UNIVERSITY OF MADRAS

M.Sc. DEGREE PROGRAMME IN MATHEMATICS

SYLLABUS WITH EFFECT FROM 2023-2024

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="6">Industry Module- Statistical Methods</td></tr>
<tr><td colspan="2">Paper Number</td><td colspan="6">Core X</td></tr>
<tr><td rowspan="2">Category
Core Industry Module</td><td rowspan="2">Core</td><td>Year</td><td>II</td><td>Credits</td><td>4</td><td>Course Code</td><td>528C3D</td></tr>
<tr><td>Semester</td><td>III</td><td colspan="4"></td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours per week</td><td>Lecture</td><td>Tutorial</td><td colspan="2">Lab Practice</td><td colspan="2">Total</td></tr>
<tr><td>5</td><td>1</td><td colspan="2">--</td><td colspan="2">6</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">UG level Statistics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">After learning the contents of this paper the student must be able toApply the concepts of probability and distributions to some case studies, Correlate the material of one unit to the material in other units, Resolve the potential misconceptions and hazards in each topic of study.</td></tr>
<tr><td colspan="2" rowspan="3">Course Outline</td><td colspan="6">UNIT – I:Historical development of Statistical Quality Control – Meaning of Quality improvement – Quality cost – Total Quality Management – Causes of variations – X, R, P and C charts.</td></tr>
<tr><td colspan="6">UNIT-II : Acceptance sampling plans by Attributes –Single Sampling Plan – Double Sampling Plan – OC Curves – AOQ, ATI curves, Dodge Roaming AOQL and LTPD plans, MIL - STD 105D plans.</td></tr>
<tr><td colspan="6">UNIT-III :Variable Sampling Plan – One sided and two sided specifications, Taguchi philosophy and contributions to Quality Improvement (Basic concepts only).</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNIT – IV : Design of Experiments- Analysis of variance – One way and Two way classification, Complete Randomized Design (CRD), Randomized Block Design (RBD), Latin Square Design (LSD),2^m Factorial Designs,3^m Factorial designs.</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNIT-V : Basics of Reliability theory – Life time distribution - Hazard rate – Survival function – MTTF- MRL, Computations of Exponential, Weibull, Gamma and life time distributions.</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Books for study and reference	1. Montgomery, DC (1991),Introduction of Statistical Quality Control, John Wiley and Sons. 2. Marvin Rausand (2004), System Reliability theory-Models, Methods and Applications, John Wiley and Sons. 3. Hsyland&Hsyland (2004) System Reliability Theory Models, Statistical Methods and applications Second Edition, Wiley. 4. H.J. Mittag and H. Rinne (1993) Statistical Methods of Quality Assurance, Germany Chapman & hall India (UK). 5. Ron.S.Kenett,Shelemyahu Zacks and Daniele Amberti, Modern Industrial Statistics with Applications in R,Minitab and JMP, Second Edition,2014,John Wiley and Sons Ltd. 6. Das & Giri (2015) Designs and analysis of Experiments, Second Edition, New Age International Publishers.
Website and e-Learning Source	http://mathforum.org, http://ocw.mit.edu/ocwweb/Mathematics, http://www.opensource.org, www.physicsforum.com

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO1: Demonstrate the knowledge of core principles in Statistics.

CLO2: Interpret and consider complex problems of statistics in a systematic way.

CLO3: Apply the variation principle for real physical situations.

CLO4: Explore different applications of these concepts in the Statistical fields.

CLO5: Describe and apply the concept of estimation, distribution and TPM

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	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	3	1	3	2	3	3	3	2	1
CLO2	2	1	3	1	3	3	3	2	1
CLO3	3	2	3	1	3	3	3	2	1
CLO4	1	2	3	2	3	3	3	2	1
CLO5	3	1	2	3	3	3	3	2	1