

Department of Computer Science and Application
Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur (C.G.)



Learning Outcome Based Scheme and Syllabus

of

M.Sc. (Computer Science)

(As approved by AC/EC in its meeting held respectively on.....)

Course Effective from Academic Session 2022-23

Department of Computer Science and Application

Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur (C.G.)

Scheme and Syllabus

of

M.Sc. Computer Science

(w.e.f. Academic Session 2022-23)

PROGRAMME CODE: MSCCS2022

OBJECTIVES:

M.Sc. Programme in Computer Science aims at developing professionals having strong foundation in Computer Science as well as Information Technology who can contribute in research, academics and industry. The programme puts emphasis on learning by solving problems through laboratory exercises and software development/research projects.

ELIGIBILITY:

B.C.A. /B.Sc.(CS/IT) or equivalent with 45% marks in aggregate.

AGE LIMIT:

As per the directives of Government of C.G. Government/University.

DURATION: Four Semesters (Two Years).

PROGRAMME OUTCOMES (POs):

After the completion of the programme students will be able to:

PO-1: An understanding of the theoretical foundations and the limits of computing.

PO-2: Understanding and ability to use advanced computing techniques and tools.

PO-3: Understand and apply programming knowledge to solve complex problems not just by using technology, but also to contribute in creation of new & emerging technologies which meet the desired needs of industry and society.

PO-4: Understand the impact of technology & its applications and provide solutions to the end user in a cost effective and efficient manner.

PO-5: Function in multidisciplinary teams and communicate with the team and clients in an effective manner.

PO-6: An ability to adapt existing design patterns, techniques, algorithms, data structures, etc. to solve real world problems.

PO-7: An understanding of professional and ethical responsibility.

PO-8: Understand the impact of IT related solutions in socioeconomic context.

PO-9: Build a strong foundation for research in future & emerging technological trends.

PO-10: Emphasize on life-long learning considering the ever changing technological environment.

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Scheme and Syllabus

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M.Sc. (Computer Science)

(w.e.f. Academic Session 2022-23)

Program Code: MSCCS2022

Semester – I											
S. No.	Course Type	Course Code	Course Name	Credit				Marks		Total	
				L	T	P	Total	ESE	IA	Max	Min
1	Core Course (CC)	MSCCS101	Programming in Python	3	1	-	4	75	25	100	40
2		MSCCS102	Advanced Database Management System	3	1	-	4	75	25	100	40
3		MSCCS103	Artificial Intelligence & Machine Learning	3	1	-	4	75	25	100	40
4		MSCCS104	Lab-1: Programming in Python	-	-	2	2	75	25	100	40
5	Elective-I (Choose any one)	MSCCS105	Data Mining & Data warehousing	3	1	-	4	75	25	100	40
		MSCCS-106	Soft Computing	3	1	-	4	75	25	100	40
		MSCCS107	Theory of Computation	3	1	-	4	75	25	100	40
6	Skill Enhancement Course	MSCCS108	1. Online MOOC course certification. 2. Participation in any activity Event/Workshop/Conference etc.	Non Credit but mandatory course							
Total				12	4	2	18	375	125	500	200

Notes:

1. Abbreviation: L-Lecture, P-Practical, T-Tutorial, ESE-End Semester Examination, IA-Internal Assessment.
2. Student must participate in some activity or event like cultural/technical/sports/social/spiritual either in the university or outside of the university and will produce certificate of completion of this noncredit course.

Semester – II											
S. No.	Course Type	Course Code	Course Name	Credit				Marks		Total	
				L	T	P	Total	ESE	IA	Max	Min
1	Core Course (CC)	MSCCS201	Compiler Design	3	1	-	4	75	25	100	40
2		MSCCS202	Big Data Analytics	3	1	-	4	75	25	100	40
3		MSCCS203	Advance Java	3	1	-	4	75	25	100	40
4		MSCCS204	Lab-2: Advance Java	-	-	2	2	75	25	100	40
5	Elective-II (Choose any one)	MSCCS205	Introduction to Blockchain	3	1	-	4	75	25	100	40
		MSCCS206	Natural Language Processing	3	1	-	4	75	25	100	40
		MSCCS207	Analysis and Design of Algorithm	3	1	-	4	75	25	100	40
6	Skill Enhancement Course	MSCCS208	MOOC	Non Credit but mandatory course							
Total				12	4	2	18	375	125	500	200
Notes:											
1. Abbreviation: L-Lecture, P-Practical, T-Tutorial, ESE-End Semester Examination, IA-Internal Assessment.											
2. Student should register for any MOOC course as verified by the department.											
3. MOOC courses will be notified at the beginning of each semester and student has to opt from the list only.											
4. Student not able to enroll or complete MOOC course due to any valid reasons shall be assigned similar task by the HOD/Mentor as an alternative option.											

Semester – III											
S. No.	Course Type	Course Code	Course Name	Credit				Marks		Total	
				L	T	P	Total	ESE	IA	Max	Min
1	Core Course (CC)	MSCCS301	Mobile Application Development	3	1	-	4	75	25	100	40
2		MSCCS302	Cryptography and Network Security	3	1	-	4	75	25	100	40
3		MSCCS303	Lab-3: Mobile Application Development	-	-	2	2	75	25	100	40
4		MSCCS304	Minor Project	-	-	2	2	100	-	100	40
5	Elective-III (Choose any one)	MSCCS305	Internet of Things	3	1	-	4	75	25	100	40
		MSCCS306	Deep Learning	3	1	-	4	75	25	100	40
		MSCCS307	Cloud Computing	3	1	-	4	75	25	100	40

6	Skill Enhancement Course	MSCCS308	MOOC/Internship	Non Credit but mandatory course							
Total				9	3	4	16	400	100	500	200
Notes:											
1. Abbreviation: L-Lecture, P-Practical, T-Tutorial, ESE-End Semester Examination, IA-Internal Assessment.											
2. Student should register for any MOOC course as verified by the department.											
3. MOOC courses will be notified at the beginning of each semester and student has to opt from the list only.											
4. Student not able to enroll or complete MOOC course due to any valid reasons shall be assigned similar task by the HOD/Mentor as an alternative option.											

Semester – IV											
S. No.	Course Type	Course Code	Course Name	Credit				Marks		Total	
				L	T	P	Total	ESE	IA	Max	Min
1	Major Project (Choose Any One)	MSCCS401	Research Based Major Project	-	-	15	15	500	-	500	200
		MSCCS402	Software Development Based Major Project								
2	Skill Enhancement Course	MSCCS403	MOOC/Internship	Non Credit but mandatory course							
Total				-	-	15	15	500	-	500	200
Grand Total (Semester I, II, III and IV)				-	-	-	67	-	-	2000	-
Notes:											
1. Abbreviation: L-Lecture, P-Practical, T-Tutorial, ESE-End Semester Examination, IA-Internal Assessment.											
2. Student should register for any MOOC course as verified by the department.											
3. MOOC courses will be notified at the beginning of each semester and student has to opt from the list only.											
4. Student not able to enroll or complete MOOC course due to any valid reasons shall be assigned similar task by the HOD/Mentor as an alternative option.											

Part A: Introduction			
Program: Master Degree		Class: M.Sc. I Year	Semester: I
w.e.f. Academic Session: 2022-23			
1.	Course Code	MSCCS101	
2.	Course Title	Programming in Python	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	Basic knowledge of programming concepts	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Define the structure and components of a Python program. • Demonstrate proficiency in handling of loops and creation of functions. Identify the methods to create and manipulate lists, tuples and dictionaries. • Discover the commonly used operations involving regular expressions and file system. • Determine the need for scraping websites and working with CSV, JSON and other file formats. • Interpret the concepts of Object-Oriented Programming as used in Python. 	
6.	Credit Value	4	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Introduction to Python: installing Python; basic syntax, interactive shell, editing, saving, and running a script, The concept of data types; variables, assignments; immutable variables; numerical types, operators (Arithmetic operator, Relational Operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator) and expressions; comments in the program; understanding error messages.	12
II.	Creating Python Programs: Input and Output Statements, Control statements (Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass). Function: Defining a function, calling a function, Types of functions, Function Arguments, Anonymous functions, Global and local variables.	12
III.	Strings and text files: manipulating files and directories, os and sys modules; text files: reading/writing text and numbers from/to a file; creating and reading a formatted file (csv or tab-separated). String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Binary, octal, hexadecimal numbers.	12

IV.	Lists, tuples, and dictionaries; basic list operators, replacing, inserting, removing an element; searching and sorting lists; Accessing tuples, Operations, Working, Functions and Methods, dictionary literals, adding and removing keys, accessing and replacing values; traversing dictionaries.	12
V.	Python Libraries: Exploring python libraries like Panda, Numpy, TensorFlow, Scikit-Learn, Keras, PyTorch, SciPy etc., Modules: Importing module, Math module, Random module, Packages, Composition. Exception Handling: Exception, Exception Handling, Except clause, Try? Finally clause, User Defined Exceptions.	12
Keywords: List, Tuple, Dictionary, Panda, Numpy, TensorFlow, Scikit-Learn, Keras, PyTorch, SciPy.		

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/ REFERENCE BOOKS:



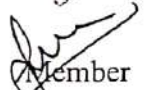



1. T. Budd, Exploring Python, TMH, 1st Ed, 2011.
2. Allen Downey, Jeffrey Elkner, Chris Meyers, How to think like a computer scientist: Learning with Python, 2012.
3. Mark Lutz, Learning Python.
4. Tony Gaddis, Starting Out With Python.
5. Kenneth A. Lambert, Fundamentals of Python.
6. James Payne, Beginning Python using Python 2.6 and Python 3.

E-RESOURCES:

1. <https://copyassignment.com/python/>
2. SWAYAM/NPTEL: <https://www.youtube.com/channel/UCxulcR5XRauYn37yg-Fh6rA>
3. SWAYAM/NPTEL: <https://www.youtube.com/channel/UCJAgw1niUkaShdmA5aAZdQw>
4. Introduction to Python Programming from Coursera: <https://www.coursera.org/learn/python-programming-intro>
5. Crash Course on Python from Coursera: <https://www.coursera.org/learn/python-crash-course>
6. Python for everybody: <https://www.coursera.org/specializations/python>
7. <https://www.youtube.com/watch?v=XGJpThSjEPw&list=PLkkt2qQlhbKYYX2Osb-vy5qB7N-SU7IRS>
8. Introduction: <https://www.w3schools.com/python/default.asp>
9. File Handling: https://www.w3schools.com/python/python_file_handling.asp
10. NumPy: <https://www.w3schools.com/python/numpy/default.asp>
11. Pandas: <https://www.w3schools.com/python/pandas/default.asp>
12. SciPy: <https://www.w3schools.com/python/scipy/index.php>
13. Django: <https://www.w3schools.com/django/index.php>
14. Matplotlib: https://www.w3schools.com/python/matplotlib_intro.asp
15. Machine Learning: https://www.w3schools.com/python/python_ml_getting_started.asp
16. Python MySQL: https://www.w3schools.com/python/python_mysql_getstarted.asp
17. Introduction to Scripting in Python Specialization:
<https://www.coursera.org/specializations/introduction-scripting-in-python>

18. Topics related to Python from Tutorials: https://www.javatpoint.com/python-tutorial http://docs.python.org/3/tutorial/index.html http://interactivepython.org/courselib/static/pythonds http://www.ibiblio.org/g2swap/byteofpython/read/	
Part D: Assessment and Evaluation	
Maximum Marks: 100 End Semester Examination(ESE): 75 Marks Internal Assessment(IA): 25 Marks	
Internal Assessment: (i) Unit test (15 Marks): There will be three tests of 15 marks, each out of which average mark of best two tests will be considered. (ii) Presentation/Assignment (10 Marks)	Total: 25 Marks

Members of BoS

- | | |
|--|--|
| 1. Dr. H.S. Hota
Prof. and Head, Department of Computer Science and Application
Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur (C.G.) | - Chairman
 |
| 2. Dr. Manish Shrivastava
Asst. Prof., Dept. of C.S.E., I.T.
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) | - Member
 |
| 3. Mr. Jeetendra Kumar
Asst. Prof., Dept. of Computer Science and Application
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| 4. Mrs. Shriya Sahu
Asst. Prof., Dept. of Computer Science and Application
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 |
| 5. Mr. H.S.P. Tonde
Asst. Prof. and Head, Dept. of Computer Science
Sant Gahira Guru University Sarguja, Ambikapur (C.G.) | - Member
(Online Present) |
| 6. Dr. Kajal Kiran Gulhare
Asst. Prof. and U. G. Head,
Govt. E.R.R. Science P.G. College, Bilaspur (C.G.) | - Member
 |
| 7. Dr. S. Pavani
Asst. Prof. and P.G. Head,
C.M. Dubey P.G. College, Bilaspur(C.G.) | - Member
 |

Date: 16.03.2022

Part A: Introduction			
Program: Master Degree	Class: M.Sc. I Year	Semester: I	w.e.f. Academic Session: 2022-23
1.	Course Code	MSCCS102	
2.	Course Title	Advanced Database Management System	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	Basic knowledge of database management system	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> Identify advance database concepts and database models. Understand various terms related to transaction management in centralized and distributed database. Understand data modeling and database development process for object –oriented DBMS. Analyze and Implement the concept of object- relational database in development of various real time software. Examine the issues related to multimedia and mobile database performance. 	
6.	Credit Value	4	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Basic Concepts:- Definition of database, Schema and instance, Database architecture, File system Vs Database system, Types of Database system, Database languages, Basic SQL query statement, Triggers and Assertion.	12
II.	Database File Organization- Introduction, Secondary storage devices, Buffering of blocks, Operation on files, Heap file, Sorted File, Hashing Techniques, RAID, B Tree, B+ Tree.	12
III.	Query processing and Optimization- Translation of SQL queries to relational algebra, merge sort algorithm for external sorting, Algorithm for select, Join, Project and set operation, Implementing aggregate function and Outer joins, Combining operation using pipelining, Heuristics in query optimization, Selectivity and cost estimates in query optimization.	12
IV.	Transaction- Introduction, Desirable properties of transaction, Recoverability, Serializability, Locking, Two Phase locking, Timestamp Ordering. Recovery- Concept, Recovery based on deferred update and immediate update, Shadow paging, ARIES recovery algorithm.	12
V.	Distributed Database- Concepts, Types of Distributed Database, Advantages of Distributed Database, Architecture of Distributed Database, Data fragmentation, Replication, and Allocation techniques in Distributed Database.	12

Keywords: Triggers, Assertion, B+ Tree, Shadow Paging, Serializability, Locking.

