ಸಂತಅಲೋಶಿಯಸ್ ಕಾಲೇಜು (ಸ್ವಾಯತ್ತ)
ಮಂಗಳೂರು– 575 003
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ST ALOYSIUS COLLEGE(AUTONOMOUS)
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Re-accredited by NAAC with 'A' Grade with CGPA 3.62/4

Recognised by UGC as "College with Potential for Excellence"

Conferred "College with "STAR STATUS" by DBT, Government of India.

Centre for Research Capacity Building under UGC-STRIDE

Date: 17-08-2022

NOTIFICATION

Sub: Syllabus of **B.C.A.** under NEP Regulations, 2021.
(As per Mangalore University guidelines)

Ref: 1. Decision of the Academic Council meeting held on 18-12-2021 vide Agenda No: 6.4 (2021-22)
2. Decision of the Academic Council meeting held on 09-07-2022 vide Agenda No: 14
3. Office Notification dated 21-02-2022
4. Office Notification dated 17-08-2022

Pursuant to the above, the Syllabus of **B.C.A.**. under NEP Regulations, 2021 which was approved by the Academic Council at its meeting held on 18-12-2021 & 09-07-2022 is hereby notified for implementation with effect from the academic year **2021-22**.

PRINCIPAL

ST. ALOYSIUS COLLEGE MANGALURU 575 003 (AUTONOMOUS)

REGISTRAR

To:

1. The Chairman/Dean/HOD.
2. The Registrar Office
3. Library

Proposed Scheme of Teaching & Evaluation for B.C.A (Basic/Hons) having practical core courses

Semester I									
Sl. No	**Course Code**	**Title of the Course**	**Category of Courses**	**Teaching Hours per Week (L + T + P)**		**SEE**	**CIE**	**Total Marks**	**Credits**
				Theory	**Lab**				
1	G 735 LA1.1	Language–I	AECC	4	-	60	40	100	3
2	G 736 LA2.1	Language-II	AECC	4	-	60	40	100	3
3	**G 601 DC 1.1**	**Fundamentals of Computers**	**DSC-1**	**3**	**-**	**60**	**40**	**100**	**3**
4	**G 601 DC 2.1**	**Programming in C**	**DSC -2**	**3**	**-**	**60**	**40**	**100**	**3**
5	**G 601 DC 3.1**	**Mathematical Foundation**	**DSC -3**	**3**	**-**	**60**	**40**	**100**	**3**
6	**G 601 DC 1.1P**	**LAB1: Information Technology**	**DSC-1P**	**-**	**4**	**25**	**25**	**50**	**2**
7	**G 601 DC 2.1P**	**LAB2: C Programming**	**DSC -2P**	**-**	**4**	**25**	**25**	**50**	**2**
8	**G 601 OE 1.1**	**Business Statistics**	**OEC**	**3**	**-**	**60**	**40**	**100**	**3**
9	**G 650 SB 1.1**	**Digital Fluency**	**SEC SB**	**1**	**2**	**30**	**20**	**50**	**2**
10	**G 702 AE 1.1**	Environmental Studies & VE	**AECC**	**3**		**30**	**20**	**50**	**2**
11	G 705 VB 1.1	Physical Education-Yoga	SEC VB		2	15	10	25	1
12	G 706 VB 2.1	Health & Wellness/ Social & Emotional Learning	SEC VB		2	15	10	25	1
Sub–Total(A)				**35**		**500**	**350**	**850**	**28**

