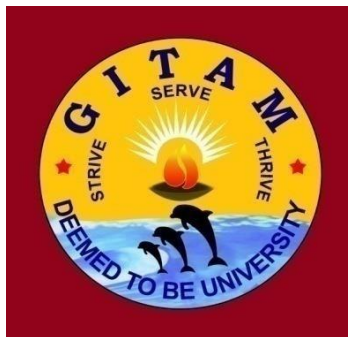


# **GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT (GITAM)**

**(Deemed to be University, Estd. u/s 3 of UGC Act 1956)**

**\*VISAKHAPATNAM \*HYDERABAD \*BENGALURU\***

**Accredited by NAAC with 'A+' Grade**



## **CURRICULUM AND SYLLABUS**

**of**

**Bachelor of Science**

**in**

**STATISTICS**

*(w.e.f. 2021-22 admitted batch)*

**A University Committed to Excellence**



**Syllabus Structure -First Year**

**B.Sc. Statistics  
w.e.f. 2021-22 admitted batch**

<b>Course Type</b>	<b>Course Code</b>	<b>Semester-I Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>J</b>	<b>Letter</b>
UC	CSEN1001	IT Productivity Tools	0	0	2	0	0	
UC	LANG1001	Communication Skills in English - Beginners	0	0	4	0	0	2
UC	LANG1011	Communication Skills in English						
FC	MATH1151	Differential Calculus	3	0	0	0	0	3
FC	MATH1201	Matrices	3	0	0	0	0	3
FC	CSCI1011	Programming with C	3	0	0	0	0	3
FC	CSCI1021	Programming with C Lab	0	0	2	0	0	1
PC	MATH1171	Descriptive Statistics and Probability Theory	3	0	0	0	0	3
PC	MATH1181	Descriptive Statistics Lab	0	0	2	0	0	1
UC	CLAD1001	Emotional Intelligence & Reasoning Skills	0	0	2	0	0	1
<b>Course Type</b>	<b>Course Code</b>	<b>Semester-II Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>J</b>	<b>Letter</b>
UC	LANG1021	Advanced Communication Skills in English	0	0	4	0	0	2
UC	CLAD1011	Leadership Skills & Quantitative Aptitude	0	0	2	0	0	1
FC	MATH1231	Differential Equations	3	0	0	0	0	3
FC	CSCI1031	Introduction to Python Programming	3	0	0	0	0	3
PC	MATH1211	Mathematical Expectation and Probability Distributions	3	0	0	0	0	3
PC	MATH1221	Probability Distributions Lab	0	0	2	0	0	1
FC	MATH1241	Differential Equations Lab	0	0	2	0	0	1
FC	CSCI1041	Python Programming Lab	0	0	2	0	0	1
UC	DOSL1011	Community Service	0	0	0	0	2	2
UC	DOSP1001	Sports 1	0	0	0	0	2	
UC	VEDC1001	Venture Development	0	0	2	0	0	1
Minor	MATH1211	Mathematical Expectation and Probability Distributions	3	0	0	0	0	3
Minor	MATH1221	Probability Distributions Lab	0	0	2	0	0	1
Minor	****	Operations Research	0	0	2	0	0	1

2  
2

## **B.Sc. Statistics**

### **SEMESTER –I**

#### **CSEN 1001 -IT productivity tools**

**UNIT-I** Create / alter documents / Technical Paper / Project report with text, pictures, graphs of different styles.

**UNIT-II** Create / modify power point presentations with text, multimedia and to add animation using / creating templates.

**UNIT-III** Perform basic calculations/ retrieve data / create pivot tables / chart using a spreadsheet application.

**UNIT-IV** Create simple diagrams / charts using online tools like: [www.draw.io](http://www.draw.io).

**UNIT-V** Manage documents, presentations, spreadsheets and websites in collaborative mode.

## **B.Sc. Statistics**

### **SEMESTER –I**

#### **LANG1001 : Communication Skills in English- Beginners**

**UNIT-I** Listen actively, understand and extract the essential information from short talks/conversations/discussions that are delivered in clear, standard speech. (Bloom's Taxonomy Level/s: 2 & 3)

**UNIT-II** Read, understand, and extract specific information from straightforward factual and simple argumentative texts on general topics and subjects of interest. (Bloom's Taxonomy Level/s: 2 & 3)

**UNIT-III** Speak clearly with some confidence on matters related to his/her interests and academic work, and make short structured oral presentations on topics of personal interest. (Bloom's Taxonomy Level/s: 3)

**UNIT-IV** Write short straightforward connected texts on a range of familiar/general topics using appropriate linking devices to achieve a clear sequence of ideas. (Bloom's Taxonomy Level/s: 3)

**UNIT-V** Acquire sufficient language competency to express oneself in speech and writing with some confidence, using appropriate vocabulary and simple grammatical structures though lexical limitations and/or difficulty with formulation might be evident at times. (Bloom's Taxonomy Level/s: 2 & 4)

## **B.Sc. Statistics**

### **SEMESTER –I**

#### **LANG1011 : Communication Skills in English**

##### **Communication Skills in English -01**

**UNIT-I** Understand the speaker's point of view in fairly extended talks on general or discipline-specific topics, and follow simple lines of argument in discussions on familiar contemporary issues. (Bloom's Taxonomy Level/s: 3)

**UNIT-II** Make short presentations on a limited range of general topics using slides, and engage in small group discussions sharing experiences/views on familiar contemporary issues and give reasons for choices/opinions/plans. (Bloom's Taxonomy Level/s: 3 & 4)

**UNIT-III** "Read and demonstrate understanding of articles and reports on limited range of contemporary issues in which the writers adopt particular stances. Also provide samples of written communication containing fairly complex information and reasons for choices/opinions/stances. (Bloom's Taxonomy Level/s: 2 & 3)

**UNIT-IV** Write clear, fairly detailed text (a short essay) on a limited range of general topics, and subjects of interest, and communicate clearly through email/letter to seek/pass on information or give reasons for choices/opinions/plans/actions. (Bloom's Taxonomy Level/s: 3)

**UNIT-V** Identifying unfamiliar words from text and exploring their meaning to deduce sentence through contextual clues.

## **B.Sc. Statistics SEMESTER –I**

### **MATH1151 : Differential Calculus**

**No. of hrs/week: 3**

**Credits: 3**

#### **UNIT-I**

Limit and Continuity ( $\varepsilon$  and  $\delta$  definition), Types of discontinuities, Differentiability of functions, Successive differentiation, Leibnitz's theorem.

#### **UNIT-II**

Partial differentiation, Euler's theorem on homogeneous functions.

#### **UNIT-III**

Tangents and normals, Curvature, Asymptotes, Singular points, Tracing of curves, Parametric representation of curves and tracing of parametric curves, Polar coordinates and tracing of curves in polar coordinates.

#### **UNIT-IV**

Rolle's theorem, Mean Value theorems, Taylor's theorem with Lagrange's and Cauchy's forms of remainder

#### **UNIT-V**

Taylor's series, Maclaurin's series of  $\sin x$ ,  $\cos x$ ,  $e^x$ ,  $\log(1+x)$ ,  $(1+x)^m$ , Maxima and Minima, Indeterminate forms.

#### **Books Recommended :**

1. "Elements of Real Analysis" by Shanthi Narayan and Dr. M.D. Raisinghania, published by S.Chand & Company Ltd., New Delhi
2. "A Text Book of B.Sc. Mathematics Volume-II" by V.Venkateswara Rao, N Krishna Murthy, B.V.S.S. Sarma and S. Anjaneya Sastry, published by S.Chand & Company Ltd., New Delhi.
3. "Calculus Single Variable" by Howard Anton, Irl Bivens and Stephen Davis, published by John Wiley and Sons, Inc., 2002.
4. "Calculus and Analytic Geometry" by George B. Thomas, Jr. and Ross L. Finney, published by Pearson Education, 2007, 9<sup>th</sup> edition.

## **B.Sc. Statistics**

### **SEMESTER – I**

#### **MATH1201 : MATRICES**

**No. of hrs/week: 4**

**Credits: 4**

##### **UNIT-I**

$\mathbb{R}$ ,  $\mathbb{R}^2$ ,  $\mathbb{R}^3$  as vector spaces over  $\mathbb{R}$ . Standard basis for each of them. Concept of Linear Independence and examples of different bases. Subspaces of  $\mathbb{R}^2$ ,  $\mathbb{R}^3$ .

##### **UNIT-II**

Translation, Dilation, Rotation, Reflection in a point, line and plane. Matrix form of basic geometric transformations. Interpretation of eigen values and eigen vectors for such transformations and eigen spaces as invariant subspaces.

##### **UNIT-III**

Types of matrices. Rank of a matrix. Invariance of rank under elementary transformations. Reduction to normal form, Solutions of linear homogeneous and non-homogeneous equations with number of equations and unknowns upto four.

##### **UNIT-IV**

Matrices in diagonal form. Reduction to diagonal form upto matrices of order 3. Computation of matrix inverses using elementary row operations.

##### **UNIT-V**

Solutions of a system of linear equations using matrices. Illustrative examples of above concepts from Geometry, Physics, Chemistry, Combinatorics and Statistics.

##### **Books Recommended**

1. A.I. Kostrikin, *Introduction to Algebra*, Springer Verlag, 1984.
2. S. H. Friedberg, A. L. Insel and L. E. Spence, *Linear Algebra*, Prentice Hall of India Pvt. Ltd., New Delhi, 2004.
3. Richard Bronson, *Theory and Problems of Matrix Operations*, Tata McGraw Hill, 1989.



**B.Sc. Statistics**  
**I SEMESTER**  
**CSCI 1011 : PROGRAMMING WITH C**

**Hours per week: 3**

**Credits: 3**

**Preamble :**

C is a general purpose programming language. It is basis for Java and C++. This course deals with the same objects that are manipulated by computers : single characters, numbers and memory addresses. Any other type of object is created, by the programmer, by combining those objects ( e.g., character strings, arrays, records, fields, etc.).

**Course Objectives:**

- To understand the difference between different data types
- To learn the basic concept , applications of control statements
- To identify and practice the functions and program structures
- Ability to process arrays, multi-dimensional arrays and character arrays.
- To understand the concept of pointers and functions.
- To understand the concept of structures and unions

**UNIT – I**

Data types, operators and some statements, Identifiers and key words, constants, C operators, Type conversion. Writing a program in C: Variable declaration, statements, simple C programs, simple input statement, simple output statement, feature of stdio.h.

Control statements: conditional expressions, If statement, If –else statement, switch statement, Loop statements, for loop, while loop, do- while loop, Breaking, control statements, Break statement, continue statement, Goto statement.

**Learning Outcomes:**

By the end of this Unit, the student will be able to

- list the data types, operators and some statements in C
- describe the basic concepts of control statements
- explain the concepts of Loop statements

**UNIT- II**

Functions and Program structures: Introduction, Defining a function, Return statement, Types of functions, Actual and formal arguments, Local Global variables, Automatic variables, register variables, static variables, External variables, Recursive functions.

By the end of this Unit, the student will be able to

- describe the basic concepts of functions
- explain different types of functions used in C
- explain difference between Local and Global variables
- explain the concept of recursive functions

### **UNIT -III**

Arrays: Array Notation, Array declaration, Array initialization, Processing with arrays, Arrays and functions, Multidimensional array, Character array.

