan *(if applicable)*

F Laboratory Plan *(if applicable)*

G Alternate Assessment ToolPlan*(if applicable)*

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Mandatory	One Question to be asked for 20 Marks
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Internal Choice	Two Questions to be asked for 20 Marks each

Bloom's Level	**Percentage of Questions to be Covered**
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%

B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19

Autonomous Institute, Affiliated to VTU

DEPARTMENT OF CSE

Academic Year	**Aug-Dec 2020/Jan-May 2021**	**Sem**	**6th**
Course Title:	**Computer Graphics & Visualization**		
Course Code:	**20CS6PECGV**		
L-T-P:	**3-0-1**	**Total Credits:**	**4**

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	**Overview of Graphics Systems:** Raster-Scan Systems, Graphics Software, Introduction to OpenGL. **Interactive Input Methods and Graphical User Interfaces:** Graphical Input Data, Logical Classification of Input, Input Function for Graphical Data, Interactive Picture-Construction Techniques, Virtual-Reality Environments, OpenGL Interactive Input-Device Functions, OpenGL Menu Functions **Computer Animation:** Raster Methods for Computer Animation, OpenGL Animation Procedures	**7**	**TextBook1:** **Chapter 2 - 2.2, 2.8, 2.9** **Chapter 11 - 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7** **Chapter13 - 13.1, 13.10**
2	**Attributes of Graphics Primitives:** OpenGL State Variables, Color and Gray Scale, OpenGL Color Functions, Point Attributes, Line Attributes, Curve Attributes, OpenGL Point-Attribute Functions, OpenGL Line-Attribute Functions, Fill-Area Attributes, General Scan-Line Polygon-Fill Algorithm, Scan-Line Fill for Convex Polygons, Open-GL Antialiasing Functions. OpenGL Query Functions **Geometric Transformations:** Basic Two-Dimensional Geometric Transformations, Matrix Representations and Homogeneous Coordinates, Inverse Transformations, Two-Dimensional Composite Transformations, Other Two-Dimensional Transformations, Transformations Between Two-Dimensional Coordinate System, Geometric Transformation in Three-Dimensional Space, Three-Dimensional Translation, Three-Dimensional Rotation, Three-Dimensional Scaling, Composite Three-Dimensional Transformations, OpenGL Geometric-Transformation Functions	**8**	**TextBook1:** **Chapter 4 - 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4 .18, 4.19** **Chapter 5 - 5.1, 5.2, 5.3, 5.4, 5.5, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13, 5.17**
3	**Two-Dimensional Viewing:** The Two-Dimensional Viewing Pipeline, The Clipping Window, Normalization and Viewport, OpenGL Two-Dimensional Viewing Functions, Clipping Algorithms, Two-Dimensional Point Clipping, Two-Dimensional Line Clipping (Cohen-Sutherland Line Clipping and Liang-Barsky Line Clipping), Polygon Fill-Area Clipping (Sutherland- Hodgman Polygon Clipping)	**8**	**TextBook1:** **Chapter 6 - 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8**
4	**Three-Dimensional Viewing:** Transformation from World to Viewing Coordinates, Projection Transformations, Orthogonal Projections, Perspective Projections, OpenGL Three-Dimensional Viewing Functions	**8**	**TextBook1:** **Capter7 - 7.4, 7.5, 7.6, 7.8, 7.9, 7.10**

5	**Graphics Output Primitives:** Coordinate Reference Frames, Specifying a Two-Dimensional World-Coordinate Reference Frame in OpenGL, OpenGL Point Functions, OpenGL Line Functions, Line-Drawing Algorithms, Circle-Generating Algorithms, OpenGL Polygon Fill-Area Functions, OpenGL Vertex Arrays, Pixel-Array Primitives, OpenGL Pixel-Array Functions, Character Primitives, Picture Partitioning, OpenGL Display Lists, OpenGL Display-Window Reshape Function **Visible-Surface Detection:** Classification of Visible-Surface Detection Algorithms, Back-Face Detection, Depth-Buffer Method, OpenGL Visibility-Detection Functions	**8**	**TextBook1:** **Chapter 3 - 3.1, 3.2, 3.3, 3.4, 3.5, 3.9, 3.16, 3.17, 3.18, 3.19, 3.20, 3.21, 3.22, 3.23, 3.24** **Chapter 9 - 9.1, 9.2, 9.3, 9.14**

Prescribed Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Computer Graphics with OpenGL	Donald Hearn & M Pauline Baker	Third Edition	Pearson	2009

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Computer Graphics using OpenGL	FS Hill & Stephen M Kelley	3rd Edition	Pearson Education	2009
2.	Interactive Computer Graphics – A Top-down Approach using Opengl	Edward Angel	6th Edition	Pearson Education	2012

E-Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Graphics Programming Black Book	Michael Abrash	----	----	----	https://www.drdobbs.com/parallel/graphics-programming-black-book/184404919
2.	Learn OpenGL	Joey de Vries	----	----	----	https://unglue.it/work/146302/

MOOC Course

Sl. No.	Course name	Course Offered By	Year	URL
1.	Interactive Computer Graphics	Coursera	2019	https://www.coursera.org/learn/interactive-computer-graphics
2.	Computer Graphics	NPTEL	2009	https://nptel.ac.in/courses/106106090/

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to **apply** the knowledge of geometric transformations and viewing.
CO2	Ability to **analyze** graphical outputs.
CO3	Ability to **design** graphic applications.
CO4	Ability to **conduct** practical experiments to solve problems using appropriate techniques of computer graphics.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	**3**														
CO2		**1**													
CO3			**3**												**2**
CO4				**3**	**3**										**3**

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	TWO	20
QUIZ	ONE	5
Lab Component	Two Lab Tests + Continuous Evaluation	25
Alternate Assessment Tool	--	--
Total		**50**

E Tutorial Plan *(if applicable)*

F Laboratory Plan *(if applicable)*

Instructions:

a) Design and develop graphical solutions using OpenGL for the following problems.
b) Lab Record - Handwrite programs and output print out.