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/REFERENCE BOOKS:

1. R. Elmasri & S. Navathe, "Database Systems :Model, Language, Design and Application Programming", Pearson, 6th edition 2014,
2. Henry F. Korth & Abraham Silberschats, "Data Base Management System", TMH, 1991.
3. Date C.J., "An Introduction to Database Management System", Vol I &II, Addison Wesley, 1981, 1983
4. S. Ceri and G. Pelagati , "Distributed Database Principles and System" , TMH, 1984

E-RESOURCES:

1. <https://www.exploredatabase.com/p/blog-page.html>
2. <https://www.tutorialandexample.com/what-is-advanced-database-management-system>
3. <https://aries.ektf.hu/~hz/pdf-tamop/pdf-xx/Radvanyi-hdbms-eng2.pdf>

Part D: Assessment and Evaluation

Maximum Marks: 100

End Semester Examination(ESE): 75 Marks

Internal Assessment(IA): 25 Marks

Internal Assessment:

- (i) **Unit test (15 Marks):** There will be three tests of 15 marks, each out of which average mark of best two tests will be considered.
- (ii) **Presentation/Assignment (10 Marks)**

Total: 25 Marks

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- Chairman

- Member

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- Member



Date: 16.03.2022

Part A: Introduction			
Program: Master Degree		Class: M.Sc. I Year	Semester: I
w.e.f. Academic Session: 2022-23			
1.	Course Code	MSCCS103	
2.	Course Title	Artificial Intelligence & Machine Learning	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	A sound knowledge of basic mathematics concepts, statistics, linear algebra, programming languages, and data modeling	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand a wide variety of learning algorithms. • Understand how to evaluate models generated from data. • Apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models. • Apply ML algorithms in various domains. • Simulate real world problems using ML techniques. • Apply deep learning techniques for computer vision. 	
6.	Credit Value	4	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Introduction: Overview of Artificial Intelligence (AI), Foundations of A.I., History of AI, Areas and state of the art in A.I., Knowledge: Introduction, Knowledge Based system, Knowledge representation techniques.	12
II.	Searching Techniques: Problem solving as state space search, production system, control strategies and problem characteristics, Search techniques: Breadth First search, Depth-first search, Hill-climbing, Heuristics search, Best-First search, greedy method, A* algorithm.	12
III.	Machine Learning: What is Machine learning, Types of machine learning, Statistical learning: background and general methods, Bayesian network, decision trees, supervised learning: linear regression, artificial neural network, Back propagation network, support vector machine, radial basis function network, unsupervised learning: types of clustering, K-means clustering, hierarchical clustering, self organization map, reinforcement learning.	12
IV.	Machine Learning Model: Measuring classification accuracy, data preprocessing , feature selection and generation, dimensionality reduction: Principal component analysis (PCA), training, testing and validation data sets, ensemble methods: Bagging and boosting.	12

V.	Application of ML and Deep Learning: Applying ML to solve real world problems in various domains like financial forecasting, classification problems, clustering, Natural language processing (NLP), health care, image classification etc. Introduction to deep learning, Convolutional Neural Network (CNN), Long Short Term Memory (LSTM), solving computer vision and other problems through deep learning techniques.	12
Keywords: Searching Technique, Supervised Learning, Unsupervised Learning, Classification Technique, Natural Language Processing (NLP), Artificial Intelligence (AI), Machine Learning (ML), Deep Learning.		

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/ REFERENCE BOOKS:

1. Artificial Intelligence and machine learning, Vinod Chandra S.S., Anand Hareendrn S., PHI learning private Ltd.
2. Introduction to Artificial Intelligence and Expert Systems, Dan W. Patterson, PHI Publication.
3. Artificial Intelligence, Elaine Rich and Kevin Knight TMH publication.
4. Machine learning, Anuradha Srinivasaraghavan, Viney Joseph, Wiley publication, India , 2019 edition.
5. Introduction to Machine Learning with python A guide for data scientists, Andreas, C. Muller & Sarah Guido, O'Reilly.
6. Understanding machine learning: From theory to algorithms, shai shalev-shwartz, shai ben-david, Cambridge University press.
7. Machine learning with python, Abhishek Vijayvargia, BPB publication.
8. Machine learning using python, U Dinesh Kumar, Manaranjan Pradhan, Wiley publication.
9. Deep learning, Ian Goodfellow , Yoshua Bengio, Aoran Courville, Adaptive computation and machine learning series.
10. Machine learning, Tom M. Mitchell, McGraw Hill, Indian Edition.

E-RESOURCES:

1. Overview of Machine Learning:
https://www.youtube.com/watch?v=whSKA8aO6xQ&list=PLyqSpQzTE6M-SISTunGRBRiZk7opYBf_K&index=3
2. Introduction to Artificial Intelligence:
https://www.youtube.com/watch?v=pKeVMlkFpRc&list=PLwdnzlV3ogoXaceHrrFVZCJkbm_laSHcH&index=2
3. Problem Solving as State Space Search:
https://www.youtube.com/watch?v=fLw8SfvaJWA&list=PLwdnzlV3ogoXaceHrrFVZCJkbm_laSHcH&index=3
4. Uninformed Search:
https://www.youtube.com/watch?v=te1K8on1Pk0&list=PLwdnzlV3ogoXaceHrrFVZCJkbm_laSHcH&index=4
5. Heuristic Search:

https://www.youtube.com/watch?v=0awSpFyh2MY&list=PLwdnzlV3ogoXaceHrrFVZCJkbm_laSHcH&index=5

6. Informed Search:

https://www.youtube.com/watch?v=-Rf2hOyjZB8&list=PLwdnzlV3ogoXaceHrrFVZCJkbm_laSHcH&index=6

7. <http://www.jnit.org/wp-content/uploads/2020/04/Machine-Learning-Lab-Manual.pdf>

8. http://www.hpc.iitkgp.ac.in/pdfs/AI_IPC.pdf

9. <https://nthu-datalab.github.io/ml/>

10. [https://www.jnec.org/labmanuals/cse/te/sem1/Machine%20Learning%20LAB%20MANUAL%20\(1\).pdf](https://www.jnec.org/labmanuals/cse/te/sem1/Machine%20Learning%20LAB%20MANUAL%20(1).pdf)

11. <https://deepakdvallur.weebly.com/machine-learning-laboratory.html>

12. https://www.tensorflow.org/resources/learn-ml?gelid=CjwKCAjw_ISWBhBkEiwAdqxb9hljli5hnqF0Cq2Fgy_JEWiD_uZbxtetr_BFUF_QztAELkSd2q3P_BoCodMQAvD_BwE

13. <https://copyassignment.com/machine-learning-a-gentle-introduction/>

Part D: Assessment and Evaluation

Maximum Marks: 100

End Semester Examination(ESE): 75 Marks

Internal Assessment(IA): 25 Marks

Internal Assessment:

- (i) **Unit test (15 Marks):** There will be three tests of 15 marks, each out of which average mark of best two tests will be considered.
- (ii) **Presentation/Assignment (10 Marks)**

Total: 25 Marks

Members of BoS

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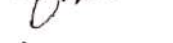
- Chairman



2. **Dr. Manish Shrivastava**

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- Member



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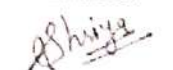
- Member



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- Member



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- Member
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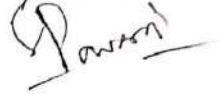
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7. **Dr. S. Pavani**
Asst. Prof. and P.G. Head,
C.M. Dubey P.G. College, Bilaspur(C.G.)

- Member



Date: 16.03.2022

Part A: Introduction			
Program: Master Degree		Class: M.Sc. I Year	Semester: I
w.e.f. Academic Session: 2022-23			
1.	Course Code	MSCCS104	
2.	Course Title	Lab-1: Programming in Python	
3.	Course Type	Practical	
4.	Pre-requisite (if any)	Theoretical knowledge of Python	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Learn the numbers, math functions, strings, list in Python. • Learn the tuples and dictionaries in Python. • Understand loops and functions. • Learn various methods to create and manipulate lists, tuples and dictionaries. • Learn decision making statements and functions. 	
6.	Credit Value	2	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Content of the Course	
Total Lectures: 30 /Total Hours: 60	
Tentative Practical List	<p>Note: This is tentative list; the teachers concern can add more program as per requirement.</p> <ol style="list-style-type: none"> 1. Python program to find the union of two lists. 2. Python program to find the intersection of two lists. 3. Using for loop, print a table of Celsius/Fahrenheit equivalences. Let c be the Celsius temperatures ranging from 0 to 100, for each value of c, print the corresponding Fahrenheit temperature. 4. Using while loop, produce a table of sines, cosines and tangents. Make a variable x in range from 0 to 10 in steps of 0.2. For each value of x, print the value of sin(x), cos(x) and tan(x). 5. Write a program that reads an integer value and prints —leap year! or —not a leap year!. 6. Write a program that takes a positive integer n and then produces n lines of output shown as follows. For example, enter a size: 5 * ** *** **** ***** 7. Write a function that takes an integer _n'as input and calculates the value of $1 + 1/1! + 1/2! + 1/3! + \dots + 1/n$ 8. Write a function that takes an integer input and calculates the factorial of that number. 9. Write a function that takes a string input and checks if it's a palindrome or not. 10. Write a list function to convert a string into a list, as in list ('_abc') gives [a, b, c]. 11. Write a program to generate Fibonacci series. 12. Write a program to check whether the input number is even or odd.

12. Write a program to check whether the input number is even or odd.
13. Write a program to compare three numbers and print the largest one.
14. Write a program to print factors of a given number.
15. Write a method to calculate GCD of two numbers.
16. Write a program to create Stack Class and implement all its methods. (Use Lists).
17. Write a program to create Queue Class and implement all its methods. (Use Lists)
18. Write a program to implement linear and binary search on lists.
19. Write a program to sort a list using insertion sort and bubble sort.
20. Python program to remove the "i" th occurrence of the given word in a list where words repeat.
21. Python program to count the occurrences of each word in a given string sentence.
22. Python program to check if a substring is present in a given string.
23. Python program to map two lists into a dictionary.
24. Python program to count the frequency of words appearing in a string using a dictionary.
25. Python program to create a dictionary with key as first character and value as words starting with that character.
26. Python program to find the length of a list using recursion.
27. Python program to read a file and capitalize the first letter of every word in the file.
28. Python program to read the contents of a file in reverse order.
29. Python program to create a class in which one method accepts a string from the user and another prints it.
30. Study and Implementation of Database, Structured Query Language and database connectivity.

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/ REFERENCE BOOKS:


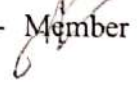



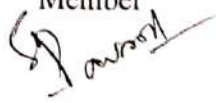
1. T. Budd, Exploring Python, TMH, 1st Ed, 2011.
2. Allen Downey, Jeffrey Elkner, Chris Meyers, How to think like a computer scientist: Learning with Python, 2012.
3. Mark Lutz, Learning Python.
4. Tony Gaddis, Starting Out With Python.
5. Kenneth A. Lambert, Fundamentals of Python.
6. James Payne, Beginning Python using Python 2.6 and Python 3.

E-RESOURCES:

1. <https://siiet.ac.in/wp-content/uploads/2020/02/PP-LAB-MANUAL-IV-CSE-I-SEM.pdf>
2. <https://www.jnec.org/labmanuals/cse/se/sem1/Python%20SY%20BTech%20Lab%20Manual.pdf>
3. [https://mrct.com/pdf/Lab%20Manuals/CSE/\(R18A0588\)%20Python%20Programming%20%20Lab%20Manual.pdf](https://mrct.com/pdf/Lab%20Manuals/CSE/(R18A0588)%20Python%20Programming%20%20Lab%20Manual.pdf)
4. <https://www.cdlsiet.ac.in/wp-content/uploads/2022/03/PYTHON-Lab-Manual.pdf>
5. <https://kgr.ac.in/storage/2021/08/PYTHON-LAB-MANUAL.pdf>
6. http://iotmumbai.bharatividyapeeth.edu/media/pdf/lab_manuals/Manual_CM6I_PWP_22616_12_0421.pdf

<p>7. http://www.jnit.org/wp-content/uploads/2020/04/Python-Lab-Manual-converted.pdf</p> <p>8. https://www.mrecaacademics.com/DepartmentStudyMaterials/20201223-python%20programming%20lab%20manual.pdf</p> <p>9. https://www.lendi.org/CSE/labmanuals/PP.pdf</p> <p>10. https://www.jnec.org/labmanuals/cse/te/sem1/Machine%20Learning%20LAB%20MANUAL%20(1).pdf</p>	
Part D: Assessment and Evaluation	
<p>Maximum Marks: 100</p> <p>End Semester Examination(ESE): 75 Marks</p> <p>Internal Assessment(IA): 25 Marks</p>	
<p>Internal Assessment:</p> <p>(i) Unit test (15 Marks): There will be three tests of 15 marks, each out of which average mark of best two tests will be considered.</p> <p>(ii) Presentation/Assignment (10 Marks)</p>	Total: 25 Marks

Members of BoS

- | | |
|---|--|
| <p>1. Dr. H.S. Hota
Prof. and Head, Department of Computer Science and Application
Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur (C.G.)</p> | <p>- Chairman</p>  |
| <p>2. Dr. Manish Shrivastava
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(Online Present)</p> |
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| <p>7. Dr. S. Pavani
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Date: 16.03.2022

Part A: Introduction			
Program: Master Degree	Class: M.Sc. I Year	Semester: I	w.e.f. Academic Session: 2022-23
1. Course Code	MSCCS105		
2. Course Title	Data Mining & Data warehousing		
3. Course Type	Theory		
4. Pre-requisite (if any)	Basic knowledge of statistics, mathematics and RDBMS		
5. Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand techniques to store voluminous data for online processing. • Understand methods to preprocess the data for mining applications. • Understand association rules for mining the data. • Learn how to deploy appropriate classification techniques. • Learn techniques to cluster the high dimensional data for better organization of the data. • Evaluate various mining techniques on complex data objects. 		
6. Credit Value	4		
7. Total Marks	Max. Marks: 100	Min. Marks: 40	

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Introduction: What is data mining?, Why it is important?, Mining on what kind of data, Data mining Functionalities, steps of data mining, Knowledge discovery.	12
II.	Data Warehouse: Meaning, definition, OLTP vs. OLAP, Data warehouse architecture, Three Tier Architecture Data warehouse architecture, Data cube and OLAP technology.	12
III.	Association Rule: Basic concept, Frequent item set mining: Apriori algorithm etc., Mining various kind of association rules: Mining Multilevel association rules, Mining multidimensional association rules.	12
IV.	Classification and Prediction: What is classification and prediction, Decision tree algorithms: CART, ID3 C4.5, CHAID, Bayesian classification, Rule based classification, Classification by backpropagation, Support vector machine, Association classification and other classification methods. Prediction using Regression and Neural Network methods, Accuracy measures, Ensemble methods.	12
V.	Cluster Analysis: What is cluster analysis?, Partitioning method, Hierarchical methods, Experiments with python data mining tools for model development, data preprocessing, feature selection for Financial data, health care data etc.	12
Keywords: knowledge discovery, OLTP, OLAP, Data cube, CART, CHAID, Regression.		

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/REFERENCE BOOKS:

1. Data Mining: Concepts and Techniques, Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishes (Elsevier, 2nd edition), 2006.
2. Data Mining Methods for Knowledge Discovery, Cios, Pedrycz, Swiniarski, Kluwer Academic Publishers, London – 1998.
3. Data mining techniques, Arun K Pujari, Universities Press (India) private limited, 2007.
4. Data Mining, Data Warehousing and OLAP, Gajendra Sharma, S.K. Kateria and Sons, 2010.

