ACTION TAKEN REPORT

[w.r.t. meeting held on 13th February 2019]

With the introduction of F.Y.B.Sc, S.Y.B.Sc, M.Sc. II [Computer Science], skill-based course syllabus and evaluation pattern to BOS members following are the actions taken:

A) F.Y.B.Sc [Computer Science]

1) We have added Set Theory Topic in theory as well as practicals in Discrete Mathematics Subject in Sem-I. **(Refer Annexure A)**
2) We have added R language and removed the Hypothesis testing & Non-parametric tests. in Descriptive Statistics in Sem-I. **(Refer Annexure B)**
3) We have added MySQL topics and removed Database Protection & DCL Statements in Database Management Systems in Sem-I. **(Refer Annexure C)**

B) S.Y.B.Sc [Computer Science]

1) We have removed the man pages command from LINUX subject in Sem-III.
2) We have rearranged the practicals of Advanced Java subject practicals in Sem-III.
3) We have changed Linux command related practical from Computer Networks subject in Sem IV.

C) M.Sc II [Computer Science]

1) We have removed two Ubiquitous Practical's and added new practical's.
2) We have removed two Advanced Operating System Practical's and added new practical's. **(Refer Annexure D)**

ANNEXURE - A

<table>
<tr><td colspan="2">Class: F.Y.B.Sc</td><td colspan="2">Branch: Computer Science</td><td colspan="2">Semester: I</td></tr>
<tr><td colspan="6">Subject: Discrete Mathematics</td></tr>
<tr><td colspan="2" rowspan="2">Period per Week(Each 48 min)</td><td colspan="2">Lecture</td><td colspan="2">03</td></tr>
<tr><td colspan="2">Practical</td><td colspan="2">03</td></tr>
<tr><td colspan="2" rowspan="5">Evaluation System</td><td colspan="2"></td><td>Hours</td><td>Marks</td></tr>
<tr><td colspan="2">Semester End Exam</td><td>2</td><td>60</td></tr>
<tr><td colspan="2">Continuous Internal Assessment</td><td>__</td><td>40</td></tr>
<tr><td colspan="2">Semester End Practical Examination</td><td>3</td><td>50</td></tr>
<tr><td colspan="2">Total</td><td>__</td><td>150</td></tr>
<tr><td>Course:
UGCS105</td><td colspan="4">Discrete Mathematics
(Credits: 2 Lectures/Week: 3)</td><td>Lectures</td></tr>
<tr><td></td><td colspan="4">Objectives:

The purpose of the course is to familiarize prospective learners with mathematical structures that are fundamentally discrete. This course introduces sets and functions, forming and solving recurrence relations and different counting principles. These concepts are useful to study or describe objects or problems in computer algorithms and programming languages.

Expected Learning Outcomes:

1) To provide an overview of the theory of discrete objects, starting with relations and partially ordered sets.
2) Study about recurrence relations, generating function and operations on them.
3) Give an understanding of graphs and trees, which are widely used in the software.
4) Provide basic knowledge about models of automata theory and the corresponding formal languages.
5) The student should be able to understand permutations and combinations and counting principles.
6) The student should be able to evaluate regular expressions and problems on finite state automata.</td><td></td></tr>
<tr><td>Unit I</td><td colspan="4">Set Theory: Fundamentals - Sets and subsets, Venn Diagrams, Operations on sets, Laws of Set Theory, Power Sets and Products, Partition of sets, The Principle of Inclusion-Exclusion.
Logic: Propositions and Logical operations, Truth tables, Equivalence, Implications, Laws of Logic, Normal forms, Predicates and quantifiers, Mathematical Induction.</td><td>15 L</td></tr>
</table>