Note: The faculty in charge of Computer Graphics course of all the sections must come up with some graphical outputs/animations which can be generated through the concepts/algorithms learnt in the theory course in addition to the programs in the laboratory set at the beginning of the semester. The students are expected to write the algorithm /program to generate these outputs. Depending on the output generated by the student the evaluation for the week must be done.

Lab Program	Unit #	Program Details
1	**1,5**	Program to recursively subdivide a tetrahedron to from 3D Sierpinski gasket. The number of recursive steps is to be specified by the user.
2	**1**	Program to display a set of values { f_{ij} } as a rectangular mesh.
3	**1,2**	Program to create a cylinder and a parallelepiped by extruding a circle and quadrilateral respectively. Allow the user to specify the circle and the quadrilateral.
4	**1,2,5**	Program to draw a color cube and spin it using OpenGL transformation matrices.
5	**1,2**	Program to create a house like figure and rotate it about a given fixed point using OpenGL functions.
6	**1,3,5**	Program to draw a color cube and allow the user to move the camera suitably to experiment with perspective viewing. Use OpenGL functions.
7	**1,3**	Program to fill any given polygon using scan-line area filling algorithm. (Use appropriate data structures.)
8	**1,3**	Program to implement the Cohen-Sutherland line-clipping algorithm. Make provision to specify the input line, window for clipping and view port for displaying the clipped image.
9	**1,4,5**	Program, using OpenGL functions, to draw a simple shaded scene consisting of a tea pot on a table. Define suitably the position and properties of the light source along with the properties of the surfaces of the solid object used in the scene.
10	**1,3**	Program to implement Liang-Barsky line clipping algorithm.

G Proposed Alternate Assessment Tool Plan *(if applicable)*

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Mandatory	One Question to be asked for 20 Marks

Bloom's Level	**Percentage of Questions to be Covered**
Remember / Understand	15%
Apply / Analyze	60%
Create / Evaluate	25%

B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19

Autonomous Institute, Affiliated to VTU

DEPARTMENT OF CSE

Academic Year	**Aug-Dec 2019/Jan-May 2020**	**Sem.**	**6th**
Course Title:	**Big Data Analytics**		
Course Code:	**20CS6PEBDA**		
L-T-P:	**3-0-1**	**Total Credits:**	**4**

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	Types of Digital Data: Classification of Digital Data. Introduction to Big Data: Characteristic of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, What is Big Data?. Big Data Analytics: Where do we Begin?, What is Big Data Analytics?, What Big Data Analytics isn't?, Classification of Analytics, Terminologies Used in Big Data Environments. The Big Data Technology Landscape: NoSQL,	**9**	**Book 1: 1.1, 2.1-2.5, 3.1-3.5, 3.12, 4.1,**
2	Introduction to Cassandra: Apache Cassandra – An Introduction, Features of Cassandra, CQL Data Types, CQLSH, Keyspaces, CRUD, Collections, Using a Counter, Time to Live, Alter Commands, Import and Export.	**7**	**Book 1: 7.1-7.11**
3	Hadoop Overview, HDFS (Hadoop Distributed File System), Processing Data with Hadoop, Managing Resources and Applications with Hadoop YARN (Yet another Resource Negotiator). Introduction to MAPREDUCE Programming: Introduction, Mapper, Reducer, Combiner, Partitioner, Searching, Sorting, Compression.	**9**	**Book 1: 5.7, 5.10-5.12, 8.1-8.8**
4	Introduction to Data Analysis with Spark: What ia Apache Spark, A unified Spark, Who uses Spark and for what?, A Brief History of Spark, Spark version and releases, Storage layers for Spark. Programming with RDDs: RDD Basics, Creating RDDs, RDD Operations, Passing functions to Spark, Common Transformations and Actions, Persistence. Spark SQL: Linking with Spark SQL, Using Spark SQL in Applications, Loading and Saving Data, JDBC/ODBC Server, User-defined functions, Spark SQL Performance. Scala: The Basics, Control Structures and functions, Working with arrays, Maps and Tuples	**8**	**Book2: 1, 3, 9** **Book4: 1, 2, 3, 4**
5	Use case Study: Recommendation Systems: Introduction, A Model for Recommendation Systems, Collaborative Filtering System and Content Based Recommendations.	**7**	**Book3: 10.1-10.4**

Prescribed Text Book					
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**
1	Big Data and Analytics	Seema Acharya, Subhashini Chellappan	First	Wiley	2015
2	Learning Spark Lightning-Fast Big Data Analysis	Andy Konwinski, Holden Karau, MateiZaharia, Patrick Wendell	First	O'Reilly	2015
3	Big Data Analytics	Radha Shankarmani, M Vijayalakshmi	Second	Wiley	2017
4	Scala for the Impatient	Cay S. Horstmann	Second	Addison-Wesley	2017

Reference Text Book					
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**
1.	Big data analytics with R and Hadoop	VigneshPrajapati	First	SPD	2013
2.	Hadoop Operations	Eric Sammer	First	O'Reilly	2012

E-Book						
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**	**URL**
1.	Hadoop: The Definitive Guide	Tom White	First	O'Reilly	2009	http://index-of.co.uk/Big-Data-Technologies/Big%20Data%20Analytics%20with%20R%20and%20Hadoop.pdf

MOOC Course				
Sl. No.	**Course name**	**Course Offered By**	**Year**	**URL**
1.	Big Data Computing	NPTEL	2018	https://nptel.ac.in/courses/106104189/
2.	Big Data Fundamentals	Edx	2020	https://www.edx.org/course/big-data-fundamentals
3.	Big Data Specialization	Coursera	2020	https://www.coursera.org/specializations/big-data

B Course Outcomes

At the end of the course the student will be able to

CO1	Apply the concept of NoSQL, Hadoop or Spark for a given task
CO2	Analyze the Big Data and obtain insight using data analytics mechanisms.
CO3	Design and implement Big data applications by applying NoSQL, Hadoop or Spark

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				3									2	
CO2		3			3									2	
CO3			3		3									2	

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internal Test	Two	20
Quiz	One	05
Lab Component	Two lab tests + Continuous Evaluation	25
Alternate Assessment Tool	--	-
Total		**50**

E Tutorial Plan *(if applicable)*

F Laboratory Plan *(if applicable)*

BIG DATA AND ANALYTICS Lab - Plan of Activities

1. Demonstration and installation of HADOOP single node cluster
2. Student should be able to install Cassandra and Spark.
3. Execution of Lab programs and submission of lab report.

