Program Name: **Bachelor of Computer Applications**

Course Name: Data Analytics Using Python   **Course Code:** TBC 401

1 Contact Hours: 42   **L** 2   **T** 1 **P**   0

2 Examination Duration(Hrs):   **Theory** 0 3   **Practical**   0 0

3 Relative Weightage: **CWE:** 25   **MTE:** 25   **ETE:** 50

4 Credits: 0   3

5 Semester: ☐   ☑   ☐
          Autumn   Spring   Both

6 Pre-Requisite: Basic fundamentals of computer science

7 Subject Area: Computer Science

8 Objective: To teach data science concepts and applications of Python programming.

9 Course Outcome: A student who successfully fulfills the course requirements will be able to-

a. Define and describe the fundamental aspects of analytics and data science.
b. Implement and examine statistical concepts on real world problems.
c. Describe and implement the fundamental concept of python programming.
d. Examine the data stored in files and evaluate it.
e. Defend and design approach for data analysis using python.

10   Details of the Course:

Unit No.	CONTENT	CONTACT HOURS
1	**Introduction to DataScience:** Introduction to data science, Knowledge domains of Data Analysis, Understanding structured and unstructured data, Data Analysis process, State of the Practice in Analytics, The Data Scientist, Data Analytics Lifecycle Challenges of Conventional Systems	9
2	**Statistical Concepts**: Sampling Distributions, Re-Sampling, Statistical Inference, Prediction Error, Regression Modelling, Multivariate Analysis, Bayesian Modelling.	9
3	**Introduction to Python**: Installation of Python in Windows, Linux and Osx, Using Interactive shell. Creating, Saving and Running a Python Script. Intro to Python's data types: String, Lists, Dictionaries, Tuples, Variables, Assignments; Immutable variables, Numerical types, operators and expressions	8
4	**Functional Programming:** Understanding If-Else, While, For, Iterations. Functions Basics, Scopes and Argument Passing. Advanced Functions. Modules creation and Managing Code with modules.File handling in python.	8

5	Processing and Visualizing Data : NumPy Basics: Understanding and creating N-dimensional arrays, Basic indexing and slicing, Data processing using arrays. Pandas: Importing files and creating data frames, Introductory Data analysis Visualization using Matplotlib.	8
		42

11   Suggested Books:

Sl. NO.	NAME OF AUTHERS/BOOKS/PUBLISHERS	YEAR OF PUBLICATION
1	David Dietrich, Barry Heller and Beibei Yang, "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data", EMC Education Services, Reprint 2015, Wiley, ISBN: 9788126556533.	2015
2	Wesley J. Chun, ―Core Python Applications Programming, 3rd Edition , Pearson Education, 2016	2016
3	Downey, A. et al., "How to think like a Computer Scientist: Learning with Python", John Wiley, 2015	2015
4	John Zelle, ―Python Programming: An Introduction to Computer Science‖, Second edition, Course Technology Cengage Learning Publications, 2013	2013

Course Name: Bachelor of Computer Applications

Subject Name: Microprocessor   **Subject Code:**   TBC-402

1   Contact Hours: 42   **L** 3   **T** 0   **P**   0

2   Examination Duration(Hrs):   **Theory**   0   3   **Practical**   0   0

3   Relative Weightage: **CWE:** 25   **MTE:** 25   **ETE:** 50

4   Credits: 0   3

5   Semester:
    Autumn   Spring   Both
    (Spring ✓)

6   Pre-Requisite: Basics of the computer architecture

7   Subject Area: Electronics

8   Objective: To familiarize students with the architecture of microprocessor.

9   Course Outcome: A student who successfully fulfills the course requirements will be able to-
   a.   The student will be able to analyse, specify, design, write and test assembly language programs of moderate complexity.
   b.   The student will be able to select an appropriate 'architecture' or program design to apply to a particular situation; e.g. an interrupt-driven I/O handler for a responsive real-time machine.
   c.   Following on from this, the student will be able to design and build the necessary programs.
   d.   The student will be able to calculate the worst-case execution time of programs or parts of programs, and to design and build, or to modify, software to maximise its run time memory or execution-time behavior.
   e.   The student will be able to characterize and predict the effects of the properties of the bus on the overall performance of a system.

