FOUR YEAR UNDERGRADUATE PROGRAM (NEP–2020)

Program: Bachelor in Computer Application (2024 -28)

DISCIPLINE – COMPUTER APPLICATION

SESSION – 2024 -25

DSC -01 to 20		DSE -01 to 12	
Code	**Title**	**Code**	**Title**
CASC -01	Discrete Mathematics	CASE -01	Cyber Security and Cyber Law
CASC -02T	Computer Fundamental and MS-Office	CASE -02	Artificial Intelligence and Expert System
CASC -02P	**Lab 1:** MS-Office	CASE -03	Numerical Analysis
CASC -03T	Operating System	CASE -04	Computer System Architecture
CASC -03P	**Lab 2:** Operating System	CASE -05	Computer Graphics
CASC -04	Digital Electronics	CASE -06T	Cloud Computing
CASC -05T	Programming in C++	CASE -06P	**Lab 13:** Cloud Computing
CASC -05P	**Lab 3:** Programming in C++	CASE -07	Cryptography and Network Security
CASC -06T	Data Structure	CASE -08	Advanced Operating systems
CASC -06P	**Lab 4:** Data Structure Using C++	CASE -09	Soft Computing
CASC -07	Software Engineering	CASE -10	Digital Image Processing
CASC -08T	Relational Database Management System	CASE -11	Big Data Analytics
CASC -08P	**Lab 5:** Relational Database Management System (Oracle/MySQL)	CASE -12	Major Project-2
CASC -09T	Programming in Java		
CASC -09P	**Lab 6:** Programming in Java	**DGE -01 & 02**	
CASC -10	Theory of Computation	CAGE -01T	Computer Fundamental and MS-Office
CASC -11T	Web Technology	CAGE -01P	**Lab 1:** MS-Office
CASC -11P	**Lab 7:** Web Technology	CAGE -02T	Operating System
CASC -12T	Python Programming	CAGE -02P	**Lab 2:** Operating System
CASC -12P	**Lab 8:** Python Programming	**VAC**	
CASC -13	Data Mining and Data Warehousing	CAVAC-01	Artificial Intelligence
CASC -14T	Programming in .Net	**SEC**	
CASC -14P	**Lab 9:** Programming in .Net	CASEC-01	ICT Based Learning
CASC -15T	Machine Learning		
CASC -15P	**Lab 10:** Machine Learning		
CASC -16	Data Communication and Computer Networking		
CASC -17T	Advanced Java		
CASC -17P	**Lab 11:** Advanced Java		
CASC -18	Major Project-1		
CASC -19T	Mobile Application Development		

Dr. H.S. Hota (Chairman)

CASC -19P	**Lab 12:** Mobile Application Development		
CASC -20T	Fundamentals of IoT and Applications		
CASC -20P	**Lab 14:** Fundamentals of IoT and Applications		

Program Outcomes (PO):

- Gain a complete exposure to the theories and practices of Computer Application.
- Get transformed into a skilled learner and active programmer, enabling the students to focus on their higher studies.
- Value computer professionals and programmers.
- Explore how the concepts and applications of Computer lead to innovative thinking with a problem-solving attitude.

Program Specific Outcomes (PSO):

- Understand the basic computer knowledge and concept of operating systems.
- Understanding the concept of programming and develop program in C++.
- Understanding the concept of data structure and implementation with C/C++.
- Understanding the concept of DBMS and implementation in MySQL /Oracle.
- Understanding the concept of OOPs and Java programming and develop program in Java.
- Understanding the concept of web technology and its implementation with HTML/CSS/DHTML/PHP.
- Understand the basic concept of data and computer networks.
- Understanding the basic concept of digital electronics.
- Understanding the basic concept of cyber security and cyber law.
- Understanding the basic concept of Artificial Intelligence.

CURRICULUM STRUCTURE

Scheme

Program: BCA

Discipline: Computer Application

Semester	Course Type	Course Code	Course Title	Total Credit	Total Marks	
					Max	Min
1st Semester	DSC (Major/Core)	CASC-01	Discrete Mathematics	4	100	40
		CASC-02T	Computer Fundamental and MS-Office	3	100	40
		CASC-02P	**Lab 1**: MS-Office	1	50	20
		CASC-03T	Operating System	3	100	40
		CASC-03P	**Lab 2:** Operating System	1	50	20
2nd Semester	DSC (Major/Core)	CASC-04	Digital Electronics	4	100	40
		CASC-05T	Programming in C++	3	100	40
		CASC-05P	**Lab 3:** Programming in C++	1	50	20
		CASC-06T	Data Structure	3	100	40
		CASC-06P	**Lab 4:** Data Structure Using C++	1	50	20
3rd Semester	DSC (Major/Core)	CASC-07	Software Engineering	4	100	40
		CASC-08T	Relational Database Management System	3	100	40
		CASC-08P	**Lab 5:** Relational Database Management System (Oracle/MySQL)	1	50	20
		CASC-09T	Programming in Java	3	100	40
		CASC-09P	**Lab 6**: Programming in Java	1	50	20
	DSE	CASE-01	Cyber Security and Cyber Law	4	100	40
4th Semester	DSC (Major/Core)	CASC-10	Theory of Computation	4	100	40
		CASC-11T	Web Technology	3	100	40
		CASC-11P	**Lab 7**: Web Technology	1	50	20
		CASC-12T	Python Programming	3	100	40
		CASC-12P	**Lab 8:** Python Programming	1	50	20