	Functions: Definition of function. Domain, co-domain and the range of a function. Direct and inverse images. Injective, surjective and bijective functions. Composite and inverse functions.	
Unit II	**Recurrence Relations** **Relations**: Definition and examples. Properties of relations, Partial Ordering sets, Linear Ordering Hasse Diagrams, Maximum and Minimum elements, Lattices **Recurrence Relations:** Definition of recurrence relations, Formulating recurrence relations **Methods of solving the recurrence relations**- Backtracking method, Linear homogeneous recurrence relations with constant coefficients. Solution of recurrence relation by the method of generating functions. **Permutations and Combinations:** Partition and Distribution of objects, Permutation with distinct and indistinct objects, Binomial numbers, Combination with identities: Pascal Identity, Vandermonde's Identity, Pascal triangle, Binomial theorem, Combination with indistinct objects.	
Unit III	**Counting Principles , Languages and Finite State Machine** **Counting Principles:** Sum and Product Rules, Two-way counting, Tree diagram for solving counting problems, Pigeonhole Principle (without proof); Simple examples, Inclusion Exclusion Principle (Sieve formula) (Without proof). **Languages, Grammars and Machines:** Languages , regular Expression and Regular languages, Finite state Automata, grammars, Finite state machines, Gödel numbers, Turing machines **Basic Graph Theory:** Graphs, Trees, Characterisation of Trees, Rooted Trees.	**15 L**
	Textbook: 1. Discrete Mathematics and Its Applications, Seventh Edition by Kenneth H. Rosen, McGraw Hill Education (India) Private Limited. (2011) 2. Norman L. Biggs, Discrete Mathematics, Revised Edition, Clarendon Press, Oxford 1989. 3. Data Structures Seymour Lipschutz, Schaum's out lines, McGraw- Hill Inc. **Additional Reference:** 1. Elements of Discrete Mathematics: C.L. Liu , Tata McGraw- Hill Edition . 2. Concrete Mathematics (Foundation for Computer Science): Graham, Knuth, Patashnik Second Edition, Pearson Education. 3. Discrete Mathematics: Semyour Lipschutz, Marc Lipson, Schaum's out lines, McGraw- Hill Inc. 4. Foundations in Discrete Mathematics: K.D. Joshi, New Age Publication, New Delhi.	

	Links: 1. https://www.tutorialspoint.com/discrete_mathematics/ 2. http://www.cs.yale.edu/homes/aspnes/classes/202/notes.pdf 3. https://www2.cs.duke.edu/courses/spring09/cps102/Lectures/Book.pdf	

Sr. No.	**Practical's of UGCS105**
1	Laws of Set Theory, The Principle of Inclusion - Exclusion.
2	Propositions and Logical operations, Equivalence
3	Mathematical Induction.
4	Graphs of standard functions such as absolute value function, inverse function, logarithmic and exponential functions, flooring and ceiling functions, trigonometric functions over suitable intervals.
5	Finding transitive closure using Warshall's Algorithm.
6	Partial ordering sets, Hasse diagram and Lattices.
7	Problem based on Fibonacci numbers, Tower of Hanoi, Intersection of lines in a plane, Sorting Algorithms.
8	Combination with identities
9	Different counting principles.
10	Finite state Automata and Finite state machines.

ANNEXURE - B

Class: F.Y.B.Sc	**Branch**: Computer Science	**Semester:** I	
Subject: Descriptive Statistics			
Period per Week(Each 48 min)	Lecture	03	
	Practical	03	
Evaluation System		**Hours**	**Marks**
	Semester End Exam	2	60
	Continuous Internal Assessment	__	40
	Semester End Practical Examination	3	50
	Total	__	150

Course: UGCS106	**Descriptive Statistics** **(Credits : 2 Lectures/Week: 3)**	**Lectures**
	Objectives:	