Semester II									
Sl. No	**Course Code**	**Title of the Course**	**Category of Courses**	**Teaching Hours per Week (L + T + P)**		**SEE**	**CIE**	**Total Marks**	**Credits**
				Theory	**Lab**				
1	G 735 LA1.2	Language-I	AECC	4	-	60	40	100	3
2	G 736 LA2.2	Language–II	AECC	4	-	60	40	100	3
3	**G 601 DC 1.2**	**Data Structures using C**	**DSC-4**	**3**	**-**	**60**	**40**	**100**	**3**
4	**G 601 DC 2.2**	**Object Oriented Concepts using JAVA**	**DSC -5**	**3**	**-**	**60**	**40**	**100**	**3**
5	**G 601 DC 3.2**	**Discrete Mathematical Structures**	**DSC -6**	**3**	**-**	**60**	**40**	**100**	**3**
6	**G 601 DC1.2P**	**LAB3: Data Structure lab**	**DSC-4P**	**-**	**4**	**25**	**25**	**50**	**2**
7	**G 601 DC 2.2P**	**LAB4: JAVA lab**	**DSC -5P**	**-**	**4**	**25**	**25**	**50**	**2**
8	**G 601 OE 1.2**	**Applied Statistics**	**OEC**	**3**	**-**	**60**	**40**	**100**	**3**
9	G 702 AE 1.2	Human Rights & VE	AECC	2		30	20	50	2
10	G 705 VB1.2	Physical Education-Sports	SEC VB		2	15	10	25	1

11	G 706 VB2.2	NCC/NSS/R&R(S&G) /Cultural	SEC VB		2	15	10	25	1
Sub–Total(B)				**34**		**470**	**330**	**800**	**26**

Course Code: **G601 OE 1.1**	**Course Title: Business Statistics**
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 03 Hours

Course Outcomes (COs):

Upon the completion of this course students should be able to:

- Frame and formulate management decision problems.
- Understand the basic concepts underlying quantitative analysis.
- Use sound judgment in the applications of quantitative methods to management decisions.

Course Contents

Contents	**Hours**
Unit – 1	
Statistical Data and Descriptive Statistics : Nature and Classification of data: univariate, bivariate and multivariate data; time-series and cross-sectional data. Measures of Central Tendency: mathematical averages including arithmetic mean geometric mean and harmonic mean, properties and applications. Positional Averages Mode and Median (and other partition values including quartiles, deciles, and percentiles). Measures of Variation: absolute and relative. Range, quartile deviation, mean deviation, standard deviation, and their coefficients, Properties of standard deviation/variance Skewness: Meaning, Measurement using Karl Pearson and Bowley's measures; Concept of Kurtosis.	12
Unit – 2	
Ratios and Proportions, Percentages, Interests and Discounts: Ratios & Proportions - Direct proportion, Inverse proportion, Compound proportions & problems. Percentages. Trade discount & cash discount - Problems. Concept of Simple interest & compound interest- nominal & effective rate of interest- Problems on all the se. Compound interest for fraction of year, Compound interest when rate changes year by year - Problems and Problems on Depreciation.	10
Unit - 3	

Index Numbers : Definition, Problems involved in the construction of index numbers, methods of constructing index numbers of prices and quantities, simple aggregate and price relatives method, weighted aggregate and weighted average of relatives method, important types of weighted index numbers: Laspeyre's, Paasche's, Bowley's, Marshall- Edgeworth, Fisher's, method of obtaining price and quantity index numbers, tests consistency of index numbers, time reversal test and factor reversal test for index numbers, Uses and limitations of index numbers. Consumer price index number: involved in the construction of cost of living index number, advantages and disadvantages, Aggregative expenditure method and Family budget method for the construction of consumer price index numbers. Applications of Cost of Living Index numbers. Definition and measurement of Inflation rate – CPI and GNP Deflator.	10

Course Code: **G601 OE 1.2**	**Course Title: Applied Statistics**
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 03 Hours

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

- Understand the Price and Quantity Index numbers and their different measures, understand the applicability of cost-of-living Index number.
- Know the components and Need for Time series, understand the different methods of studying trend and Seasonal Index.
- Study the concept of vital statistics, sources of data, different measures of Fertility and Mortality, Understand the Growth rates- GRR and NRR and their interpretations.
- Know the concept of Population, Sample, Sampling unit, sampling design, sampling frame, sampling scheme, need for sampling, apply the different sampling methods for designing and selecting a sample from a population, explain sampling and non-sampling errors.
- Describe the philosophy of statistical quality control tools as well as their usefulness in industry and hence develop quality control tools in a given situation.