By the end of this Unit, the student will be able to

- describe the basic concepts of arrays
- explain different types of arrays and functions
- explain multidimensional arrays and character arrays

### **UNIT-IV**

Pointers: Pointer declaration, Pointer operator, address operator, pointer expressions, pointer arithmetic, pointers and functions, call by value. Call by reference, pointers and arrays, pointer and one dimensional array, pointer and multidimensional array, pointer and strings, array of pointers, pointers to pointers.

By the end of this Unit, the student will be able to

- describe the basic concepts of pointers
- explain different types of pointers and functions
- explain the concept of pointer and strings and also pointers to pointers

### **UNIT-V**

Structures, Unions : Declaration of structure, Initializing a structure, Functions and structures, Arrays of structures, arrays within a structure, structure within a structure, Flow charts and structures, Unions.

By the end of this Unit, the student will be able to

- describe the basic concepts of structures and unions
- explain different types of functions and structures
- explain the concept of arrays of structures, structures within a structure and flowcharts and structures

#### **Text Book:**

1. Programming in C by D.Ravi Chandran, New Age international Publishers,2006.

#### **Reference Books:**

1. Let Us C by Yashwant Kanetkar, 13<sup>th</sup> Edition, Bpb Publications, 2012.
2. Programming in ANSI C by E. Balaguruswamy, 6<sup>th</sup> Edition, McGraw Hill Education, 2012.

**Course Learning Outcomes:**

On successful completion of this course, students will be able to

- describe the basic concepts of control statements in C
- explain the concepts of Loop statements in C
- explain difference between Local and Global variables
- explain the concept of recursive functions
- explain multidimensional arrays and character arrays
- explain different types of pointers and functions
- explain the concept of pointer and strings and also pointers to pointers
- explain different types of functions and structures in C
- explain the concept of arrays of structures, structures within a structure and flowcharts and structures in C

**B.Sc. Statistics**  
**I SEMESTER**  
**CSCI1021 :PROGRAMMING WITH C LAB**

**Hours per week: 2**

**Credits: 1**

1. Program to convert a given decimal number to octal number
2. Program to solve quadratic equation using switch case structure
3. Program to check a given integer is a palindrome
4. Program to check a given integer is a prime number
5. Sorting of numbers
6. Multiplication of two matrices
7. Inverse of a matrix
8. Finding norm of a matrix using function
9. Program to check a given string is a palindrome or not
10. Using pointers copying a string to another string
11. Using pointers and functions sorting of number
12. Computer binomial coefficients using recursive function for factorial

**Course Outcomes:**

- Able to solve problems using switch case structure
- Differentiate the sorting of numbers using different methods
- Explain looping structure to create a matrix
- Identify the differences in matrix multiplication and to find inverse of a matrix
- Examine the working of Control structures in C programs(L4)
- Able to develop and implement pointers
- Able to develop applications with the help of pointers and functions
- Understand various types of subroutine programs and apply in applications

## **B.Sc. Statistics**

### **SEMESTER –I**

#### **MATH1171:Descriptive Statistics and Probability Theory**

**No. of hrs/week: 3**

**Credits: 3**

##### **UNIT-I**

**Introduction to Statistics:** Concepts of Primary and Secondary data. Methods of collection and editing of primary data, Secondary data. Designing a questionnaire and a schedule. Measures of Central Tendency - Mean, Median, Mode, Geometric Mean and Harmonic Mean.

##### **Unit - II**

**Measures of dispersion:** Range, Quartile Deviation, Mean Deviation and Standard Deviation. Descriptive Statistics -Central and Non-Central moments and their interrelationship. Sheppard's correction for moments. Skewness and kurtosis.

##### **Unit - III**

**Introduction to Probability:** Basic Concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favorable outcomes. Mathematical, Statistical, axiomatic definitions of probability. Conditional Probability and independence of events.

##### **Unit - IV**

**Probability theorems:** Addition and multiplication theorems of probability for two and for n events. Boole's inequality and Bayes's theorems and problems based on Bayes's theorem.

##### **Unit - V**

**Random variable:** Definition of random variable, discrete and continuous random variables, functions of random variable. Probability mass function. Probability density function, Distribution function and its properties. Bivariate random variable - meaning, joint, marginal and conditional Distributions, independence of random variables.

##### **Text Books:**

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. BA/BSc I year statistics - descriptive statistics, probability distribution - Telugu Academy - DrM.JaganmohanRao,DrN.Srinivasa Rao, DrP.Tirupathi Rao, Smt.D.Vijayalakshmi
3. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.

##### **Reference books:**

1. WillamFeller : Introduction to Probability theory and its applications. Volume –I, Wiley
2. Modern Mathematical Statistics with Applications Jay L. Devore, Kenneth N. Berk Springer Second edition.
3. Goon AM, Gupta MK, Das Gupta B : Fundamentals of Statistics , Vol-I, the World Press Pvt.Ltd., Kolakota.
4. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.
5. Sanjay Arora and Bansilal: New Mathematical Statistics : Satya Prakashan , New Delhi.
6. Hogg.Tanis.Rao: Probability and Statistical Inference. 7th edition. Pearson.

**B.Sc. Statistics**  
**SEMESTER –I**

**MATH1181 : Descriptive Statistics Lab**

**No. of hrs/week: 2**

**Credits: 1**

1. Graphical presentation of data (Histogram, frequency polygon, Ogives).
2. Graphical presentation of data (Bar diagram, Histogram, frequency polygon, Ogives) using MS Excel
3. Diagrammatic presentation of data (Bar and Pie).
4. Diagrammatic presentation of data (Bar and Pie) using MS Excel
5. Computation of Mean, Standard deviation, Coefficient of Variation
6. Computation of Mean, Standard deviation, Coefficient of Variation using MS Excel
7. Computation of non-central and central moments – Sheppard's corrections for grouped data.
8. Computation of coefficients of Skewness ( $\beta_1$ ) and Kurtosis ( $\beta_2$ ) – Karl Pearson's and Bowley's coefficient of skewness.
9. Computation of measures of central tendency, dispersion and coefficients of Skewness, Kurtosis using MS Excel.

## **B.Sc. Statistics**

### **SEMESTER –I**

#### **CLAD1001- Emotional Intelligence & Reasoning Skills**

1. **Self-Awareness & Self-Regulation:** Introduction to Emotional Intelligence, Self-Awareness: Self-Motivation, Accurate Self-Assessment (SWOT Analysis), Self-Regulation: Self Control, Trustworthiness & Adaptability
2. **Social Awareness & Relationship Management:** Social Awareness: Importance, Practising Social Awareness, Building Relationships, Healthy and Unhealthy Relationships, Relationship Management Competencies-Influence, Empathy, Communication, Types of Conflicts, Causes, Conflict Management
3. **Social Media:** Creating a blog, use of messaging applications, creating a website to showcase individual talent, creation of a LinkedIn Profile
4. **Goal Setting & Time Management:** Setting SMART Goals, Time Wasters, Prioritization, Urgent Vs Important, Q2 Organization
5. **Teamwork:** Team Spirit, Difference Between Effective and Ineffective Teams, Characteristics of High Performance Teams, Team Bonding, Persuasion, Team Culture, Building Trust, Emotional Bank Account
6. **Verbal Reasoning:** Introduction, Coding-decoding, Blood relations, Ranking, Directions, Group Reasoning
7. **Analytical Reasoning:** Cubes and Dices, Counting of Geometrical figures
8. **Logical Deduction:** Venn diagrams, Syllogisms, Data Sufficiency, Binary logic

**Spatial Reasoning:** Shapes, Paper Cutting/Folding, Mirror images, Water images and Rotation of figures

## **B.Sc. Statistics**

### **SEMESTER –II**

#### **LANG1021 : Advanced Communication Skills in English**

**UNIT-I** Listen to extended lectures, presentations, and discussions on a wide range of contemporary issues and demonstrate understanding of relatively complex lines of argument. (Bloom's Taxonomy Level/s: 2)

**UNIT-II** Make presentations using suitable AV aids and engage in formal group discussions on a wide range of topics of contemporary interest, demonstrating awareness of standard/widely accepted conventions. (Bloom's Taxonomy Level/s: 3)

**UNIT-III** Read and demonstrate understanding of the writer's stance/viewpoint in articles and reports on a wide range of contemporary issues and discipline-specific subjects. (Bloom's Taxonomy Level/s: 2 & 4)

**UNIT-IV** Write analytical essays on a wide range of general topics/subjects of interest, and engage in written communication (emails/concise reports) to exchange relatively complex information, giving reasons in support of or against a particular stance/point of view. (Bloom's Taxonomy Level/s: 3 & 4)

**UNIT-V** Complete a mini project that necessitates the use of fairly advanced communication skills to accomplish a variety of tasks and submit a report in the given format. (Bloom's Taxonomy Level/s: 4 & 5)



## **B.Sc. Statistics**

### **SEMESTER –II**

#### **CLAD1011: Leadership Skills & Quantitative Aptitude**

1. **Communication Skills:** The Communication Process, Elements of Interpersonal Communication, Non-Verbal Communication: Body Language, Posture, Eye Contact, Smile, Tone of Voice, Barriers to Communication. Effective Listening Skills: Active Listening, Passive Listening, Asking Questions, Empathizing, Being Non Judgemental, Being Open Minded, Mass Communication: Design of Posters, Advertisements, notices, writing formal and informal invitations.
2. **Presentation Skills:** Seven Basic Rules for Effective Presentation: Be Passionate, Focus on Audience Needs, Focus on the Core Message, Use Body Language and Voice, Start Strongly, Organizing Ideas & Using Visual Aids: SPAM Model, Effective Opening and Closing Techniques, Guy Kawasaki's Rule (10-20-30 Rule), Overcoming Stage Fear, Story Telling.
3. **Problem Solving & Decision Making:** Difference Between the Two, steps in Rational Approach to Problem Solving: Defining the Problem, Identifying the Root Causes, Generating Alternative Solutions, Evaluating and Selecting Solutions, Implementing and Following-Up, Case Studies.
4. **Group Discussion:** Understanding GD, Evaluation Criteria, Nine Essential Qualities for Success, Positive and Negative Roles, Mind Mapping, Structuring a Response, Methods of Generating Fresh Ideas.
5. **Number Theory:** Number System, Divisibility rules, Remainders and LCM & HCF.
6. **Numerical Computation and Estimation-I:** Chain Rule, Ratio Proportions, Partnerships & Averages, Percentages, Profit-Loss & Discounts, Mixtures, Problems on Numbers & ages.
7. **Data Interpretation:** Interpretation and analysis of data in Tables, Caselets, Line-graphs, Pie-graphs, Box-plots, Scatter-plots and Data Sufficiency.
8. **Mental Ability:** Series (Number, Letter and Alphanumeric), Analogy (Number, Letter and Alphanumeric) and Classifications

## **B.Sc. Statistics** **SEMESTER –II**

### **MATH1211: Mathematical Expectation and Probability Distributions**

**No. of hrs/week: 3**

**Credits: 3**

#### **Unit-I**

**Mathematical expectation** : Mathematical expectation( ME) of a random variable and function of a random variable. Moments and covariance using mathematical expectation with examples. Addition and Multiplication theorems on expectation. Definitions of M.G.F, C.G.F, P.G.F, C.F its properties. Chebyshev and Cauchy - Schwartz inequalities.

#### **Unit - II**

**Discrete Distributions** : Binomial and Poisson distributions, their definitions, 1<sup>st</sup> to 4 central moments, M.G.F, C.F, C.G.F, P.G.F, mean, variance, additive property if exists. Poisson approximation to Binomial distribution.

