BAGALKOT UNIVERSITY

Mudhol Road, Jamkhandi – 587301 Dist: Bagalkote

The Draft

REGULATIONS AND COURSE STRUCTURE

Governing the Choice Based Credit System (CBCS) Semester Scheme with multiple entry and exit options in

Bachelor of Computer Applications (B.C.A.)

III Semester

As Per NEP – 2020 and Adapted from RCU Belagavi

Applicable from the Academic Year 2024-25

SECOND YEAR; SEMESTER-III										
Category	**Course code**	**Title of the Paper**	**Marks**			**Teaching hours/week**			**Credit**	**Duration of exams(Hrs)**
			IA	**SEE**	**Total**	**L**	**T**	**P**		
L-5	----------	Languages	40	60	100	4	0	0	3	2
L-6	----------	Languages	40	60	100	4	0	0	3	2
DSC7	126BCA03XXXDSC08T	Database Management System	40	60	100	3	0	0	3	2
	126BCA03XXXDSC08L	DBMS Lab	25	25	50	0	0	3	2	3
DSC8	126BCA03XXXDSC09T	C# and .Net Framework	40	60	100	3	0	0	3	2
	126BCA03XXXDSC09L	C# and .Net Framework Lab	25	25	50	0	0	3	2	3
DSC9	126BCA03XXXDSC10T	Computer Communication and Networks	40	60	100	3	0	0	3	2
OEC3	126BCA03XXXOEC03T	Python Programming Concepts	40	60	100	3	0	0	3	2
AECC	126COM03XXXAEC03T	Constitution of India	20	30	50	1	0	2	2	2
VBC5	126COM03XXXVBC05B	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
VBC6	126COM03XXXVBC06B	Physical Education – Sports	25	-	25	-	-	2	1	-
Total Marks					**800**	**Semester Credits**			**26**	

Course Content for BCA III Semester

Course Title: Database Management System	Course Code: 126BCA03XXXDSC08T
Total Contact Hours: 42	Course Credits: 03
Formative Assessment or IA Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (COs):

At the end of the course, students will be able to:

- Explain the various database concepts and the need for database systems.
- Identify and define database objects, enforce integrity constraints on a database using DBMS.
- Demonstrate a Data model and Schemas in RDBMS.
- Identify entities and relationships and draw ER diagram for a given real-world problem.
- Convert an ER diagram to a database schema and deduce it to the desired normal form.
- Formulate queries in Relational Algebra, Structured Query Language (SQL) for database manipulation.
- Explain the transaction processing and concurrency control techniques.

DSC7: Database Management System (DBMS)

Unit	Description	Hours
1	**Database Architecture:** Introduction to Database system applications. Characteristics and Purpose of database approach. People associated with Database system. Data models. Database schema. Database architecture. Data independence. Database languages, interfaces, and classification of DBMS.	08
2	**E-R Model:** Entity-Relationship modeling: E – R Model Concepts: Entity, Entity types, Entity sets, Attributes, Types of attributes, key attribute, and domain of an attribute. Relationships between the entities. Relationship types, roles and structural constraints, degree and cardinality ratio of a relationship. Weak entity types, E -R diagram.	08
3	**Relational Data Model:** Relational model concepts. Characteristics of relations. Relational model constraints: Domain constrains, key constraints, primary & foreign key constraints, integrity constraints and null values.	10

	Relational Algebra: Basic Relational Algebra operations. Set theoretical operations on relations. JOIN operations Aggregate Functions and Grouping. Nested Sub Queries-Views. Introduction to PL/SQL & programming of above operations in PL/SQL.	
4	**Data Normalization:** Anomalies in relational database design. Decomposition. Functional dependencies. Normalization. First normal form, Second normal form, Third normal form. Boyce-Codd normal form.	07
5	**Query Processing Transaction Management:** Introduction Transaction Processing. Single user & multiuser systems. Transactions: read & write operations. Need of concurrency control: The lost update problem, Dirty read problem. Types of failures. Transaction states. Desirable properties (ACID properties) of Transactions. Concurrency Control Techniques: Locks and Time stamp Ordering. Deadlock & Starvation.	09

References:

1. Fundamentals of Database Systems, Ramez Elamassri, Shankant B. Navathe, 7th Edition, Pearson, 2015
2. An Introduction to Database Systems, Bipin Desai, Galgotia Publications, 2010.
3. Introduction to Database System, C J Date, Pearson, 1999.
4. Database Systems Concepts, Abraham Silberschatz, Henry Korth, S.Sudarshan, 6th Edition, McGraw Hill, 2010.
5. Database Management Systems, Raghu Rama Krishnan and Johannes Gehrke, 3rd Edition, McGraw Hill, 2002

Year	**II**	**Course Title : DBMS LAB** **Code : 126BCA03XXXDSC08L**	**Credits**	**02**
Sem.	**III**		**Hours**	**40**
Course Pre-requisites, ifany:		Knowledge of Programming		
Formative Assessment Marks: 25		Summative Assessment Marks: 25	Duration of ESA: 03 hrs.	