Course Contents

Contents	**Hours**
Unit – 1	
Vital Statistics **10 Hours** Sources of demographic data, errors in data. Measurement of mortality: crude death rate, specific death rates, and standardized death rates, infant mortality rate, maternal mortality rate, neo natal mortality rates, merits and demerits and comparisons of various mortality rates. Measurement of Fertility and Reproduction: Fecundity, fertility, measurement of fertility, crude birth rate, general fertility rate, age specific fertility rate and total fertility rates, merits and demerits of each measure of fertility, comparative study of these measures of fertility, Growth rates: Gross reproduction rate and Net reproduction rates.	10
Unit – 2	

Sampling Methods **10 Hours** Population and Sample. Need for sampling, Complete Enumeration versus Sample Surveys, Merits and Demerits, Non-Probability and Probability Sampling, Need and illustrations. Use of random numbers, principal steps in sample survey. Requisites of a good questionnaire. Pilot surveys, Sampling and non – sampling errors, Simple random sampling, Stratified random sampling, Systematic random sampling procedure of obtaining sample. Merits and demerits of these sampling methods.	10
Unit - 3	
Correlation and Regression Analysis **Correlation Analysis**: Concept of correlation, Scatter diagram, Karl Pearson's coefficient and its properties (Statement only). Rank correlation coefficient, Applications of correlation. **Regression Analysis**: Meaning of regression, regression lines, and properties of regression coefficients and applications of regression equation.	12

Unit - 4	
Statistical Quality Control **10 Hours** Concept of quality and its management, meaning of SQC, Causes of variations in quality: chance and assignable. General theory of control charts, Control charts for variables: X- bar and R-charts. Control charts for attributes: p and c-charts. Applications of these charts. Acceptance Sampling Plans (Product control): Basic terminologies: AQL, LTPD, AOQ, AOQL, ASN, OC curve, producer's risk, and consumer's risk. Single sampling plan, double sampling plan.	10

Reference Books

1. Laura Lemay & Rafe Colburn, Mastering Html, CSS & Javascript, Web Publishing, 2016
2. Firuza Aibara, HTML 5 for Beginners, 2012
3. Glenn Johnson, Training Guide – Programming in HTML5 with JavaScript and CSS3 (Microsoft Press Training Guide), 2013

Unit - 4	
Time Series Analysis*:* Introduction, definition and components of Time series, illustrations, Additive, Multiplicative and mixed models, analysis of time series, methods of studying time series: Secular trend, method of moving averages, least squares method – linear, quadratic, exponential trend fittings to the data. Seasonal variation - definition, illustrations, measurements, simple average method, ratio to moving average method, ratio of trend method, link relatives method, Cyclical variation- definition, distinction from seasonal variation, Irregular variation- definition, illustrations.	10

Reference Books:

1. Levin, Richard, David S. Rubin, Sanjay Rastogi, and H M Siddiqui. Statistics for Management. 7th ed., Pearson Education.
2. David M. Levine, Mark L. Berenson, Timothy C. Krehbiel, P. K.Viswanathan, Business Statistics: A First Course, Pearson Education.
3. Siegel Andrew F. Practical Business Statistics. McGraw Hill Education.
4. Gupta, S.P., and Archana Agarwal. Business Statistics, Sultan Chand and Sons, New Delhi.
5. Vohra N. D., Business Statistics, McGraw Hill Education.
6. Murray R Spiegel, Larry J. Stephens, Narinder Kumar. Statistics (Schaum's Outline Series), Mc-Graw Hill Education.
7. Gupta, S.C. Fundamentals of Statistics. Himalaya Publishing House.
8. Anderson, Sweeney, and Williams, Statistics for Students of Economics and Business, Cengage Learning.