#### **Unit - III**

**Negative Binomial, geometric, hyper geometric distributions** - Definitions, means, variances, M.G.F, C.F, C.G.F, P.G.F, reproductive property if exists. Binomial approximation to Hyper Geometric Distribution, Poisson approximation to Negative binomial distribution.

#### **Unit - IV**

**Continuous Distributions** : Rectangular, Exponential, Gamma, Beta Distributions of two kinds. Other properties such as mean , variance, M.G.F, C.G.F, C.F, reproductive property.

#### **Unit - V**

**Normal Distribution**: Definition, Importance, Properties, M.G.F, additive properties, Interrelation between Normal and Binomial, Normal &Poisson distribution. Cauchy Distribution .

#### **Text Books:**

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. BA/BSc I year statistics - descriptive statistics, probability distribution - Telugu Academy - DrM.Jaganmohan Rao ,DrN.Srinivasa Rao, DrP.Tirupathi Rao, Smt.D.Vijayalakshmi

#### **Reference Books:**

1. WillamFeller : Introduction to Probability theory and its applications. Volume –I, Wiley
2. Modern Mathematical Statistics with Applications Jay L. Devore, Kenneth N. Berk Springer Second edition.
3. Goon AM, Gupta MK, Das Gupta B : Fundamentals of Statistics , Vol-I, the World Press Pvt.Ltd., Kolakota.
4. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.
5. Sanjay Arora and Bansilal: New Mathematical Statistics : Satya Prakashan , New Delhi.
6. Hogg.Tanis.Rao: Probability and Statistical Inference. 7th edition. Pearson.
7. K.V.S. Sarma: statistics Made Simple: do it yourself on PC. PHI
8. Gerald Keller: Applied Statistics with Microsoft excel. Duxbury, Thomson Learning.
9. Levine, Stephen, Krehbiel, Berenson: Statistics for Managers using Microsoft Excel 4th edition. Pearson Publication.

**B. Sc. Statistics**  
**SEMESTER – II**

**CSCI 1031 : INTRODUCTION TO PYTHON PROGRAMMING**

Hours per week: 3

Credits: 3

**Objective:** To enable the student to understand the basic concept of Programming using Python programming language.

**UNIT - I**

**Introduction to Computers and Programming:** Introduction, Hardware and Software, How Computers Store Data, How a Program Works, Using Python.

**Core Python:** What is Python, History, features, Installing, Running, Getting Started, Syntax and Style, Python Objects, Numbers, Keywords, Operators, Syntax, Compilers and Interpreters, The Python Interpreter.  
(12)

**UNIT - II**

**Input, Processing, and Output:** Designing a Program, Input, Processing, and Output, Displaying Output with the print Statement, Comments, Variables, Reading Input from the Keyboard, Performing Calculations, More about Data Output.

**Decision Structures and Boolean Logic:** The if Statement, The if -else Statement, Comparing Strings, Nested Decision Structures and the if -elseif -else Statement, Logical Operators, Boolean Variables.  
(10)

**UNIT - III**

**Repetition Structures:** Introduction to Repetition Structures, The while Loop: a Condition-Controlled Loop, The for Loop: a Count-Controlled Loop, Calculating a Running Total, Sentinels, Input Validation Loops, Nested Loops.  
(10)

**UNIT - IV**

**Data Structures:** Lists, Quick Introduction to Objects and Classes, Tuple, Dictionary, Sequence, Set, Working with Strings.  
(10)

**UNIT - V**

**Functions:** Introduction to Functions, Defining and Calling a Function, Designing a Program to Use Functions, Local Variables, Passing Arguments to Functions, Global Variables and Global Constants.

**Files and Exceptions:** Introduction to File Input and Output, Using Loops to Process Files, Processing Records, Exceptions.  
(10)

**Text books:**

1. Starting Out with Python, Tony Gaddis, Haywood Community College, Pearson, 2018
2. Core Python Programming, Wesley J. Chun, Prentice Hall PTR, First Edition, 2000

**Reference Book:**

1. How to Think Like a Computer Scientist: Learning with Python by Jeffrey Elkner, Allen B. Downey and Chris Meyers, Samurai Media Limited, 2016.

## **B.Sc. Statistics**

### **SEMESTER –II**

#### **MATH1231 : Differential Equations**

**No. of hrs/week: 3**

**Credits: 3**

#### **UNIT-I**

First order exact differential equations. Integrating factors, rules to find an integrating factor. First order higher degree equations solvable for x, y, p. Methods for solving higher-order differential equations.

#### **UNIT-II**

Basic theory of linear differential equations, Wronskian, and its properties. Solving a differential equation by reducing its order. Linear homogenous equations with constant coefficients, Linear non-homogenous equations, The method of variation of parameters, The Cauchy-Euler equation, Simultaneous differential equations, Total differential equations.

#### **UNIT-III**

Order and degree of partial differential equations, Concept of linear and non-linear partial differential equations, Formation of first order partial differential equations

#### **UNIT-IV**

Linear partial differential equation of first order, Lagrange's method, Charpit's method.

#### **UNIT-V**

Classification of second order partial differential equations into elliptic, parabolic and hyperbolic through illustrations only.

#### **Books Recommended**

1. N.Krishna Murthy & others " A text book of Mathematics for BA/B.Sc. Vol. 1 S.Chand & Company, New Delhi.
2. Shepley L. Ross, *Differential Equations*, 3rd Ed., John Wiley and Sons, 1984
3. I. Sneddon, *Elements of Partial Differential Equations*, McGraw-Hill, International Edition, 1967.

## **B.Sc. Statistics**

### **SEMESTER –II**

#### **MATH1241 : Differential Equations Lab**

**No. of hrs/week: 3**

**Credits: 1**

1. Solving first order and first degree differential equations
2. Solving first order and higher degree differential equations
3. Solving linear differential equations with constant coefficients
4. Solving differential equations with variation of parameters
5. Solving Cauchy-Euler equation
6. Solving Simultaneous differential equations
7. Solving total differential equations
8. Formation of first order partial differential equations
9. Problems using Lagrange's method
10. Problems using Charpit's method
11. Classification of second order partial differential equations

## **B.Sc. Statistics**

### **SEMESTER –II**

#### **MATH1221 : Probability Distributions Lab**

**No. of hrs/week: 3**

**Credits: 1**

1. Fitting of Binomial distribution – Direct method.
2. Fitting of Binomial distribution – Direct method using MS Excel.
3. Fitting of binomial distribution – Recurrence relation Method.
4. Fitting of Poisson distribution – Direct method.
5. Fitting of Poisson distribution – Direct method using MS Excel.
6. Fitting of Poisson distribution - Recurrence relation Method.
7. Fitting of Normal distribution – Areas method.
8. Fitting of Normal distribution – Ordinates method.

**B.Sc. Statistics**  
**SEMESTER – II**  
**CSCI 1041 : Python Programming Lab**

Hours per week: 2

Credits: 1

**Objectives:** To write, test, and debug simple Python programs. To implement Python programs with conditionals and loops. Use functions for structuring Python programs.

1. Installing Python, executing Python, Python Standard Library, and Find where the python executables and standard library modules are installed on your system.
2. Start the Python interpreter in interactive mode.
3. Demonstrate to write, test, and debug simple Python programs.
4. Demonstrate Python syntax – identifiers, variables, keywords, Lines & Indentation, Quotation, and Comments.
5. Demonstrate the use operators- Arithmetic, Comparison, Assignment, Logical, Bitwise, Membership, Identity, and Operator Precedence.
6. Demonstrate assigning values to variable, Multiple Assignments, Standard Data Types- Numbers, Strings, Lists, Tuples, Dictionary, Data Type Conversion.
7. Demonstrate Decision Making & Loops-
  - a. Check if a given number is divisible by 5
  - b. Sum of N different numbers
  - c. Sum and average of N different numbers
  - d. Sum of numbers between 1 and 50 which are divisible by 3 and not by 5
  - e. First N even numbers
  - f. First N numbers divisible by 4
8. Demonstrate Built-in functions.
9. Demonstrate the use of Lists.
  - a. Create a list and perform the following operations on the list:
  - b. Display content of list
  - c. Display length of list
  - d. Display element in given position in the list
  - e. Add elements to the list
  - f. Remove elements from the list:
  - g. Slice
  - h. Sort
  - i. Reverse
  - j. Replace elements
  - k. Join two lists
  - l. Membership test
  - m. Nested lists
10. Demonstrate the use of Dictionaries.
  - a. Creating a Dictionary and perform the following operations:
  - b. Get the values in a Dictionary
  - c. Looping over dictionary
  - d. Add elements to a dictionary
  - e. combine two dictionaries

- f. Delete elements of a dictionary
  - g. Test the presence of a key
- 11. Demonstrate the use of Tuples
  - a. Creating a Tuple
  - b. Accessing values in Tuple
  - c. Updating Tuples
  - d. Delete Tuple elements
  - e. Basic Tuple Operations
  - f. Indexing, Slicing, Matrixes
- 12. Demonstrate the use of Functions
  - a. Smallest number from a set of numbers
  - b. Largest number from a set of numbers
  - c. Sum of even and odd numbers from a set of numbers
  - d. Sort the elements of a matrix
  - e. Read an N x N matrix. Check if the last element of each row is the sum of the all other elements in that row
- 13. Demonstrate Files
  - a. Read a file and display all words containing all 5 vowels atleast once.
  - b. Write a program to read student details (Name, roll number and CGPA) and write to file. Also display the file content.

**Reference Books:**

1. Head First Python by Barry, Paul, O Rielly Publications, 2<sup>nd</sup> Edition, 2010.
2. Core Python Programming by Wesley J. Chun, Prentice Hall, First Edition, 2000.
3. Learning Python by Lutz, Mark, O Rielly Publications, 4th Edition, 2009.



**B. Sc. Statistics**  
**SEMESTER – II**

**DOSP1001: RACQUET SPORTS (Badminton + TT)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>2</b>	<b>15</b>	<b>2</b>

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

**Course Objectives**

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

**List of Topics**

1. Introduction to Badminton - History and development
2. Rules of the Game, Play Area & dimensions
3. Fundamental Skills - Badminton: Grips - Racket, shuttle
4. Sports Specific fitness and warmup drills
5. Stances and footwork
6. Badminton Gameplay: Service, Forehand, Backhand
7. Preparatory Drills and Fun Games
8. Game Variations: Singles/ Doubles/ Mixed
9. Introduction to Table Tennis - History and development
10. Rules of the Game, Play Area & dimensions
11. Fundamental Skills - TT: Grips - Racket, ball
12. Stances and footwork
13. TT Gameplay- Forehand, Backhand, Side Spin, High Toss. Strokes-Push, Chop, Drive, Half Volley, Smash, Drop-shot, Balloon, Flick, Loop Drive.
14. Preparatory Drills and Fun Games
15. Game Variations: Singles/ Doubles/ Mixed

**List of Activities**

1. Watch a sport documentary / training video / game history
2. On field coaching and demonstration session
3. Guided practise and play
4. Event management & game officiating
5. Friendly competitions and structured matches

**References**

1. Handbook of the Badminton World Federation (BWF)
2. Handbook of the International Table Tennis Federation (ITTF)

## Course Outcomes

- Learn to play two (2) sports - Badminton + Table Tennis
- Understanding of the fundamental concepts such as rules of play, game variations
- Understanding of the governing structure and administration of the sport
- Understand the event management of the sport
- Apply sport concepts into an active physical lifestyle