Practicals:

CO: Student would be able to create tables, execute queries and PL/SQL programs.

1. Execute a single line query and group functions.
2. Execute DDL Commands.
3. Execute DML Commands
4. Execute DCL and TCL Commands.
5. Implement the Nested Queries.
6. Implement Join operations in SQL
7. Create views for a particular table
8. Implement Locks for a particular table
9. Write PL/SQL procedure for an application using exception handling.
10. Write PL/SQL procedure for an application using cursors.
11. Write a PL/SQL procedure for an application using functions
12. Write a PL/SQL procedure for an application using package

Evaluation Scheme for Lab Examination:

Assessment Criteria		**Marks**
Program – 1 from Part A	Writing the Program	03
	Execution and Formatting	07
Program -2 from Part B	Writing the Program	03
	Execution and Formatting	07
Viva Voice based on **DBMS**		05
Total		25

Course Title: C# and Dot Net Framework	Course code: 126BCA03XXXDSC09T
Total Contact Hours: 42	Course Credits: 03
Formative Assessment or IA Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (COs):

At the end of the course, students will be able to:

- Describe Object Oriented Programming concepts like Inheritance and Polymorphism in C# programming language.
- Interpret and Develop Interfaces for real-time applications.
- Build custom collections and generics in C#.

DSC8: C# and Dot Net Framework

Unit	Description	Hours
1	Introduction The C# language, the .Net Architecture and .Net Framework, The Common Language Runtime (CLR), Microsoft Intermediate Language (MSIL) Code, Just In Time Compilers (JITers),The Framework Class Library (FCL), The Common Languages Specification (CLS), The Common Type System (CTS), The .Net Framework, Working with Visual Studio.Net, Similarities and Differences between C# and C++, Java, and Visual Basic, Understanding the HELLO WORLD Application Code, The System. Environment Class, The System. Console Class, Namespaces in C#, The using Keyword, The class Keyword, The Main() Method, Printing on the Console, Comments.	10
2	C# Basics: Data Types, Variables & Constants, Operators in C#, Arithmetic Operators, Prefix and Postfix notation, Assignment Operators, Relational Operators, Other Operators, Operators precedence, Flow Control and Conditional Statements. Object and Classes: Concept of a class, Objects, Fields, Methods, Access modifiers, Properties, Static members of the class, Constructors, Destructors, Method overloading.	08
3	Pillars of OOP, Encapsulation support, Class properties, C#‟s Inheritance Support, C #'s Polymorphic Support, Interface: Deriving classes, calling base class constructor, Overriding Methods, Non-Inheritable Classes, Abstract Class, Interface Inheritance, Namespace and Access Modifiers, Boxing and Un-boxing. .NET Delegate type, defining a Delegate in C#, System. Delegate Base Classes, Delegate examples, C# Events, operator overloading.	08
4	Exception Handling: Handling Exceptions using try and catch, Raising Exceptions using throw, Pre- defined Exception classes, Custom Exception classes, Understanding Object Lifetime classes, Objects and References, the basics of Object Lifetime, System. GC type. Assemblies-The Role of .NET Assemblies, Understanding the format of .NET Assemblies, single file assembly, multifile assembly, Private and Shared Assemblies.	08

5	Working with Collections: List and Dictionary, Array List and Hash Table, Generic Classes, Comparable and Sorting, WinForms: Introduction, Controls, Menus and Context Menus, Menu Strip, Toolbar Strip, Graphics and GDI, SDI and MDI Applications, Dialog box (Modal and Modeless), Form Inheritance, Developing Custom, Composite and Extended Controls.	08

References:

1. E. Balagurusamy, Programming in C#, Tata McGraw Hill
2. Stephen Walthert, ASP.NET 3.5 unleased, SAMS
3. ShibiPanikkar and Kumar Sanjeev, C# with .NET Frame Work, Firewall Media
4. Jeffrey Richter, Applied Microsoft .Net Framework Programming, (Microsoft)

Additional Reading:

5. http://www.bestdotnettraining.com
6. http://www.bestsharepointtraining.com
7. https://stackoverflow.com/documentation
8. Troelsen, Andrew, Pro C# 5.0 and the .NET 4.5 Framework, 6th Edition, APress, India