Dr. H.S Hota (Chairman) (Dr. K.B. Dubey) (Dr S K Saha) Dr. S. Jain

	DSE	CASE-02	Artificial Intelligence and Expert System	4	100	40
5th Semester	DSC (Major/Core)	CASC-13	Data Mining and Data Warehousing	4	100	40
		CASC-14T	Programming in .Net	3	100	40
		CASC-14P	**Lab 9**: Programming in .Net	1	50	20
		CASC-15T	Machine Learning	3	100	40
		CASC-15P	**Lab 10:** Machine Learning	1	50	20
	DSE	CASE-03	Numerical Analysis	4	100	40
6th Semester	DSC (Major/Core)	CASC-16	Data Communication and Computer Networking	4	100	40
		CASC-17T	Advanced Java	3	50	20
		CASC-17P	**Lab 11:** Advanced Java	1	100	40
		CASC-18	Major Project-1	4	50	20
	DSE	CASE-04	Computer System Architecture	4	100	40
7th Semester	DSC (Major/Core)	CASC-19T	Mobile Application Development	3	100	40
		CASC-19P	**Lab 12:** Mobile Application Development	1	50	20
	DSE	CASE-05	Computer Graphics	4	100	40
		CASE-06T	Cloud Computing	3	100	40
		CASE-06P	**Lab 13:** Cloud Computing	1	50	20
		CASE-07	Cryptography and Network Security	4	100	40
		CASE-08	Advanced Operating systems	4	100	40
8th Semester	DSC (Major/Core)	CASC-20T	Fundamentals of IoT and Applications	3	100	40
		CASC-20P	**Lab 14:** Fundamentals of IoT and Applications	1	50	20
	DSE	CASE-09	Soft Computing	4	100	40
		CASE-10	Digital Image Processing	4	100	40
		CASE-11	Big Data Analytics	4	100	40
		CASE-12	Major Project - 2	4	100	40

(Chairman) (Dr. K.B. Dubey) Dr S K Sahu (Dr. Anil Sharma) (Dr. S Dairy) (H.S.P. Tandi)
(Sushil Kumar Sahu) (Suresh Thakur) (Dr. Asmita Shukla)
(Shailendra Arya) ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Computer Application *(Certificate / Diploma / Degree/Honors)*		**Semester – V**	Session: 2024-2025
1	Course Code	CASC-13	
2	Course Title	**Data Mining and Data Warehousing**	
3	Course Type	**DSC (Discipline Specific Course)**	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Store voluminous data for online processing. • Preprocess the data for mining applications. • Apply the association rules for mining the data. • Design and deploy appropriate classification techniques. • Cluster the high dimensional data for better organization of the data. • Evaluate various mining techniques on complex data objects.	
6	Credit Value	**4 Credits**	*Credit = 15 Hours - Learning & Observation*
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) – 60 Periods (60 Hours)

Unit	Topics (Course contents)	No. of Period
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. **Data Warehouse:** Meaning, definition, OLTP vs. OLAP, Data warehouse architecture, Three Tier Architecture Data warehouse architecture, Data cube and OLAP technology.	15
II	**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.	15
III	**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.	15
IV	**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.	15
Keywords	*Data Mining, Data Warehouse, Knowledge discovery, OLTP, OLAP, Data cube, CART, CHAID, Regression.*	

Name and Signature of Convener & Members of CBoS:

Dr. H. S Hota
Chairman
(Suresh Thakur)
ANJEETA KUJU

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Data Mining: Concepts and Techniques, Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishes (Elsevier, 2nd edition), 2006.
- Data Mining Methods for Knowledge Discovery, Cios, Pedrycz, Swiniarski,Kluwer Academic Publishers, London – 1998.

Reference Books Recommended:

- Data mining techniques, Arun K Pujari, Universities Press (India) private limited, 2007.
- Data Mining, Data Warehousing and OLAP, Gajendra Sharma, S.K. Kateria and Sons, 2010.