E-RESOURCES:

1. <https://docs.oracle.com/database/121/DWHSG/concept.htm#DWHSG-GUID-452FBA23-6976-4590-AA41-1369647AD14D>
2. <https://www.tutorialspoint.com/dwh/index.htm#:~:text=A%20data%20warehouse%20is%20constructed,necessary%20concepts%20of%20data%20warehousing.>
3. <https://intellipaat.com/blog/tutorial/data-warehouse-tutorial/>
4. <https://www.guru99.com/data-warehousing-tutorial.html>
5. <https://www.javatpoint.com/data-warehouse>
6. <https://www.softwaretestinghelp.com/data-warehousing-fundamentals/>
7. https://www.tutorialspoint.com/data_mining/index.htm
8. <https://www.javatpoint.com/data-mining>
9. <https://www.guru99.com/data-mining-tutorial.html>
10. <https://www.mygreatlearning.com/blog/data-mining-tutorial/>
11. <https://www.tutorialride.com/data-mining/data-mining-tutorial.htm>
12. <https://data-flair.training/blogs/data-mining-tutorial/>
13. <https://www.geeksforgeeks.org/data-mining/>
14. <https://siiet.ac.in/wp-content/uploads/2020/02/DM-LAB-MANUAL-IV-CSE-I-SEM.pdf>
15. <https://mrcet.com/pdf/Lab%20Manuals/CSE%20IV-I%20SEM.pdf>
16. <https://mrcet.com/pdf/Lab%20Manuals/IT%20III%20B.TECH%20%20SEM-II%20DWD-M-R17A0590%20LAB%20MANUAL%202019-20.pdf>
17. https://www.iare.ac.in/sites/default/files/lab1/IARE_DWDM_AND_WT_LAB_MANUAL.pdf
18. <http://www.apgcm.edu.in/images/data-mining-lab-manual.pdf>
19. <https://www.jnec.org/labmanuals/cse/be/sem1/DWDM-BE-PART-I.pdf>
20. <https://www.jnec.org/labmanuals/it/be/sem1/DWDM-lab.pdf>
21. <https://www.bharathuniv.ac.in/downloads/csc/BCS6L1-DWDM%20lab.pdf>
22. <http://www.nrcmec.org/pdf/Manuals/CSE/student/4-1%20dwdm16-17.pdf>

Part D: Assessment and Evaluation

Maximum Marks: 100

End Semester Examination(ESE): 75 Marks






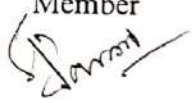
Internal Assessment(IA): 25 Marks

Internal Assessment:

- (i) **Unit test (15 Marks):** There will be three tests of 15 marks, each out of which average mark of best two tests will be considered.
- (ii) **Presentation/Assignment (10 Marks)**

Total: 25 Marks

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- Member


Date: 16.03.2022

Part A: Introduction			
Program: Master Degree	Class: M.Sc. I Year	Semester: I	w.e.f. Academic Session: 2022-23
1.	Course Code	MSCCS106	
2.	Course Title	Soft Computing	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	Proficiency with algorithms and programming skills in python, MATLAB etc.	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Learn the applications which can use fuzzy logic. • Understand practical applications of Neural Networks (NN). • Understand the efficiency of a hybrid system and how Neural Network and fuzzy logic can be hybridized to form a Neuro-fuzzy network and also its various applications • Learn the importance of optimizations and its use in computer engineering fields and other domains. • Understand the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience. 	
6.	Credit Value	4	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Introduction: What is soft computing? Different tools of soft computing and its comparison, Area of application.	12
II.	Artificial Neural Network (ANN): Architecture, Introduction, Evolution of Neural Network, Biological Neural Network vs ANN, Basic Model of ANN, Different types of ANN, Single layer Perceptron, Solving XOR problem, Activation function, Linear separability, Supervised and unsupervised learning, perceptron learning, delta learning, Feed-forward and Feedback networks, Error Back Propagation Network (EBPN), Associative memories and its types, Hopfield Network, Kohenenself-organizing Map.	12
III.	Fuzzy Logic: Introduction to Classical Sets and Fuzzy Sets, Membership Function, properties and operations of classical set and Fuzzy set, α -cuts, Properties of α -cuts, Linguistic Variables, Membership function, Classical relation and Fuzzy Relation and its properties and operations, Defuzzification and its methods, Fuzzy rule base.	12
IV.	Genetic Algorithm: What is Optimization?, Introduction, Application, GA operators: selection, crossover and mutation ,different techniques of selection, crossover and mutation, different types of chromosomes, Application of GA.	12

V.	Hybrid Soft Computing: Design of Neuro-Fuzzy model like ANFIS, Neuro-Genetic, Fuzzy-Genetic Neuro-Fuzzy-Genetic model, MATLAB environment for soft computing.	12
Keywords: Soft computing, Artificial Neural Network (ANN), Fuzzy Logic, Genetic Algorithm.		

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/REFERENCE BOOKS:

1. Principles of soft computing , S.N. Shivanandan and S.N Deepa , Wiley publication, Wiley India Edition.
2. Neural network and Learning Machines, Simon Haykin, Pearson Education, 2011.
3. Artificial Neural Networks, Robert J. Scholkoff, McGraw Hill Education(India) Pvt. Limited,1997.
4. Neural Networks and Fuzzy Systems, A dynamical Systems Approach to Machine Learning, Bart Kosko, PHI learning private limited.
5. Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications, S. Rakasekaran, G.A. VijayalakshmiPai, PHI learning private limited, 14th Edition. 2003.
6. Neural Networks and Fuzzy Logic, K. Vinoth Kumar, R. Saravana Kumar, S. K. Katarraia and Sons publication.
7. Artificial Neural Networks, B.Yegnanarayana Prentice Halll of India (P) Limited.
8. Introduction to Artificial Neural Systems, Jacek M. Zurada, Jaico Publication House.
9. Fuzzy Sets, Uncertainty and Information, G. J. Klir and T.A. Folger, PHI learning private limited. Publisher– Pearson 3Edition 1999.

E-RESOURCES:

1. Swayam/NPTEL: https://onlinecourses.nptel.ac.in/noc20_cs17/preview
2. <https://www.javatpoint.com/what-is-soft-computing>
3. <https://www.geeksforgeeks.org/need-for-soft-computing/>
4. https://www.tutorialspoint.com/fuzzy_logic/index.htm
5. <https://www.slideshare.net/ganeshpaul6/soft-computing-14879490>
6. https://www.iare.ac.in/sites/default/files/lab1/IARE_SOFT_COMPUTING_LAB_MANUAL.pdf
7. <https://coeosmanabad.ac.in/wp-content/uploads/2020/03/SC-LAB-MANUAL-2017-18.pdf>
8. http://ggn.dronacharya.info/Mtech_CSE/Downloads/Labmanuals/Mtech/Lab_Manual_Soft_Computing%20_MTCE-612-A.pdf
9. <https://www.slideshare.net/vivekkumarsinha35/cse-7-softcomputing-lab>
10. https://annamalaiuniversity.ac.in/studport/download/CSE_Engg/Lab_Manual/08CP706_Soft_Computing_Techniques_Lab.pdf
11. <https://mu.ac.in/wp-content/uploads/2021/07/M.Sc.IT-Part-I-Semester-I-Soft-Computing-I-2.pdf>
12. <http://vlabs.iitkgp.ernet.in/scte/index.html>
13. <http://vlabs.iitkgp.ac.in/vlt/project.html#>

Part D: Assessment and Evaluation

Maximum Marks: 100

End Semester Examination(ESE): 75 Marks

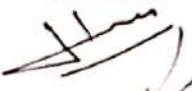
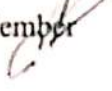




Internal Assessment(IA): 25 Marks

Internal Assessment:

- (i) **Unit test (15 Marks):** There will be three tests of 15 marks, each out of which average mark of best two tests will be considered.
- (ii) **Presentation/Assignment (10 Marks)**

Total: 25 Marks

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C.M. Dubey P.G. College, Bilaspur(C.G.)
- Member


Date: 16.03.2022

Part A: Introduction			
Program: Master Degree	Class: M.Sc. I Year	Semester: I	w.e.f. Academic Session: 2022-23
1. Course Code	MSCCS107		
2. Course Title	Theory of Computation		
3. Course Type	Theory		
4. Pre-requisite (if any)	Basic knowledge of data structure and algorithms		
5. Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand the mathematical foundations of computation including automata theory • Construct the abstract machines including finite automata, pushdown automata, and Turing machines from their associated languages and grammar • Understand use of pumping lemma to show that a language is not regular / not context-free • Construct the grammar for any given finite automata, pushdown automata or Turing machines • Understand the characteristics of P, NP and NP Complete problems. 		
6. Credit Value	4		
7. Total Marks	Max. Marks: 100	Min. Marks: 40	

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Introduction and overview: Sets, Relations and Functions, Fundamental Proof Techniques, Introduction of alphabets, Strings and Languages; Automata, Finite automata (FA), Transition System & Function and their properties; Deterministic Finite Automata (DFA) -Formal definition, simplified notations (state transition diagram, transition table), Non-deterministic Finite Automata (NFA -Formal Definition, Acceptability of a String by a DFA & NFA.), Minimizing number of state of a DFA, Finite Automata with output (Moore and Mealy Machine, Procedure for Transforming a Mealy Machine into a Moore Machine and vice versa.	12
II.	FORMAL LANGUAGES: Definition of a Grammar, Derivations and the Language Generated by a Grammar, Chomsky Classification of Languages, Languages and Their Relation, Recursive and Recursively Enumerable Sets, Operations on Languages, Languages and Automata.	12
III.	Regular expressions (RE): Definition, FA and RE, Transition System Containing A-moves, NFAs with A-moves and Regular Expressions, NFA to DFA conversion, Algebraic Method Using Arden's Theorem, Construction of Finite Automata Equivalent to a Regular Expression and vice versa, Equivalence of two FA, Equivalence of two RE, Pumping Lemma for Regular Sets, Application of Pumping Lemma, Closure Properties of Regular Sets, Regular Sets and Regular Grammars, Closure Properties of Regular languages, emptiness, finiteness,	12

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IV.	Context-free Grammars (CFGs): Formal definition, sentential forms, leftmost and rightmost derivations, The language of CFG, Derivation tree, Ambiguity in grammars and Languages, Ambiguity in CFG, Simplification of CFG, Normal Forms for CFG (Chomsky Normal Form, Greibach Normal Form), Pumping Lemma for Context-free Languages, Closure Properties of CFG's.	12
V.	Pushdown Automata (PDA): Formal definition, acceptance by PDA, PDAs and CFGs, CFG to PDA, PDA to CFG, DPDAs -Definition, DPDAs and Regular Languages, DPDAs, and CFLs, Languages of DPDAs, DPDAs. Context Sensitive Grammar, Linear Bounded Automata, Turing Machines -Formal definition and behaviour, Transition diagrams, acceptance by TM, Multi tape Turing Machine, Universal Turing Machine, Halting Problem of Turing Machine.	12
Keywords: Automata, NFA, DFA, Context free grammar, Context Sensitive Grammar, Turing machine.		

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/REFERENCE BOOKS:

1. "Elements of the Theory of Computation", H.R. Lewis & C.H. Papadimitriou, P.H.I.
2. "Introduction to Automata Theory, Language and Computation" J.E. Hopcroft, R. Motwani J.D. Ullman, Pearson Education.
3. "Theory of Computer Science (Automata, Languages and Computation)", K.L.P. Mishra, N. Chandrasekaran, PHI.
4. "Introduction to languages and Theory of Computation", John Martin, McGraw Hill.
5. "Introduction to Computer Theory", D.A. Cohen (J. Wiley).

E-RESOURCES:

1. <https://www.gatevidyalay.com/tag/theory-of-computation-tutorial/>
2. https://www.tutorialspoint.com/automata_theory/index.htm
3. <https://www.javatpoint.com/automata-tutorial>
4. <https://www.geeksforgeeks.org/theory-of-computation-automata-tutorials/>
5. https://www.vssut.ac.in/lecture_notes/lecture1428551440.pdf
6. [https://miet.ac.in/assets/uploads/cs/instruction_materials/TAFL%20\(RCS%20453\).pdf](https://miet.ac.in/assets/uploads/cs/instruction_materials/TAFL%20(RCS%20453).pdf)
7. <https://btechgeeks.com/theory-of-computation-lab-manual-notes/>
8. <https://pdfdrive.com/download/4660813-introduction-to-theory-of-computation-lab-manual>
9. <https://www.jnec.org/labmanuals/cse/be/sem1/PCD-BE-PART-I.pdf>
10. <https://www.goeduhub.com/2909/rgpv-b-tech-cse-v-sem-theory-of-computation-lab>

Part D: Assessment and Evaluation

Maximum Marks: 100







End Semester Examination(ESE): 75 Marks

Internal Assessment(IA): 25 Marks



Internal Assessment: (i) Unit test (15 Marks): There will be three tests of 15 marks, each out of which average mark of best two tests will be considered. (ii) Presentation/Assignment (10 Marks)	Total: 25 Marks
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- Member


Date: 16.03.2022

Part A: Introduction

Program: Master Degree		Class: M.Sc. (CS) I Year	Semester: I	w.e.f. Academic Session: 2022-23
1.	Course Code	MSCCS108		
2.	Course Title	MOOC/ Workshop/Conference etc.		
3.	Course Type	Practical		
4.	Pre-requisite (if any)	Not required		
5.	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Join and explore MOOC courses from reputed platforms. • Enhance knowledge on latest techniques. • Make ready for IT industry. • Up skill knowledge. • Present paper in conference. • Enhance knowledge through the workshop. 		
6.	Credit Value	2		
7.	Total Marks	Max. Marks: 50	Min. Marks: 20	

Part B: Important Guidelines

Total Hours: 60

1. Student has to complete at least one MOOC course or can participant in Conference or Workshop.
2. Student should register for any MOOC course from SWAYAM/NPTEL/Coursera/Edx etc. or as notified by the department from time to time under the guidance of mentor and certificate of completion must be submitted in the department.
3. MOOC courses will be notified at the beginning of each semester and student has to opt from the list only.
4. Student not able to enroll or complete MOOC course due to any valid reasons shall be assigned similar task by the HOD/Mentor as an alternative option.
5. At the end of the semester student has to present his/her work in front of internal/Mentor.
6. Student can join workshop or can present research paper in national or international level conference.
7. Student has to take prior approval of MOOC.

Part C - Learning Resources

Text Books, Reference Books and E-Resources

NA

Part D: Assessment and Evaluation

Maximum Marks: 50

Internal Assessment (IA): 50 Marks

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- Member


- Member


- Member


- Member
(Online Present)

- Member


- Member


Date: 16.03.2022

Part A: Introduction			
Program: Master Degree	Class: M.Se. 1 Year	Semester: II	w.e.f. Academic Session: 2022-23
1. Course Code	MSCCS201		
2. Course Title	Compiler Design		
3. Course Type	Theory		
4. Pre-requisite (if any)	A sound knowledge of Theory of Computation		
5. Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand the lexical, syntactic and semantic phases of a compiler. • Understand working of scanner, parser, and semantic analyser • Understand the techniques for intermediate code and machine code optimization. • Understand the structures and support, required for compiling advanced language features. 		
6. Credit Value	4		
7. Total Marks	Max. Marks: 100	Min. Marks: 40	

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Introduction: Introduction to Compiler, Analysis of the source program, phases of compiler, cousins of compiler, grouping of phases, compiler construction tools. Lexical Analysis: Role of Lexical Analyzer, Specification of tokens, Recognition of tokens, Regular expression, Finite automata, from regular expression to finite automata transition diagrams, Lex.	12
II.	Syntax Analysis And Parsing Techniques: Context free grammars, Bottom-up parsing and top down parsing. Top down Parsing : elimination of left recursion, recursive descent parsing, Predictive Parsing, Bottom Up Parsing: Operator precedence parsing, LR parsers, Construction of SLR, canonical LR and LALR parsing tables, Construction of SLR parse tables for Ambiguous grammar, the parser generator – YACC.	12
III.	Syntax Directed Translation & Intermediate Code Generation: Synthesized and inherited attributes, dependency graph, Construction of syntax trees, bottom up and top down evaluation of attributes, S-attributed and L-attributed definitions, Postfix notation; Three address codes, quadruples, triples and indirect triples, Translation of assignment statements, control flow, Boolean expression and Procedure Calls.	12
IV.	Runtime Environment: Storage organization, activation trees, activation records, allocation strategies, Parameter passing symbol table, dynamic storage allocation.	12
V.	Code Optimization & Code Generation: Basic blocks and flow graphs, Optimization of basic blocks, Loop optimization, Global data flow analysis, Loop invariant computations. Issue in the design of Code generator, register allocation, the target machine, and simple Code generator.	12



V.	Code Optimization & Code Generation: Basic blocks and flow graphs, Optimization of basic blocks, Loop optimization, Global data flow analysis, Loop invariant computations. Issue in the design of Code generator, register allocation, the target machine, and simple Code generator.	12
Keywords: Lexical Analysis, LR parser, SLR parser, YACC, Dependency graph, Code optimization.		