## DOSP1011: RACQUET SPORTS (BADMINTON + TENNIS)

L T P C0 2 15  
2

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

## Course Objectives

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

## List of Topics

1. Introduction to Badminton - History and development
2. Rules of the Game, Play Area & dimensions
3. Fundamental Skills - Badminton: Grips - Racket, shuttle
4. Sports Specific fitness and warmup drills
5. Stances and footwork
6. Badminton Gameplay: Service, Forehand, Backhand
7. Preparatory Drills and Fun Games
8. Game Variations: Singles/ Doubles/ Mixed
9. Introduction to Tennis - History and development
10. Rules of the Game, Play Area & dimensions
11. Fundamental Skills - Tennis: Grips - Racket, ball
12. Stances and footwork
13. Gameplay- Forehand, Backhand, Service, volley, chops,
14. Preparatory Drills and Fun Games
15. Game Variations: Singles/ Doubles/ Mixed

## List of Activities

1. Watch a sport documentary / training video / game history
2. On field coaching and demonstration session
3. Guided Practise and play
4. Event management & game officiating
5. Friendly competitions and structured matches

## References

1. Handbook of the Badminton World Federation (BWF)
2. Handbook of the International Table Tennis Federation (ITTF)

### **Course Outcomes**

- Learn to play two (2) sports - Badminton + Tennis
- Understanding of the fundamental concepts such as rules of play, game variations
- Understanding of the governing structure and administration of the sport
- Understand the event management of the sport
- Apply sport concepts into an active physical lifestyle
- Apply sport concepts into an active physical lifestyle

### **DOSP1021: BOARD GAMES (CHESS + CARROM)**

**L T P C0 2 15**  
**2**

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

### **Course Objectives**

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

### **List of Topics**

1. Introduction to Chess - History and development
2. Rules of the Game, Board Area & dimensions
3. Fundamental Skills - Chess: Pieces & functions, basic play
4. Chess board moves & terminology
5. Chess Gameplay: Openings, castling, strategies & tactics
6. Preparatory Drills and Fun Games
7. Game Variations & Officiating
8. Warmup drills (mental, preparatory gamework)
9. Introduction to Carrom - History and development
10. Rules of the Game, Board components & dimensions
11. Fundamental Skills - Carrom: - Striking
12. Gameplay - General
13. Preparatory Drills and Fun Games
14. Game Variations: Singles/ Doubles/ Mixed
15. Game Variations: Singles/ Doubles/ Mixed

### **List of Activities**

1. Watch a sport documentary / training video / game history
2. On field coaching and demonstration session
3. Guided practise and play
4. Event management & game officiating

5. Friendly competitions and structured matches

### References

1. International Chess Federation (FIDE) Handbook
2. Indian Carrom Federation Handbook - Laws

### Course Outcomes

- Learn to play two (2) board games - Chess + Carrom
- Understanding of the fundamental concepts such as rules of play, game variations
- Understanding of the governing structure and administration of the sport
- Understand the event management of the sport
- Apply sport concepts into an active lifestyle

### DOSP1031: TACTICAL SPORTS (HANDBALL + FOOTBALL)

<b>L</b>	<b>T</b>	<b>P</b>	<b>C0</b>	<b>2</b>	<b>15</b>
					<b>2</b>

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

### Course Objectives

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

### List of Topics

1. Introduction to Handball - History and development
2. Rules of the Game, Play Area & dimensions
3. Fundamental Skills - Handball: Throwing, Ball control, Movement
4. Sports Specific fitness and warmup drills
5. Stances and footwork: Jumps, dribbles, catching, throws
6. Gameplay: Shots, throws, movements, attack, defense
7. Preparatory Drills and Fun Games
8. Introduction to Football - History and development
9. Rules of the Game, Play Area & dimensions
10. Fundamental Skills: Kicking, heading, ball control, Keeping
11. Movement, throwins, tackling, defense, scoring, defense
12. Gameplay- Formations, passing, FKs, CKs, PK, tactics
13. Preparatory Drills and Fun Games
14. Game Variations: Small sided games, 7v7, 11v11

### List of Activities

1. Watch a sport documentary / training video / game history
2. On field coaching and demonstration session
3. Guided practise and play

4. Event management & game officiating
5. Friendly competitions and structured matches

### **References**

1. International Handball Federation - Rules of the Game & Regulations
2. FIFA Laws of the Game

### **Course Outcomes**

- Learn to play two (2) sports - Handball + Football
- Understanding of the fundamental concepts such as rules of play, game variations
- Understanding of the governing structure and administration of the sport
- Understand the event management of the sport
- Apply sport concepts into an active physical lifestyle

### **DOSP1041: TACTICAL SPORTS (BASKETBALL + FOOTBALL)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C0</b>	<b>2</b>	<b>15</b>
					<b>2</b>

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

### **Course Objectives**

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

### **List of Topics**

1. Introduction to Basketball - History and development
2. Rules of the Game, Play Area & dimensions
3. Fundamental Skills: Passing, Receiving, Dribbling
4. Sports Specific fitness and warmup drills
5. Stances and footwork: Jumps, dribbles, catching, throws
6. Gameplay: Shots, throws, movements, attack, defense
7. Preparatory Drills and Fun Games
8. Introduction to Football - History and development
9. Rules of the Game, Play Area & dimensions
10. Fundamental Skills: Kicking, heading, ball control, Keeping
11. Movement, throwins, tackling, defense, scoring, defense
12. Gameplay- Formations, passing, FKs, CKs, PK, tactics
13. Preparatory Drills and Fun Games
14. Game Variations: Small sided games, 7v7, 11v11

### **List of Activities**

1. Watch a sport documentary / training video / game history
2. On field coaching and demonstration session

3. Guided practise and play
4. Event management & game officiating
5. Friendly competitions and structured matches

### **References**

1. International Handball Federation - Rules of the Game & Regulations
2. FIFA Laws of the Game

### **Course Outcomes**

- Learn to play two (2) sports - Basketball + Football
- Understanding of the fundamental concepts such as rules of play, game variations
- Understanding of the governing structure and administration of the sport
- Understand the event management of the sport
- Apply sport concepts into an active physical lifestyle

### **DOSP1051: TACTICAL SPORTS (HANDBALL + BASKETBALL)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C0</b>	<b>2</b>	<b>15</b>
					<b>2</b>

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

### **Course Objectives**

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

### **List of Topics**

1. Introduction to Handball - History and development
2. Rules of the Game, Play Area & dimensions
3. Fundamental Skills - HB: Throwing, Ball control, Scoring, Movement
4. Sports Specific fitness and warmup drills
5. Stances and footwork: Jumps, dribbles, catching, throws
6. Gameplay: Shots, throws, movements, attack, defense
7. Preparatory Drills and Fun Games
8. Introduction to Basketball - History and development
9. Rules of the Game, Play Area & dimensions
10. Fundamental Skills: Passing, Receiving, Dribbling
11. Sports Specific fitness and warmup drills
12. Stances and footwork: Jumps, dribbles, catching, throws
13. Gameplay: Shots, throws, movements, attack, defense
14. Preparatory Drills and Fun Games

### **List of Activities**

1. Watch a sport documentary / training video / game history

2. On field coaching and demonstration session
3. Guided practise and play
4. Event management & game officiating
5. Friendly competitions and structured matches

### **References**

1. International Handball Federation - Rules of the Game & Regulations
2. FIBA Basketball Official Rules

### **Course Outcomes**

- Learn to play two (2) sports - Handball + Basketball
- Understanding of the fundamental concepts such as rules of play, game variations
- Understanding of the governing structure and administration of the sport
- Understand the event management of the sport
- Apply sport concepts into an active physical lifestyle

### **DOSP1061: SPORTS (VOLLEYBALL + THROWBALL)**

**L T P C0 2 15**  
**2**

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

### **Course Objectives**

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

### **List of Topics**

1. Introduction to Volleyball - History and development
2. Rules of the Game, Play Area & dimensions
3. Fundamental Skills: Striking, Ball control, Lifting
4. Sports Specific fitness and warmup drills
5. Stances and footwork
6. Gameplay: Jumps, strikes, layoffs, attack, defense
7. Preparatory Drills and Fun Games
8. Introduction to Throwball - History and development
9. Rules of the Game, Play Area & dimensions
10. Fundamental Skills: Throwing, Receiving
11. Sports Specific fitness and warmup drills
12. Stances and footwork
13. Gameplay: Shots, throws, movements, control
14. Preparatory Drills and Fun Games

### **List of Activities**

1. Watch a sport documentary / training video / game history
2. On field coaching and demonstration session
3. Guided practise and play
4. Event management & game officiating
5. Friendly competitions and structured matches

### **References**

1. FIVB - Official Volleyball Rules
2. World Throwball Federation - Rules of the Game

### **Course Outcomes**

- Learn to play two (2) sports - Volleyball + Throwball
- Understanding of the fundamental concepts such as rules of play, game variations
- Understanding of the governing structure and administration of the sport
- Understand the event management of the sport
- Apply sport concepts into an active physical lifestyle

### **DOSP1071: TRADITIONAL SPORTS (KABADDI + KHOKHO)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C0</b>	<b>2</b>	<b>15</b>
					<b>2</b>

This course provides instruction and the opportunity for participation in sports and physical fitness activities. Skills, strategies, rules, and personal wellness goals are included as appropriate. This course will provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the chosen sport.

### **Course Objectives**

- Understand training principles used in the sport
- Demonstrate knowledge of the game in a recreational /competitive play setting
- Organize an event around the sport
- Demonstrate concepts of warm up, game conditioning, training plans

### **List of Topics**

1. Introduction to Kabaddi - History and development
2. Rules of the Game, Play Area & dimensions
3. Fundamental Skills: Raiding, catching,
4. Sports Specific fitness and warmup drills
5. Stances and footwork
6. Gameplay: Chain system movement
7. Preparatory Drills and Fun Games
8. Introduction to Kho Kho - History and development
9. Rules of the Game, Play Area & dimensions
10. Fundamental Skills: Siting, giving Kho, Pole dive
11. Sports Specific fitness and warmup drills
12. Stances and footwork: Running, sitting
13. Gameplay: Running strategies, ring method, chain method



## 14. Preparatory Drills and Fun Games

## List of Activities

1. Watch a sport documentary / training video / game history
2. On field coaching and demonstration session
3. Guided practise and play
4. Event management & game officiating
5. Friendly competitions and structured matches

## References

1. Amateur Kabaddi Federation of India (AKFI) - Official Rules
2. Rules of Kabaddi - International Kabaddi Federation
3. Khelo India Official Rulebook of Kho Kho

## Course Outcomes

- Learn to play two (2) sports - Kabaddi + KhoKho
- Understanding of the fundamental concepts such as rules of play, game variations
- Understanding of the governing structure and administration of the sport
- Understand the event management of the sport
- Apply sport concepts into an active physical lifestyle

DOSL1001		Club Activity (participant)										
Version	1	School	DoSL	Date of Approval				10-Nov-21				
								L	T	P	C	
								0	1	2	2	
Total Number of Contact Hours							L	0	T	2	P	56
Pre-requisites												
Alternate Exposure												
Co-requisites												
Course Outcomes	1	Identify personal interest areas										
	2	Learn from diverse perspectives and experiences										
	3	Gain exposure to various activities and opportunities for extra-curricular activities										
	4	Learn to manage time effectively										
	5	gain confidence										
Specific Instructional Objectives	1	Create opportunities for students to participate in a variety of non-academic experiences										
	2	Interact with and learn from peers in a setting without an external performance pressure										