Online Resources:

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

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment (CIA):	**30 Marks**
End Semester Exam (ESE):	**70 Marks**

Continuous Internal Assessment (CIA):	Internal Test / Quiz-(2): **20 +20** Assignment / Seminar - **10**	Better marks out of the two Test / Quiz + obtained marks in Assignment

(By Course Teacher)	Total Marks - 30	shall be considered against 30 Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts.,1 out of 2 from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

(Suresh Thekkan)

(Dr. S. Jain)

Shailendra Ojha

ANJEETA KUJU

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor of Computer Application (Certificate / Diploma / Degree/Honors)	Semester - V	Session: 2024-2025

1	Course Code	CASC-14T	
2	Course Title	**Programming in .Net**	
3	Course Type	**DSC (Discipline Specific Course)**	
4	Prerequisite	*As per program*	
5	Course Learning. Outcomes (CLO)	After Completing this course, students will be able to: • Study and use of .NET framework and object-oriented programming. • Develop the console and GUI applications using .Net programming. • Evaluate the .NET framework namespace contents. • Understand the procedures, File I/O, Error handling and Message queues. • Understand and remember the components in VB.NET IDE, ADO.NET and also the window forms.	
6	Credit Value	3 Credits	*Credit = 15 Hours - learning & Observation*
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Introduction to .NET**: Overview of .net framework, Features and architecture, Managed Execution process, CLR, Common language specification, JIT Compilation, MSIL, Namespace, Assemblies, Metadata common type, System, Visual development and event driven programming , Cross language, Interoperability, Garbage collection.	12
II	**Programming with .NET Framework:** Windows form: working with Visual Studio IDE, Creating a .NET solution, MDI application, Components and controls, Data types, Variable, Type conversions, Operators, Methods and events, Scope and lifetime of variables, Creating Enumerations.	11
III	**Control Structures:** Control Structures: conditional statement, Loops, Arrays, Types of methods, Method data, Creating Sub Procedures and Function, Introduction to exception handling try catch statement, finally statement, throw, user defined Exception. **GUI Programming**: GUI Programming with window forms, Showing & hiding, Textbox, RichText box, Label, Button, Listbox, Combobox, Checkbox, Picturebox, Radio button, Toggle button, Panel, Groupbox, Scrollbar, Timer, Dialog boxes, OpenfileDialog, Save File dialog, Print dialog, Front dialog, Color dialog, Designing menus and sub menus, Msgbox and Inputbox.	11
IV	**Database Programming with ADO.net** – ADO .Net Architecture, .Net data provider, dataset components, creating database application using Window forms (Database connectivity through ADO.Net), Accessing data using server explorer, Data Adapters and Data sets, Command & Data reader, Data bind controls, displaying data in data grid.	11
Keywords	*.NET, Window form, Graphical User Interface (GUI), MDI, ADO.Net*	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota Chairman

(Suresh Thakur)

Shailendra Arya

ANJEETA KU

PART–C: Learning Resources

Text Books Recommended:

- Visual Basic .Net Complete- by BPB Publications , New Delhi
- The Complete Reference VB.Net –by Jeffery R. Shapiro , Tata Mcgraw Hill.
- Bill Evjen, Jason Beres, et.al, Visual Basic .Net programming, Wiley Dreamtech India (p) Ltd.

Reference Books Recommended:

- Professional VB.Net 2003 – by Bill Evjen & others , Wiley Dreamtech India(P) Ltd. New Delhi
- Fergal Grimes, Microsoft .NET for programmers, Shroff Publishers & Distributors (P) Ltd.
- Thuan Thai & Hoang Q.Lam, .NET Framework Essentials, Shroff Publishers & Distributors (P) Ltd.
- MSDN online – by Microsoft

Online Resources:

- VB.Net Basic Tutorial: https://www.tutorialspoint.com/vb.net/vb.net_loops.htm.
- VB.NET Tutorial: https://www.javatpoint.com/vb-net.
- VB.NET Tutorial for Beginners: Learn VB.Net Programming : https://www.guru99.com/vb-net-tutorial.html?gpp&gpp_sid.
- Home and Learn: VB Net Programming Course Contents: https://www.homeandlearn.co.uk/NET/vbNet.html.
- Programming with VB.NET : https://www.mcu.ac.in/wp-content/uploads/2020/04/1PGDCA4B-Part-I-Programming-with-VB-.Net_.pdf
- Programming with visual Basic.Net (Notes in Hindi): https://computerhindinotes.com/programming-with-visual-basic-net-notes-in-hindi/
- Programming with visual Basic.Net (Video Lectures in Hindi): https://computerhindinotes.com/visual-basic-net-video-tutorials-in-hindi.
- Visual Basic .NET The Complete Reference: https://ravithanki.files.wordpress.com/2010/10/complete-reference-vb_net.pdf
- Learning Visual Basic.NET Language: https://riptutorial.com/Download/visual-basic--net-language.pdf.
- VB.NET Programming: https://mkasoft.com/downloads/VB.NET%20programming.pdf.
- Visual Basic.Net: https://books-library.net/files/books-library.online_noo25328f31569407903f036b-8313.pdf
- Visual Basic.Net Black Book: https://bcaofficial.wordpress.com/wp-content/uploads/2017/05/vb-net-black-book.pdf.
- A Programmer's Introduction to Visual Basic.Net: https://www.interplat.com/vbnet.pdf.
- Visual Basic 2017 Made Easy : https://www.vbtutor.net/vb2017/vb2017me_preview.pdf.