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/ REFERENCE BOOKS:

1. Compilers-Principles, Techniques and Tools, Alfred V. Aho, Ravi Sethi and Ullman J.D., Addison Wesley, 2nd Ed.
2. Principle of Compiler Design, Alfred V. Aho, and J.D. Ullman, Narosa Publication.
3. Compiler design in C, A.C. Holub, PHI.
4. Compiler construction (Theory and Practice), A.Barret William and R.M. Bates, Galgotia Publication.
5. Compiler Design, Kakde.
6. Compiler Construction – Principles and Practice, Kenneth C. Louden Cengage Learning Indian Edition, 2006.
7. Tremblay and Sorenson, The Theory and Practice of Compiler Writing, Tata McGraw Hill & Company, 1984.

E-RESOURCES:

1. <https://www.geeksforgeeks.org/compiler-design-tutorials/>
2. <https://www.javatpoint.com/compiler-tutorial>
3. <https://www.javatpoint.com/compiler-tutorial>
4. <https://tutorialspoint.dev/computer-science/compiler-design>
5. https://www.tutorialspoint.com/compiler_design/index.htm
6. <https://mrcet.com/pdf/Lab%20Manuals/CSE/COMPILER%20DESIGN%20LAB.pdf>
7. <https://www.iare.ac.in/sites/default/files/lab2/CD%20Lab%20Manual.pdf>
8. <https://kgr.ac.in/storage/2021/08/CD-Lab-Manual.pdf>
9. https://gcekbpatna.ac.in/assets/documents/lecturenotes/compiler_design_Lab_manual.pdf
10. <http://vvitengineering.com/lab/CS6612-COMPILER-LABORATORY.pdf>
11. <http://www.nrcmec.org/pdf/Manuals/CSE/student/3-1%20cd%2016-17.pdf>

Part D: Assessment and Evaluation

Maximum Marks: 100
 End Semester Examination(ESE): 75 Marks
 Internal Assessment(IA): 25 Marks





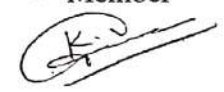
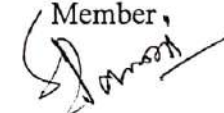
Internal Assessment:

- (i) **Unit test (15 Marks):** There will be three tests of 15 marks, each out of which average mark of best two tests will be considered.
- (ii) **Presentation/Assignment (10 Marks)**

Total: 25 Marks



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Date: 16.03.2022

Part A: Introduction			
Program: Master Degree	Class: M.Sc. I Year	Semester: II	w.e.f. Academic Session: 2022-23
1. Course Code	MSCCS202		
2. Course Title	Big Data Analytics		
3. Course Type	Theory		
4. Pre-requisite (if any)	A sound knowledge of Database Management System		
5. Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand fundamentals of Big Data analytics. Investigate Hadoop framework and Hadoop Distributed File system. • Demonstrate the Map Reduce programming model to process the big data along with Hadoop tools. • Analyze web contents and Social Networks to provide analytics with relevant visualization tools. • Interpret business models and scientific computing paradigms, and apply software tools for big data analytics. 		
6. Credit Value	4		
7. Total Marks	Max. Marks: 100	Min. Marks: 40	

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Introduction to Big Data: Big Data and its importance, Characteristics of Big Data, What Comes Under Big Data, Who's Generating Big Data, Challenges in Handling Big Data, How Big Data Impact on IT, Big Data Analytics, Big data applications, Future of Big Data, Risks of Big Data.	12
II.	Introduction to Hadoop: Introduction to Hadoop, Hadoop Architecture, Design Principles of Hadoop, Advantages of Hadoop, Hadoop Storage: Hadoop Distributed File System (HDFS), Properties of HDFS, Name Node, Secondary Name Node, Data Node, Goals of HDFS, Hadoop vs. Other Systems.	12
III.	Hadoop Mapreduce: Hadoop Map Reduce, Map Reduce paradigm, Resource manager, Node manager, Partitioner, combiner.	12
IV.	YARN: Introduction to YARN, YARN Framework, Classic Map Reduce Vs YARN, Schedulers: FIFO, Fair, Capacity.	12
V.	Hadoop Ecosystem: Spark, Hive, HBase, Pig, Sqoop, Oozie.	12
Keywords: Big Data, Hadoop, Mapreduce, YARN, Spark, Hive, Hbase, Pig, Sqoop, Oozie.		

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/ REFERENCE BOOKS:

1. "Professional Hadoop Solutions", Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, Wiley, 2015.
2. "Understanding Big data", Chris Eaton, Dirk deroos et al., McGraw Hill, 2012.
3. "HADOOP: The definitive Guide" , Tom White, O Reilly 2012.
4. "Big Data Analytics with R and Haoop", VigneshPrajapati, Packet Publishing 2013.
5. "Oracle Big Data Handbook", Tom Plunkett, Brian Macdonald et al , Oracle Press, 2014.
6. "Big Data and Business analytics", JyLiebowitz, CRC press, 2013.

E-RESOURCES:

1. Swayam/NPTEL: https://onlinecourses.nptel.ac.in/noc20_cs92/preview
2. Swayam/NPTEL: https://onlinecourses.swayam2.ac.in/arp19_ap60/preview
3. Coursera: <https://www.coursera.org/search?query=big%20data%20analytics>
4. <https://www.edureka.co/blog/big-data-tutorial>
5. <https://www.guru99.com/bigdata-tutorials.html>
6. <https://www.softwaretestinghelp.com/big-data-tutorial/>
7. <https://www.javatpoint.com/what-is-big-data>
8. <https://data-flair.training/blogs/big-data-tutorials-home/>
9. <https://www.simplilearn.com/tutorials/big-data-tutorial>
10. https://www.tutorialspoint.com/big_data_tutorials.htm
11. <http://deccancollege.ac.in/MCALABMANUALS/BIGDATALABMANUAL.pdf>
12. https://www.iare.ac.in/sites/default/files/lab1/IARE_BIGDATA_LAB_MANUAL.pdf
13. <https://www.studocu.com/in/document/gujarat-technological-university/big-data-analytics/big-data-analytics-2180710-lab-manual/18844373>
14. <https://usermanual.wiki/Document/CP5261202020DATA20ANALYTICS20LABORATORY20MANUAL20ME20CSE.1885205982/help>
15. https://sites.google.com/site/vsat2k/beit_bda

Part D: Assessment and Evaluation

Maximum Marks: 100

End Semester Examination(ESE): 75 Marks

Internal Assessment(IA): 25 Marks

Internal Assessment:

- (i) **Unit test (15 Marks):** There will be three tests of 15 marks, each out of which average mark of best two tests will be considered.
- (ii) **Presentation/Assignment (10 Marks)**

Total: 25 Marks

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- Member


- Member


- Member


- Member
(Online Present)

- Member


- Member


Date: 16.03.2022

Part A: Introduction			
Program: Master Degree		Class: M.Sc. I Year	Semester: II
w.e.f. Academic Session: 2022-23			
1.	Course Code	MSCCS203	
2.	Course Title	Advanced Java	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	A sound knowledge of core java and DBMS	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Design console based, GUI based and web based applications. • Understand an integrated development environment to create, debug and enterprise-level applications. • Develop distributed applications using RMI. • Develop Java software using JavaBeans. • Develop server side programs in the form of servlets. • Develop Swing-based GUI. 	
6.	Credit Value	4	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Core Java: History and Evolution of JAVA, Overview of JAVA, Java Magic, JDK and JRE, Java SE and EE, Different IDE for writing JAVA program like Eclipse, NetBeans etc. Primitive Data Types, Variables, Array, operators, control statement, classes and objects, Abstract Classes, Polymorphism, Inheritance, Method Overriding, Method Overloading, Constructors, Keyword super, this, final, static, Packages and Interfaces, Multi threading and Exception Handling.	12
II.	JAVA Applet and Packages: Applet class, Event Handling, AWT, Exploring JAVA Packages: java.lang, java.util, java.io.	12
III.	Network-Socket Programming and JDBC: Introduction to Collections, Java Serialization, Network Programming, Socket Programming, Socket for client and server, Processing E-Mails with Java: Protocols and Servers, Creating Mailer, Writing the Mail Sender. Database Using JDBC: Concept, JDBC Driver Types, JDBC package, Establishing a database connection and executing SQL statements, Introduction to Swing, Introduction to Remote Method Invocation (RMI).	12
IV.	Java Server Page (JSP): Basics of Servlet, writing simple program in servlet, Introduction to Java Server Page (JSP), Embedding Java Code into HTML, Implicit JSP Objects, Overview of the JSP Tags, Directives, Declarations, Expressions, Deploying Servlet and JSP, JSTL.	12



V.	JAVA, XML and Advance API: Java and XML, XML syntax, Document type definition, Parsers, Simple API for XML (SAX), JAVA API for XML Processing (JAXP), Introduction, Types and Benefits of EJB, EJB Containers, Deploying EJB, Introduction to the Java Persistence API, Overview of Spring, Model View Controller (MVC).Introduction to Struts, JavaFX and Hibernate.	12
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Keywords: Java development Kit (JDK), Java Runtime Environment (JRE), Remote Method Invocation (RMI), Java Database Connectivity (JDBC), Java Server Page (JSP).

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT /REFERENCE BOOKS:

1. The Complete Reference JAVA, Herbert Schildt, Tata McGraw Hill publication, 5th Edition.
2. Advance JAVA, Gajendra Gupta, Firewall Media, 1st Edition, 2006.
3. JAVA network programming, Elliotte Rusty Harold, O'Reilly Publication, 3rd Edition.
4. Core Java for Beginners, Rashmi Kanta Das, Vikas Publishing House Pvt. Ltd.
5. JAVA in a Nutshell, David Flanagan, O'Reilly Publication, 5th Edition.
6. Learning JAVA, Patrik Niemeyer and Jonathan Knudsen, O'Reilly Publication, 3rd edition.
7. Java Servlet and JSP Cookbook, Bruce W. Perry, O'Reilly Publication, 1st Edition.
8. Enterprise JAVA beans 3.1, Andrew Lee Rubinger and Bill Burke, O'Reilly Publication, 6th Edition.
9. The Struts Frameworks: Practical guide for Java Programmers, Sue Spielman, Murgan Kaufmann publisher.
10. Programming Jakarta Struts, Chuck Cavaness, O'Reilly Publication, 1st Edition.
11. Spring and Hibernate, K.Santosh Kumar, McGraw Hill Education (India) Pvt. Limited, 2nd edition.
12. Introduction to Programming with JAVA – A Problem Solving Approach , John Dean, Raymond Dean, Tata Mc Graw Hill.
13. Java2, Swing, Servlets, JDBC and JAVA Beans Programming Black Book Steven Holzner, Dreamtech press.
14. Core and Advanced JAVA (Black Book), Dreamtech Press.
15. JAVA and XML: Solutions to real world problem, Justin Edelson, Brett McLaughlin, O'Reilly Publication, 6th Edition.







E-RESOURCES:

1. <https://www.edureka.co/blog/advanced-java-tutorial>
2. <https://www.javatpoint.com/what-is-advance-java>
3. <https://www.w3schools.in/java>
4. <https://www.tutorialspoint.com/java/index.htm>
5. <https://www.jigsawacademy.com/blogs/tutorial/advanced-java>
6. <https://enos.itcollege.ee/~jpoial/allalaadimised/reading/Advanced-java.pdf>

Part D: Assessment and Evaluation

Maximum Marks: 100 End Semester Examination(ESE): 75 Marks Internal Assessment(IA): 25 Marks	
Internal Assessment: (i) Unit test (15 Marks): There will be three tests of 15 marks, each out of which average mark of best two tests will be considered. (ii) Presentation/Assignment (10 Marks)	Total: 25 Marks

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Date: 16.03.2022

Part A: Introduction			
Program: Master Degree		Class: M.Sc. I Year	Semester: II w.e.f. Academic Session: 2022-23
1.	Course Code	MSCCS204	
2.	Course Title	Lab-2: Advanced Java	
3.	Course Type	Practical	
4.	Pre-requisite (if any)	Theoretical knowledge of advance java	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling. • Design and develop Web applications. • Design Enterprise based applications by encapsulating an application's business logic. • Design applications using pre-built frameworks. 	
6.	Credit Value	2	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Content of the Course	
Total Lectures: 30 /Total Hours: 60	
Tentative Practical List	<p>Note: This is tentative list; the teachers concern can add more program as per requirement.</p> <ol style="list-style-type: none"> 1. Write a java program to create an abstract class named shape that contains two integers and an empty method named printArea() Provide three classes named Rectangle,, Triangle and Circle such that each one of the classes extends the class shape. Each one of the class contains only the method printArea() that print the area of the given shape. 2. Write a Java program that implements a multithreaded program that has three threads. First thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd the third thread will print the value of the cube of the number. 3. Write a Java program that correctly implements the producer - consumer problem using the concept of inter-thread communication. (use of synchronize) 4. Write an applet program that displays a rainbow pattern using applet viewer and command Develop an applet that receives an integer in one text field, and computes its factorial Value and prompt. 5. Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked. 6. Write a program in java which creates a list containing at least 3 states of india.On the click of any state, the capital of that state should be displayed in a text field. 7. Write a java program which creates a list containing ice cream flavours. On selection of any flavor price should be displayed in a text field. 8. Write a java program to demonstrate BorderLayout. 9. Write a java program to demonstrate GridLayout. 10. Write a program in java which takes name,age from user.On click of the button



and display a message on label "user is eligible to vote or not".

11. Write a JDBC program to create a table product (id number, name varchar, price varchar) and insert a record in the table.
12. Write a program to execute a select query using JDBC.
13. Write a program to execute an Update query using JDBC.
14. Write a server program to return the square root of a number to the client using Socket.
15. Write a server program to return Date and time to clients using socket programming.
16. Write a JDBC program to accept empid as command line argument. And display the name of employee who is getting highest salary from employee table (EMPID,EMPNAME,EMPSAL).
17. Write a swing program containing 3 text fields. First text field accepts Last name and second text field accepts First name. On click of button full name is displayed in third box.
18. Write a java program that accepts a computer name as a command line argument and to display name and to display its Inet Address.
19. Write a servlet program to display cookie id.
20. Write a JSP program for basic arithmetic functions.
21. Write a JAVA bean program to generate plain texts.

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/ REFERENCE BOOKS:

1. The Complete Reference JAVA, Herbert Schildt, Tata McGraw Hill publication, 5th Edition.
2. Advance JAVA, Gajendra Gupta, Firewall Media, 1st Edition, 2006.
3. JAVA network programming, Elliotte Rusty Harold, O'Reilly Publication, 3rd Edition.
4. Core Java for Beginners, Rashmi Kanta Das, Vikas Publishing House Pvt. Ltd.
5. JAVA in a Nutshell, David Flanagan, O'Reilly Publication, 5th Edition.
6. Learning JAVA, Patrik Niemeyer and Jonathan Knudsen, O'Reilly Publication, 3rd edition.
7. Java Servlet and JSP Cookbook, Bruce W. Perry, O'Reilly Publication, 1st Edition.
8. Enterprise JAVA beans 3.1, Andrew Lee Rubinger and Bill Burke, O'Reilly Publication, 6th Edition.
9. The Struts Frameworks: Practical guide for Java Programmers, Sue Spielman, Murgan Kaufmann publisher.
10. Programming Jakarta Struts, Chuck Cavaness, O'Reilly Publication, 1st Edition.
11. Spring and Hibernate, K.Santosh Kumar, McGraw Hill Education (India) Pvt. Limited, 2nd edition.
12. Introduction to Programming with JAVA – A Problem Solving Approach , John Dean, Raymond Dean, Tata Mc Graw Hill.
13. Java2, Swing, Servlets, JDBC and JAVA Beans Programming Black Book Steven Holzner, Dreamtech press.
14. Core and Advanced JAVA (Black Book), Dreamtech Press.
15. JAVA and XML: Solutions to real world problem, Justin Edelson, Brett McLaughlin, O'Reilly

Publication, 6th Edition.