Evaluation: 25 Marks; Lab Test – Writing and execution of lab programs

Note:

a) Question Number 3, 5, 11, 12 are Open Ended Questions.

b) The course handling faculty will provide guidelines to execute the problem.

Experiment #	Unit #	Name of Experiment	Remarks
1.	2	Create a Data set either structured/Semi-Structured/Unstructured from twitter/Facebook etc. to perform various DB operations using Cassandra. (Use FacePager app to perform real time streaming)	
2.	2	Create a Data set either structured/Semi-Structured/Unstructured from twitter/Facebook etc. to perform various DB operations using Cassandra. (Use FacePager app to perform real time streaming)	
3.	2	Students should be classifying a dataset into one of the standard forms and apply suitable querying rules to obtain suitable results.	Open Ended Question
4.	3	Execution of HDFS Commands for interaction with Hadoop Environment. (Minimum 10 commands to be executed)	
5.	3	Students should be able identify the HDFS concept and apply relevant Hadoop framework to extract relevant data from the dataset provided.	Open Ended Question
6.	3	From the following link extract the weather data https://github.com/tomwhite/hadoop-book/tree/master/input/ncdc/all Create a Map Reduce program to a) find average temperature for each year from NCDC data set. b) find the mean max temperature for every month	
7.	3	For a given Text file, Create a Map Reduce program to sort the content in an alphabetic order listing only top 10 maximum occurrences of words.	

8.	3	From the following link extract the user data http://content.udacity-data.com/course/hadoop/forum_data.tar.gz Create a Map Reduce program to combine information from the users file along with Information from the posts file by using the concept of join and display user_id, Reputation and Score.	
9.	4	From the following link extract the user data https://github.com/rvanrijn/spark-workshop/blob/master/data/reduced-tweets.json Design a Cluster computing framework using Spark to extract the number of tweets by an individual user and find the number of individual tweets.	
10.	4	Using RDD and FlaMap count how many times each word appears in a file and write out a list of words whose count is strictly greater than 4 using Spark.	
11.	4	Students should apply cluster computing framework to appreciate the unique feature of Spark	Open Ended Question
12.	4	Students should be able to invoke APIs of Scala on Spark to understand streaming data.	Open Ended Question

G Alternate Assessment Tool Plan *(if applicable)*

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Mandatory	One Questions to be asked for 20 Marks
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Internal Choice	Two Question to be asked for 20 Marks each
Unit-5	Mandatory	One Question to be asked for 20 Marks

Bloom's Level	**Percentage of Questions to be Covered**
Remember / Understand	30%
Apply / Analyze	45%
Create / Evaluate	25%

B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19

Autonomous Institute, Affiliated to VTU

DEPARTMENT OF CSE

Academic Year	**Aug-Dec 2020/Jan-May 2021**	**Sem**	**6th**
Course Title:	**Natural Language Processing**		
Course Code:	**20CS6PENLP**		
L-T-P:	**3-0-1**	**Total Credits:**	**4**

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	**OVERVIEW AND LANGUAGE MODELING** Overview: Origins and challenges of NLP, Language and Grammar, Processing Indian Languages, NLP Applications, Information Retrieval. Language Modeling: Various Grammar - based Language Models, Statistical Language Model.	**8**	**Text Book 1:** **Chapter 1 and Chapter 2**
2	**WORD LEVEL AND SYNTACTIC ANALYSIS** Word Level Analysis: Regular Expressions, Finite-State Automata, Morphological Parsing, Spelling Error Detection and correction, Words and Word Classes, Part-of Speech Tagging. Syntactic Analysis: Context-free Grammar, Constituency, Parsing, Probabilistic Parsing.	**8**	**Text Book 1:** **Chapter 3 and Chapter 4**
3	**SEMANTIC ANALYSIS AND DISCOURSE PROCESSING** Semantic Analysis: Meaning Representation, Lexical Semantics, Ambiguity, Word Sense Disambiguation. Discourse Processing: Cohesion, Reference Resolution, Discourse Coherence and Structure.	**8**	**Text Book 1:** **Chapter 5 and Chapter 6**
4	**NATURAL LANGUAGE GENERATION AND MACHINE TRANSLATION** Natural Language Generation: Architecture of NLG Systems, Generation Tasks and Representations, Application of NLG, Machine Translation: Problems in Machine Translation, Characteristics of Indian Languages, Machine Translation Approaches, Translation involving Indian Languages**.**	**7**	**Text Book 1:** **Chapter 7** **Chapter 8: 8.1, 8.2, 8.3, 8.4, 8.9**
5	**INFORMATION RETRIEVAL AND LEXICAL RESOURCES** Information Retrieval: Design features of Information Retrieval Systems, Information Retrieval Models, Classical Information Retrieval Models, Non-classical models of IR, Alternative Models of IR, Evaluation of the IR System, Lexical Resources: Word Net, Frame Net, Stemmers, Part-of-Speech Tagger, Research Corpora	**8**	**Text Book 1:** **Chapter 9 and Chapter 12**

Prescribed Text Book					
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**
1.	Natural Language Processing and Information Retrieval	Tanveer Siddiqui, U.S. Tiwary	1st Edition	Oxford University press	2008

Reference Text Book					
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**
1.	Speech and Language Processing: An introduction to Natural Language Processing, Computational Linguistics and Speech Recognition	Daniel Jurafsky and James H Martin	2nd Edition	Prentice Hall	2008
2.	Natural Language Understanding	James Allen	2nd Edition	Benjamin /Cummings publishing company	1995

E-Book						
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**	**URL**
1	Natural Language processing with python – Analyze text with the natural language toolkit	Steven bird, Ewan Klen and Edward Loper	1st Edition	O'Reilly	2009	www.nltk.org/book_1ed/