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment (CIA):	**30 Marks**
End Semester Exam (ESE):	**70 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20 +20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: Q1. Objective – **10 x1= 10** Mark; Q2. Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts., **1 out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

Dr. S. Jain

ANJEETA RUJU

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor of Computer Application *(Certificate / Diploma / Degree)*	Semester - V	Session: 2024-2025

1	Course Code	CASC-14P
2	Course Title	Lab 9: Programming in .Net
3	Course Type	Practical
4	Prerequisite	*As per program*
5	Course Learning Outcomes (CLO)	After Completing this course, students will be able to: • Study and use of .NET framework and object-oriented programming. • Develop the console and GUI applications using .Net programming. • Evaluate the .NET framework namespace contents. • Understand the procedures, File I/O, Error handling and Message queues. • Understand and remember the components in .NET IDE, ADO.NET and also the window forms. • Design, create, build, and debug dot net applications.
6	Credit Value	1 Credits *Credit =30 Hours Laboratory or Field Learning/Training*
7	Total Marks	Max. Marks: 50 Min Passing Marks: 20

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	List of Experiments	No. of Period
List of practical experiments	1. Write a program to addition, subtraction, multiplication and division of any two numbers. 2. Write a program to find the maximum between three numbers. 3. Write a program to check whether a number is negative, positive or zero. 4. Write a program to check whether a year is a leap year or not. 5. Design an application to input marks of five subjects Physics, Chemistry, Biology, Mathematics and Computer. Calculate percentage and grade as following: a. Percentage > 90%: Grade A b. Percentage >= 80%: Grade B c. Percentage > 70%: Grade C d. Percentage >60%: Grade D e. Percentage >= 40%: Grade E f. Percentage < 40%: Grade F 6. Design an application to input basic salary of an employee and calculate its Gross salary following: a. Basic Salary <= 10000: HRA = 20%, DA = B0% b. Basic Salary <n20000: HRA = 30%, DA = 90% c. Basic Salary> 20000: HRA = 30%, DA = 95% 7. Design an application to input electricity unit charges and calculate the given condition: a. For first 50 units Rs. 0.50/unit b. For next 100 units Rs. 0.75/unit c. For next 100 units Rs. 1.20/unit d. For unit above 250 Rs. 1.50/unit e. An additional surcharge of 20% is added to the bill	30hrs.

8. Write a program to convert decimal to binary number system using bitwise operators.
9. Write a program to swap two numbers using the bitwise operator.
10. Write a program to create Simple Calculator using a select case.
11. Write a program to find the sum of all natural numbers between 1 to n.
12. Write a program to enter any number and print its reverse.
13. Write a program to enter any number and check whether the number is palindrome or not.
14. Write a program to check whether a number is Armstrong number or not
15. Write a program to print Fibonacci series up to n terms.
16. Write a program to print Pascal triangles up to n rows.
17. Write a program to print all negative elements in an array.
18. Design a digital clock using timer control
19. Create an application that offers various food items to select from check boxes and a mode of payment using a radio button. It then displays the total amount payable.
20. Create an application to implement the working of Context menu on textbox
21. Write a program to illustrate all functionalities of list box and combo box.
22. Write a program for temperature conversion using a radio button.
23. Write a program to launch a rocket using Picture Box and Timer control
24. Write a program to change the back color of any control using a scroll box.
25. Write a program to search an element for a one dimensional array.
26. Design a menu such that it contains submenu such as Addition, Subtraction, Scalar Multiplication, and Transpose of two metrics.
27. Write a program to find greatest among three given number using user define procedures
28. Write a program to check whether given number neon or not using user defined function
29. Write a program to check whether a given number is Niven or not using procedure.
30. Write a program to check whether a given number is duck number or not
31. Write a program to check whether a given number is a spy number or not.
32. Write a program to check whether a given number
33. Design the following application using radio button and checkbox:
34. Develop an application which is similar to notepad using menus.
35. Develop an application for facilitating purchasing order.
36. Develop an application for a billing system in a coffee shop.
37. Develop an application which is similar to login form.
38. Define structure student structure student has written member for storing name roll number name of three subjects and marks with member function to store and print data.
39. create a class circle with data member radius provide member function to calculate area driver class fare from class circle provide member function to calculate volume derived class cylinder from class is fair with additional data member for height and member function to calculate volume
40. Write a program that implements the concept of encapsulation.
41. Write a program to demonstrate the concept of function overloading.
42. Create a class student having a data member to store roll number name of the student name of three subject Max marks, Min marks, and obtained marks. Declare an object of class. Provide facilities to input data in data members and display result of students
43. Create a class array having an array of integer having five elements at data member provide following facilities: a) constructor to get number in array element b) sort the elements

44. Create a table for employees and write a program using a data set to add, delete, edit and navigate records.
45. Write a program to access a database using ADO.NET and display key columns in the combo box or list box when an item is selected in it its corresponding records are shown in data grid control.
46. Write a program to calculate factorial of a number using user defined procedure.