E-RESOURCES:

1. <https://www.gacwrmd.in/learning/Computer/7MCE1P1-Advanced%20Java%20Programming%20Lab.pdf>
2. http://ggnindia.dronacharya.info/ECS/Downloads/Labmanuals/V-Sem/LM_Ad_Java.pdf
3. https://ggnindia.dronacharya.info/CSE/Downloads/Labmanuals/Aug09-Dec09/CSE%20&%20IT/VII%20Sem/Adv_java_LAB_MANNUAL_VIISem.pdf
4. <http://oseven.in/files/591337ebe6177.pdf>
5. https://www.arsdcollege.ac.in/wp-content/uploads/2020/05/Programming_in_Java_-_week9.pdf

Part D: Assessment and Evaluation







Maximum Marks: 100
End Semester Examination(ESE): 75 Marks
Internal Assessment(IA): 25 Marks

Internal Assessment:

- (i) **Unit test (15 Marks):** There will be three tests of 15 marks, each out of which average mark of best two tests will be considered.
- (ii) **Presentation/Assignment (10 Marks)**

Total: 25 Marks

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Date: 16.03.2022

Part A: Introduction			
Program: Master Degree		Class: M.Sc. I Year	Semester: II w.e.f. Academic Session: 2022-23
1.	Course Code	MSCCS205	
2.	Course Title	Introduction to Blockchain	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	A sound knowledge of data structure and programming	
5.	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Understand block chain technology. • Understand Cryptocurrency. • Understand Smart contract. • Use Remix IDE. • Develop block chain based solutions and write smart contract using Ethereum Framework. • Deploy Decentralized Application. 	
6.	Credit Value	4	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Introduction: Overview of Block chain, History of Blockchain, Peer to Peer Network, Smart Contract, Wallet, Digital Currency, Ledgers, Types of Blockchain Platfrom.	12
II.	Consensus Mechanism: Permissioned Blockchain, Permissionless Blockchain, Different Consensus Mechanism- Proof of Work, Proof of Stake, Proof of Activity, Proof of Burn, Proof of Elapsed Time, Proof of Authority, Proof of Importance.	12
III.	Crypto currency and Wallet: Types of Wallet, Desktop Wallet, App based Wallet, Browser based wallet, Metamask, Creating a account in Metamask, Use of faucet to fund wallet, transfer of cryptocurrency in metamask. Smart contract and Ethereum: Overview of Ethereum, Writing Smart Contract in Solidity, Remix IDE , Different networks of ethereum, understanding blocks practically at blockhcain.com, how to compile and deploy smart contract in remix.	12
IV.	Understanding Hyperledger Fabric: Overview of Open source Hyperledger project, Hyperledger Fabric- Architecture, Identities and Policies, Membership and Access Control, Channels, Transaction Validation, Writing smart contract using Hyperledger Fabric.	12



V.	Use Cases: Enterprise application of Block chain: Cross border payments, Know Your Customer (KYC), Food Security, Block chain enabled Trade, We Trade – Trade Finance Network, Supply Chain Financing, Identity on Block chain, Blockchain in energy sector, Blockchain in governance.	12
Keywords: Blockchain, Hyperledger, Cryptocurrency, Smart Contract, Ethereum, Remix.		

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/ REFERENCE BOOKS:

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin. and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).
2. Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies.
3. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System.
4. DR. Gavin Wood, "ETHEREUM: A Secure Decentralized Transaction Ledger,"Yellow paper.2014.
5. Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli, A survey of attacks on Ethereum smart contracts.
6. Melanie Swan, Blockchain: Blueprint for a New Economy.
7. Imran Bashier, Mastering Blockchain: Deeper insights into decentralization, cryptography, Bitcoin, and popular Blockchain frameworks.
8. Andrews, Mastering Ethereum: Building Smart Contracts and DApps.

E-RESOURCES:

1. Swayam/NPTEL: https://onlinecourses.swayam2.ac.in/aic21_ge01/preview
2. Swayam/NPTEL: https://onlinecourses.nptel.ac.in/noc20_cs01/preview
3. edX: <https://www.edx.org/course/blockchain-technology>
4. Coursera: <https://www.coursera.org/search?query=Blockchain&>
5. Hyperledger Fabric: <https://www.youtube.com/watch?v=GWoN9TwbM20>
6. Case studies of Blockchain: <https://www.youtube.com/watch?v=GTEExtIjIE7I>
7. <https://www.youtube.com/watch?v=fhWjGs-2PLE&list=PLkkt2qQlhbKYLQ1fFKXHmw64QfC9bRz2G>
8. <https://iabtechlab.com/wp-content/uploads/2018/07/Blockchain-Technology-Primer.pdf>
9. https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SITA1301.pdf
10. <https://www.guru99.com/blockchain-tutorial.html>
11. <https://www.tutorialspoint.com/blockchain/index.htm>
12. <https://www.javatpoint.com/blockchain-tutorial>
13. <https://www.simplilearn.com/tutorials/blockchain-tutorial>
14. <https://www.edureka.co/blog/blockchain-tutorial/>
15. <https://www.simplilearn.com/tutorials/blockchain-tutorial/how-to-become-a-blockchain-developer>
16. <https://www.edureka.co/blog/blockchain-tutorial/>

Part D: Assessment and Evaluation

Maximum Marks: 100

End Semester Examination(ESE): 75 Marks






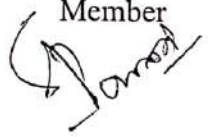
Internal Assessment(IA): 25 Marks

Internal Assessment:

- (i) **Unit test (15 Marks):** There will be three tests of 15 marks, each out of which average mark of best two tests will be considered.
- (ii) **Presentation/Assignment (10 Marks)**

Total: 25 Marks

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- Member


Date: 16.03.2022

Part A: Introduction			
Program: Master Degree	Class: M.Sc. I Year	Semester: II	w.e.f. Academic Session: 2022-23
1. Course Code	MSCCS206		
2. Course Title	Natural Language Processing		
3. Course Type	Theory		
4. Pre-requisite (if any)	Basic knowledge of programming concepts		
5. Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Understand natural language processing. • Understand probabilistic model of defining language and techniques. • Learn how to apply hidden markov model and speech recognition. • Understand application of context free grammar and language parsing. • Implement probabilistic and language parsing. • Differentiate of semantic and discourse in terms of NLP. 		
6. Credit Value	4		
7. Total Marks	Max. Marks: 100	Min. Marks: 40	

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Introduction to NLP: What is NLP? Why NLP is Difficult? History of NLP, Advantages of NLP, Disadvantages of NLP, Components of NLP, Applications of NLP, How to build an NLP pipeline? Phases of NLP, NLP APIs, NLP Libraries.	12
II.	Language Modeling and Part of Speech Tagging: Unigram Language Model, Bigram, Trigram, N-gram, Advanced smoothing for language modeling, Empirical Comparison of Smoothing Techniques, Applications of Language Modeling, Natural Language Generation, Parts of Speech Tagging, Morphology, Named Entity Recognition.	12
III.	Words and Word Forms: Bag of words, skip-gram, Continuous Bag-Of-Words, Embedding representations for words Lexical Semantics, Word Sense Disambiguation, Knowledge Based and Supervised Word Sense Disambiguation.	12
IV.	Text Analysis, Summarization and Extraction: Sentiment Mining, Text Classification, Text Summarization, Information Extraction, Named Entity Recognition, Relation Extraction, Question Answering in Multilingual Setting; NLP in Information Retrieval, Cross-Lingual IR.	12
V.	Machine Translation: Need of MT, Problems of Machine Translation, MT Approaches, Direct Machine Translations, Rule-Based Machine Translation, Knowledge Based MT System, Statistical Machine Translation (SMT), Parameter learning in SMT (IBM models) using EM), Encoder-decoder architecture, Neural Machine Translation. Pre-trained language model like: BERT, BART, PEGASUS, Hugging face etc.	12
Keywords: Natural Language Processing (NLP), Unigram Language Model, Bigram, N-gram, Sentiment mining.		

Keywords: Natural Language Processing (NLP), Unigram Language Model, Bigram, N-gram, Sentiment mining.

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/REFERENCE BOOKS:

1. Daniel Jurafsky, James H. Martin—Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, Pearson Publication, 2014.
2. Charu C. Aggarwal, Machine Learning for Text, Springer, 2018 edition.
3. Christopher D. Manning and Hinrich Schuetze, Foundations of Statistical Natural Language Processing, MIT press, 1999.
4. Steven Bird, Ewan Klein and Edward Loper Natural Language Processing with Python, O'Reilly Media: 1st edition, 2009.
5. Roland R. Hausser, Foundations of Computational Linguistics: Human Computer Communication in Natural Language, Paperback, MIT press, 2011.
6. Breck Baldwin, Language Processing with Java and Ling Pipe Cook book, Atlantic Publisher, 2015.
7. Richard M Reese, Natural Language Processing with Javal, O'Reilly Media, 2015.
8. Nitin Indurkha and Fred J. Damerau, Handbook of Natural Language Processing, Second Edition, Chapman and Hall/CRC Press, 2010.
9. Tanveer Siddiqui, U.S. Tiwary, Natural Language Processing and Information Retrieval, Oxford University Press, 2008.

E-RESOURCES:

1. Swayam/NPTEL: https://onlinecourses.nptel.ac.in/noc19_cs56/preview
2. Swayam/NPTEL: https://onlinecourses.nptel.ac.in/noc19_cs57/preview
3. Swayam/NPTEL: <https://www.classcentral.com/course/swayam-natural-language-processing-7950>
4. Coursera: <https://www.coursera.org/search?query=Natural%20Language%20Processing&>
5. <https://www.cs.princeton.edu/courses/archive/fall20/cos109/labs/python-nlp/index.html>
6. <https://nlp-iiith.vlabs.ac.in/Introduction.html>
7. <https://studylib.net/doc/25812016/nlp-lab-manual>
8. <https://web.stanford.edu/class/archive/cs/cs224n/cs224n.1162/handouts/cs224n-lecture1-6up.pdf>
9. <https://www.iitp.ac.in/~ai-nlp-ml/course/dnlp/Lec-Introduction-CEP.pdf>
10. https://www.tutorialspoint.com/natural_language_processing/index.htm#:~:text=Language%20is%20a%20method%20of,understand%20and%20process%20human%20language.
11. <https://www.javatpoint.com/nlp>
12. <https://www.analyticsvidhya.com/blog/2021/09/complete-tutorial-on-natural-language-processing-using-spacy/>
13. <https://towardsai.net/p/nlp/natural-language-processing-nlp-with-python-tutorial-for-beginners-1f54e610a1a0>
14. <https://www.guru99.com/nlp-tutorial.html>
15. <https://www.datacamp.com/tutorial/tutorial-natural-language-processing>

Part D: Assessment and Evaluation

Maximum Marks: 100

End Semester Examination(ESE): 75 Marks







Internal Assessment(IA): 25 Marks

Internal Assessment:

- (i) **Unit test (15 Marks):** There will be three tests of 15 marks, each out of which average mark of best two tests will be considered.
- (ii) **Presentation/Assignment (10 Marks)**

Total: 25 Marks

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- Member


Date: 16.03.2022

Part A: Introduction			
Program: Master Degree	Class: M.Sc. I Year	Semester: II	w.e.f. Academic Session: 2022-23
1.	Course Code	MSCCS207	
2.	Course Title	Analysis and Design of Algorithm	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	Basic knowledge of programming concepts	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand concept of computation and mathematics to algorithm design. • Analyze a problem and identify the computing requirements appropriate for its solution; • Design, implement, and evaluate an algorithm to meet desired needs. • Apply mathematical foundations, algorithmic principles, and computer science theory to the modeling and design of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design choices. • Understand design and development principles in the construction of software systems of varying complexity. • Understand current techniques, skills, and tools necessary for computing practice. 	
6.	Credit Value	4	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Introduction of Algorithm , Analysis of algorithms, asymptotic notations, Standard notations and common functions, Recurrence solution: Substitution method, iteration method and the master method, algorithm design techniques: basic.	12
II.	Divide and Conquer: Binary search, Min-Max Problem, merge sort, quick sort, and Matrix Multiplication. Introduction to NP-Completeness: The class P and NP, Polynomial reduction, NP Completeness Problem, NP-Hard Problems.	12
III.	Graph Algorithms: Undirected Graph, Directed Graph, Traversing Graphs, Representation of graphs, Breadth-first search, Depth-first search, strongly connected components, topological sort. String Matching: Introduction, The naïve string matching algorithm, Rabin-Karp algorithm, String Matching with finite automata.	12
IV.	Greedy Method: Knapsack problem, Huffman codes, job sequencing with deadlines, Minimum Spanning trees: Prim's and Kruskal's algorithms, Single Source Shortest path: Dijkstra's algorithm and Bellman Ford algorithms.	12

III.	Graph Algorithms: Undirected Graph, Directed Graph, Traversing Graphs, Representation of graphs, Breadth-first search, Depth-first search, strongly connected components, topological sort. String Matching: Introduction, The naïve string matching algorithm, Rabin-Karp algorithm, String Matching with finite automata.	12
IV.	Greedy Method: Knapsack problem, Huffman codes, job sequencing with deadlines, Minimum Spanning trees: Prim's and Kruskal's algorithms, Single Source Shortest path: Dijkstra's algorithm and Bellman Ford algorithms.	12
V.	Dynamic Programming: 0/1 Knapsack problem, all Pair's shortest paths: Warshal's and Floyd's algorithms, Single source shortest paths, Backtracking, Branch and Bound: Travelling Salesman Problem.	12
Keywords: Asymptotic notation, Master method, Polynomial reduction, Backtracking, Branch and Bound.		

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT /REFERENCE BOOKS:

1. "Introduction to Algorithms ", Thomas H. Cormen et al., PHI.
2. "Fundamentals of computer algorithms", Ellis Horowitz, Sartraj Sahni and Rajasekaran, Galgotia.
3. "Design Methods and Analysis of Algorithms", Prof S.K.Basu, BHU, PHI.
4. "Data Structures, Algorithms and Applications in C++", Sahni, TMH.
5. "Design and analysis of computer algorithms", Aho A.V, Hopcroft, J.E. Ullman, Addison-wesley.
6. "Fundamentals of Algorithmics", Brassard and Bratley, PHI.
7. "Data Structure in C", Andrew.S.Tanenbaum, PHI.