	3	Allow exploration of interesting activities and reflection about these experiences		
	4	Learn to manage time effectively		
Catalog Description	This course recognizes student participation in multiple activities organized by various student organizations that pursue specific co-curricular and extra-curricular interests. These activities allow students to engage in and identify and pursue their personal interests and hobbies.			
Text Books	1	Small move: big Change (Caroline Arnold)		
	2	How to Win at College: Surprising Secrets for Success from the Country's Top Students (Cal Newport)		
	3			
	4			
Reference	1	Making the most of college: Students speak their minds (author - Richard Light)		
	2	Failing Forward: Turning Mistakes into Stepping Stones for Success (John C Maxwell)		
	3	The Last Lecture (Randy Pausch)		
	4	Lean in (Sheryl Sandberg)		
Online resources	1	List of clubs and activities		
	2	Youtube- Introduction to various club activities		
	3			
List of student club Activities				
1	Music (vocals, instruments, technical, recording, mixing, production, management)			
2	Dance (Indian classical, western, jazz, latin, contemporary, folk, production, event management)			
3	Theatre (classical, experimental, one-act, street, production, direction, casting, etc.)			
4	Arts (fine arts, painting, calligraphy, sketching, caricaturing, etc)			
5	Craft (origami, model making, sculpture, pottery, etc)			
6	Cooking (home-style, baking, confectionery, Indian, intercontinental, etc.)			
7	Graffiti (street, mural, collage, multi media, etc)			
8	Workshops, quizzes, debates, elocution, etc			
9	Filmmaking (adventure, drama, film appreciation, documentary, etc)			
10	Photography (conventional, immersive (360), landscape, portrait, technical, editing, etc.)			
11	College Fests			
12	Designing (graphic design, landscape, interior, etc)			

13	Competitive coding									
14	Recreational sports activities									
15	Other club activities organized by student clubs									
Pedagogy tools	Experiential learning	Journaling and Reflection Paper	Multimedia Portfolio							
	Components	Term End Learning reflection paper			Internal Examination					
					RP	PE	RP	PE	RP	PE
	Marks				10	10	10	10	10	10
	Total Marks	20			80					
	DOSL1001	#REF!			1	2	3	4	5	6
1	Identify personal interest areas									
2	Learn from diverse perspectives and experiences									
3	Gain exposure to various activities and opportunities for extra-curricular activities									
4	Learn to manage time effectively									
5	gain confidence									
Instructional Plan										
	Activities		Readings	Activities					CO	
1	Participation in various club based activities									
2	Weekly reflection paper									
3	Portfolio (on social media using an instagram account)									
4	Two learning papers (one per semester)									

<b>DOSL1011</b>		<b>Club Activity (Member of club)</b>											
Version	1	School	DoSL	Date of Approval				10-Nov-21					
								L	T	P	C		
								0	1	2	2		
Total Number of Contact Hours								L	0	T	2	P	56
Pre-requisites													
Alternate Exposure													
Co-requisites													
Course Outcomes	1	Be a member of a club and organize activities in that particular interest area											
	2	Learn from diverse perspectives and experiences											
	3	Learn to design and execute extra-curricular activities											
	4	Develop management skills through hands on experience											
	5	Explore different managerial roles and develop competencies											
Specific Instructional Objectives	1	Create opportunities for students to learn from organizing club activities											
	2	Learn teamwork, leadership, planning and management of events and activities											
	3	Learn to appreciate multiple perspectives, cultures, and individual capabilities											
	4	Learn to manage time effectively											
Catalog Description	This course encourages and acknowledges student members' work in organizing events and activities organized by various student organizations that pursue specific co-curricular and extra-curricular interests. These activities allow students to actively learn from the process of conceptualizing and organizing such activities as part of a team.												
Text Books	1	Small move: big Change (Caroline Arnold)											
	2	How to Win at College: Surprising Secrets for Success from the Country's Top Students (Cal Newport)											
	3												
	4												
Reference	1	Making the most of college: Students speak their minds (author - Richard Light)											
	2	Failing Forward: Turning Mistakes into Stepping Stones for Success (John C Maxwell)											
	3	The Last Lecture (Randy Pausch)											

	4	Lean in (Sheryl Sandberg)									
Online resources	1	List of clubs and activities									
	2	Youtube- Introduction to various club activities									
	3										
List of student Club Activities											
1	Music (vocals, instruments, technical, recording, mixing, production, management)										
2	Dance (Indian classical, western, jazz, latin, contemporary, folk, production, event management)										
3	Theatre (classical, experimental, one-act, street, production, direction, casting, etc.)										
4	Arts (fine arts, painting, calligraphy, sketching, caricaturing, etc)										
5	Craft (origami, model making, sculpture, pottery, etc)										
6	Cooking (home-style, baking, confectionery, Indian, intercontinental, etc.)										
7	Graffiti (street, mural, collage, multi media, etc)										
8	Workshops, quizzes, debates, elocution, etc										
9	Filmmaking (adventure, drama, film appreciation, documentary, etc)										
10	Photography (conventional, immersive (360), landscape, portrait, technical, editing, etc.)										
11	College Fests										
12	Designing (graphic design, landscape, interior, etc)										
13	Competitive coding										
14	Recreational sports activities										
15	Other club activities organized by student clubs										
Pedagogy tools	Experiential learning	Journaling and Reflection Paper	Multimedia Portfolio								
	Components	Term End Learning reflection paper			Internal Examination						
					RP	RF	RP	RF	RP	RF	RP
	Marks				10	10	10	10	10	10	10
	Total Marks	20			80						

	DOSL101 1	Club Activity (Member of club)	1	2	3	4	5	6	7	8
1	Be a member of a club and organize activities in that particular interest area									
2	Learn from diverse perspectives and experiences									
3	Learn to design and execute extra-curricular activities									
4	Develop management skills through hands on experience									
5	Explore different managerial roles and develop competencies									
Instructional Plan										
	Activities		Readings	Activities		C O				
1	Organization of the activities as a member of the club									
2	fortnightly reflection paper									
3	Portfolio (on social media using an instagram account)									
4	Two learning papers (one per semester)									

DOSL1021		Club Activity (Leader of Club)									
Version	1	School	DoSL	Date of Approval			10-Nov-21				
							L	T	P	C	
							0	1	2	2	
Total Number of Contact Hours						L	0	T	2	P	56

Pre-requisites								
Alternate Exposure								
Co-requisites								
Course Outcomes	1	Be the leader of the club and implement the charter, vision and mission of the club						
	2	Learn from diverse perspectives and experiences						
	3	Learn to lead the team, design and execute extra-curricular activities						
	4	Develop management skills through hands on experience						
	5	Explore different managerial roles and develop competencies						
Specific Instructional Objectives	1	Create opportunities for students to learn from organizing club activities						
	2	Learn teamwork, leadership, planning and management of events and activities						
	3	Learn to appreciate multiple perspectives, cultures, and individual capabilities						
	4	Learn to manage time effectively						
Catalog Description	This course encourages and recognizes student members' work in leading the student organizations through various leadership roles. As leaders they work not just to organize events and activities in specific co-curricular and extra-curricular interests, but also lead the teams that form the core members of the clubs. These activities allow students to learn and practice leadership and management skills through real world experience.							
Text Books	1	Small move: big Change (Caroline Arnold)						
	2	How to Win at College: Surprising Secrets for Success from the Country's Top Students (Cal Newport)						
	3							
	4							
Reference	1	Making the most of college: Students speak their minds (author - Richard Light)						
	2	Failing Forward: Turning Mistakes into Stepping Stones for Success (John C Maxwell)						
	3	The Last Lecture (Randy Pausch)						
	4	Lean in (Sheryl Sandberg)						
Online resources	1	List of clubs and activities						
	2	Youtube- Introduction to various club activities						
	3							
List of Student club Activities								
1	Music (vocals, instruments, technical, recording, mixing, production, management)							
2	Dance (Indian classical, western, jazz, latin, contemporary, folk, production, event							

	management)											
3	Theatre (classical, experimental, one-act, street, production, direction, casting, etc.)											
4	Arts (fine arts, painting, calligraphy, sketching, caricaturing, etc)											
5	Craft (origami, model making, sculpture, pottery, etc)											
6	Cooking (home-style, baking, confectionery, Indian, intercontinental, etc.)											
7	Graffiti (street, mural, collage, multi media, etc)											
8	Workshops, quizzes, debates, elocution, etc											
9	Filmmaking (adventure, drama, film appreciation, documentary, etc)											
10	Photography (conventional, immersive (360), landscape, portrait, technical, editing, etc.)											
11	College Fests											
12	Designing (graphic design, landscape, interior, etc)											
13	Competitive coding											
14	Recreational sports activities											
15	Other club activities organized by student clubs											
Pedago gy tools	Experiential learning	Journaling and Reflection Paper	Multime dia Portfolio									
	Components	Term End Learning reflection paper			Internal Examination							
					RP	PE	RP	PE	RP	PE	RP	PE
	Marks				10	10	10	10	10	10	10	10
	Total Marks	20			80							
	DOSL102 1	Club Activity (Leader of CLub)			1	2	3	4	5	6	7	8
1	Be the leader of the club and implement the charter, vision and mission of the club											
2	Learn from diverse perspectives and experiences											
3	Learn to lead the team, design and execute extra-											



	curricular activities								
4	Develop management skills through hands on experience								
5	Explore different managerial roles and develop competencies								
Instructional Plan									
	Activities	Readings	Activities						C O
1	Playing a leadership role in a student club								
2	Fortnightly reflection paper								
3	Portfolio (on social media using an instagram account)								
4	Two learning papers (one per semester)								

DOSL1031		Club Activity (Competitor)										
Version	1	School	DoSL	Date of Approval				10-Nov-21				
								L	T	P	C	
								0	1	2	2	
Total Number of Contact Hours							L	0	T	2	P	5 6
Pre-requisites												
Alternate Exposure												
Co-requisites												
Course Outcomes	1	Be the leader of the club and implement the charter, vision and mission of the club										
	2	Learn from diverse perspectives and experiences										
	3	Learn to lead the team, design and execute extra-curricular activities										
	4	Develop management skills through hands on experience										
	5	Explore different managerial roles and develop competencies										
Specific Instructional Objectives	1	Create opportunities for students to learn from organizing club activities										
	2	Learn teamwork, leadership, planning and management of events and activities										
	3	Learn to appreciate multiple perspectives, cultures, and individual capabilities										
	4	Learn to manage time effectively										
Catalog Description	This course encourages and recognizes individual student effort in participating in various inter-college cultural competitions within and outside the University. As representatives of the University, they help bring laurels and positive publicity to the University. This course recognizes their effort and time invested in practicing and participating in such competitions.											