Note: This is a tentative list; the teachers' concern can add more experiment as per requirement.

Keywords	*.NET, Window form, GUI, MDI, ADO.Net.*

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota Chairman

(Dr. S. Jain)

(Suresh Thakur)

Shailendra Agr

ANJEETA KUJUR

PART–C: Learning Resources

Text Books Recommended:

- Visual Basic .Net Complete- by BPB Publications , New Delhi
- The Complete Reference VB.Net –by Jeffery R. Shapiro , Tata Mcgraw Hill.
- Bill Evjen, Jason Beres, et.al, Visual Basic .Net programming, Wiley Dreamtech India (p) Ltd.

Reference Books Recommended:

- Professional VB.Net 2003 – by Bill Evjen & others , Wiley Dreamtech India(P) Ltd. New Delhi
- Fergal Grimes, Microsoft .NET for programmers, Shroff Publishers & Distributors (P) Ltd.
- Thuan Thai & Hoang Q.Lam, .NET Framework Essentials, Shroff Publishers & Distributors (P) Ltd.
- MSDN online – by Microsoft

Online Resources:

- VB.Net Basic Tutorial: https://www.tutorialspoint.com/vb.net/vb.net_loops.htm.
- VB.NET Tutorial: https://www.javatpoint.com/vb-net.
- VB.NET Tutorial for Beginners: Learn VB.Net Programming : https://www.guru99.com/vb-net-tutorial.html?gpp&gpp_sid.
- Home and Learn: VB Net Programming Course Contents: https://www.homeandlearn.co.uk/NET/vbNet.html.
- Programming with VB.NET : https://www.mcu.ac.in/wp-content/uploads/2020/04/1PGDCA4B-Part-I-Programming-with-VB-.Net_.pdf
- Programming with visual Basic.Net (Notes in Hindi): https://computerhindinotes.com/programming-with-visual-basic-net-notes-in-hindi/
- Programming with visual Basic.Net (Video Lectures in Hindi): https://computerhindinotes.com/visual-basic-net-video-tutorials-in-hindi.
- Visual Basic .NET The Complete Reference: https://ravithanki.files.wordpress.com/2010/10/complete-reference-vb_net.pdf

- Learning Visual Basic.NET Language: https://riptutorial.com/Download/visual-basic--net-language.pdf.
- VB.NET Programming: https://mkasoft.com/downloads/VB.NET%20programming.pdf.
- Visual Basic.Net: https://books-library.net/files/books-library.online_noo25328f31569407903f036b-8313.pdf
- Visual Basic.Net Black Book: https://bcaofficial.wordpress.com/wp-content/uploads/2017/05/vb-net-black-book.pdf.
- A Programmer's Introduction to Visual Basic.Net: https://www.interplat.com/vbnet.pdf.
- Visual Basic 2017 Made Easy: https://www.vbtutor.net/vb2017/vb2017me_preview.pdf.
- Introduction and Programming of dotNet: www.w3school.com

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance:** On spot Assessment A. **Performed the Task based on lab. work - 20 Marks** B. **Spotting based on tools & technology (written) – 10 Marks** C. **Viva-voce (based on principle/technology) - 05 Marks**	**Managed by Course teacher as per lab. status**

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

ANJEETA KUTUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor of Computer Application *(Certificate / Diploma / Degree/Honors)*	Semester - V	Session: 2024-2025

1	Course Code	**CASC-15T**	
2	Course Title	**Machine Learning**	
3	Course Type	**DSC (Discipline Specific Course)**	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Gain a deep understanding of advanced AI and machine learning principles. • Acquire skills for conducting a thorough literature review and formulating research problems. • Learn to design and implement advanced AI and machine learning algorithms. • Can understand and design generative AI techniques. • Can apply AI and machine learning techniques to solve real-world problems.	
6	Credit Value	**3 Credits**	***Credit = 15 Hours - learning & Observation***
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Introduction:** Concept of Machine Learning, Applications of Machine Learning, Key elements of Machine Learning, Supervised vs. Unsupervised Learning, Traditional programming Vs. Machine learning Statistical Learning: Bayesian Method, The Naïve Bayes Classifier.	13
II	**Linear Regression:** Prediction using Linear Regression, Gradient Descent, Linear Regression with one variable, Linear Regression with multiple variables, Polynomial Regression, Feature Selection and Feature Extraction. **Logistic Regression:** Classification using Logistic Regression, Logistic Regression vs. Linear Regression, Logistic Regression with one variable and with multiple variables.	11
III	**Regularization**: Regularization and its utility: The problem of Over fitting, Application of Regularization in Linear and Logistic Regression, Regularization and Bias/Variance. **Neural Networks:** Introduction, Model Representation, Gradient Descentvs. Perceptron Training, Stochastic Gradient Descent, Multilayer Perceptrons, Multiclass Representation, Back propagation Algorithms.	10
IV	**Deep Learning:** Introduction basics, various architectures of Deep learning: CNN, LSTM, Generative AI. **Machine learning tools:** Introduction of MATLAB, WEKA as machine learning tools, Using GUI of MATLAB and WEKA to develop Machine learning based models. Write programs to Implement machine learning models.	11