MOOC Course				
Sl. No.	**Course name**	**Course Offered By**	**Year**	**URL**
1.	Natural Language Processing	IIT Bombay	2012	https://nptel.ac.in/courses/106101007/
2.	Natural Language Processing	IIT Kharagpur	2017	https://nptel.ac.in/courses/106/105/106105158/

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to apply information retrieval techniques
CO2	Ability to analyze the natural language text
CO3	Ability to conduct practical experiment to perform natural language processing and information retrieval

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3														
CO2		3											3		
CO3				3	3										

Indicate strength of mapping (1/2/3) with justification

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	**TWO**	**20**
QUIZ	**ONE**	**5**
Lab Component	Lab Test + Continuous Evaluation	**25**
AAT	---	---
Total		**50**

E **Tutorial Plan** *(if applicable)*

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F **Laboratory Plan** *(if applicable)*

Instructions to Students to be followed in each NLP lab:

1. Each Student should write down the work carried out and the outputs in the observation book and get it evaluated by the respective lab faculty in-charge.
2. Each Student should bring the lab record with the programs and outputs written for the programs completed in their respective previous week and get it evaluated by the lab faculty in-charge.
3. Write a program for the following concepts using Python NLTK package (Order of the programs depend on the instructor of the subject)

Note:

The student should develop two open ended applications based on the concept learned in the course. The open ended questions should be evaluated as like regular lab exercise.

The continuous evaluation for the lab is done as follows:

- 10 marks for each lab program and 10 marks for open-ended questions.
- Final continuous evaluation marks will be calculated for 10 marks: (10 marks lab programs + 10 marks open-ended)/2
- Lab Test: The faculty should give open ended application to evaluate the student for 15 marks

Experiment #	Name of Experiment
1	Data Retrieval with Web Scraping
2	Text wrangling and pre-processing
3	POS (Part-Of-Speech) Tagging & Chunking
4	Stemming and Lemmatization
5	Tagging Problems and Hidden Markov Model
6	Counting POS Tags, Frequency Distribution & Collocations
7	Remove stop words from a given text.
8	Omit few given stop words from the stop-words list
9	Find the definition and examples of a given word using WordNet.
10	Find the sets of synonyms and antonyms of a given word.
11	Get overview of the tag-set, details of a specific tag in the tag-set and details on several related tag-sets, using regular expression.
12	Compare the similarity of two given nouns and verbs

G **Alternate Assessment Tool Plan** *(if applicable)*

H **SEE Exam Question paper format**

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Mandatory	One Question to be asked for 20 Marks

Bloom's Level	**Percentage of Questions to be Covered**
Remember / Understand	15%
Apply / Analyze	35%
Create / Evaluate	50%

B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19

Autonomous Institute, Affiliated to VTU

DEPARTMENT OF CSE

Academic Year	**Aug-Dec 2020/Jan-May 2021**	**Sem.**	**6th**
Course Title:	**Java Programming**		
Course Code:	**20CS6OEJVP**		
L-T-P:	**3-0-0**	**Total Credits:**	**3**

A **Syllabus**

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	Introduction of Java: How Java changed the Internet Java is interpreted, Java's Magic: Byte code, Java Buzz Words. Overview of Java, First Simple Program. Data types, Variables and Arrays: Java is strongly typed language, Integers, Floating Point Types, Characters, Booleans, Variables, Arrays-One Dimensional ,Multidimensional Arrays, Alternative Array Declaration syntax Control Statements: Selection statements, iteration statements, Jump statements. Introducing Classes-class Fundamentals, Declaring Objects, Introducing Methods, Constructors, this keyword, Garbage Collection, finalize() method. Closer Look at Methods and Classes: Overloading Methods, Using Objects as parameters, A closer look at Argument passing, Returning Objects, Introducing Access Control, Understanding static, Introducing Final, Arrays Revisited, Inner classes.	8	Text Book 1: Chapter 1, Chapter 2, Chapter 3, Chapter 5, Chapter 6, Chapter 7.
2	Inheritance: Inheritance Basics, Using super, multilevel hierarchy, dynamic method dispatch, Using abstract class, Using final with inheritance. Packages: Defining a package, Finding packages and class path, Example, Access protection, importing packages. Interfaces: Defining Interface, Implementing Interface, Nested Interfaces, Applying interfaces, Variables in interfaces. Interfaces can be Extended.	8	Text Book 1: Chapter 8, Chapter 9.
3	Enumeration: Enumeration Fundamentals, value() and valueOf() Methods, Java Enum's are class types. I/O Basics: Streams: Byte Streams and Character Streams, Predefined Streams, Reading Console Input .Reading Characters, Reading Strings, Writing Console Output, Reading and Writing Files. String handling: String Constructors, Special string operations, character extraction, string comparison, searching strings, modifying a string, String Buffer, additional string buffer methods.	7	Text Book 1: Chapter 12, Chapter 13, Chapter 17.
4	Exception handling: Fundamentals, Exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, Java's built-in exceptions. Creating your own exception subclasses. Multithreaded Programming: Introduction to Process, Difference between Process and Threads, Java thread model, main thread, creating thread, creating multiple threads, using isalive() and Join(), thread priorities, synchronization, Interthread communication, suspending, resuming and stopping threads.	8	Text Book 1: Chapter 10, Chapter 11.