E-RESOURCES:

1. <https://www.javatpoint.com/daa-tutorial>
2. https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm#:~:text=An%20Algorithm%20is%20a%20sequence,computer%20science%20and%20information%20technology.
3. <https://www.guru99.com/design-analysis-algorithms-tutorial.html>
4. https://www.cet.edu.in/noticefiles/278_DAA%20Complete.pdf
5. https://www.vssut.ac.in/lecture_notes/lecture1428551222.pdf
6. <http://deccancollege.ac.in/CSELABMANUALS/DAA.pdf>
7. <https://www.jnec.org/labmanuals/cse/se/sem2/DAA-SY-PART-II.pdf>
8. <https://www.rgmcet.edu.in/assets/img/departments/CSE/materials/R19/2-2/DAA%20Lab.pdf>
9. <http://camelliait.ac.in/Lab%20Manual/ADA%20Lab%20Programs.pdf>
10. <http://www.anuraghyd.ac.in/cse/wp-content/uploads/sites/10/DAA-through-Java-Lab.pdf>
11. https://www.bietdvg.edu/media/department/CS/data/learning-materials/DAA_LAB_MANUAL_18CSL47.pdf
12. <https://docs.google.com/document/preview?hgd=1&id=1RYIA4N7apzPfxwNFYdCgZcYaU6bKAz894JHJtiZNWv4>

Part D: Assessment and Evaluation

Maximum Marks: 100 End Semester Examination(ESE): 75 Marks Internal Assessment(IA): 25 Marks	
Internal Assessment: (i) Unit test (15 Marks): There will be three tests of 15 marks, each out of which average mark of best two tests will be considered. (ii) Presentation/Assignment (10 Marks)	Total: 25 Marks

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 |

Date: 16.03.2022

Part A: Introduction			
Program: Master Degree		Class: M.Sc. (CS) II Year	Semester: II w.e.f. Academic Session: 2022-23
1.	Course Code	MSCCS208	
2.	Course Title	MOOC/Internship	
3.	Course Type	Practical	
4.	Pre-requisite (if any)	Not required	
5.	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Join and explore MOOC courses from reputed platforms. • Enhance knowledge on latest techniques. • Make ready for IT industry. • Up skill knowledge. 	
6.	Credit Value	2	
7.	Total Marks	Max. Marks: 50	Min. Marks: 20

Part B: Important Guidelines	
Total Hours: 60	
<ol style="list-style-type: none"> 1. Student has to complete at least one MOOC course or internship. 2. Student should register for any MOOC course from SWAYAM/NPTEL/Coursera/Edx etc. or as notified by the department from time to time under the guidance of mentor and certificate of completion must be submitted in the department. 3. MOOC courses will be notified at the beginning of each semester and student has to opt from the list only. 4. Student not able to enroll or complete MOOC course due to any valid reasons shall be assigned similar task by the HOD/Mentor as an alternative option. 5. At the end of the semester student has to present MOOC or patent in front of internal/Mentor. 6. Student has to take prior approval of MOOC. 	

Part C - Learning Resources	
Text Books, Reference Books and E-Resources	
NA	
Part D: Assessment and Evaluation	
Maximum Marks: 50	
Internal Assessment (IA): 50 Marks	

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- Chairman



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- Member

- Member

- Member

- Member
(Online Present)

- Member

- Member

Date: 16.03.2022

Part A: Introduction			
Program: Master Degree		Class: M.Sc. II Year	Semester: III w.e.f. Academic Session: 2022-23
1.	Course Code	MSCCS301	
2.	Course Title	Mobile Application Development	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	A sound knowledge of programming concepts	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Apply general programming knowledge in the field of developing mobile applications. • Understand the specific requirements, possibilities and challenges when developing for a mobile context. • Understand interaction between user interface and underlying application. • Plan and carry out a design work including developing a prototype that can be evaluated with a specified user group. • Reflect over possibilities and demands in collaborative software development. 	
6.	Credit Value	4	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Introduction to Mobile Applications: History of Android, Android Features, Android Versions, Fundamentals: Basic Building blocks, Activities, Services, Broadcast Receivers & Content providers; UI Components: Views & notifications.	12
II.	Android Development: Java, Android Studio, Eclipse, Virtualization APIs. Android tools: Debugging with DDMS, Android File system, Working with emulator and smart devices, A Basic Android Application, Deployment. Android Activities: The Activity Lifecycle, Lifecycle methods, Creating Activity; Intents, Intent Filters, Activity stack.	12
III.	Basic UI Design: Styles & Themes Form widgets, Text Fields, Layouts: Relative Layout Table Layout, Frame Layout, Linear Layout, Nested layouts (dip.dp, sip, sp versus px), styles.xml, Drawable resources for shapes, gradients (selectors), Style attribute in layout file, Alert Dialogs & Toast, Time and Date, Images and media.	12
IV.	Android Interface: Menus: Option menu, context menu, pop-up menu; Lists and Notifications: creation and display. Input Controls: Buttons, Text Fields, Checkboxes, alert dialogs, Spinners, rating bar, progress bar, Android Threads and Thread handlers, Files, Content Providers and Databases.	12

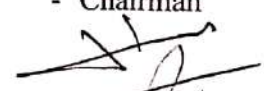
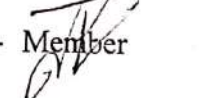


V.	Messaging and Location-Based Services: Sending SMS Messages Programmatically, Getting Feedback after Sending the Message Sending SMS Messages Using Intent Receiving, sending email, Introduction to location-based service, configuring the Android Emulator for Location-Based Services, Geocoding and Map-Based Activities; Introduction to App Deployment and Testing: Doodlz app, Tip calculator app, Weather viewer app.	12
Keywords: Android, Eclipse, Virtualization, Debugging, Toast, Spinners, Threads, Geocoding, Doodlz.		

Part C - Learning Resources	
Text Books, Reference Books and E-Resources	
TEXT/REFERENCE BOOKS: <ol style="list-style-type: none"> 1. Bill Phillips, Chris Stewart, Brian Hardy, and Kristin Marsicano, Android Programming: The Big Nerd Ranch Guide, Big Nerd Ranch LLC, 3rd edition, 2017. 2. Rajiv Ramnath, Roger Crawfis, and Paolo Sivilotti, Android SDK 3 for Dummies, Wiley. 	
E-RESOURCES: <ol style="list-style-type: none"> 1. Swayam/NPTEL: https://nptel.ac.in/courses/106106147 2. TutorialsPoint: https://www.tutorialspoint.com/android/android_overview.htm 3. Javatpoint: https://www.javatpoint.com/android-tutorial 4. Android App Development: https://developer.android.com/guide 5. Android Application Development – Udemy: https://www.udemy.com/course/learn-android-application-development-y/ 6. Android Application Development – Coursera: https://www.coursera.org/specializations/android-app-development 	
Part D: Assessment and Evaluation	
Maximum Marks: 100 End Semester Examination(ESE): 75 Marks Internal Assessment(IA): 25 Marks	
Internal Assessment: <ol style="list-style-type: none"> (i) Unit test (15 Marks): There will be three tests of 15 marks, each out of which average mark of best two tests will be considered. (ii) Presentation/Assignment (10 Marks) 	Total: 25 Marks

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C.M. Dubey P.G. College, Bilaspur(C.G.)

- Member



- Member



- Member
(Online Present)

- Member



- Member



Date: 16.03.2022

Part A: Introduction			
Program: Master Degree		Class: M.Sc. II Year	Semester: III w.e.f. Academic Session: 2022-23
1.	Course Code	MSCCS302	
2.	Course Title	Cryptography and Network Security	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	Basic knowledge of networking and algorithms	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand classification of the symmetric encryption techniques. • Understand various public key cryptography techniques. • Understand the authentication and hash algorithms. • Understand the intrusion detection and its solutions to overcome the attacks. • Understand basic concepts of system level security. 	
6.	Credit Value	4	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Classical Encryption Technique: Basics of computer network, TCP/IP model, Foundations of Cryptography and security trends, Secret key vs public key cryptography, Symmetric cipher model, substitution techniques, Transportation techniques, Mathematical tools for cryptography: modular arithmetic, Euclidean algorithm, finite fields, polynomial arithmetic.	12
II.	Symmetric cipher: Symmetric cipher model, Traditional block cipher: Stream and block cipher, Feistel cipher network structure, Design Principles of Block Ciphers, Data Encryption Standard (DES), Strength of DES Triple DES, Block cipher design principal, Block cipher operation, Advance encryption Standard (AES), Evaluation criteria of AES, AES transformation function, key distribution.	12
III.	Public Key cryptography and Hash Function: Principles of public key cryptosystem, requirement, RSA algorithm. Hash function, Key management: Diffie-Helman Key exchange, Man in the middle attack, elliptic curve arithmetic, elliptic curve cryptography, Application of cryptographic hash function, Hash and Message authentication Code (MAC), Hash and MAC algorithms, MAC based on hash function, Digital signature and Authentication protocol. Key management and distribution: Distribution of symmetric key and public key, Public key Infrastructure (PKI).	12
IV.	IP and Web security protocols: User authentication: principle, Remote user authentication using symmetric and asymmetric encryption, Kerberos, E-mail security: Pretty Good Privacy (PGP), S/MIME, IP security: IPsec, transport layer Security: Secure Socket layer (SSL), Secure Electronic Transaction (SET).	12

V.	Network Security and Management: Principles of cryptography, Authentication, integrity, key distribution and certification, Access control and Firewalls, attacks and counter measures, security in many layers. Infrastructure for network management, The internet standard management framework, SMI, MIB, SNMP, Security and administration.	12
Keywords: Symmetric Cipher, Hash, Message Authentication Code (MAC), Public key, Private key, Secure Socket Layer (SSL), Secure Electronic Transaction (SET).		

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/REFERENCE BOOKS:

1. Cryptography and Network Security, William Stallings, 4th Edition Pearson Publication.
2. Network security and cryptography, Bernard Menezes, Cenage Learning India Pvt. Ltd. First edition 2010.
3. Applied cryptography - protocols and algorithm, Bruce Schneier, Springer Verlag 2003.
4. Cryptography and Network Security, Atul Kahate , TMH Publication.
5. Cryptography and Network Security, Behrouz A. Forouzan, First Edition, TMH Publication.
6. Network Security: Private Communication in Public World By Charlie Kaufman ,Radia Perlman and Mike Speciner, PHI Publication.

E-RESOURCES:

1. Swayam/NPTEL: https://onlinecourses.nptel.ac.in/noc20_cs21/preview
2. Swayam/NPTEL: https://onlinecourses.nptel.ac.in/noc20_cs02/preview
3. Coursera: <https://www.coursera.org/search?query=Cryptography>
4. Coursera: <https://www.coursera.org/search?query=network%20security&>
5. <https://www.gatevidyalay.com/tag/cryptography-and-network-security-tutorial/>
6. <https://www.javatpoint.com/computer-network-security>
7. <https://www.geeksforgeeks.org/cryptography-introduction/>
8. <https://www.tutorialspoint.com/cryptography/index.htm>
9. https://www.vssut.ac.in/lecture_notes/lecture1428550736.pdf
10. <http://www.anuraghyd.ac.in/cse/wp-content/uploads/sites/10/NS-CRYPTO-LAB-Final11.pdf>
11. <https://www.vvitengineering.com/lab/odd/CS6711-Security-Lab-Manual.pdf>
12. <https://www.vidyarthiplus.com/vp/attachment.php?aid=53300>
13. <https://kgr.ac.in/storage/2021/08/CNS-LAB-Manual.pdf>

Part D: Assessment and Evaluation






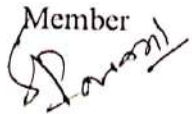
Maximum Marks: 100
 End Semester Examination(ESE): 75 Marks
 Internal Assessment(IA): 25 Marks

Internal Assessment:

- (i) **Unit test (15 Marks):** There will be three tests of 15 marks, each out of which average mark of best two tests will be considered.
- (ii) **Presentation/Assignment (10 Marks)**

Total: 25 Marks

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C.M. Dubey P.G. College, Bilaspur(C.G.)
- Member


Date: 16.03.2022

Part A: Introduction			
Program: Master Degree		Class: M.Sc. II Year	Semester: III w.e.f. Academic Session: 2022-23
1.	Course Code	MSCCS303	
2.	Course Title	Lab-3: Mobile Application Development	
3.	Course Type	Practical	
4.	Pre-requisite (if any)	Theoretical knowledge of android and programming skills	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Know the components and structure of mobile application development frameworks for Android based mobiles. • Understand how to work with various mobile application development frameworks. • Understand the basic and important design concepts and issues of development of mobile applications. • Understand the capabilities and limitations of mobile devices. 	
6.	Credit Value	2	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Content of the Course	
Total Lectures: 30 /Total Hours: 60	
Tentative Practical List	<p>Note: This is tentative list; the teachers concern can add more program as per requirement.</p> <ol style="list-style-type: none"> 1. Create "Hello World" application. That will display "Hello World" in the middle of the screen in the red color with white background. 2. Create Custom Toast & Dialog Box. 3. Design an application that contains phone contacts in vertical linear manner. Selected contact appears at the top of the list with a large italicized font and a blue background. 4. Create an application that uses Layout Managers and Event Listeners. 5. Develop a standard calculator application to perform basic calculations like addition, subtraction, multiplication and division. 6. Devise an application that draws basic graphical primitives (rectangle, circle) on the screen. 7. Design an android application Using Radio buttons. 8. Create a user registration application that stores the user details in a database table. 9. Build a mobile application that create, save, update and delete data in database. 10. Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button. 11. Devise an application that implements Multi threading. 12. Develop a mobile application that uses GPS location information. 13. Create an application that writes data to the SD card. 14. Implement an application that creates an alert upon receiving message. 15. Devise a mobile application that creates alarm clock.

	<p>16. Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric) and a Submit button. On clicking the submit button, print all the data below the Submit Button (use any layout).</p> <p>17. Design an android application to create page using Intent and one Button and pass the Values from one Activity to second Activity.</p> <p>18. Design an android application Send SMS using Intent.</p> <p>19. Create an android application using Fragments.</p> <p>20. Design an android application for menu.</p>
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Part C - Learning Resources	
Text Books, Reference Books and E-Resources	
TEXT/ REFERENCE BOOKS:	
<ol style="list-style-type: none"> 1. Bill Phillips, Chris Stewart, Brian Hardy, and Kristin Marsicano, Android Programming: The Big Nerd Ranch Guide, Big Nerd Ranch LLC, 3rd edition, 2017. 2. Rajiv Ramnath, Roger Crawfis, and Paolo Sivilotti, Android SDK 3 for Dummies, Wiley. 	
E-RESOURCES:	
<ol style="list-style-type: none"> 1. https://pesitsouth.pes.edu/pdf/2019/July/MCA/android%20Lab%20manual.pdf 2. http://www.jnit.org/wp-content/uploads/2020/04/SDL-II-android.pdf 3. https://mrcet.com/pdf/Lab%20Manuals/MOBILE%20APPLICATION%20DEVELOPMENT%20LAB.pdf 4. https://www.studocu.com/in/document/gujarat-technological-university/android-programming/android-programming2180715-lab-manual/18844347 5. https://www.vvitengineering.com/lab/CS6611-MOBILE-APPLICATION-DEVELOPMENT-LABORATORY.pdf 6. https://mrcet.com/CSE_downloads.html 7. http://iotmumbai.bharativedyapeeth.edu/index.php/lab-manuals#computer-technology 	
Part D: Assessment and Evaluation	
Maximum Marks: 100 End Semester Examination(ESE): 75 Marks Internal Assessment(IA): 25 Marks	
Internal Assessment:	Total: 25 Marks
(i) Unit test (15 Marks): There will be three tests of 15 marks, each out of which average mark of best two tests will be considered.	
(ii) Presentation/Assignment (10 Marks)	

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Date: 16.03.2022

Part A: Introduction			
Program: Master Degree	Class: M.Sc. II Year	Semester: III	w.e.f. Academic Session: 2022-23
1.	Course Code	MSCCS304	
2.	Course Title	Minor Project	
3.	Course Type	Practical	
4.	Pre-requisite (if any)	Programming and research knowledge as per project	
5.	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Demonstrate a sound technical knowledge of their selected project topic. • Undertake identification, formulation and solution. • Demonstrate the knowledge, skills and attitudes of a professional. 	
6.	Credit Value	2	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Important Guidelines for Minor Project

Total Lectures: 30 /Total Hours: 60







A project report has to be submitted as per the rules described below:

1. **Number of Copies:** The student should submit One hard bound copy of the Project Report with one RW/CD/DVD.
2. **No of students:** Every student has to submit separate project.
3. **Acceptance / Rejection of Project Report:** The student must submit a project report to the Head of Department/Project Guide for approval. The Head of Department/Project Guide holds the right to accept the project or suggest modifications for resubmission.
4. **Format of the Project Report :** The student must adhere strictly to the following format for the submission of the Project Report
 - I. **Paper:** The report shall be typed on white paper, A4 size or continuous computer stationary bond, for the final submission. The report to be submitted to the University must be original and subsequent copies may be photocopied on any paper.
 - II. **Typing:** The typing shall be of standard letter size, double-spaced and on one side of the paper only, using black ribbons and black carbons.
 - III. **Margins:** The typing must be done in the following margins
 Left ----- 35mm, Right ----- 20mm
 Top ----- 35mm, Bottom ----- 20mm
 - IV. **Binding:** The Report shall be Rexene bound in black. Plastic, spiral bound Project Reports not be accepted.
 - V. **Front Cover:** The front cover should contain the following details:
TOP: The title in block capitals of 6mm to 15mm letters.
CENTER: Full name in block capitals of 6mm to 10mm letters.
BOTTOM: Name of the University, year of submission- all in block capitals of 6mm to 10mm letters on separate lines with proper spacing and centring.
 - VI. **Blank Sheets:** At the beginning and end of the report , two white black bound papers should be provided, one for the purpose of binding and other to be left blank.