10   Details of the Course:

Unit No.	CONTENT	CONTACT HOURS
1	**Introduction to Microprocessor:** Overview of Intel 8085 to Intel pro-Pentium, Motorola 6800 series. Architecture of 8085 Microprocessor: Pin Diagram, Internal architecture, external system bus architecture.	9
2	**Programming Model (8085):** General-purpose register, flags, segment registers, Memory Interfacing, memory addressing. Peripheral I/O, memory mapped I/O.	9

3	**Basic Input/ Output Interface:** Basic I/O and handshaking, I/O port address decoding; 8255 programmable peripheral interface; 8279 programmable keyboard and display interface; 8254 programmable timer; 8251 programmable communication interface; interrupts, hardware & software interrupts, 8259 programmable interrupt controller, direct memory access, 8237 DMA controller.	8
4	**Assembly Language Programming (8085):** Instruction and data format, how to write and execute a simple program, writing simple assembly language programs, Debugging a program, data transfer instructions and operations. Arithmetic instructions and operations, Logic operations, stacks and subroutines.	8
5	**Introduction to Micro controller:** 8051 architecture, Applications, hardware, input/output pins, ports, interrupts.	8
	TOTAL	42

11   Suggested Books:

Sl. NO.	NAME OF AUTHERS/BOOKS/PUBLISHERS	YEAR OF PUBLICATION
1	R.S Goankar, "Microprocessor architecture, programming and application with the 8085" , Pen Ram International.	2012
2	Daniel Tabak, "Advanced Microprocessor", McGraw Hill	2010
3	Kenneth J. Ayala - 8051 Micro controller - Thomson	2010

Subject Name: Software Project Management and Information Systems

Subject Code: TBC- 403

1. Contact Hours: 42   L: 2   T: 1   P: 0

2. Examination Duration(Hrs): Theory | 0 | 3 | Practical | 0 | 0 |

3. Relative Weightage: CWE | 25 | MTE | 25 | ETE | 50 |

4. Credits: | 0 | 3 |

5. Semester: | | | ✓ | | |
   Autumn   Spring   Both

6. **Pre-Requisite:** Basics of the Software Engineering concepts

7. **Subject Area**: Software Engineering and Information Systems

8. **Objective:** To familiarize students with the how the software project are handled

9. **Learning Outcomes:**

   A student who successfully fulfills the course requirements will be able to:

   a) Understand and apply software project planning strategies.
   b) Analyze and implement the scheduling techniques of software projects in terms of cost and size.
   c) Understand the process of software configuration management.
   d) Identify and analyze requirements for information systems
   e) Understand and apply design principles in Information Systems and planning and control.
   f) Identify and define Manufacturing and Service Systems.

10. **Details of the Course:**

Sl.NO	CONTENT	CONTACT HOURS
1.	**Overview of Software Project Planning:** Software Project, Categorization of software Project, Introduction to Stepwise Project Planning, Project Scope, Infrastructure, Resource Allocation, Project Plan Execution. **Estimation:** Software Project Estimation, Decomposition Techniques- Software Sizing, Problem Based estimation, LOC based estimation, Function Point based estimation, Process Based estimation, Cost Benefit analysis, Cost Estimation Models, Selection of Technologies.	8
2.	**Project Scheduling:** Basic Concepts, Project Scheduling- Basic Principles, Relationship between People and Effort, Task Network, Scheduling, Gantt and PERT charts, Staffing, Project monitoring and control. **Software configuration management:** Concepts and definitions, Need and	8