Year	II	Course Code: 126BCA03XXXDSC09L	Credits	02
Sem.	III	Course Title: C# and Dot Net Framework LAB	Hours	40
Course Pre-requisites, ifany:		Knowledge of Programming		
Formative Assessment Marks: 25		Summative Assessment Marks: 25	Duration of ESA: 03 hrs.	
		Practicals: 1. Write a C# program to show the machine details like machine name, Operating System, Version, Physical Memory and calculate the time since the Last Boot Up. (Hint: Use System. Environment Class) 2. Write a program in C# Sharp to count a total number of alphabets, digits and special characters in a string 3. Write a program in C# Sharp to create a function to calculate the sum of the individual digits of a given number. 4. Draw a square with sides 100 pixels in length. Then inscribe a circle of radius 50 inside the square. Position the square and the inscribed circle in the middle of the screen. 5. Write a program to implement multilevel inheritance. 6. Write a program to demonstrate System exception. 7. Write an object oriented program to demonstrate bank transaction. Include methods for amount deposit, amount withdrawal and display. 8. Demonstrate operator overloading two complex numbers. 9. Demonstrate Dialog box (Modal and Modeless). 10. Write a program in C# Sharp to create Menu and menu items.		

Evaluation Scheme for Lab Examination:

Assessment Criteria		Marks
Program – 1 from Part A	Writing the Program	03
	Execution and Formatting	07
Program -2 from Part B	Writing the Program	03
	Execution and Formatting	07
Viva Voice based on **C# and Dot Net Framework**		05
Total		25

Course Title: Computer Communication and Networks	Course code: 126BCA03XXXDSC10T
Total Contact Hours: 42	Course Credits: 03
Formative Assessment or IA Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (COs):

At the end of the course, students will be able to:

- Explain the transmission technique of digital data between two or more computers and a computer network that allows computers to exchange data.
- Apply the basics of data communication and various types of computer networks in real world applications.
- Compare the different layers of protocols.
- Compare the key networking protocols and their hierarchical relationship in the conceptual model like TCP/IP and OSI.

DSC9: Computer Communication and Networks

Unit	Description	Hours
1	**Introduction:** Computer Networks and its applications, Network structure, network architecture, Topologies, LAN, WAN, MAN, The OSI reference model, The TCP/IP reference model.	08
2	**The Physical Layer:** Transmission Media – Twisted pair, coaxial cable, optical fiber, radio transmission, microwaves and infrared transmission, Switching – message switching, Multiplexing.	07
3	**The Data Link Layer:** Data Link Layer design issues, Error detection – Single parity checking, Checksum, polynomial codes – CRC, Error correction-Hamming code, Elementary data link protocols, sliding window protocols.	08
4	**The Network Layer:** Network layer design issues, Routing algorithms – Flooding, Distance vector routing, Hierarchical routing, Link state routing, Congestion, control algorithms – Leaky bucket, token bucket algorithm, admission control, Hop by Hop choke packets.	09
5	**The Transport Layer and Application Layer:** Elements of Transport service, Elements of Transport, protocols, Internet transport protocols (TCP & UDP), DNS, Electronic Mailing, and World Wide Web.	10

References:

1. Computer Networks, Andrew S. Tanenbaum, 5th Edition, Pearson Education, 2010.
2. Data Communication & Networking, Behrouza A Forouzan, 3rd Edition, Tata McGraw

Hill,2001.
3. Data and Computer Communications, William Stallings, 10th Edition, Pearson Education, 2017.
4. Data Communication and Computer Networks, Brijendra Singh, 3rd Edition, PHI, 2012.
5. Data Communication & Network, Dr. Prasad, Wiley Dreamtech.
6. http://highered.mheducation.com/sites/0072967757/index.htmls

Open Elective for III Semester

OEC3: Python Programming Concepts

Course Code: 126BCA03XXXOEC03T **Course Title: Python Programming Concepts**	**Course Credits: 3 (3L+0T+0P)**
Semester: III	**Duration of SEE: 02 Hour**
Total Contact Hours: 42	**SEE: 60 Marks** **IA: 40 Marks**

Course Outcomes (COs):

- Explain the fundamentals of Computers.
- Explain the basic concepts of Python Programming.
- Demonstrate proficiency in the handling of loops and the creation of functions.
- Identify the methods to create and store strings.

Unit I Fundamentals of Computers 10 Hrs

Introduction to Computers - Computer Definition, Characteristics of Computers, Evolution and History of Computers, Types of Computers, Basic Organization of a Digital Computer; Number Systems – different types, conversion from one number system to another; Computer Codes – BCD, Gray Code, ASCII and Unicode; Boolean Algebra – Boolean Operators with Truth Tables; Types of Software – System Software and Utility Software; Computer Languages - Machine Level, Assembly Level & High Level Languages, Translator Programs – Assembler, Interpreter and Compiler; Planning a Computer Program - Algorithm, Flowchart and Pseudo code with Examples.