Text Books	1	Small move: big Change (Caroline Arnold)									
	2	How to Win at College: Surprising Secrets for Success from the Country's Top Students (Cal Newport)									
	3										
	4										
Reference	1	Making the most of college: Students speak their minds (author - Richard Light)									
	2	Failing Forward: Turning Mistakes into Stepping Stones for Success (John C Maxwell)									
	3	The Last Lecture (Randy Pausch)									
	4	Lean in (Sheryl Sandberg)									
Online resources	1	List of clubs and activities									
	2	Youtube- Introduction to various club activities									
	3										
List of Student club Activities											
1	Music (vocals, instruments, technical, recording, mixing, production, management)										
2	Dance (Indian classical, western, jazz, latin, contemporary, folk, production, event management)										
3	Theatre (classical, experimental, one-act, street, production, direction, casting, etc.)										
4	Arts (fine arts, painting, calligraphy, sketching, caricaturing, etc)										
5	Craft (origami, model making, sculpture, pottery, etc)										
6	Cooking (home-style, baking, confectionery, Indian, intercontinental, etc.)										
7	Graffiti (street, mural, collage, multi media, etc)										
8	Workshops, quizzes, debates, elocution, etc										
9	Filmmaking (adventure, drama, film appreciation, documentary, etc)										
10	Photography (conventional, immersive (360), landscape, portrait, technical, editing, etc.)										
11	College Fests										
12	Designing (graphic design, landscape, interior, etc)										
13	Competitive coding										
14	Recreational sports activities										
15	Other club activities organized by student clubs										
Pedagogy tools	Experiential learning	Journaling and Reflection Paper	Multimedia Portfolio								
	Components	Term End Learning reflection paper			Internal Examination						
					RP	PF	RP	PF	RP	PF	RP
	Marks				10	10	10	10	10	10	10
	Total Marks	20			80						

	DOSL103 1	Club Activity (Competitor)	1	2	3	4	5	6	7	8
1	Be the leader of the club and implement the charter, vision and mission of the club									
2	Learn from diverse perspectives and experiences									
3	Learn to lead the team, design and execute extra-curricular activities									
4	Develop management skills through hands on experience									
5	Explore different managerial roles and develop competencies									
Instructional Plan										
	Activities		Readings	Activities						C O
1	Practicing for, participating in and representing University in Inter college fests									
2	Fortnightly reflection paper									
3	Portfolio (on social media using an instagram account)									
4	Two learning papers (one per semester)									

DOSL1041		Community Services - Volunteer										
Version	1	School	DoSL	Date of Approval				9-Nov-21				
								L	T	P	C	
								0	1	2	2	
Total Number of Contact Hours							L	0	T	2	P	56
Pre-requisites												
Alternate Exposure												
Co-requisites												
Course Outcomes	1	Experience of volunteering in a variety of Community service activities										
	2	Gaining empathy for lesser privileged sections of society by experience										
	3	Understanding the process of generating community awareness										
	4	Understanding Disaster management and relief through training and experience										

	5	Developing environmental and sustainability awareness
Specific Instructional Objectives	1	To help students develop empathy and citizenship behavior
	2	Enable students to develop an altruistic attitude and community development sensibility
	3	Allow exploration of community service activities and reflect about these experiences
	4	Learn to work in small and large teams for achieving community objectives
Catalog Description	This course recognizes student participation in Community service activities organized by various student organizations and other Government and non-government organizations that exist for providing service to communities. These activities allow students to develop empathy, citizenship behavior and community values.	
Text Books	1	Soul of a citizen: living with conviction in Challenging times (author: Paul Rogat Loeb)
	2	Community Services intervention: Vera Lloyd
	3	
	4	
Reference	1	A path appears: Transforming lives, creating opportunities(Nicholas Kristof and Sheryl WuDunn)
	2	The story of My Experiments with Truth (author: M. K. Gandhi)
	3	
	4	
Online resources	1	List of student run and and other Government and non-government community service organizationsorganizations
	2	
	3	
<b>List of Community Service Activities</b>		
1	Community Health Services	
2	Swachh Bharat Abhiyan and other Cleanliness drives	
3	Tree Plantation and similar environmental conservation initiatives	
4	Rain water harvesting awareness and implementation	
5	Fundraising and visits to Orphanages, Old-age homes, etc.	
6	Health and disease awareness programs	
7	Working with NGOs	
8	Disaster mitigation and management training and relief work	
9	Rural Upliftment projects	
10	Campus awareness and action projects (cleanliness, anti-ragging, blood donation, etc)	
11	Community investigations and surveys for development research	
12	Educational support for underprivileged (remedial classes, coaching, training, etc)	
13	Service camps	
14	Advocacy and information literacy initiatives	
15	Other activities serving local communities	

Pedagogy tools	Experiential learning	Journaling and Reflection Paper	Multimedia Portfolio								
	Components	Term End Learning reflection paper		Internal Examination							
				RP	PF	RP	PF	RP	PF	RP	PF
	Marks			10	10	10	10	10	10	10	10
	Total Marks	20		80							
	<b>DOSL1041</b>	<b>Community Services - Volunteer</b>		1	2	3	4	5	6	7	8
1	Experience of volunteering in a variety of Community service activities										
2	Gaining empathy for lesser privileged sections of society by experience										
3	Understanding the process of generating community awareness										
4	Understanding Disaster management and relief through training and experience										
5	Developing environmental and sustainability awareness										
Instructional Plan											
	Activities		Readings	Activities				CO			
1	Participation in various community service activities										
2	Weekly reflection paper										
3	Portfolio (on social media using an instagram account)										
4	Two learning papers (one per semester)										

Course Outcomes	1	Experience of mobilizing and executing Community service activities
	2	Providing opportunities for community service volunteering for other fellow students
	3	Understanding the process of mobilizing cash, kind and volunteer support
	4	Building leadership and management skills
	5	Building empathy and citizenship behavior
Specific Instructional Objectives	1	To help students understand leadership in a community environment
	2	Enable students to develop an altruistic attitude and community development sensibility
	3	Allow deep understanding of community service through practical experience
	4	Learn to lead small and large teams for achieving community objectives
Catalog Description	This course recognizes student leadership in mobilizing community service activities as members of various student organizations or other Government and non-government organizations that exist for providing service to communities. These activities allow students to develop leadership, management skills, empathy, citizenship behavior and community values.	
Text Books	1	Soul of a citizen: living with conviction in Challenging times (author: Paul Rogat Loeb)
	2	Community Services intervention: Vera Lloyd
	3	
	4	
Reference	1	A path appears: Transforming lives, creating opportunities(Nicholas Kristof and Sheryl WuDunn)
	2	The story of My Experiments with Truth (author: M. K. Gandhi)
	3	
	4	
Online resources	1	List of student run and and other Government and non-government community service organizationsorganizations
	2	
	3	
<b>List of Community Service Activities</b>		
1	Community Health Services	
2	Swachh Bharat Abhiyan and other Cleanliness drives	
3	Tree Plantation and similar environmental conservation initiatives	
4	Rain water harvesting awareness and implementation	
5	Fundraising and visits to Orphanages, Old-age homes, etc.	
6	Health and disease awareness programs	
7	Working with NGOs	
8	Disaster mitigation and management training and relief work	
9	Rural Upliftment projects	
10	Campus awareness and action projects (cleanliness, anti-ragging, blood donation, etc)	

11	Community investigations and surveys for development research											
12	Educational support for underprivileged (remedial classes, coaching, training, etc)											
13	Service camps											
14	Advocacy and information literacy initiatives											
15	Other activities serving local communities											
Pedagogy tools	Experiential learning	Journaling and Reflection Paper	Multimedia Portfolio									
	Components	Term End Learning reflection paper			Internal Examination							
					RP	PF	RP	PF	RP	PF	RP	PF
	Marks				10	10	10	10	10	10	10	10
	Total Marks	20			80							
	DOSL1051	Community Services - Mobilizer			1	2	3	4	5	6	7	8
1	Experience of mobilizing and executing Community service activities											
2	Providing opportunities for community service volunteering for other fellow students											
3	Understanding the process of mobilizing cash, kind and volunteer support											
4	Building leadership and management skills											
5	Building empathy and citizenship behavior											
Instructional Plan												
	Activities			Readings	Activities						CO	
1	Organizing and leading teams in various community service activities											
2	Fortnightly reflection paper											
3	Portfolio (on social media using an instagram account)											
4	Two learning papers (one per semester)											

**B. Sc. Statistics**  
**SEMESTER – II**  
**VEDC1001 : VENTURE DEVELOPMENT**

**Course Outline**

**Course Description**

In this course, you will discover your deeper self in terms of how you might contribute to society by creating exciting new products and services that can become the basis of a real business. Your efforts, creativity, passion, and dedication to solving challenging problems are the future of our society, both in your country and worldwide.

The course is divided into four sections:

1. Personal discovery of your core values and natural skills
2. Ideation and improving the impact
3. Business model design for the innovation
4. Presenting your idea in a professional manner suitable for a new venture pitch

Each section has key frameworks and templates for you to complete, improving your idea step by step until the final presentation.

First, you will discover your personal values and emerging areas of knowledge that are the foundations of any successful company. Next, you will learn how to develop insight into the problems and desires of different types of target customers and identify the design drivers for a specific innovation. Then, you will learn specific design methods for new products and services. And as important as the product or service itself, it is a strategy for monetizing the innovation – generating revenue, structuring the operating costs, and creating the operating profit needed to support the business, hire new employees, and expand forward.

This project is intended to be for teams of students. Innovation and entrepreneurship are inherently team-based. This course will give you that entrepreneurial experience.

This is the beginning of what might be the most important journey of personal and career discovery so far in your life, one with lasting impact. This is not just a course but potentially an important milestone in your life that you remember warmly in the years to come.



## **Course Objectives**

Students will have the opportunity to:

- Discovery who you are – Values, Skills, and Contribution to Society
- Understand how creativity works and permeates the innovation process
- Learn the basic processes and frameworks for successful innovation.
- Gain experience in actually going through the innovation process.
- Conduct field research to test or validate innovation concepts with target customers.
- Understand innovation outcomes: issues around business models, financing for start-ups, intellectual property, technology licensing, corporate ventures, and product line or service extensions.

## **Course Materials**

- Meyer and Lee (2020), Personal Discovery through Entrepreneurship, The Institute for Enterprise Growth, LLC. Boston, MA., USA
- Additional readings
- Additional videos, including case studies and customer interviewing methods.

***Expectations of you in the classroom:*** Each student is expected to be prepared to discuss the readings/exercises assigned for each class. It's not optional! Students will be randomly asked to discuss and summarize the material. Your learning – and your success—in this course are heavily dependent upon your willingness to participate actively in class discussion. Your class participation will be assessed on the quality and consistency of your effort in each and every class.

***Late assignments:*** Late assignments are subject to grade penalty. Lateness will only be considered for grading if prior notice was given to the instructor before the due date.

***Presentation:*** Achieving success with an innovative idea requires you to package and present the idea in a crisp, creative, and powerful manner. The activity of presenting helps you to internalize your idea -- as you talk about it and obtain feedback -- and improve upon it. There would be two major presentations during the course, plus a series of other smaller unscheduled presentations of work in progress or course material. Prepare, practice, and succeed!

***Time spent outside of class:*** The course is hands-on and requires students to conduct field research through direct interactions with people (interviews/surveys) and online/in the library. Specifically, the course requires that students conduct studies with potential target users and stakeholders. You must be prepared to go out of your comfort zone to dig for information. You will need to search for information online and arrange to meet or talk to relevant people who may have the information you need.

## **Group Project Overview**

This is a semester length project and the cornerstone component of the course. The group project will give you the opportunity to apply the course concepts to a real situation. You will learn about the entrepreneurship for your own business or your work in organizations. Even if you are not going to be an entrepreneur, you need to know how to identify the opportunities, who to persuade people, and how to create economic and social values in many different contexts.