5. **Abstract:** Every report should have an abstract following the Institute's Certificate. The abstract shall guide the reader by highlighting the important material contained in the individual chapters, section, subsection etc.
 6. **Certificates etc:** The report should contain the following:
 - I. Institute Certificate: Successful completion of project by competent authority.
 - II. Acknowledgment
 - III. List of Figures
 - IV. Tables
 - V. Nomenclature and Abbreviations
 7. **Contents of the Project Report:** The project report must contain following in form of chapter, however student may include any other relevant chapter(s):
 - I. **Introduction to the project:** This chapter shall highlight the purpose of project work, it will also define the chapters to be followed in the Project Report.
 - II. **Scope of work:** Brief scope of the project work done
 - III. **Existing System and Need for proposed System:** If there is some system already in use, then give brief detail of it in order to help to understand the enhancements carried out by the student in the existing system.
 - IV. **Operating Environment:** Hardware and Software required and used.
 - V. **Proposed System:** Which may contain following:
 - a. **Objectives to be fulfilled:** clearly define the objective(s) of the system.
 - b. **User Requirements:** State the requirements of the use in an unambiguous manner.
 - c. **Requirements Determination Techniques and Systems Analysis Methods Employed:** Use the formal methods to describe the requirements of the use like Fact Finding Methods, Decision Analysis, Data Flow Analysis etc.
 - d. **Prototyping:** If the prototypes has been developed prior to the detailed design, then give details of the prototype.
 - e. **System Feature:** Which includes as follows:
 - Module specifications
 - D.F.D. and ER
 - System flow charts
 - Data Dictionary
 - Structure charts
 - Database /File layouts
 - Design of Input Design of Output screens and reports
 - User Interfaces
 - Design of Control Procedures
 8. **Testing procedures and Implementation phase**
 9. **Problems encountered, Drawbacks and Limitations**
 10. **Proposed Enhancements/ Future enhancement**
 11. **Conclusions**
 12. **Bibliography**
- Annexure**

Part C - Learning Resources
Text Books, Reference Books and E-Resources
As per project.
Part D: Assessment and Evaluation
Maximum Marks: 100 End Semester Examination(ESE): 100 Marks

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Date: 16.03.2022

Part A: Introduction			
Program: Master Degree		Class: M.Sc. II Year	Semester: III
w.e.f. Academic Session: 2022-23			
1.	Course Code	MSCCS305	
2.	Course Title	Internet of Things	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	Programming skills and basic knowledge of cloud computing	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand general concepts of Internet of Things (IoT). • Recognize various devices, sensors and applications. • Apply design concept to IoT solutions. • Analyze various M2M and IoT architectures. • Evaluate design issues in IoT applications. • Create IoT solutions using sensors, actuators and devices. 	
6.	Credit Value	4	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	IoT: What is the IoT and why is it important? Elements of an IoT ecosystem, Technology drivers, Business drivers, Trends and implications, Overview of Governance, Privacy and Security Issues.	12
II.	IoT Protocols: Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE802.15.4–BACNet Protocol– Modbus – KNX – Zigbee– Network layer – APS layer – Security.	12
III.	IoT Architecture: IoT Open source architecture (OIC)- OIC Architecture & Design principles- IoT Devices and deployment models- IoTivity: An Open source IoT stack - Overview- IoTivity stack architecture- Resource model and Abstraction.	12
IV.	Web of Things: Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence.	12
V.	IoT Applications: IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Study of existing IoT platforms /middleware, IoT- A, Hydra etc., Developing IoT solutions: Introduction to Python, Introduction to different IoT tools, Introduction to Arduino and Raspberry Pi Implementation of IoT with Arduino and Raspberry, Cloud Computing, Fog Computing, Connected Vehicles, Data Aggregation for the IoT in Smart Cities, Privacy and Security Issues in IoT.	12

Keywords: Internet of Things (IoT), Raspberry Pi, Sensors, Actuators, Arduino, Cloud Computing, Fog computing, Edge computing.

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/REFERENCE BOOKS:

1. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press, 2012.
2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), "Architecting the Internet of Things", Springer, 2011.
3. David Easley and Jon Kleinberg, "Networks, Crowds, and Markets: Reasoning About a Highly Connected World", Cambridge University Press, 2010.
4. Olivier Hersent, David Boswarthick, Omar Elloumi, "The Internet of Things – Key applications and Protocols", Wiley, 2012.
5. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.
6. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.
7. Cuno Pfister, Getting Started with the Internet of Things, O'Reilly Media, 2011.
8. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on Approach)", 1st Edition, VPT, 2014.

E-RESOURCES:

1. Swayam/NPTEL: https://www.youtube.com/channel/UC6ZY_csXZc7YZZm2W8HcQ6A
2. Javatpoint: <https://www.javatpoint.com/iot-internet-of-things>
3. Tutorialspoint: https://www.tutorialspoint.com/internet_of_things/index.htm
4. Topics Related to IOT from data-flair: <https://data-flair.training/blogs/iot-tutorial/>
5. Topics Related to IOT from edureka: <https://www.edureka.co/blog/iot-tutorial/>
6. https://www.lnmiit.ac.in/Department/ECE/uploaded_files/Internet_of_Things_Lab_manual.pdf
7. https://www.iare.ac.in/sites/default/files/lab1/IARE_IOT%20LAB%20MANUAL.pdf
8. https://www.amirajcollege.in/wp-content/uploads/2020/06/2180709-iot_manual.pdf
9. <https://peer.asee.org/internet-of-things-iot-laboratory.pdf>
10. <https://www.teachmint.com/tfile/studymaterial/class-7th/internetofthingsiot/iotlabmanualpdf/d85015cf-722b-4b50-86e4-0f456f91bfa0>
11. <https://www.slideshare.net/RadheyShyam18/iot-lab-manual-new>
12. <https://www.psgkrkcw.ac.in/wp-content/uploads/2021/08/IoT-Applications-Lab-Manual-IT.pdf>
13. <https://www.coursehero.com/file/37028140/IoT-Lab-Manualpdf/>
14. <https://www.scribd.com/document/408744059/IoT-Lab-Manual>
15. https://mrcet.com/CSE_downloads.html
16. <http://iotmumbai.bharativedyapeeth.edu/index.php/lab-manuals#computer-technology>




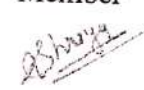


Part D: Assessment and Evaluation

Maximum Marks: 100

End Semester Examination(ESE): 75 Marks

Internal Assessment(IA): 25 Marks	
Internal Assessment: (i) Unit test (15 Marks): There will be three tests of 15 marks, each out of which average mark of best two tests will be considered. (ii) Presentation/Assignment (10 Marks)	Total: 25 Marks

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Asst. Prof. and P.G. Head,
C.M. Dubey P.G. College, Bilaspur(C.G.)
- Member


Date: 16.03.2022

Part A: Introduction			
Program: Master Degree		Class: M.Sc. II Year	Semester: III
w.e.f. Academic Session: 2022-23			
1.	Course Code	MSCCS306	
2.	Course Title	Deep Learning	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	Basic knowledge of AI & ML concepts	
5.	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Understand the concepts of neural networks. • Select the learning networks in modeling real world systems. • Use an efficient algorithm for deep models. • Apply optimization strategies for large scale applications. 	
6.	Credit Value	4	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Basics: Biological Neuron, Idea of computational units, McCulloch–Pitts unit and Thresholding logic, Linear Perceptron, Perceptron Learning Algorithm, Linear separability. Convergence theorem for Perceptron Learning Algorithm. Feed forward Networks: Multilayer Perceptron, Gradient Descent, Backpropagation, Empirical Risk Minimization, regularization, autoencoders.	12
II.	Deep Neural Networks: Difficulty of training deep neural networks, Greedy layerwise training. Better Training of Neural Networks: Newer optimization methods for neural networks (Adagrad, adadelat, rmsprop, adam, NAG), second order methods for training, Saddle point problem in neural networks, Regularization methods (dropout, drop connect, batch normalization).	12
III.	Recurrent Neural Networks: Back propagation through time, Long Short Term Memory, Gated Recurrent Units, Bidirectional LSTMs, Bidirectional RNNs. Convolutional Neural Networks: Pre-trained CNN models like LeNet, AlexNet etc.	12
IV.	Generative models: Restrictive Boltzmann Machines (RBMs), Introduction to MCMC and Gibbs Sampling, gradient computations in RBMs, Deep Boltzmann Machines. Recent trends: Variational Autoencoders, Generative Adversarial Networks, Multi-task Deep Learning, Multi-view Deep Learning.	12
V.	Applications: Large-Scale Deep Learning, Computer Vision, Speech Recognition, Natural Language Processing, Other Applications.	12

Keywords: Deep learning, Linear perceptron, Feed forward network, Autoencoders, Adversarial Network.

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/ REFERENCE BOOKS:

1. Goodfellow, Yoshua Bengio, Aaron Courville, Deep Learning (Adaptive Computation and Machine Learning series), MIT Press.
2. Li Deng and Dong Yu. Deep Learning Methods and Applications. Foundations and Trends in Signal Processing Volume 7 Issues 3-4, ISSN: 1932-8346.
3. Dr. N.D. Lewis, Deep Learning Made Easy with RA Gentle Introduction for Data Science. Create Space Independent Publishing Platform (January 10, 2016).
4. François Chollet, JJ Allaire. MEAP Edition Manning Early Access Program Deep Learning w Version 1, Copyright 2017 Manning Publications.

E-RESOURCES:

1. Swayam/NPTEL: https://onlinecourses.nptel.ac.in/noc20_cs11/preview
2. Swayam/NPTEL: https://onlinecourses.nptel.ac.in/noc20_cs50/preview
3. Coursera: <https://www.coursera.org/search?query=deep%20learning>
4. <https://www.kaggle.com/learn/intro-to-deep-learning>
5. <https://www.kaggle.com/code/kanncaa1/deep-learning-tutorial-for-beginners/notebook>
6. https://www.tensorflow.org/resources/learn-ml?gclid=CjwKCAjw_ISWBhBkEiwAdqxb9hljli5hnqF0Cq2Fgy_JEWiD_uZbxtetr_BFUF_QztAELk8d2q3P_BoCodMQAvD_BwE
7. <https://www.manning.com/books/deep-learning-with-javascript>
8. <https://www.datacamp.com/tutorial/tutorial-deep-learning-tutorial>
9. <https://www.javatpoint.com/deep-learning>
10. https://www.tutorialspoint.com/python_deep_learning/index.htm
11. <https://www.simplilearn.com/tutorials/deep-learning-tutorial>
12. <https://www.guru99.com/deep-learning-tutorial.html>
13. <http://deeplearning.stanford.edu/tutorial/>
14. http://paulorauber.com/slides/deep_learning_lab.pdf
15. <http://www.jnit.org/wp-content/uploads/2020/04/Machine-Learning-Lab-Manual.pdf>
16. http://www.hpc.iitkgp.ac.in/pdfs/AI_HPC.pdf
17. <https://nthu-datalab.github.io/ml/>
18. [https://www.jnec.org/labmanuals/cse/te/sem1/Machine%20Learning%20LAB%20MANUAL%200\(1\).pdf](https://www.jnec.org/labmanuals/cse/te/sem1/Machine%20Learning%20LAB%20MANUAL%200(1).pdf)
19. http://ais.informatik.uni-freiburg.de/teaching/ws17/deep_learning_course/presentation1a2017.pdf
20. <https://kgr.ac.in/storage/2021/08/ML-LAB-MANUAL.pdf>
21. <https://deepakdvallur.weebly.com/machine-learning-laboratory.html>
22. https://pesitsouth.pes.edu/pdf/2019/July/ISE/ML_LAB.pdf

Part D: Assessment and Evaluation

Maximum Marks: 100

End Semester Examination(ESE): 75 Marks

Internal Assessment(IA): 25 Marks

Internal Assessment:

- (i) **Unit test (15 Marks):** There will be three tests of 15 marks, each out of which average mark of best two tests will be considered.
- (ii) **Presentation/Assignment (10 Marks)**

Total: 25 Marks

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- Chairman



- Member



- Member



- Member



- Member
(Online Present)

- Member



- Member



Date: 16.03.2022

Part A: Introduction			
Program: Master Degree		Class: M.Sc. II Year	Semester: III
w.e.f. Academic Session: 2022-23			
1.	Course Code	MSCCS307	
2.	Course Title	Cloud Computing	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	Basic knowledge of operating system and sound knowledge of networking	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> Identify the appropriate cloud services for a given application. Assess the comparative advantages and disadvantages of Virtualization technology. Analyze authentication, confidentiality and privacy issues in cloud computing. Identify security implications in cloud computing. Understand the importance of protocols and standards in management for cloud services. 	
6.	Credit Value	4	
7.	Total Marks	Max. Marks: 100	Min. Marks: 40

Part B: Content of the Course		
Total Hours/Lectures: 60		
Unit	Topics	No. of Lectures
I.	Introduction: Introduction to Cloud Computing Defining Cloud computing, Characteristics, Components, deployment model, service model, Applications, Benefits of cloud computing, Limitations of cloud computing. Grid Computing, Grid vs Cloud Computing.	12
II.	Cloud architecture, Services and Applications: Exploring cloud computing stack – Composability, Infrastructure, Platforms, Virtual Appliances, Communication Protocols, Applications, Defining Infrastructure as a Service (IaaS), Defining Software as a Service (SaaS), Defining Platform as a Service (PaaS), Defining Identity as a Service (IDaaS), Defining Compliance as a Service (CaaS).	12
III.	Cloud Infrastructure and Virtualization: Hardware and Infrastructure – Clients, Security, Network and Services, use of Virtualization technology, Load Balancing and Virtualization, virtualization benefits, Hypervisors, porting application, Defining cloud capacity by defining baselines and Metrics.	12
IV.	Exploring cloud services: Software as a Service – Overview, advantages, limits, virtualization benefits, examples. Platform as a Service – overview, advantages and functionalities, PaaS application frameworks – Drupal, Long Jump. Case study – Google Apps and Web Services.	12

V.	Cloud Administration and Security Management: Management responsibilities, lifecycle management, cloud management products, Cloud management standards. Cloud security, data security, Identity and presence protocol standards, Availability management in SaaS, IaaS, PaaS, Access Control, Security Vulnerability, Patch and Configuration Management, Security as a Service of cloud, Future of Security in Cloud computing.	12
Keywords: Cloud Computing, Security, Governance, Storage, Virtualization, Virtual appliances, Hypervisors.		