	The purpose of this course is to familiarize students with basics of Statistics. This will be essential for prospective researchers and professionals to know these basics. **Expected Learning Outcomes:** 1) Enable learners to know descriptive statistical concepts 2) Enable study of probability concept required for Computer learners 3) Enable to understand the fundamental principles of statistical reasoning, achieving proficiency in data analysis 4) Descriptive statistics helps us to understand the data and its properties by use of central tendency and variability. 5) Inferential statistics helps us to infer properties of the population from a given sample of data. 6) The central objective of the undergraduate major in Statistics is to equip students with consequently requisite quantitative skills that they can employ and build on in flexible ways.	
Unit I	**Data Presentation** **Data types :** attribute, variable, discrete and continuous variable **Data presentation :** frequency distribution, histogram o give, curves, stem and leaf display **Introduction to R Programming**: introduction, Environment, Variable, Operators, Decision Making, Loops, Functions, String, Vectors, List, Matrices, Arrays, Factors, Data Frame, R Charts & Graphic, R Statistics	**15 L**
Unit II	**Measures of Central tendency:** Mean, Median, mode for raw data, discrete, grouped frequency distribution. **Measures dispersion:** Variance, standard deviation, coefficient of variation for raw data, quartiles, quantiles Real life examples **Correlation and Regression:** bivariate data, scatter plot, correlation, Karl Pearson's coefficients of correlation **Linear regression:** fitting of linear regression using least square regression	**15 L**
Unit III	**Probability :** Random experiment, sample space, events types and operations of events **Probability definition :** classical, axiomatic, Elementary Theorems of probability (without proof) $0 \leq P(A) \leq 1$, $P(A \cup B) = P(A) + P(B) - P(A \cap B)$,$P(A') = 1 - P(A)$, $P(A) \leq P(B)$ if $A \subset B$ Conditional probability, 'Bayes' theorem, independence, Examples on Probability **Standard distributions:** random variable; discrete, continuous, expectation and variance of a random variable, pmf, pdf, cdf, reliability **Introduction and properties without proof for following distributions:** binomial, normal, chi-square, t, F. Examples	**15 L**
	Text Book:	

	1) Trivedi, K.S.(2001) : Probability, Statistics, Design of Experiments and Queuing theory, with applications of Computer Science, Prentice Hall of India, New Delhi **Additional References:** 1) Ross, S.M. (2006): A First course in probability. 6th Edⁿ Pearson 2) Kulkarni, M.B., Ghatpande, S.B. and Gore, S.D. (1999): common statistical tests. Satyajeet Prakashan, Pune 3) Gupta, S.C. and Kapoor, V.K. (1987): Fundamentals of Mathematical Statistics,S. Chand and Sons, New Delhi 4) Gupta, S.C. and Kapoor, V.K. (1999): Applied Statistics, S. Chand and Son's, New Delhi 5) Montgomery, D.C. (2001): Planning and Analysis of Experiments, wiley. **Links:** **1. https://www.tutorialspoint.com/statistics/hypothesis_testing.htm** **2. https://2012books.lardbucket.org/pdfs/beginning-statistics.pdf** **3. http://www.math.louisville.edu/~pksaho01/teaching/Math662TB-09S.pdf**	

Sr. No.	**Practical's of UG**CS106/ST **Descriptive Statistics ,Introduction to Probability & Hypothesis testing (To be implemented using R)**
1	Data entry using, functions, c(), scan (), Creating vectors, Mathematical Operations: ** +/- /*/ / ^ , exp, log, log10, etc, creating vector of text type, useful functions: data, frame, matrix operations, seq(), split() etc.
2	Frequency distribution using cut(), table()
3	Data presentation
4	Measures of central tendency, dispersion
5	Measures of skewness and kurtosis, Correlation and regression
6	Probability,Conditional probability
7	Problems based on binomial distribution & plotting of binomial distribution
8	Problems based on normal distribution & plotting of normal distribution
9	Plotting pdf, cdf, pmf, for discrete and continuous distribution
10	t test, normal test, F test

ANNEXURE - C

Course: UGCS104	**Database Management Systems** **(Credits : 2 Lectures/Week: 3)**	**Lectures**
	Objectives: The objective of this course is to introduce the concept of the DBMS with respect to the relational model, to specify the functional and data requirements for a typical database application and to understand creation, manipulation and querying of data in databases **Expected Learning Outcomes** 1) Students should be able to evaluate business information problem and find the requirements of a problem in terms of data. 2) Students should be able to design the database schema with the use of appropriate data types for storage of data in database. 3) Students should be able to create, manipulate, query and back up the databases. 4) Students should be able to understand and design ER models. 5) Students should be able to understand normalization concept. 6) Students should be able to understand and apply DDL and DML statements.	
Unit I	**Introduction to DBMS –** Database, DBMS – Definition, Overview of DBMS, Advantages of DBMS, Levels of abstraction, Data independence, DBMS Architecture **Data models** - Client/Server Architecture, Object Based Logical Model, Record Based Logical Model (relational, hierarchical, network) **Entity Relationship Model -** Entities, attributes, entity sets, relations, relationship sets, Additional constraints (key constraints, participation constraints, weak entities, aggregation / generalization, Conceptual Design using ER (entities VS attributes, Entity Vs relationship, binary Vs ternary, constraints beyond ER) **Relational data model**– Domains, attributes, Tuples and Relations, Relational Model Notation, Characteristics of Relations, Relational	**15 L**