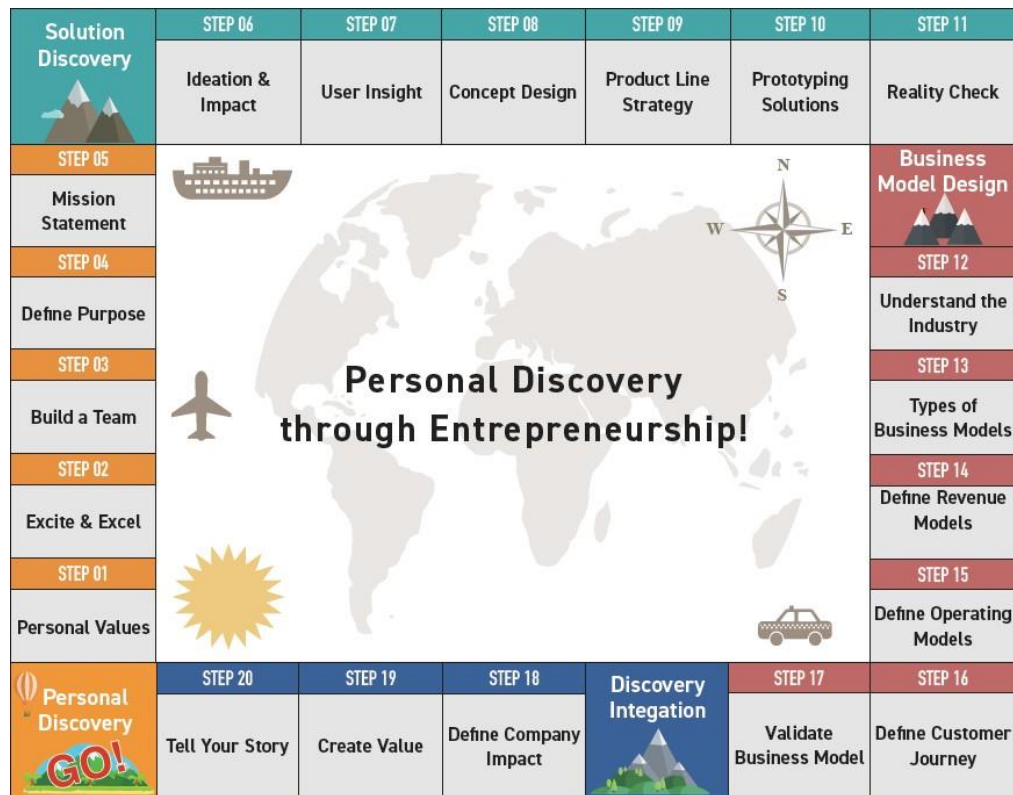
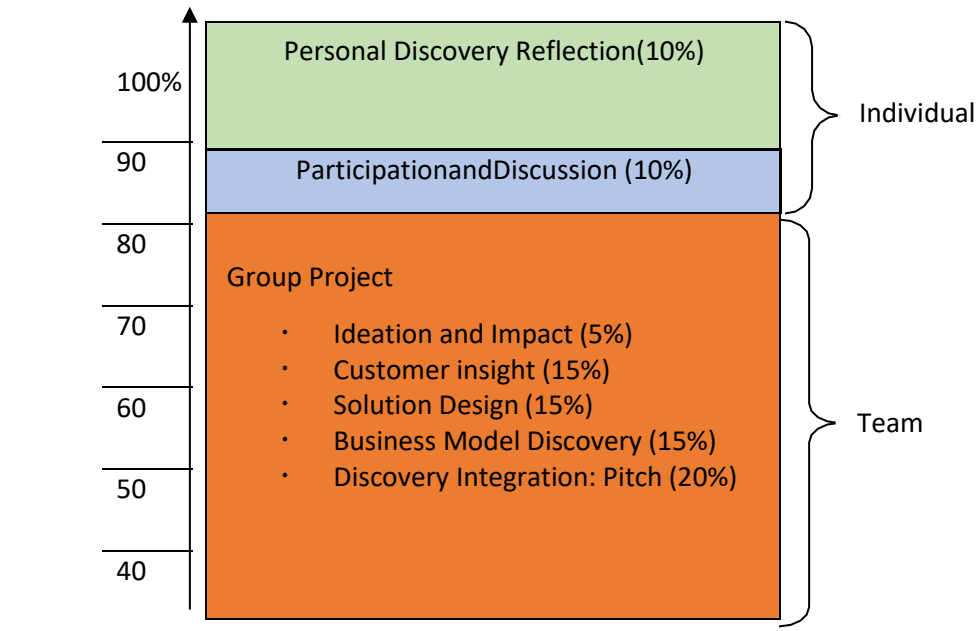
Talking to customers is one of the most important steps in investigating your business because your entrepreneurial vision must correspond to a true market opportunity. With your group, select 5-6 potential customers willing to be interviewed. They should represent a cross-section of our target market and should provide information that helps you refine your opportunity. This is not a simple survey: you are seeking in-depth understanding of the lifestyle and behaviors of your customer that can help you shape your opportunity. Please remember, you are not simply looking to confirm you have a great idea, but to shape your idea into a great opportunity. You will maximize your chances for success and your ability to execute your business cost-effectively by making early (rather than later) changes to your concept.

“Design” is fun, particularly when you merge customer insight with your own creativity. Enjoy! In this book, we provide structured methods to be an active listener and learner from customers as well as a product or service designer.

Business modeling is not as hard as it might sound. This is the design of your business – how it charges customers, what is spent producing and selling products or services, and the money that can be made for each unit sold. We keep it simple – so should you.

For the final outcome, you will be required to come up with Pitch that can be used as the basis for actually starting a company based on an impactful innovation. Once again, we provide a specific format and tools for creating a compelling Pitch. We also want you to think about an exciting proposition that is more than just making money, but rather, one that helps society. This will give you innovation and venture concept greater lift with customers – and it will also make you feel better, deep inside.

## Project Components and Grading



[20 Steps and activities in this course]

## Deliverables

There are a number of different deliverables for the course that follow the templates presented in the book, as applied to your own venture idea. Do your best to keep up with the timeline of the class; do not fall behind! Later templates build on the learnings from prior templates. Make the most of your team! Everyone needs to pitch in. In no case, should one person be taking the lead on all templates. Rather, different team members should take the lead on specific deliverables. Coordinate well. Let your teacher know if a team member is not carrying his or her load.

## **Specific Deliverables**

**Ideation and Impact** Hand-in Package: 5% of total grade  
clearly written, with a one-page explanation for the team's decision

- Problem to Solve Templates, Step 4, Page 62 and 63 (with a page of additional explanation if needed)
- Idea Impact Template, Step 6, Page 69 (with a page of explanation)

**Customer Interviews and Insight** Hand-in Package: 15%  
(1<sup>st</sup> Round of Customer Interviews)

- Customer Interviews Template, Step 7, Pages 75-78, plus add additional template forms for each additional customer interview. The more, the better.
- Idea Reshaping Template, Step 7, Pages 84 and 85. Integration into overall conclusions. How have you improved your original idea through customer research?
- Latent Needs Template, Step 7, Page 93 – what are the frustrations of users that are not solved by current products or services?
- Full Use Case Template, Step 7, Page 99 – how do your customers' needs change over the full use case, and what innovative ideas can you propose at each step of the way?

**Concept Design (and Test)** Hand-in Package: 15%

- Customer Value Proposition Template: Step 8, Page 107. This becomes the landing point for what you learned in your customer interviews.
- Competitive Analysis Template: Step 8, Page 109. (Use the Web or actual stores/dealers)
- Product Vision and Subsystem Design Templates: Step 10, Pages 121 and 126 (You can add additional pages with design illustration and explanations of your bubble chart)
- Reality Check Survey Template and Results: Step 11, Page 141, 143-144  
(You can use more than 2 pages for reporting the results.)

**Business Model Design** Hand-in Package: 15%

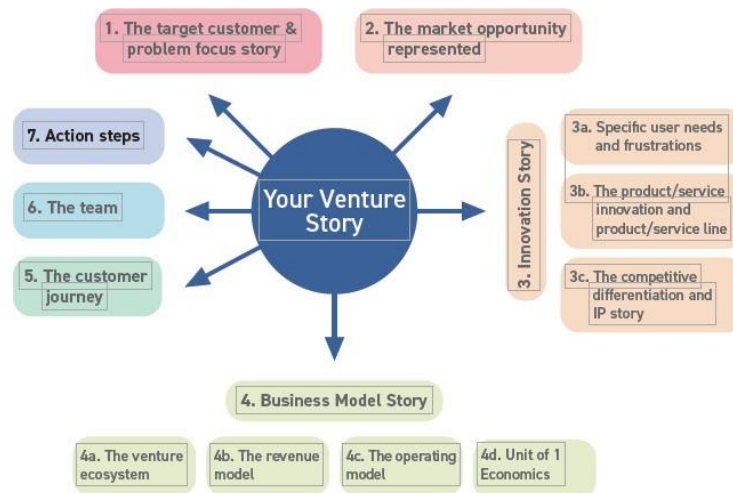
- Industry Analysis Templates: Step 12, Pages 153 and 154

- Illustrate the Business Model Template: Step 13, Page 170  
(Use different colours or line patterns to show the flows of product, money, and information)
- Revenue Model Template: Step 14, Page 177
- Operating Model Template: Step 15, Page 187
- Customer Journey Template: Step 16, Page 195
- Validating the Business Model Template: Step 17, Pages 199 and 200

### Discovery Integration Hand-in Package: 20%

- Business and Social Vision Impact Statement Template: Step 18, Page 210.
- Per Unit Profitability Template: Step 19, Page 229
- Your Venture Story Pitch: Step 20(PowerPoint)

Overall Pitch Design Template: Page 264



Assemble the templates from all your work above, plus any others that you found particularly meaningful, and from these, create your Team's Innovation Pitch. The book has lists specific templates that fit for each part of the final presentation.

Do not just regurgitate the templates in your pitch; rather, take the key points from them to create your own, unique presentation. The templates help you think – but most are too complex to present to outside people who have not taken the course. Therefore, design this pitch as if you presenting to a new set of investors.

And don't forget to add an attractive title page with your team members names and email addresses! You can also add an Appendix at the very back with particularly interesting information, such as industry data or the results of your customer interviews and Reality Check.

### **Individual Innovation Assignments**

You will be required to submit two Reflection Journals as well as a maximum two pages double spaced Synthesis, Integration and Application paper by email at the Week 4 and Week 14 respectively. Please note, this exercise is not about regurgitating the course concepts.

#### **(1) Personal Discovery Reflection Journal (10%)**

At the beginning of this semester, you will have a time to think about your self (who you are, what you are good at, what areas you want to contribute on) using a couple of templates. After that sessions, you will have a quiet moment to think about yourself, your career, and your happiness in your life. Please write 2-page reflectional journal what you feel and learning through the personal discovery sessions.

#### **(2) Insight Learning Reflection Journal (10%)**

At the end of this semester, you are to prepare a short reflection of impressive sessions as well as related activities outside the classroom. Specially, (1) reflect on the key points from lectures, reading, discussion, guest speakers, and interviews, (2) apply this to your own situation, and (3) outline ways that you intend to use this knowledge in the future.