3 BCA – 5 SEM

	Subject Code	Subject	Theory Hours/ Week	Practical Hours/ Week	Duration of Exams (Hrs)	Marks & Credits			
						IA	Exam	Total	Credits
Group – 2	G 601.5	Java 2 Enterprise Edition	4	-	3	20	100*	100	2
	G 602.5	Computer Graphics & Multimedia	4	-	3	20	100*	100	2
	G 603.5	Object Oriented Analysis & Design	4	-	3	20	100*	100	2
	G 604.5	Software Engineering	4	-	3	20	100*	100	2
	G 605.5	Python Programming	4	-	3	20	100*	100	2
	G 606.5	Design and Analysis of Algorithms	4	-	3	20	100*	100	2
	G 601.5P	Lab 1 - Java 2 Enterprise Edition	-	3	3	20	80	100	2
	G 602.5P	Lab 2 - Computer Graphics	-	3	3	20	80	100	2
	G 603.5P	Lab 3 - Python Programming		3	3	20	80	100	2
		Total	24	9	27	180		900	18

3 BCA – 6 SEM

	Subject Code	Subject	Theory Hours / Week	Practical Hours /Week	Duration of Exams (Hrs)	Marks & Credits			
						IA	Exam	Total	Credits
Group 2	G 601.6	Linux and Shell Programming	4	-	3	20	100*	100	2
	G 602.6	Mobile Communication	4	-	3	20	100*	100	2
	G 603.6	Cloud computing	4	-	3	20	100*	100	2
	G 601.6P	Lab: Shell Programming and Wireframes	-	4	3	20	80	100	2
		Total	12	4	12			400	8

V SEMESTER: G 605 .5: PYTHON PROGRAMMING

Learning Objectives:
To Study Python Fundamentals to advanced concepts like OOPS, Exception handling, multi-threading, Networking, Database Connectivity and Graphical User Interface
Learning outcomes:
Be skilled at creating, debugging and testing a software application using the Python programming language.

UNIT I

Introduction to Python: Features of Python, Flavors of python, Python Virtual machine, Memory management, Garbage Collection, Comparison between Python and C, Java and Python**.** Installing Python for windows, Writing and executing Python program. **Datatypes & Operators in Python**: Writing comments, docstrings, Built in data types – None type, numeric type, sequences ,sets and mappings. Literals, Determining data types of variable, naming conventions in Python, **Operators:** Arithmetic, Assignment, relational, logical, Boolean, Bitwise, membership & Identity Operators. Using Python interpreter as Calculator Mathematical functions. **Input & Output:** Input/output Statements, Command line arguments. **Control Statements** – if, if..else, if..elif, while loop , for loop , else suite, break , continue ,assert , return Statements.
Arrays in Python- Creating arrays, Importing array module, Indexing and slicing on arrays, Processing the arrays, types of arrays, working with arrays using numpy. Creating array using linspace() , logspace() , arrange() , zeros() and ones() functions. Mathematical operations on arrays, Comparing arrays, Aliasing, viewing and copying arrays. Dimensions and attributes of Array. Working with multidimensional arrays, indexing and slicing, matrices in numpy.

12 HOURS

UNIT II

Strings and characters-Creating, indexing, slicing, repeating, concatenating & comparing strings. Finding and counting substrings in string, Replacing, splitting and joining strings, Working with characters.
Functions – Functions and methods, Defining, calling functions, returning multiple values, formal and actual parameters, Keyword argument Default arguments and variable argument. , Local and Global variables , Anonymous functions and Lambdas, **Lists and Tuples :** Creating , updating ,concatenating lists ,Repetition of list ,Aliasing and cloning lists, Sorting lists , Nested lists, Tuples ,Creating and accessing tuple elements, Basic operations on tuples ,Functions to process tuples , Nesting ,inserting ,modifying and deleting tuple elements. **Dictionaries:** Operations on Dictionaries, Dictionary methods, Sorting elements of dictionary, Converting list and strings into Dictionary.

12 HOURS

UNIT III

Classes and Objects-Defining class & Objects, constructors, type of methods and variables , Inner classes.
Inheritance and Polymorphism : Type of Inheritance , super() method , method overloading & Overriding, Abstract classes and interfaces. **Exception Handling** –Type of exceptions, assert Statement, Except Block, User defined exceptions, logging the exceptions. Threads.