5	Event Handling: Two Event Handling Mechanisms, The Delegation Event Model, Events- Event Sources, Event Listeners, Key Event Class-The Mouse Event Class, Text Event class Event Listener Interfaces-The Mouse Listener Interface. Abstract window toolkit: Window Fundamentals, Working with Frame windows, Creating a Frame Window in an AWT-Based Applet-Handling Events in a Frame Window, Creating windowed Program. Introducing Graphics-Drawing Lines, Rectangles, Ellipses and Circles, Arcs.	8	Text Book 1: Chapter 24, Chapter 25

Prescribed Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Java the Complete Reference.	Herbert Schildt	Eleventh Edition	Tata McGraw-hill Edition.	2019

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Introduction to JAVA Programming	Y. Daniel Liang	Ninth Edition	pearson education	2012
2.	Programming in JAVA 5.0	James P Cohoon, Jack W Davidson	1st Edition	Tata McGrawHill Edition	2019
3.	Programming with Java A Primer	E.BalaGuruSwamy	Fifth Edition	McGraw Hill Education	2014

E-Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Java Object Oriented Problem Solving	R. Morelli and R. Walde	Third Edition	Pearson Education Inc	2012	https://ia800303.us.archive.org/26/items/JavaJavaJavaObject-orientedProblemSolving/jjj-os.pdf
2.	The Art and Science of Java	Eric S. Roberts	Greg Tobin	----	2007	http://people.reed.edu/~jerry/121/materials/artsciencejava.pdf
3.	Java Programming	Wikibooks Contributors	Seventh Edition	wikibooks.org	2016	https://upload.wikimediaorg/wikipedia/commons/e/e7/Java_Programming.pdf
4.	Think Java How to Think Like a Computer Scientist	Allen B. Downey and Chris Mayfield	6.1.3	Green Tea Press Needham, Massachusetts	2016	https://www.pdfdrive.com/think-java-how-to-think-like-a-computer-scientist-e17327018.html
5	Introduction to Programming Using Java,	David J. Eck	Seventh Edition	Create Space	2014	http://math.hws.edu/javanotes/index.html.

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MOOC Course				
Sl. No.	**Course name**	**Course Offered By**	**Year**	**URL**
1.	Object Oriented Programming in Java	Coursera	2019	https://www.classcentral.com/course/coursera-object-oriented-programming-in-java-4212
2.	Java Programming Basics	Udacity	2019	https://www.udacity.com/course/java-programming-basics--ud282.
3.	Programming in Java	NPTEL	Aug – Oct 2019	https://onlinecourses.nptel.ac.in/noc18_cs41

B **Course Outcomes**

At the end of the course the student will be able to

CO1	Apply knowledge of java constructs for developing programs/applications
CO2	Analyse the given java program to identify bugs and to write correct code.
CO3	Design java programs/ applications for a given requirement.
CO4	Conduct practical experiments for demonstrating features of java using eclipse.

C **CO-PO-PSO mapping**

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	**1**													**1**	
CO2		**2**												**1**	
CO3			**3**											**1**	**1**
CO4			**2**		**3**									**1**	

D **Assessment Plan (for 50 marks of CIE)**

Tool	**Remarks**	**Marks**
Internals	TWO	40
QUIZ	ONE	5
Lab Component	---	-
Alternate Assessment Tool	ONE	5
Total		50

E **Tutorial Plan *(if applicable)***

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F **Laboratory Plan *(if applicable)***

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G **Alternate Assessment Tool Plan *(if applicable)***

Students are supposed to execute and demonstrate Java Program in the Lab based on the concepts taught in the theory class. The Programs will be set by course Instructor. From the List of programs student has to demonstrate any two of them as given by the course instructor.

H **Alternative Assessment Evaluation Rubrics**

Criteria	Excellent	Good	Unsatisfactory
Design and Implementation of Program (CO2,CO3,CO4,PO2, PO3,PO5)	Able To fully Design and Implement Program using appropriate Java Construct in accordance to the given problem (2)	Able To Moderately Design and Implement Program using appropriate Java Construct in accordance to the given problem (1.5)	Not Able to Design and Implement Program using appropriate Java Construct in accordance to the given Problem(0.5),
Demonstration (CO4,PO 3,5)	Demonstrates the functionality of the program with proper Input and Output using appropriate Tools of Java for all cases.(1)	Demonstrates the functionality of the program with proper Input and Output using appropriate Tools of Java for few cases.(0.5)	Demonstrates the functionality of the program without proper Input and Output using appropriate Tools of Java for few cases.(0)
Viva-Voce (CO1,PO1)	Able to Answer all Viva Questions of the java Concepts (1)	Able to Answer few Viva Questions of the java Concepts(0.5)	Able to Not Answer Viva Questions of the java Concepts(0)
Documentation (CO4,PO3,PO5)	Well written and neatly organized Report showing proper Input and Output (1).	Well written and neatly organized Report without showing proper Input and Output (0.5).	Not Well written and not neatly organized Report without Input and Output (0).

I **SEE Exam Question paper format**

Unit-1	Mandatory	One Question to be asked for 20 Marks.
Unit-2	Mandatory	One Question to be asked for 20 Marks.
Unit-3	Mandatory	One Question to be asked for 20 Marks.
Unit-4	Internal Choice	Two Questions to be asked for 20 Marks each.
Unit-5	Internal Choice	Two Questions to be asked for 20 Marks each.

Bloom's Level	**Percentage of Questions to be Covered**
Remember / Understand	25%
Apply / Analyze	40%
Create / Evaluate	35%

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DEPARTMENT OF CSE

Academic Year	**Aug-Dec 2020/Jan-May-2021**	**Sem**	**6th**
Course Title:	**Robot Process Automation Design and Development**		
Course Code:	**20CS6OERPA**		
L-T-P:	**3-0-0**	**Total Credits:**	**3**

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	**What is Robotic Process Automation?** **Scope and Techniques of automation:** what should be automated? What can be automated? Techniques of automation **Roboic Process Automation:** What can RPA do? Benefits of RPA Components of RPA, RPA platforms. About UiPath. The future of automation. **Record and Play:** UiPtha stack, Downloading and Installing UiPath Studio, Learning UiPath Studio, Task Recorder, Emptying trash in Gmail, Emptying Recycle Bin.	**8**	**Text Book 1: Chapter 1 & Chapter 2**
2	**Sequence, Flowchart, and Control Flow:** Sequencing the workflow, Activities, Control flow, various types of loops, and decision making, how to use a sequence, how to use a flowchart, step by step example using sequence and control flow. **Data Manipulation:** Variables and scope, Collections, Arguments-purpose and use, Data table usage with examples, Clipboard management, File operation with step-by-step example. CSV/Excel to data table and vice versa examples.	**8**	**Text Book 1: Chapter 3 & Chapter 4**
3	**Taking control of the controls :** Finding and attaching windows, Finding the control, Techniques for waiting for a control, Act on controls-mouse and keyboard activities, working with UiExplorer, Handling events, Revisit recorder, Screen scraping, When to use OCR, Types of OCR available, How to use OCR, Avoiding typical failure points. **Tame that Application with Plugins and Extensions Terminal plugin:** SAP automation, Java Plugin, Citrix automation, Mail plugin, PDF plugin, web integration, Excel and Word plugins, Credential management.	**8**	**Text Book 1: Chapter 5 & Chapter 6**
4	**Handling User Events and Assistant Bots:** What are assistant bots? Monitoring system event triggers, Monitoring image and element triggers, Launching an assistant bot on a keyboard event. **Exception Handling, Debugging, and Logging Exception handling:** Common exceptions and ways to handle them, Logging and taking screenshots, Debugging techniques, Collecting crash dumps, Error reporting.	**8**	**Text Book 1: Chapter 7 & Chapter 8**