	importance of SCM, Benefits of SCM, The SCM Process, Plan preparation with case study, Infrastructure setup, Team Training, System Operation, System Maintenance, System Retirement. Configuration Baselines, Interface Control, Metrics change control –Submitting Change Request, Request Analysis, Request Disapproval and Request Approval Configuration Control Tool.	
3.	**Information and information systems:** Concept of Information system, Components of information system,Transaction Processing System (TPS) - Office Automation System (OAS), Management Information System (MIS) - Decision Support System (DSS) and Group Decision Support System (GDSS)-Expert System(ES) Executive Support System (EIS or ESS).	10
4.	**Concepts of Planning & Control:** Concept of organizational planning, The Planning Process, Computational support for planning, Characteristics of control process, The nature of control in an organization.**Information System Planning:** Information System Development, Analysis, Design, Testing, Evaluation & Implementation.	10
5.	Manufacturing and Service Systems, Information systems for Accounting, Finance, Production and Manufacturing, Marketing and HRM functions - IS in hospital, hotel, bank ,**Enterprise Resources Planning (ERP):** Features, selection criteria, merits, issues and challenges in Implementation, **ERP related Technologies**:Supply Chain Management (SCM): Features, Modules in SCM, Customer Relation Management(CRM), E-Commerce applications.	10
	TOTAL	42

13. **Suggested Books:**

Sl.NO	NAME OF AUTHERS/BOOKS/PUBLISHERS	YEAR OF PUBLICATION/ REPRINT
1.	Pressman, Roger S., "Software Engineering: A Practitioner's Approach Ed. Boston: McGraw Hill, 6th edition, 2001	2002
2.	Shtub, Bard, and Globerson,"Project Management: Engineering, Technology, & Implementation", Prentice Hall	2001
3.	Bob Hughes, Mike Cotterell, "Software Project Management", 3rd Edition, McGrawHill	2005
4.	", Kenneth J Laudon, Jane P.Laudon ,"Management Information Systems", Pearson/PHI,10/e, 2007	2002
5.	W. S. Jawadekar ,"Management Information Systems", , Tata McGraw Hill Edition, 3/e, 2004	2001

Course Name: Web Technologies   **Course Code:** TBC 404

Program Name: BCA

1 Contact Hours: 42   **L** 2   **T** 1   **P** 0

2 Examination Duration(Hrs):   **Theory** 0 3   **Practical** 0 0

3 Relative Weightage: **CWE:** 25   **MTE:** 25   **ETE:** 50

4 Credits: 0 3

5 Semester: ☐ ☑ ☐
     Autumn   **Spring**   **Both**

6 Pre-Requisite: Basic knowledge of Internet Protocols.

7 Subject Area: Web Programming

8 Objective: To familiarize the students with the basics of web development.

9 Course Outcome: After completion of the course students will be able to

CO 1 Analyze the knowledge of Protocols, Websites and Web Applications.
CO 2 Create a web page and analyze its elements and attributes.
CO 3 Design a basic web site using HTML and CSS to demonstrate responsive web design.
CO 4 Design well-formed XML Document.
CO 5 Implement Client Side Scripting i.e. JavaScript to design dynamic web pages.
CO 6 Create simple web application using server side PHP programming and implement Database Connectivity using MySQL.

10 Details of the Course:

Unit No.	CONTENT	CONTACT HOURS
1	History of the Internet and World Wide Web, Gopher, HTML Protocols – HTTP, SMTP, POP3, MIME, IMAP. FTP, Telnet, Load Balancing, Web server and Application server, Email, ISP, URL address, DNS. Static VS Dynamic Websites, and Website VS Web Applications.	8
2	**HTML/DHTML** Basic Tags of HTML, Creating Links, Tables, Frames, forms etc. Style sheet - Cascading Style Sheets: Introduction to Cascading Style Sheet (CSS), three ways of introducing the style sheets to your document. Basic Syntax; Creating and saving cascading style sheets. <STYLE> tag.	8
3	**Extensible Markup Language (XML)** Introduction of XML, Features of XML, Advantages and Disadvantages of XML, HTML VS XML, XML Tree, XML DTD, and XML DOM.	8
4	**Client Side Scripting** Introduction to JavaScript, Advantage and disadvantages of JavaScript, Datatype - Variable - Array - Operator and Expression - Looping Constructor – Function, - Dialog box, DOM, Date and Time, Event Handling, External JavaScript, Form Validation, and cookies.	9
5	Introduction to PHP , Install PHP, A First PHP Web Page , Variables, Data Type, Expressions ,Control Statements , Functions , Arrays, String Handling in PHP, PHP Form, Cookie and Session, PHP MYSQLi.	9
	TOTAL	**42**