Part C - Learning Resources

Text Books, Reference Books and E-Resources

TEXT/REFERENCE BOOKS:

1. Mastering Cloud Computing, Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, McGraw Hill Education.
2. Barrie Sosinsky, "Cloud Computing Bible", Wiley India Edition.
3. Anthony Velte, tobyVelte, Robert Elsenpeter, "Cloud Computing – A Practical Approach", Tata McGraw-Hill Edition.
4. Cloud Computing:Black Book, Kailash Jayaswal et al., Kogent Learning Solutions, Dreamtech Press.
5. Cloud Computing: Principals and Paradigms,RajkumarBuyya et al., Wiley India.
6. Cloud Computing: Concepts, Technology & Architecture,Erl, Pearson Education India.
7. Cloud Computing Bible, Barrie Sosinsky, O'Reilly Media.
8. Cloud Computing: A Practical Approach, Toby Velte, Anthony Vote and Robert Elsenpeter, McGraw Hill.
9. Cloud Application Architectures: Building Applications and Infrastructures in the Cloud, George Reese, O'Reilly Media.

E-RESOURCES:

1. Coursera: <https://www.coursera.org/courses?query=computing>
2. Introduction to Cloud Computing from W3shool: <https://www.w3schools.in/cloud-computing/tutorials/>
3. Introduction to Cloud Computing from Coursera: <https://www.coursera.org/learn/introduction-to-cloud>
4. Cloud Computing Basics: <https://www.coursera.org/learn/cloud-computing-basics>
5. Cloud Computing Concepts: <https://www.coursera.org/learn/cloud-computing>
6. Cloud Computing Specialization from Coursera: <https://www.coursera.org/specializations/cloud-computing>
7. Cloud Computing from SWAYAM/NPTEL
https://onlinecourses.nptel.ac.in/noc22_cs20/preview
<https://www.youtube.com/channel/UCK73enkjfQNDwdBqMyaMtRg>
8. <https://annauniversityedu.blogspot.com/2020/10/cs8711-cloud-computing-laboratory.html>
9. <https://drive.google.com/file/d/1oiuQYwkgFXy4R4518us4ynnXNFqx6OkW/view>
10. <https://www.vidyarthiplus.com/vp/attachment.php?aid=53342>
11. <https://www.iare.ac.in/sites/default/files/lab1/CAD%20LAB%20UPDATED%20BY%20ANJAI>

AH-%20FINAL_0.pdf

12. <https://jainakshay781.files.wordpress.com/2019/02/final-cc-lp-iv-manual-1.pdf>

13. <http://www.gpcet.ac.in/wp-content/uploads/2018/08/GCC-LAB-MANUAL.pdf>

14. <https://shanpnk.weebly.com/uploads/5/8/9/4/58948709/gcclab-courseware-labmanual.pdf>

15. <https://www.bharathuniv.ac.in/downloads/csc/BCS7L1%20-Grid%20&%20Cloud%20Computing%20lab.pdf>

Part D: Assessment and Evaluation

Maximum Marks: 100

End Semester Examination(ESE): 75 Marks

Internal Assessment(IA): 25 Marks

Internal Assessment:

- (i) **Unit test (15 Marks):** There will be three tests of 15 marks, each out of which average mark of best two tests will be considered.
- (ii) **Presentation/Assignment (10 Marks)**

Total: 25 Marks

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Date: 16.03.2022

Part A: Introduction			
Program: Master Degree		Class: M.Sc. (CS) II Year	Semester: III w.e.f. Academic Session: 2022-23
1.	Course Code	MSCCS308	
2.	Course Title	MOOC/Patent	
3.	Course Type	Practical	
4.	Pre-requisite (if any)	Not required	
5.	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Join and explore MOOC courses from reputed platforms. • Enhance knowledge on latest techniques. • Make ready for IT industry. • Up skill knowledge 	
6.	Credit Value	2	
7.	Total Marks	Max. Marks: 50	Min. Marks: 20

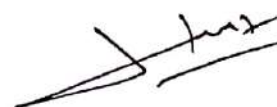
Part B: Important Guidelines	
Total Hours: 60	
<ol style="list-style-type: none"> 1. Student has to complete one MOOC course or one patent. 2. Student should register for any MOOC course from SWAYAM/NPTEL/Coursera/Edx etc. or as notified by the department from time to time under the guidance of mentor and certificate of completion must be submitted in the department. 3. MOOC courses will be notified at the beginning of each semester and student has to opt from the list only. 4. Student not able to enroll or complete MOOC course due to any valid reasons shall be assigned similar task by the HOD/Mentor as an alternative option. 5. Patent must be awarded. 6. At the end of the semester student has to present MOOC or patent in front of internal/Mentor. 7. Student has to take prior approval of MOOC. 	

Part C - Learning Resources	
Text Books, Reference Books and E-Resources	
NA	
Part D: Assessment and Evaluation	
Maximum Marks: 50	
Internal Assessment (IA): 50 Marks	

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- Member


- Member


- Member



- Member
(Online Present)

- Member



- Member


Date: 16.03.2022

Part A: Introduction			
Program: Master Degree	Class: M.Sc.(CS) II Year	Semester: IV	w.e.f. Academic Session: 2022-23
1.	Course Code	MSCCS401	
2.	Course Title	Research Based Major Project	
3.	Course Type	Practical	
4.	Pre-requisite (if any)	Programming and research knowledge as per project topic	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Demonstrate a sound technical knowledge of their selected project topic. • Undertake identification, formulation and solution. • Enhance research skill. • Find out research gape. • Up skill research based approach. • Solve the real world problems through research. • Demonstrate the knowledge, skills and attitudes of a professional. 	
6.	Credit Value	15	
7.	Total Marks	Max. Marks: 500	Min. Marks: 200

Part B: Important Guidelines for Major Project	
Total Hours: 450	
A project report has to be submitted as per the rules described below:	
<ol style="list-style-type: none"> 1. Number of Copies: The student should submit One hard bound copy of the Project Report with one RW/CD/DVD. 2. No of students: Every student has to submit separate project. 3. Acceptance /Rejection of Project Report: The student must submit a project report to the Head of Department/Project Guide for approval. The Head of Department/Project Guide holds the right to accept the project or suggest modifications for resubmission. 4. Format of the Project Report :The student must adhere strictly to the following format for the submission of the Project Report <ol style="list-style-type: none"> I. Paper: The report shall be typed on white paper, A4 size or continuous computer stationary bond, for the final submission. The report to be submitted to the University must be original and subsequent copies may be photocopied on any paper. II. Typing: The typing shall be of standard letter size, double-spaced and on one side of the paper only, using black ribbons and black carbons. III. Margins: The typing must be done in the following margins Left ---- 35mm, Right ---- 20mm Top ---- 35mm, Bottom ---- 20mm IV. Binding: The Report shall be Rexene bound in black. Plastic, spiral bound Project Reports not be accepted. V. Front Cover: The front cover should contain the following details: TOP: The title in block capitals of 6mm to 15mm letters. CENTER: Full name in block capitals of 6mm to 10mm letters. BOTTOM: Name of the University, year of submission- all in block 	



capitals of 6mm to 10mm letters on separate lines with proper spacing and centring.

- VI. Blank Sheets:** At the beginning and end of the report, two white blank bound papers should be provided, one for the purpose of binding and other to be left blank.
5. **Abstract:** Every report should have an abstract following the Institute's Certificate. The abstract shall guide the reader by highlighting the important material contained in the individual chapters, section, subsection etc.
6. **Certificates etc:** The report should contain the following:
- I. Certificates
 - II. Institute Certificate: Successful completion of project by competent authority.
 - III. Acknowledgment
 - IV. List of Figures
 - V. List of Tables
 - VI. List of abbreviations
7. **Contents of the dissertation/project :** The report must contain following in form of chapter, however student may include any other relevant chapter(s):
- I. **Research Topic:** Need to choose real world topic of the research and write scope and abstract of the research in 500 words.
 - II. **Literature Review:** Review of at least 50 research papers from popular databases like science direct
 - III. **Methodology:** Brief description of the methods and techniques used in the research work.
 - IV. **Model or software development:** Brief about models developed or any system / software developed for the proposed research work.
 - V. **Conclusion:** Concluding remark of the research work.
 - VI. **Reference:** Must be in APA format.
- Annexure (If any)

Part C - Learning Resources
Text Books, Reference Books and E-Resources
As per project topic.
Part D: Assessment and Evaluation
Maximum Marks: 500 End Semester Examination(ESE): 500 Marks

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- Member



Date: 16.03.2022

Part A: Introduction			
Program: Master Degree		Class: M. Sc. (CS) II Year	Semester: IV w.e.f. Academic Session: 2022-23
1.	Course Code	MSCCS402	
2.	Course Title	Software Development Based Major Project	
3.	Course Type	Practical	
4.	Pre-requisite (if any)	Programming and research knowledge as per project topic	
5.	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Demonstrate a sound technical knowledge of their selected project topic. • Undertake identification, formulation and solution. • Design engineering solutions to complex problems utilizing systems approach. • Communicate with the community at large in written and oral forms. • Demonstrate the knowledge, skills and attitudes of a professional. 	
6.	Credit Value	15	
7.	Total Marks	Max. Marks: 500	Min. Marks: 200

Part B: Important Guidelines for Major Project	
Total Hours: 450	
<p>A project report has to be submitted as per the rules described below:</p> <ol style="list-style-type: none"> 1. Number of Copies: The student should submit One hard bound copy of the Project Report with one RW/CD/DVD. 2. No of students: Every student has to submit separate project. 3. Acceptance /Rejection of Project Report: The student must submit a project report to the Head of Department/Project Guide for approval. The Head of Department/Project Guide holds the right to accept the project or suggest modifications for resubmission. 4. Format of the Project Report :The student must adhere strictly to the following format for the submission of the Project Report <ol style="list-style-type: none"> I. Paper: The report shall be typed on white paper, A4 size or continuous computer stationary bond, for the final submission. The report to be submitted to the University must be original and subsequent copies may be photocopied on any paper. II. Typing: The typing shall be of standard letter size, double-spaced and on one side of the paper only, using black ribbons and black carbons. III. Margins: The typing must be done in the following margins Left ----- 35mm, Right ----- 20mm Top ----- 35mm, Bottom ----- 20mm IV. Binding: The Report shall be Rexene bound in black. Plastic, spiral bound Project Reports not be accepted. V. Front Cover: The front cover should contain the following details: <ul style="list-style-type: none"> TOP: The title in block capitals of 6mm to 15mm letters. CENTER: Full name in block capitals of 6mm to 10mm letters. BOTTOM: Name of the University, year of submission- all in block capitals of 6mm to 10mm letters on separate lines with proper spacing and 	

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- VI. Blank Sheets:** At the beginning and end of the report , two white black bound papers should be provided, one for the purpose of binding and other to be left blank.
5. **Abstract:** Every report should have an abstract following the Institute's Certificate. The abstract shall guide the reader by highlighting the important material contained in the individual chapters, section, subsection etc.
6. **Certificates etc:** The report should contain the following:
 - I. Certificate from Company
 - II. Institute Certificate: Successful completion of project by competent authority.
 - III. Acknowledgment
 - IV. List of Figures
 - V. Tables
 - VI. Nomenclature and Abbreviations
7. **Contents of the Project Report:** The project report must contain following in form of chapter, however student may include any other relevant chapter(s):
 - I. **Company Profile:** This chapter should highlight the company details. This would be chapter 1 and should include the main stream activity of the company, the product line of the company and the details of the department where the student has carried out his/her project work. This should not exceed two pages or 800 words.
 - II. **Introduction to the project:** This chapter shall highlight the purpose of project work, it will also define the chapters to be followed in the Project Report.
 - III. **Scope of work:** Brief scope of the project work done
 - IV. **Existing System and Need for proposed System:** If there is some system already in use, then give brief detail of it in order to help to understand the enhancements carried out by the student in the existing system.
 - V. **Operating Environment:** Hardware and Software required and used.
 - VI. **Proposed System:** Which may contain following:
 - a. **Objectives to be fulfilled:** clearly define the objective(s) of the system.
 - b. **User Requirements:** State the requirements of the use in an unambiguous manner.
 - c. **Requirements Determination Techniques and Systems Analysis Methods Employed:** Use the formal methods to describe the requirements of the use like Fact Finding Methods, Decision Analysis, Data Flow Analysis etc.
 - d. **Prototyping:** If the prototypes has been developed prior to the detailed design, then give details of the prototype.
 - e. **System Feature:** Which includes as follows:
 - Module specifications
 - D.F.D. and ER
 - System flow charts
 - Data Dictionary
 - Structure charts
 - Database /File layouts
 - Design of Input Design of Output screens and reports
 - User Interfaces
 - Design of Control Procedures
8. **Testing procedures and Implementation phase**
9. **Problems encountered, Drawbacks and Limitations**

10. Proposed Enhancements/ Future enhancement

11. Conclusions

12. Bibliography

Annexure

Part C - Learning Resources

Text Books, Reference Books and E-Resources

As per project topic.

Part D: Assessment and Evaluation

Maximum Marks: 500

End Semester Examination(ESE): 500 Marks

Members of BoS

1. **Dr. H.S. Hota**
Prof. and Head, Department of Computer Science and Application
Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur (C.G.)
2. **Dr. Manish Shrivastava**
Asst. Prof., Dept. of C.S.E., I.T.
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)
3. **Mr. Jeetendra Kumar**
Asst. Prof., Dept. of Computer Science and Application
Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur (C.G.)
4. **Mrs. Shriya Sahu**
Asst. Prof., Dept. of Computer Science and Application
Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur (C.G.)
5. **Mr. H.S.P. Tonde**
Asst. Prof. and Head, Dept. of Computer Science
Sant Gahira Guru University Sarguja, Ambikapur (C.G.)
6. **Dr. Kajal Kiran Gulhare**
Asst. Prof. and U. G. Head,
Govt. E.R.R. Science P.G. College, Bilaspur (C.G.)
7. **Dr. S. Pavani**
Asst. Prof. and P.G. Head,
C.M. Dubey P.G. College, Bilaspur(C.G.)

- Chairman



- Member



- Member



- Member



- Member
(Online Present)

- Member



- Member



Date: 16.03.2022

Part A: Introduction			
Program: Master Degree		Class: M.Sc. (CS) II Year	Semester: IV w.e.f. Academic Session: 2022-23
1.	Course Code	MSCCS403	
2.	Course Title	MOOC/Patent	
3.	Course Type	Practical	
4.	Pre-requisite (if any)	Not required	
5.	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Join and explore MOOC courses from reputed platforms. • Enhance knowledge on latest techniques. • Make ready for IT industry. • Up skill knowledge 	
6.	Credit Value	2	
7.	Total Marks	Max. Marks: 50	Min. Marks: 20

Part B: Important Guidelines	
Total Hours: 60	
<ol style="list-style-type: none"> 1. Student has to complete one MOOC course or one patent. 2. Student should register for any MOOC course from SWAYAM/NPTEL/Coursera/Edx etc. or as notified by the department from time to time under the guidance of mentor and certificate of completion must be submitted in the department. 3. MOOC courses will be notified at the beginning of each semester and student has to opt from the list only. 4. Student not able to enroll or complete MOOC course due to any valid reasons shall be assigned similar task by the HOD/Mentor as an alternative option. 5. Patent must be awarded. 6. At the end of the semester student has to present MOOC or patent in front of internal/Mentor. 7. Student has to take prior approval of MOOC. 	

Part C - Learning Resources	
Text Books, Reference Books and E-Resources	
NA	
Part D: Assessment and Evaluation	
Maximum Marks: 50	
Internal Assessment (IA): 50 Marks	

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