5	**Managing and Maintaining the Code:** Project Organization, Nesting workflows, Reusability of workflows, Commenting techniques, State Machine, When to use Flowcharts, State Machines or sequences, Using config files and examples of a config file. **Deploying and Maintaining the Bot:** Publishing using publish utility, Overview of Orchestration Server, Using Orchestration Server to control bots, Using Orchestration Server to deploy bots.	**7**	**Text Book 1: Chapter 9 & Chapter 10**

Prescribed Text Book					
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**
1.	"Learning Robotic Process Automation"	Alok Mani Tripathi	1st Edition	Packpub.com	2018

Reference Text Book					
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**
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E-Book						
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**	**URL**
1.	Learning Robotic Process Automation	Alok Mani Tripathi	1st Edition	Packpub.com	2018	https://book.akij.net/eBooks/2018/November/5be2a5c7bc9bd/Sanet.st_Learning_Robotic_Proc.pdf

MOOC Course				
Sl. No.	**Course name**	**Course Offered By**	**Year**	**URL**
1.	RPA	UiPath	2016	https://www.uipath.com/developers/video-tutorials
2.	Robotic Process Automation	Guru99.com	----	https://www.guru99.com/uipath-tutorial.html

B Course Outcomes

At the end of the course the student will be able to

CO1	Apply the concept of Robotic Process Automation to automate various applications.
CO2	Analyse the usage of appropriate Robotic Process Automation technique for a given application.
CO3	Design and implement techniques of Robotic Process Automation.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3														
CO2		3													
CO3			3											2	

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	TWO	40
QUIZ/AAT	TWO	10
Lab Component	--	--
Alternate Assessment Tool	--	--
Total		**50**

E Tutorial Plan *(if applicable)*

F Laboratory Plan *(if applicable)*

G Alternate Assessment Tool Plan *(if applicable)*

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Mandatory	One Question to be asked for 20 Marks

Bloom's Level	**Percentage of Questions to be Covered**
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%

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DEPARTMENT OF CSE

Academic Year	**Aug-Dec 2020/Jan-May 2021**	**Sem.**	**6th**
Course Title:	**Project Work-4**		
Course Code:	**20CS6PWPW4**		
L-T-P:	**0-0-2**	**Total Credits:**	**2**

A Syllabus

Introduction:

Data Science or Security based application development: Under this project work, student should develop Data Science or Security based Application development using technologies such as Weka, R tool, Cryptool, Wireshark, Nessus, Packet analyser, etc.

- Students can form a group with minimum of two and maximum of four.
  Note: Under this project work, students can form a group with non-CS students of other departments of BMSCE.
- Teacher allotted for project work to students should teach students' technologies like Weka, R tool, Kaggle kernels, during Class/Lab hours as per time table allotment.
- Teacher allotted for project work should guide the students in choosing the topic & towards carrying out project work and complete the evaluation of assigned students.
- The evaluation of project work will be based on the rubrics set by the department under the committee of HOD, UG NBA coordinator, One professor, One Associate professor and One Assistant Professor.

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to apply the practical knowledge and latest tools for the project development.
CO2	Ability to design and develop a project using Data Analytics or Security technologies to solve societal problems.
CO3	Ability to report and present the implemented solutions in a team.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				3										
CO2	3	3	3	2	3	2	2	2				1	1	3	2
CO3								2	3	3					

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	--	--
QUIZ	--	--
Lab Component	--	**50**
Alternate Assessment Tool	--	--
Total		**50**

Rubrics for Project Evaluation:

Criteria	Exemplary	Proficient	Partially Proficient	Points
Design of Modules for the application	(10) All modules are designed appropriately in accordance to the requirements.	(6) All modules are designed moderately in accordance to the requirements.	(4) Some of the modules are not designed in accordance to the requirements.	__ / 10
Implementation	(10) Implementation of modules using appropriate analytic techniques/security features for all set objectives.	(6) Implementation of modules using appropriate analytic techniques/security features for most of the set objectives.	(4) Some of the modules are not implemented in accordance with the design.	__ / 10
Demonstration of the project	(10) Demonstrates the functionality of the application using appropriate reports or plots for various cases.	(6) Demonstrates the functionality of the application using appropriate reports or plots for few cases.	(4) Demonstrates the functionality of the application without much reporting.	/ 10
Report	(10) Clear and Effective writing and adherence to appropriate style guidelines	(6) Writing that is clear and effective for the most part and minor errors in adherence to appropriate style guidelines	(4) Unclear and ineffective writing and multiple errors in adherence to appropriate style guidelines	__/ 10
Oral communication. (presentation)	(5) Clear and effective communication	(3) Communication is clear	(2) Unclear communication	/ 5
Participation in Discussions	(5) Provided many good ideas; inspired others; clearly communicated ideas, needs, and feelings.	(3) Participated in discussions; on some occasions, made suggestions.	(2) Listened mainly; Rarely spoke up, and ideas were off the mark.	/ 5
Total				/ 50

E **Tutorial Plan** *(if applicable)*

F **Laboratory Plan** *(if applicable)*

Project Topics for Data Science using R or any Data analytics tool:

Students should carry out projects that combine aspects of statistics, computer science, applied mathematics, and visualization for real-world problems. Analyse vast amounts of data, extract knowledge from them and generate reports/plots using R. The applications can be based on domains such as finance, social media, politics, networks, recommendation systems, crime analysis, sentiment analysis, medical, bioinformatics, geospatial etc.