12 HOURS

UNIT IV

Graphical User Interface: Root window, font& colors, Canvas and frames. Widgets: Button, Label, Message, Text, Scrollbar, Chekcbutton, Radiobutton, Entry, Spinbox, Listbox and Menu, Creating Tables.

Database Connectivity: Types of databases used with Python, Using MySQL from Python, Retrieving and Inserting , updating and deleting data in a table, Creating Database tables through Python.

12 HOURS

Text Book:

1. Ch Satynarayana, M Radhika Mani, ands B N Jagadeesh, Python Programming, Universities Press,2018.

Reference Books:

1. Python The Complete Reference by Martin C. Brown ,McGraw Hill Education
2. Complete Introduction to Python Language By Mark Summerfield , Second Edition.
3. Dr. R. Nageshwara Rao , Core Python Programming , Dreamtech Press , Second Addition

VI SEMESTER: G 603.6: CLOUD COMPUTING

Learning Objectives:

- A clear definition of what Cloud Computing is
- A comprehensive understanding of Cloud Computing
- An understanding of Cloud Computing benefits and key concepts

Learning Outcome:

- Understand the concepts, characteristics, delivery models and benefits of cloud computing
- Understand the key security and compliance challenges of cloud computing

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UNIT I

Defining Cloud Computing - Defining Cloud Computing**,** Cloud types: The NIST model, The cloud Cube Model, Deployment Models, Service Models, Examining the Characteristics of Cloud Computing: Paradigm shift, Benefits of cloud computing; Assessing the Role of Open standards.

Understanding Cloud Architecture – Exploring the cloud computing stack: composability, infrastructure, platforms, virtual appliances, communication protocols, applications, connecting to the cloud.

12 HOURS

UNIT II

Understanding Services and Applications by Type - Defining Infrastructure as a

Service (IaaS) : Iaas Workloads, Pods, Aggregation and silos, Defining Platform as a Service(Paas),Defining Software as a Service(SaaS): SaaS characteristics, Open Saas and SOA,Salesforce.com and CRM SaaS, Defining Identify as a Service(IDaaS): What is an identity, Networked identity service classes, Identity system codes of conduct, IDaas Interoperability: User authentication, Authorization markup languages, Defining Compliance as a Service(CaaS),

Understanding Abstraction and Virtualization - Using Virtualization Technologies, Load Balancing and Virtualization: Advanced load Balancing, The Google cloud, Understanding Hypervisors: Virtual machine types, VMware vSphere, Understanding Machine Imaging, Porting Applications: The Simple Cloud API, AppZero Virtual Application Appliance.

12 HOURS

UNIT III

Managing the Cloud – Administrating the clouds: Management responsibilities, Lifecycle management, Cloud management Products, Emerging Cloud Management Standards: DMTF cloud management standards, Cloud Commons and SMI,

Understanding Cloud Security - Securing the cloud: The security boundary, Security service boundary, Security mapping, Security Data: Brokered cloud storage access, Storage location and tenancy, Encryption, Adding and compliance, Establishing Identity and Presence: Identity Protocol standards, Windows Azure identity standards, presence.

12 HOURS

UNIT IV

Working with Cloud-based Storage – Measuring the digital universe, cloud storage definition, provisioning cloud storage, managed and unmanaged cloud storage, creating cloud storage systems, virtual storage containers, exploring cloud backup solutions: types, cloud backup features, cloud attached backup; cloud storage interoperability, CDMI, OCCI

Moving Applications to the Cloud – Applications in the Clouds, Functionality mapping, Application attributes, cloud service attributes, system abstraction, cloud bursting, applications and cloud APIs.

Communicating with the Cloud – Exploring Instant Messaging, Instant messaging clients, Instant messaging interoperability, Micro-blogs or Short Message Services.

12 HOURS

Text Books:

1. A T. Velte, Toby J Velte, " Cloud Computing A Practical Approach", Tata McGrawHill
2. Barrie Sosinsky, "Cloud Computing Bible", Wiley India