11 Suggested Books:

Sl. NO.	NAME OF AUTHERS/BOOKS/PUBLISHERS	YEAR OF PUBLICATION
1.	Ivan Bayross, "Web Technologies Part II", BPB Publications.	2001
2.	Welling & Thomson's *PHP and MySQL Web Development*	2002
3.	Complete reference HTML	2004
4.	JavaScript Bible	1998
5.	HTML, DHTML, JavaScript, Perl & CGI Ivan Bayross	2003

Course Name: Bachelor of Computer Applications

Subject Name: Computer Based Numerical & Statistical Techniques   **Subject Code:** TBC-405

1 Contact Hours: 42   **L** 3   **T** 0   **P** 2

2 Examination Duration(Hrs):   **Theory** 0 3   **Practical** 0 2

3 Relative Weightage: **CWE:** 25   **MTE:** 25   **ETE:** 50

4 Credits: 0 3

5 Semester: ☐ ☑ ☐
    Autumn   Spring   Both

6 Pre-Requisite: Basics of C Programming, Integration, Differentiation

7 Subject Area: Mathematics and Computer Programming

8 Objective: To familiarize students with the practical implementation of the mathematics functions.

9 Course Outcome: A student who successfully fulfills the course requirements will be able to-
   a. Understand floating point representation in computer system.
   b. Understand, analyze and use iterative method of problem solving.
   c. Find solutions to complicated mathematical business applications.
   d. Understand, analyze and use different algorithmic approach to problem solving.
   e. Understand, analyze and use interpolation and extrapolation.
      .

10   Details of the Course:

Unit No.	CONTENT	CONTACT HOURS
1	**Floating point Arithmetic:** Representation of floating point numbers, Operations, Normalization, Pitfalls of floating point representation, Errors in numerical computation **Iterative Methods:** Solution of Algebric and Transcendental Equation using Bisection Method, Iteration Method, Regula-Falsi method, Newton Raphson method, Secant method (Only Solutions to be included no proofs are required)	9
2	**Simultaneous Linear Algebric Equations**: Matrix Inversion Method Gauss Elimination method , ILL Conditioned system of equations. Finite Differences , Interpolation and approximation: Finite Differences, Difference tables(Forward and Backward),Shift Operator E Polynomial Interpolation: Newton's forward and backward formula Central	9

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	Difference Formulae: Gauss forward and backward formula, Stirling's, Bessel's, Everett's formula. Interpolation with unequal Intervals: Langrange's Interpolation, Newton Divided difference formula. (Only Solutions to be included no proofs are required)	
3	**Numerical Differentiation and Integration**: Introduction, Numerical Differentiation using Newton Forward and Newton Backward Formula. Numerical Integration: Trapezoidal rule, Simpson's rules, Boole's Rule, Weddle's Rule. **Solution of differential equations:** Picard's Method, Euler's Method, Modified Euler's Method Taylor's Method, Runge-Kutta methods (Only Solutions to be included no proofs are required)	8
4	**Curve fitting, Cubic Spline and Approximation:** Method of least squares, fitting of straight lines, polynomials, Exponential curves, **Statistical Computation :** Frequency Distribution, Cumulative, Relative Frequency distribution, Graphical Representation of Frequency Distribution **Regression analysis**: Linear and Non-linear regression, Multiple regression,**Correlation Analysis:** Karl Pearson, Rank Correlation, Spearman Coefficent.	8
5	**Time series and forecasting**: Measurement of secular trend methods, forecasting models and methods.	8
	TOTAL	**42**