Project topics for Security:

Students can use tools such as Cryptool, Wireshark, Nessus, Packet analyser, etc for implementation. Projects related to information security such as website vulnerability detection, online transaction fraud detection, phishing detection, digital watermarking, SQL injection prevention in websites, Authentication system using QR code, Detecting data leaks in e-commerce website, Developing hybrid techniques for data encryption.

Note: Apart from the above mentioned project topics if student groups come up with any innovative project ideas which are useful for the Department / College academic purpose will be considered based on the approval and acceptance from class teacher.

Sl. No	Week	Activity	Content deliverables by the assigned teacher
1	1st	Formation of groups. Note: Student groups of size 2 or 3 or 4	Introduction to system security, information security, network security.
2	2nd	Project topic selection by each group	Various encryption techniques implementation.
3	3rd	Presentation: Student and Project topic introduction by each group	Usage of existing libraries for various security features implementation
4	4th 5th and 6th	Front-end Design Layout of the project	Website vulnerabilities demonstration.
5	7th	Presentation on Front-end Design by each group	Usage of Crypstool and it's features.
6	8th and 9th	Back end design of the project with all the security features	Demonstration of encryption and decryption using Cryptool.
7	10th	Attacks possible on the application created	Demonstration of Wireshark tool.
8	11th	Complete Project Work Demonstration by each group	
9	12th	Project Report Preparation	

Sl. No	Week	Activity	Content deliverables by the assigned teacher
1	1st	Formation of groups. Note: Student groups of size 2 or 3 or 4	Introduction Data analytics using R
2	2nd	Project topic selection by each group	Introduction to Weka tool
3	3rd	Presentation: Student and Project topic introduction by each group with ER diagram	Introduction of Data analytics using python
4	4th 5th and 6th	Front-end Design Layout of the Forms	Sample code demonstration using R tool
5	7th	Presentation on Front-end Design by each group	Sample code demonstration using Weka tool
6	8th and 9th	Back end design of the project tables with schema diagram Design and Development of connecting among different web pages	Sample code demonstration using Python
7	10th	Presentation of Normalized tables with front-end back-end connectivity.	
8	11th	Complete Project Work Demonstration by each group	
9	12th	Project Report Preparation	

G SEE Exam (50 Marks)

Evaluation of Projects carried out by students by External examiner along with internal faculty.

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DEPARTMENT OF CSE

Academic Year	**Aug-Dec 2020/Jan-May 2021**	**Sem.**	**6th**
Course Title:	**Seminar on Internship / MOOC course**		
Course Code:	**20CS6SRSTI**		
L-T-P:	**0-0-1**	**Total Credits:**	**1**

A Syllabus

Introduction: Technical Seminar Based on
Summer/Winter Internship (with any company the internship should be at least two weeks) during the vacation period of 4th and 5th Sem.). Internship should be based on Hands-on skills implementation related to Computer technology.

OR

Completion of any one MOOC (Massive Open online course) course through online platforms like NPTEL/SWAYAM /Coursera/Edx etc. (at least 2 weeks) based on Computer Science and Engineering related courses. MOOC should be registered and completed by students during the vacation period of 4thsem or 5th sem.

B Course Outcomes

At the end of the course the student will be able to

Course Outcomes: INTERNSHIP

Sl. No.	Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Ability to apply domain knowledge during the course of internship in the company.	**3**														
2	Ability to develop/implement the solutions with appropriate techniques, resources and contemporary tools.			**3**		**3**										
3	Ability to work independently and in a collaboration /multidisciplinary environment.							**2**		**3**						
4	Ability to allocate time effectively and manage to complete the work allotted within appropriate time											**3**				
5	Ability to demonstrate effective verbal and written communication skills										**3**					
6	Ability to exhibit integrity and ethical behaviour while carrying out the internship on site and for the preparation of report.								**3**							

C Assessment Plan (for 50 marks of CIE)

Evaluation will be based on the rubrics set by the department under the committee of HOD, UG NBA coordinator, One professor, One Associate professor and One Assistant Professor.

Internship CIE Rubrics – 50 Marks

Criteria	Excellent	Good	Average	Poor
Ability to apply domain knowledge during the course of internship (10M)	Apply domain knowledge for design and development of all issues during the course of internship (10M)	Apply domain knowledge for design and development of most issues during the course of internship (7M)	Apply domain knowledge for design and development of specific issues during the course of internship (5M)	Unable to apply complete domain knowledge for design and development issues during the course of internship (2M)
Ability to develop / implement the solutions with appropriate techniques, resources and contemporary tools (10M)	Able to develop/implement all the solutions with appropriate techniques, resources and contemporary tools (10M)	Able to develop/implement most of the solutions with appropriate techniques, resources and contemporary tools (7M)	Able to develop/implement specific solutions with appropriate techniques, resources and contemporary tools (5M)	Not confident to develop/implement solutions with appropriate techniques, resources and contemporary tools (2M)
Ability to work independently and in collaboration / multidisciplinary environment. (10M)	Able to work independently and in a collaboration/multidisciplinary environment. (10M)	Able to work independently with minimal guidance and in a collaboration/multidisciplinary environment. (7 M)	Able to work independently with more guidance and in a collaboration/multidisciplinary environment. (5M)	Unable to work independently without guide support and in a collaboration/multidisciplinary environment. (2M)
Ability to allocate time effectively and manage to complete the work allotted within appropriate time. (5M)	Able to allocate time effectively and complete all the work allotted within appropriate time. (5M)	Able to allocate time effectively and complete most of the work allotted within appropriate time. (4M)	Able to allocate time effectively and manage to complete the work allotted (3M)	Unable to use time effectively and complete the work allotted.(1M)
Ability to exhibit integrity and ethical behaviour while carrying out the internship and for the preparation of internship report. (5M)	Able to effectively exhibit integrity and ethical behaviour while carrying out the internship and for the preparation of internship report. (5M)	Able to moderately exhibit integrity and ethical behaviour while carrying out the internship and for the preparation of internship report. (4M)	Able to partially exhibit integrity and ethical behaviour while carrying out the internship and for the preparation of internship report. (3M)	Unable to exhibit integrity and ethical behaviour while carrying out the internship and for the preparation of internship report. (1M)
Ability to demonstrate effective oral and written communication skills (10M)	Able to demonstrate effective oral and written communication skills (10M)	Able to demonstrate oral and written communication skills moderately. (7M)	Able to demonstrate oral and written communication skills minimally. (5M)	Unable to demonstrate effective verbal and written communication skills (2M)