## Course Schedule

We ek	Sessi on	Topics and Steps	Key CONCEPTS Introduced in Class	Class Focus Activity
1	1	<b>Course Overview</b>	<ol style="list-style-type: none"> <li>1. Why is entrepreneurship important?</li> <li>2. What is Personal Discovery through Entrepreneurship?</li> <li>3. Four Stages; Personal Discovery, Solution Discovery, Business Model Discovery, Discovery Integration</li> <li>4. Preparation (finding interesting areas)</li> </ol>	<b>Lecture and Discussion</b>
	2	<b>Personal Discovery</b> (Step 01, Step 02)	<ol style="list-style-type: none"> <li>1. Personal Values</li> <li>2. Strength and Weakness</li> </ol>	Individual: <ul style="list-style-type: none"> <li>• Work with the templates provided on pages:</li> <li>• Core values: 22, 23</li> <li>• Skills: 27, 28, 29, 30, 31</li> <li>• Societal Contribution: 33, 34</li> </ul>
2	3	<b>Find Teammates</b> (Step 03)	<ol style="list-style-type: none"> <li>1. Review Problem Area Template at the beginning of the book to find classmates who want to work on the same problem area.</li> <li>2. Findteammates               <ol style="list-style-type: none"> <li>(1) Shared values</li> <li>(2) Levels of commitment</li> <li>(3) Skills and experiences (Same or Different?)</li> </ol> </li> </ol>	Problem template: Page 9 <ul style="list-style-type: none"> <li>• Talk to your classmates and find teammates. See who wants to work on in the same problem space, with a shared vision of solutions, and complementary skill sets.</li> <li>• Sit back and assess: Team templates on Pages 44, 45, and 46.</li> <li>• Prepare to present your team, the problem it is going to tackle, and its collective skills.</li> </ul>
	4	<b>Define Purpose</b> (Step 04) <b>Create Mission</b> (Step 05)	<ol style="list-style-type: none"> <li>1. Methods for defining and refining a venture's purpose</li> <li>2. Defining a Venture's Purpose</li> <li>3. Creating a Vision Statement</li> </ol>	Team: <ul style="list-style-type: none"> <li>• Purpose and Mission Templates: Pages 49 and 52</li> <li>• Be prepare to present to the class.</li> <li>• Personal Discovery Reflection Journal Due</li> </ul>

We ek	Sess ion	Topics and Steps	Key CONCEPTS Introduced in Class	Class Focus Activity
3	5	<b>Ideation &amp; Impact</b> (Step 06)	Ideation Methods <ul style="list-style-type: none"> <li>An in-class ideation exercise</li> </ul>	Team: <ul style="list-style-type: none"> <li>Problem to Solve Templates, Step 4, Page 62, and 63</li> </ul>
	6		Increasing the Impact of an Idea. (The Eat-Your-Coffee Video – a good example of ideation)	Team: <ul style="list-style-type: none"> <li>Idea Impact Template, Step 6, Page 69</li> </ul>
4	7	<b>User Insights Frameworks</b> (Step 07)	<ul style="list-style-type: none"> <li>Identify and find the right target users.</li> <li>Interview style and methods</li> <li>The Customer Interview template.</li> </ul>	Team: <ul style="list-style-type: none"> <li>Customer Interviews Template, Step 7, Pages 75</li> <li>Edit interview template for your project.</li> </ul>
	8		Laddering methods for interviews	Team: <ul style="list-style-type: none"> <li>Latent Needs Template, Step 7, Page 93</li> </ul>
5	9	<b>User Insights Customer Interviews</b> (Step 07)	<ul style="list-style-type: none"> <li>Finding latent needs</li> <li>Field work check-in</li> </ul>	Team: <ul style="list-style-type: none"> <li>Latent Needs Template, Step 7, Page 93</li> <li>Field work – customer interviewing</li> </ul>
	10		<ul style="list-style-type: none"> <li>Think about innovation across the entire use case</li> <li>Field work check-in</li> </ul>	Team: <ul style="list-style-type: none"> <li>Full Use Case Template, Step 7, Page 99</li> <li>Field work – customer interviewing</li> </ul>
6	11	<b>User Insights Interpreting Results</b> (Step 07)	<ul style="list-style-type: none"> <li>Interpreting customer interview results</li> <li>Field work check-in</li> </ul>	Team: <ul style="list-style-type: none"> <li>Field work – customer interviewing</li> <li>Also talk to retailers/dealers if appropriate</li> </ul>
	12		<ul style="list-style-type: none"> <li>Idea Reshaping based on Customer Interviews</li> <li>Field work check-in</li> </ul>	Teams prepare results of results from customer interviews and how the original ideas have been reshaped & improved.
7	13	<b>User Insights Interpreting Results</b> (Step 07)	<ul style="list-style-type: none"> <li>Customer Research Reports</li> <li>Implications for product and service design</li> </ul>	<ul style="list-style-type: none"> <li>Teams prepare PPTs for class presentation</li> <li><b>Customer Insight Template Hand-in Package</b></li> </ul>
	14			

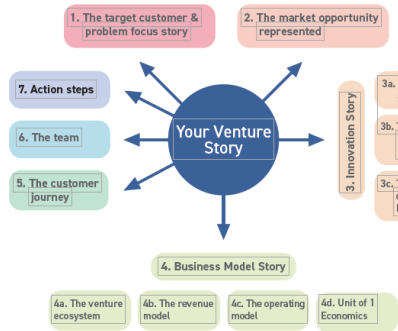
We ek	Sessi on	Topics and Steps	Key CONCEPTS Introduced in Class	Class Focus Activity
8	15	<b>Concept Design</b> (Step 08)	<ul style="list-style-type: none"> <li>Defining Customer Value</li> <li>Understanding Customer Value Proposition</li> </ul>	Team: <ul style="list-style-type: none"> <li>Customer Value Proposition</li> <li>Template: Step 8, Page 107</li> <li>Draft the CVP</li> </ul>
	16		<ul style="list-style-type: none"> <li>Presentation and review of CVPs</li> </ul>	Team: <ul style="list-style-type: none"> <li>Complete CVP</li> </ul>



9	17	<b>Competitive Analysis and Positioning</b> (Step 08)	<ul style="list-style-type: none"> <li>Understanding of Competitive Matrix</li> <li>Competitive positioning: creating your separate space</li> </ul>	<b>Team:</b> <ul style="list-style-type: none"> <li>Identify major competitors, and dimensions for analysis</li> <li>Template: Step 8, Page 109</li> </ul>
	18		<ul style="list-style-type: none"> <li>Presentations of Competitive Analyses and Positionings</li> </ul>	<b>Team:</b> <ul style="list-style-type: none"> <li>Perform the competitive analysis and present results, including positioning</li> </ul>
10	19	<b>Product Line Strategy</b> (Step 09)	<ul style="list-style-type: none"> <li>Product line framework: good, better, best on underlying platforms, plus application to Services.</li> </ul>	<b>Team:</b> <ul style="list-style-type: none"> <li>Identify good, better, best variations based on the underlying concept.</li> <li>Product line template: Page 115</li> </ul>
	20	<b>Product Visioning Subsystem Design, and Prototype Sketch</b> (Step 10)	<ul style="list-style-type: none"> <li>The structured bubble chart, showing implementation options and the team's choices</li> <li>Prototype sketching (The Bluereo Video is a good example of iterative prototyping driven by customer discovery.)</li> </ul>	<b>Team:</b> <ul style="list-style-type: none"> <li>Prototype sketch, and for Web apps, a wireframe. For physical products, an initial bill of materials.</li> <li>Underlying bubble chart showing your decision process.</li> <li>Product Vision and Subsystem Design Templates: Step 10, Pages 121 and 126</li> </ul>
<b>Week</b>	<b>Session</b>	<b>Topics and Steps</b>	<ul style="list-style-type: none"> <li><b>Key CONCEPTS Introduced in Class</b></li> </ul>	<b>Team or Individual Activity</b>
11	21	<b>Reality Check</b> (Step 11)	<ul style="list-style-type: none"> <li>The purpose of the Reality Check, testing the product concept, channel preferences, and much other.</li> <li>Guidance on the number or additional customers for the reality check survey</li> <li>How to analyze and interpret the results</li> </ul>	<b>Team:</b> <ul style="list-style-type: none"> <li>Reality Check Survey Template and Results: Step 11, Page 141, 143-144</li> <li>Customize the Reality Check template for your venture.</li> <li>Do a quick round of customer surveying. Aim for 12 more interviews.</li> </ul>
	22			
12	23	<b>Industry Analysis</b> (Step 12)	<ul style="list-style-type: none"> <li>Team reports on Reality Check Results</li> <li>Examine major components of an Industry Analysis</li> <li>Review Templates</li> </ul>	<b>Team:</b> <ul style="list-style-type: none"> <li>Prepare and present the results of your reality check, plus any pivots you wish to make.</li> <li><b>Concept Design (and Test) Hand-in Package</b></li> <li>Industry Analysis Templates: Step 12, Pages 153 and 154s</li> </ul>

	24	<b>Business Model</b> (Step 13)	<ul style="list-style-type: none"> <li>Defining the Business Model:</li> <li>Lecture on basic structure and different types.</li> <li>Illustrating it as the flow of product, money, and information.</li> </ul>	Team: <ul style="list-style-type: none"> <li>Business Model Illustration Template, Step 13, Page 170</li> </ul>
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We ek	Sessi on	Topics and Steps	• Key CONCEPTS Introduced in Class	Team or Individual Activity
13	25	<b>Business Model</b> (Steps 14, 15, 16, 17)	<ul style="list-style-type: none"> <li>Revenue and Expenses</li> <li>The key decision points in the Revenue Model</li> <li>The key decision points in the Operating Model</li> <li>Designing the Customer Journey</li> <li>Validating the Business Model (The Polka Dog Bakery Video: an example of creating a new retail experience, plus new products.)</li> </ul>	Team <ul style="list-style-type: none"> <li>Step 14, Page 177</li> <li>Step 15, Page 187</li> <li>Step 16, Page 195</li> <li>Step 17, Pages 199 and 200</li> <li>Validate the Revenue and Operating Model by trying to have phone calls with a few Sellers and Manufacturers to validating pricing, channels, and costs.</li> </ul>
	26			
14	27	<b>Impact Visioning</b> (Step 18)	<ul style="list-style-type: none"> <li>Develop clear statements for business and societal impact.</li> <li>Look at good existing examples of companies that do both.</li> </ul>	Team: <ul style="list-style-type: none"> <li>Start integrating your research and templates towards the final presentation, provided in Step 20, Page 264</li> <li><b>Business Model Design Hand-in Package</b></li> </ul>
	28	<b>Creating Value</b> (Step 19)	<ul style="list-style-type: none"> <li>Develop a project of the profitability in make low volumes for a product, a service, and a Web app.</li> <li>Discuss applications of the framework to your venture.</li> </ul>	Team: <ul style="list-style-type: none"> <li>Develop and present Unit of 1 Economics Template, Step 19, Page 229</li> <li>Keep working on the Final presentation</li> </ul>

We ek	Sess ion	Topics and Steps	Key CONCEPTS Introduced in Class	Team or Individual Activity
15	29	Tell Your Story	<ul style="list-style-type: none"><li>• Presentation Format and Style</li><li>• Format:<ul style="list-style-type: none"><li>(1) Title Slide with names and contact information</li><li>(2) The Target Customer and the Problem to be Solved</li><li>(3) The Market Opportunity</li><li>(4) The Innovation Story</li><li>(5) The Business Model Story</li><li>(6) The Customer Journey</li><li>(7) The Team</li><li>(8) The Proposed Action Steps.</li><li>(9) Appendices (if needed or desired)</li></ul></li><li>• If you have built a prototype during the class, please bring it and show it to us!</li></ul> <p>(The Fortify Video is a good example of how a good technical idea can translate into a business model, and next, into a well-funded venture.)</p>	<p>Team:</p> <ul style="list-style-type: none"><li>• The PPT Presentation</li></ul>  <ul style="list-style-type: none"><li>• Practice, practice, practice!</li><li>• Not too many words on one slide</li><li>• Use pictures</li><li>• Use template to develop your thinking, but try to create slides that are not just the templates.</li></ul>
	30			
Final Course Deliverables			Due on the Monday after the weekend of the final class meeting.	<p>Team: Your Venture PPTs</p> <p>Individual: Insight Learning Reflection Journal</p>