Unit II Python Basics 10 Hrs

Introduction to Features and Applications of Python; Python Versions; Installation of Python; Python Command Line mode and Python IDEs; Simple Python Program. Identifiers; Keywords; Statements and Expressions; Variables; Operators; Precedence and Association; Data Types; Indentation; Comments; Built-in Functions- Console Input and Console Output, Type Conversions; Python Libraries; Importing Libraries with Examples; Illustrative programs.

Unit III 08 Hrs

Python Control Flow: Types of Control Flow; Control Flow Statements- if, else, elif, while loop, break, continue statements, for loop Statement; range() and exit () functions; Illustrative programs.

Unit IV 08 Hrs

Python Functions: Types of Functions; Function Definition- Syntax, Function Calling, Passing Parameters/arguments, the return statement; Default Parameters; Command line Arguments; Key Word Arguments; Illustrative programs.

Unit V **6 Hrs**

Strings: Creating and Storing Strings; Accessing Sting Characters; the str() function; Operations on Strings- Concatenation, Comparison, Slicing and Joining, Traversing; Format Specifiers; Escape Sequences; Raw and Unicode Strings; Python String Methods; Illustrative programs.

References

1. Computer Fundamentals (BPB), P. K. Sinha & Priti Sinha
2. Think Python How to Think Like a Computer Scientist, Allen Downey et al., 2nd Edition, Green Tea Press. Freely available online 2015. @https://www.greenteapress.com/thinkpython/thinkCSpy.pdf
3. Introduction to Python Programming, Gowrishankar S et al., CRC Press, 2019.
4. http://www.ibiblio.org/g2swap/byteofpython/read/
5. http://scipy-lectures.org/intro/language/python_language.html
6. https://docs.python.org/3/tutorial/index.html

Semester End Exam Question Paper Pattern

Duration of the examination: 2hour **Max. Marks:60**

Section A

Answer any TEN from the following, each carries 2 marks: [10X2=20]

1. ----------
2. ----------
3. ----------
4. ----------
5. ----------
6. ----------
7. ----------
8. ----------
9. ----------
10. ----------
11. ----------
12. ----------

Section B

Answer any FOUR from the following questions each carries 5 marks.

[4X5=20]

13. ----------
14. ----------
15. ----------
16. ----------
17. ----------

Section C

Answer Any two from the following questions each carries 10 marks.

(The Question may consist two sub-questions)

[2X10=20]

18. ----------
19. ----------
20. ----------

Theory Paper IA 40 Marks distribution

	C1	C2	Total Marks
First IA	Test-1: 15marks	Assignment/Activity-1: 05Marks	**20**
Second IA	Test-2: 15marks	Assignment/Activity-2 : 05Marks	**20**
	30	**10**	**40**

Theory Paper IA 20 Marks distribution

	C1	C2	Total Marks
First IA	Test-1: 10 marks	--	**10**
Second IA	Test-2: 5marks	Assignment/Activity-2 : 05	**10**
	15	**5**	**20**

BCA LANGUAGES SEMESTER III
Question paper codes for languages

SEMESTER-III			
SL NO	**Category of the Course**	**Course Code**	**Title of the Course**
1	L-5	**126BCA03LANAEC17T**	Kannada
2	L-5	**126 COM03LANAEC18T**	Functional Kannada
3	L-5	**126 BCA03LANAEC19T**	English
4	L-5	**126 BCA03LANAEC20T**	Hindi
5	L-5	**126 BCA03LANAEC21T**	Sanskrit
6	L-5	**126 BCA03LANAEC22T**	Marathi
7	L-5	**126 BCA03LANAEC23T**	Urdu
8	L-5	**126 BCA03LANAEC24T**	Arabic

SEMESTER-III			
SL NO	**Category of the Course**	**Course Code**	**Title of the Course**
1	L-6	**126BCA03LANAEC17T**	Kannada
2	L-6	**126 COM03LANAEC18T**	Functional Kannada
3	L-6	**126 BCA03LANAEC19T**	English
4	L-6	**126 BCA03LANAEC20T**	Hindi
5	L-6	**126 BCA03LANAEC21T**	Sanskrit
6	L-6	**126 BCA03LANAEC22T**	Marathi
7	L-6	**126 BCA03LANAEC23T**	Urdu
8	L-6	**126 BCA03LANAEC24T**	Arabic