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Course Outcomes for MOOC Completion Course

Sl. No.	Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Ability to understand the basics and domain knowledge through videos, lecture notes, PPTs for the course registered during the course period.	**3**														
2	Ability to answer, solve , develop/implement the solutions with appropriate techniques, resources and contemporary tools			**3**		**3**										
3	Ability to allocate time effectively and manage to complete the work allotted and submit the assignment within the given deadline.											**3**				
4	Ability to demonstrate effective oral presentation and the preparation of course report.								**3**							

MOOC Course CIE Rubrics – 50 Marks

Criteria	Excellent	Good	Average	Poor
Ability to understand the basics and domain knowledge through videos, lecture notes, ppts for the course registered during the course period. (10M)	Ability to understand the All the basics and domain knowledge through videos, lecture notes, ppts during the course period (10M)	Ability to understand Most of the basics and domain knowledge through videos, lecture notes, ppts during the course period (7M)	Ability to understand few specific basics and domain knowledge through videos, lecture notes, ppts during the course period (5M)	Unable to understand the basics and domain knowledge through videos, lecture notes, ppts during the course period (2M)
Ability to answer, solve , develop/implement the solutions with appropriate techniques, resources and contemporary tools (10M)	Ability to answer, solve , develop/implemen t all the solutions with appropriate techniques, resources and contemporary tools (10M)	Ability to answer, solve , develop/implement Most of the solutions with appropriate techniques, resources and contemporary tools (7M)	Ability to answer, solve , develop/implement few specific solutions with appropriate techniques, resources and contemporary tools (5M)	Unable to answer, solve , develop/impleme nt the solutions with appropriate techniques, resources and contemporary tools (2M)

Ability to allocate time effectively and manage to complete the work allotted and submit the assignment within the given deadline. (10M)	Ability to allocate time effectively and manage to complete All the work allotted and submit the assignment within the given deadline. (10M)	Ability to allocate time effectively and manage to complete Most of the work allotted and submit the assignment within the given deadline. (7M)	Ability to allocate time effectively and manage to complete Few of the specific work allotted and submit the assignment given within the given deadline. (5M)	Unable to allocate time effectively andnot able to complete the work allotted and submit the assignment given within the given deadline. (2M)
Ability to complete the registered course successfully with score >=90 (10M)	Ability to complete the registered course successfully with score >=90 (10M)	Ability to complete the registered course successfully with score >=(60-89) (7M)	Successfully Completed course with score 40 to 59 (5M)	No Certificate with score less than 40. (2M)
Ability to demonstrate effective oral presentation and the preparation of course report. (10M)	Ability to demonstrate effective oral presentation and the preparation of course report. (10M)	Ability to demonstrate effective oral presentation and the preparation of course report moderately. (7M)	Ability to demonstrate effective oral presentation and the preparation of course report minimally. (5M)	Unable to demonstrate effective oral presentation and the preparation of course report. (2M)

D SEE Exam (for 50 Marks)

Internship/MOOC course presentation, evaluation will be carried out by External examiner along with Internal faculty.

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DEPARTMENT OF CSE

Sem.	**6th**		
Course Title:	**Personality Development and Communication Skills or Aptitude Skills**		
Course Code:	**20CS6NCNC6**		
L-T-P:	**0-0-0**	**Total Credits:**	**ZERO PASS/FAIL**

A Introduction

- Student should participate in any Personality Development & Communication (PDC) Skills Programme or any Aptitude test conducted by any organization, example GATE, GRE, TOFEL or any public sector exams conducted by ISRO, HAL or Defence.
- Student should submit participation certificate of PDC/Aptitude test for passing this mandatory course.
- Student should have participated in PDC skill training programme or appeared for Aptitude exam during the period from his/her 4th sem. vacation upto 6th sem. But should have completed training programme or should have appeared for aptitude test before the final evaluation of this non-credit mandatory course.

  Note: In case if student is unable to produce the certificate, then department head should take care of conducting aptitude Test or technical test with GATE questions.

B Course Outcomes

CO1	Signifying his/her Communication skills.
CO2	Demonstrating individuality to engage in independent and life-long learning

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1									**3**						
CO2												**3**			

D Assessment Plan

Category	Marks (Range)	Personality Development and Communication Skills or Aptitude Skills
L1	**90 (90-100)**	-Participated in PDC training programmes conducted by national institute's such as IISC, IITs, IIITs or NITs OR -Passed the GATE, GRE, TOFEL or any public sector exams conducted by ISRO, HAL or Defence with good score
L2	**80 (80-89)**	-Participated in PDC training programmes conducted by any industry OR -Passed the GATE, GRE , TOFEL or any public sector exams conducted by ISRO, HAL or Defence with average score
L3	**70 (70-79)**	-Participated in PDC training programmes conducted by any private training institute OR -Passed the GATE, GRE, TOFEL or any public sector exams conducted by ISRO, HAL or Defence with passing score
L4	**60 (60-69)**	-Participated in PDC training programmes conducted by online course platforms such as Courseera, NPTEL, Edx, Udacity, etc. OR -Appeared for the GATE, GRE, TOFEL etc
L5	**50 (50-59)**	-Participated in PDC training programmes conducted by online private tutors. OR -Appeared for any public sector exams conducted by ISRO, HAL or Defence
L6	**40 (40-49)**	- Participated in PDC training programmes conducted by the college OR - Appeared for any aptitude exam conducted by private organization or by the department.

E SEE Exam

Student should submit participation certificate of PDC or certificate of appearing to Aptitude test for passing this mandatory course.