Keywords	*Artificial Intelligence (AI), Linear Regression, Logistic Regression, Artificial Neural Network (ANN).*

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
-Chairman

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Machine learning, Anuradha Srinivasaraghavan, Vincy Joseph, Wiley publication, India , 2019 edition.
- Introduction to Machine Learning with python A guide for data scientists, Andreas, C. Muller & Sarah Guido, O'Reilly.

Reference Books ***Recommended:***

- Understanding machine learning: From theory to algorithms, shai shalev-shwartez, shai ben-david, Cambridge University press.
- Machine learning with python, Abhishek Vijayvargia, BPB publication.
- Machine learning using python, U Dinesh Kumar, Manaranjan Pradhan, Wiley publication.
- Deep learning, Ian Goodfellow , Yoshua Bengio, Aoran Courville, Adaptive computation and machine learning series.
- Machine learning, Tom M. Mitchell, McGraw Hill, Indian Edition.

Online Resources:

- Overview of Machine Learning: https://www.youtube.com/watch?v=whSKA8aO6xQ&list=PLyqSpQzTE6M-SISTunGRBRiZk7opYBf_K&index=3
- Introduction to Artificial Intelligence: https://www.youtube.com/watch?v=pKeVMlkFpRc&list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH&index=2
- Deep Learning specialization: https://www.coursera.org/specializations/deep-learning
- Learning Material for Deep Learning https://onlinecourses.nptel.ac.in/noc24_cs114/preview
- Learning Material for Artificial Intelligence and Machine Learning https://onlinecourses.nptel.ac.in/noc24_ce107/preview
- Learning Material for Machine Learning https://onlinecourses.swayam2.ac.in/imb24_mg126/preview
- learning Material for Artificial Intelligence https://swayam-plus.swayam2.ac.in/course_detail?course_code=P_SMARTBRIDGE_01
- Learning Material for Machine Learning using Python https://www.coursera.org/specializations/machine-learning-introduction
- Learning Material for Artificial Intelligence https://www.coursera.org/learn/ai-for-everyone
- Learning Material for Machine Learning https://coursera.org/specializations/machine-learning-introduction
- Learning Material for deep Learning https://coursera.org/specializations/deep-learning

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment (CIA):	**30 Marks**
End Semester Exam (ESE):	**70 Marks**

Continuous Internal Assessment (CIA): **(By Course Teacher)**	Internal Test / Quiz-(2): **20 +20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts..**1 out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor of Computer Application *(Certificate / Diploma / Degree)*	Semester - V	Session: 2024-2025

1	Course Code	**CASC-15P**	
2	Course Title	**Lab 10: Machine Learning**	
3	Course Type	**Practical**	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes (CLO)	At the end of course, Students will be able to: • Understand complexity of Machine Learning algorithms and their limitations; • Applying common Machine Learning algorithms in practice and implementing their own. • Perform experiments in Machine Learning using real-world data. • Design and implement machine learning solutions to classification, regression, and clustering problems; and be able to evaluate and interpret the results of the algorithms. • Understand modern notions in data analysis oriented computing.	
6	Credit Value	**1 Credits**	***Credit =30 Hours Laboratory or Field Learning/Training***
7	Total Marks	**Max. Marks: 50**	**Min Passing Marks: 20**

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
List of Practical Experiments	1. Use command to compute the size of a matrix, size/length of a particular row/column, load data from a text file, store matrix data to a text file, finding out variables and their features in the current scope. 2. Perform basic operations on matrices (like addition, subtraction, multiplication) and 3. Display specific rows or columns of the matrix. 4. Perform other matrix operations like converting matrix data to absolute values, taking the negative of matrix values, adding/removing rows/columns from a matrix, finding the maximum or minimum values in a matrix or in a row/column, and finding the sum of some/all elements in a matrix. 5. Create various type of plots/charts like histograms, plot based on sine/cosine function based on data from a matrix. Further label different axes in a plot and data in a plot. 6. Generate different subplots from a given plot and color plot data. 7. Use conditional statements and different type of loops based on simple example/s. 8. Perform vectorized implementation of simple matrix operation like finding the transpose of a matrix, adding, subtracting or multiplying two matrices. 9. Implement Linear Regression problem. For example, based on a dataset comprising of existing set of prices and area/size of the houses, predict the estimated price of a given house. 10. Based on multiple features/variables perform Linear Regression. For example, based on a number of additional features like number of bedrooms, servant room,	**30**

number of balconies, number of houses of years a house has been built – predict the price of a house.