	Constraints - primary key, referential integrity, unique constraint, Null constraint, Check constraint **ER to Table**- Entity to Table, Relationship to tables with and without key constraints.	
Unit II	**Schema refinement and Normal forms:** Functional dependencies, first, second, third, and BCNF normal forms based on primary keys, lossless join decomposition. **Relational Algebra** operations (selection, projection, set operations union, intersection, difference, cross product, Joins –conditional, equi join and natural joins, division) **Introduction to MySQL** **DDL Statements** - Creating Databases, Using Databases, datatypes, Creating Tables (with integrity constraints – primary key, default, check, not null), Altering Tables, Renaming Tables, Dropping Tables, Truncating Tables, Backing Up and Restoring databases **DML Statements** – Viewing the structure of a table insert, update, delete, Select all columns, specific columns, unique records, conditional select, in clause, between clause, limit,	**15 L**
Unit III	**Functions** – Aggregate functions (count, min, max, avg, sum), group by clause, having clause String Functions (concat, instr, left, right, mid, length, lcase/lower, ucase/upper, replace, strcmp, trim, ltrim, rtrim), Math Functions (abs, ceil, floor, mod, pow, sqrt, round, truncate) Date Functions (adddate, datediff, day, month, year, hour, min, sec, now, reverse) **Joining Tables** – inner join, outer join (left outer, right outer, full outer) **Subqueries** – subqueries with IN, EXISTS, subqueries restrictions, Nested subqueries, ANY/ALL clause, correlated subqueries	**15 L**
	Text books: 1. Ramez Elmasri & Shamkant B.Navathe, Fundamentals of Database Systems, Pearson Education, Sixth Edition, 2010 2. Ramakrishnam, Gehrke, Database Management Systems, McGraw-Hill, 2007 3. Joel Murach, Murach's MySQL, Murach, 2012 **Additional References:** 1. Robert Sheldon, Geoff Moes, Begning MySQL, Wrox Press, 2005. **Links:** 1) https://www.studytonight.com/dbms/ 2) http://nptel.ac.in/courses/106106093/ 3) http://www.inf.unibz.it/~nutt/Teaching/IDBs1011/idbs-slides.html	

Sr. No.	Practical's of UGCS104
1	For given scenario Draw the E-R diagram and convert entities and relationships to the table.
2	Write relational algebra queries on the tables created in Practical-1.
3	Perform the following in MySQL ● Viewing all databases ● Creating a Database ● Viewing all Tables in a Database ● Creating Tables (With and Without Constraints) ● Inserting/Updating/Deleting Records in a Table ● Saving (Commit) and Undoing (rollback)
4	Perform the following: ● Altering a Table ● Dropping/Truncating/Renaming Tables ● Backing up / Restoring a Database
5	Perform the following: ● Simple Queries ● Simple Queries with Aggregate functions ● Queries with Aggregate functions (group by and having clause)
6	Queries involving ● Date Functions ● String Functions ● Math Functions
7	Join Queries ● Inner Join ● Outer Join
8	Subqueries ● With IN clause ● With EXISTS clause
9	Views ● Creating Views (with and without check option) ● Dropping views ● Selecting from a view
10	DCL statements ● Granting and revoking permissions

ANNEXURE - D

Sr. No.	**Practical's of PG**CS301/AOS **Advanced Operating System**
1	Demonstrate solution for race condition using synchronized block
2	Interprocess Communication in Java
3	Write Android application to demonstrate data storage with the following options (anyone can be asked in Practical examination): Shared Preferences (Store private primitive data in key-value pairs) Internal Storage (Store private data on the device memory) External Storage (Store public data on the shared external storage)
4	Write Android Application to demonstrate data storage with SQLite Database with 3 fields Name, No, Class.