11   Suggested Books:

Sl. NO.	NAME OF AUTHERS/BOOKS/PUBLISHERS	YEAR OF PUBLICAT ION
1	Manish Goel,"Computer Based Numeriacal and Statistical Techniques",Lakshmi Publication	2002
2	Rajaraman V., "Computer Oriented Numerical Methods", PHI	2003
3	Gerald & Wheatley, "Applied Numerical Analyses", AW	2004
4	Jain, Iyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New Age Int	2001
5	Grewal B. S., "Numerical methods in Engineering and Science", Khanna Publishers, Delhi	1998
6	T. Veerarajan, T Ramachandran, "Theory and Problems in Numerical Methods", TMH	1999
7	Pradip Niyogi, "Numerical Analysis and Algorithms", TMH	2001
8	Francis Scheld, "Numerical Analysis", TMH	2002
9	Gupta S. P., "Statistical Methods", Sultan and Sons	2003

Subject Name: Career Skills - II   **Subject Code:**   TBC 406

Course Name: Bachelor of Computer Application

1 **Contact Hours:**   30   **L** 2   **T** 0 **P**   0

2 **Examination Duration(Hrs):**   **Theory**   0 2   **Practical**   0 0

3 **Relative Weightage:**   **CWE:** 25   **MTE:** 25   **ETE:**   50

4 **Credits:**   0   2

5 **Semester:**

             ☐   ✓   ☐
          Autumn   Spring   Both

6 **Pre-Requisite:**   Basic concepts of Logic and application

7 **Subject Area:**   Quantitative Aptitude

8 **Objective:**   Prepare the students for the quantitative aptitude part for campus placement and competitive exams

9 **Course Outcomes:**   A student who successfully fulfills the course requirements will be

able to:

CO 1. Apply the properties of numbers and the other concepts to solve different problems on number theory.
CO 2. Understand the concepts of profit loss and simple interest and compound interest to solve different types of problems.
CO 3. Apply the concepts of Ratio and Proportion to solve the different types of questions in mixtures and solutions.
CO 4. Analyze the relation between speed, distance and time to effectively solve the problems of relative speed, boats and streams and trains.
CO 5. Understand the concept of Permutation, Combination and Probability to apply and practice the different types of questions.

10   **Details of the Course:**

Unit No.	CONTENT	CONTACT HOURS
1	Classification of numbers, rules of divisibility, properties of remainders, LCM-HCF and their applications, concept of the last digit, concept of alpha numerals. Practice of questions based on number system concepts. Concept of percentage and percentage equivalent of fractions, multiplication factor, importance and understanding of the base in calculations, concept and	7

	application of the successive percentage change rule	
2	Concept of profit, loss and discount and its application. Understanding and practice of questions based on addition of impurity and unequal quantity buying and selling concept. Concept and understanding of simple and compound interest and their difference, understanding CI as an application of the successive percentage change rule, concept of effective rate of interest and practice of all the types of problems in SI and CI.	6
3	Concept of ratio proportion and its application. Concept, understanding and practice of mixtures and solutions including alligation and replacement of part of a solution. Concept and understanding of average, weighted average and its application. Practice of problem based on age related concepts.	5
4	Concepts of time, speed and distance, understanding the direct and inverse relations in the topic, average speed and its application. Understanding the concept and application of relative speed and practice of problems based on trains and boats and streams. Concepts of time and work and its application based problems using the LCM method for individual efficiencies and practice of problems based on group efficiencies.	6
5	Concept, understanding and practice of questions based on permutation and combination, difference in the approach for different things and identical things. Concept, understanding and practice of questions based on probability.	6
	TOTAL	**30**

11   Suggested Books:

Sl. NO.	NAME OF AUTHERS/BOOKS/PUBLISHERS	YEAR OF PUBLICAT ION
1	R.S.Aggarwal, Quantitative Aptitude for Competitive Exams, S.Chand, 20th Edition.	2013
2	P.A.Anand, Quantitative Aptitude for Competitive Exams, Wiley Publication, First Edition.	2015