11. Implement a classification/ logistic regression problem. For example based on different features of students data, classify, whether a student is suitable for a particular activity. Based on the available dataset, a student can also implement another classification problem like checking whether an email is spam or not.
12. Use some function for neural networks, like Stochastic Gradient Descent or back propagation - algorithm to predict the value of a variable based on the dataset of problem.

Note: List of experiments may be changed by the concerned teacher.

Keywords	*Artificial Intelligence (AI), Linear Regression, Logistic Regression, Artificial Neural Network (ANN).*

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

(Suresh Thakur)

ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Machine learning, Anuradha Srinivasaraghavan, Vincy Joseph, Wiley publication, India, 2019 edition.
- Introduction to Machine Learning with python A guide for data scientists, Andreas, C. Muller & Sarah Guido, O'Reilly.

Reference Books ***Recommended:***

- Understanding machine learning: From theory to algorithms, shai shalev-shwartez, shai ben-david, Cambridge University press.
- Machine learning with python, Abhishek Vijayvargia, BPB publication.
- Machine learning using python, U Dinesh Kumar, Manaranjan Pradhan, Wiley publication.
- Deep learning, Ian Goodfellow , Yoshua Bengio, Aoran Courville, Adaptive computation and machine learning series.
- Machine learning, Tom M. Mitchell, McGraw Hill, Indian Edition.

Online Resources:

- Overview of Machine Learning:
  - https://www.youtube.com/watch?v=whSKA8aO6xQ&list=PLyqSpQzTE6M-SISTunGRBRiZk7opYBf_K&index=3
  - http://www.jnit.org/wp-content/uploads/2020/04/Machine-Learning-Lab-Manual.pdf
  - https://nthu-datalab.github.io/ml/
  - https://www.deeplearning.ai/courses/
  - https://www.jnec.org/labmanuals/cse/te/sem1/Machine%20Learning%20LAB%20MANUAL%20(1).pdf
  - https://deepakdvallur.weebly.com/machine-learning-laboratory.html

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

- Introduction to Artificial Intelligence:
  - https://www.youtube.com/watch?v=pKeVMlkFpRc&list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH&index=2
  - http://www.hpc.iitkgp.ac.in/pdfs/AI_HPC.pdf
  - https://www.tensorflow.org/resources/learn-ml?gclid=CjwKCAjw_ISWBhBkEiwAdqxb9hljIi5hnqF0Cq2Fgy_JEWiD_uZbxtetr_BFUF_QztAELk8d2q3P_BoCodMQAvD_BwE
  - https://www.edx.org/professional-certificate/deep-learning

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance:** On spot Assessment A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Computer Application *(Certificate / Diploma / Degree/Honors)*	Semester -V	Session: 2024-2025

1	Course Code	**CASE-03**		
2	Course Title	**Numerical Analysis**		
3	Course Type	**DSE (Discipline Specific Elective)**		
4	Prerequisite	*As per Program*		
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Obtain numerical solutions of algebraic and transcendental equations. • Find out numerical solutions of system of linear equations and check the accuracy of the solutions. • Evaluating the solution of problem using various interpolating and extrapolating methods. • Solve initial and boundary value problems in differential equations using numerical methods. • Apply various numerical methods in real life problems.		
6	Credit Value	**4 Credits**	***Credit = 15 Hours - learning & Observation***	
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**	

PART -B: Content of the Course

Total No. of Teaching–learning Periods (01 Hr. per period) – 60 Periods (60 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Numerical Methods for Solving Algebraic and Transcendental Equations:** Round-off error, Cubic and Bi-quadratic Solution: Cardon's Method, Ferrari Method, Descartes Method, Graeffe's Root Squaring, Bisection method, False position method, Fixed point iteration method, Newton's method and secant method for solving equations.	15
II	**Numerical Methods for Solving Linear Systems:** Determinant Method, Matrix Inversion Method, Lower and upper triangular (LU) decomposition of a matrix and its applications, Thomas method for tridiagonal systems; Gauss-Jordan, Jacobi's, Gauss-Seidel and successive over-relaxation (SOR) methods.	15
III	**Interpolation:** Lagrange and Newton interpolations, Piecewise linear interpolation, Cubic spline interpolation, Hermite's Interpolation, Gregory-Newton forward and backward difference interpolations. **Numerical Differentiation and Integration:** First order and higher order approximation for first derivative, Approximation for second derivative; Numerical integration: Trapezoidal rule, Simpson's rules and error analysis, Bulirsch-Stoer extrapolation methods, Richardson extrapolation.	15
IV	**Initial and Boundary Value Problems of Differential Equations:** Euler's method, Taylor's Method, Runge-Kutta methods, Predictor-Corrector, Higher order one step method, multi-step methods: Adams–Bashforth methods, Adams–Moulton methods, Finite difference method, Shooting method.	15
Keywords	*Error, Decomposition, Interpolation, Differentiation, Integration, Higher order.*	

Name and Signature of Convener & Members of CBoS:

Dr H.S. Hota
Chairman

ANJEETA KUJU

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Brian Bradie (2006), A Friendly Introduction to Numerical Analysis. Pearson.
- C. F. Gerald & P. O. Wheatley (2008). Applied Numerical Analysis (7th edition), Pearson Education, India.
- F. B. Hildebrand (2013). Introduction to Numerical Analysis: (2nd edition). Dover Publications.

Reference Books Recommended:

- M. K. Jain, S. R. K. Iyengar & R. K. Jain (2012). Numerical Methods for Scientific and Engineering Computation (6th edition). New Age International Publishers.
- Robert J. Schilling & Sandra L. Harris (1999). Applied Numerical Methods for Engineers Using MATLAB and C. Thomson-Brooks/Cole.
- Dr B. S. Grewal, Numerical Methods, Khanna Publications.

Online Resources:

- SWAYAM/NPTEL : Online Lecture Series on Numerical Analysis
  https://onlinecourses.swayam2.ac.in/cec20_ma11/preview
  https://onlinecourses.nptel.ac.in/noc19_ma21/preview
- NPTEL : Online Lecture Series on Numerical Methods
  https://www.youtube.com/channel/UCqpVOOZS6-OFQaPKWBZLKJQ
  https://www.youtube.com/watch?v=TWAN_T66Cps&list=PLq-Gm0yRYwTguDcfylj1ZicXxzdZCAr5S

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20 & 20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – 10 x1= **10** Mark; **Q2**. Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts.,**1out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:

Chairman

ANJEETA KUTUR

FOUR YEAR UNDERGRADUATE PROGRAM(2024–28)

DEPARTMENTOF Commerce and Management

COURSECURRICULUM

PART-A: Introduction				
Program:Bachelorin Business Administration *(Certificate/ Diploma/Degree/Honors)*			**Semester- V**	**Session:2024-2027**
1	**CourseCode**	**BBVAC – 03**		
2	**CourseTitle**	**Data Analytics Using MS Excel**		
3	**CourseType**	**Value Addition Course [VAC]**		
4	**Pre-requisite(if, any)**	***Asperrequirement***		
5	**CourseLearning. Outcomes(CLO)**	➢ Learn spreadsheet functions to efficiently perform calculations related to real-world operations. ➢ Identify real-world problems of data using spreadsheets. ➢ Apply spreadsheets'summarise and report tools to analyze real- world data.		
6	**CreditValue**	**2Credits**	***Credit=15 Hours-learning& Observation***	
7	**TotalMarks**	**Max.Marks: 50**	**MinPassingMarks: 20**	

PART-B: Contentof theCourse		
TotalNo.ofTeaching–learningPeriods (01Hr. perperiod)-30Periods(30 Hours)		
Unit	**Topics(Coursecontents)**	**No.of Period**
I	Working on Data in Spreadsheets: Applying Logic in Decision Making	**08**
II	Excel for Problem Solving	**07**
III	Data Visualisation with MS-Excel	**08**
IV	Lectures, Hands-on Practice, Case analysis	**08**
Keywords	***Data, MS- Excel, Problem Solving, Spreadsheets.***	

PART–C: LearningResources

OnlineResources–
https://www.theexcelexperts.com/importance-excel-business/
https://www.youtube.com/watch?v=eIN40JN7sro&ab_channel=LeilaGharani

PART-D:AssessmentandEvaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 50Marks
Continuous Internal Assessment (CIA): 15Marks
End Semester Exam (ESE): 35Marks

Continuous Internal Assessment(CIA): (By Course Teacher)	Internal Test / Quiz-(2):**10** & **10**Assignment/Seminar +Attendance - **05**Total Marks - **15**	Better marks out of the two Test/ Quiz +obtainedmarksinAssignmentshallbeconsideredagainst**15**Marks
End Semester Exam(ESE):	**Two section– A &B** SectionA:**Q1**. Objective–**05 x1=05** Mark;**Q2**. Short answertype-**5x2 =10Marks** Section **B**:Descriptive answer typeqts.,**1outof 2** fromeachunit-**4x05=20Marks**	

Name and Signature of Convenor & Members: (CBOS)