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| Semester | FIVE |
| Course | Major |
| Paper Code | C3ST230531T |
| Paper Title | Economic Statistics & Statistical Quality Control |
| No. of Credits | 4 |
| Theory / Practical /Composite | Theory |
| Classes per week | Module I: 2 periods / week Module II: 2 periods/week |
| Module | 2 |

Course outcomes of Module 1

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| 1. Remember the basic formulae for index numbers |
| 2. Understand the rationale behind the different index numbers in use |
| 3. Analyze real life economic data to derive meaningful insights with respect to price changes |
| 4. Apply the different formulae as applicable to the data at hand |
| 5. Evaluate the performance of the different index number formulae |
| 6. Create self - designed problems from relevant data for deeper economic insight |

Course outcomes of Module II

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| 1. Remember the basic ideas of Statistical Quality Control |
| 2. Understand the basic difference in the approaches to Process and Product control |
| 3. Analyze real life industrial data to derive meaningful insights to process variability |
| 4. Apply the different control charts to real life data |
| 5. Evaluate the performance of the process from producer and consumer perspectives |
| 6. Create self - designed problems from industrial sphere to track process performance |

Syllabus

| Unit/Module | Content | No. of lectures | CO mapping | Cognitive levels |
|--------------------|----------------|------------------------|-------------------|-------------------------|
| Module I | | | | |

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| Unit 1 | Price, quantity and value indices, choice of weights, different indices and their comparisons. Tests of index numbers. Errors in index numbers. Chain Index Number. | 10 | CO1 CO2 | K1 K2 |
| | Some important indices: Cost of living index, Wholesale price index, Index of industrial Production- methods of construction and uses. | 3 | CO1 CO2 CO3 | K1 K2 K3 |
| | National accounts: Definition of national income. A brief account of product, expenditure and income approaches for estimation of National Income. | 3 | CO4 | K4 |
| Unit 2 | Measures of income inequality and their desirable properties (Gini's coefficient, Lorenz curve). Income distributions. Measures of unemployment. | 7 | CO1 CO2 CO3 CO4 | K1 K2 K3 K4 |
| | Comparative Social Statistics: Indices related to human development and gender disparity. | 3 | CO5 CO6 | K5 K6 |
| Module II | | | | |
| Unit 1 | Definition, dimensions of quality, Statistical Process Control - Seven tools of SPC, chance and assignable causes of quality variation. Rational Sub-grouping. Statistical Control Charts- Construction and Statistical basis of 3- σ Control charts. | 4 | CO1 CO2 | K1 K2 |
| | Control charts: X-bar & R-chart, X-bar & s-chart. Control charts for attributes: np-chart, p-chart, c-chart and u-chart. Comparison between control charts for variables and control charts for attributes. Analysis of patterns on control chart. Estimation of process capability. | 9 | CO1 CO2 CO3 | K1 K2 K3 |

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| Unit 2 | Acceptance sampling plan for attributes: Principle of acceptance sampling plans. Single and Double sampling plans - OC, AQL, LTPD, AOQ, AOQL, ASN, ATI functions with graphical interpretations, use and interpretation of Dodge and Romig's sampling inspection plan tables. | 9 | CO1 CO2 CO3 | K1 K2 K3 |
| | Total quality management (TQM). Overview of Six Sigma. DMAIC using one case study. | 4 | CO4 CO5 CO6 | K4 K5 K6 |

Reading/Reference list

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| 1. Mudgett Bruce D (1951): Index Numbers, N.Y: Wiley. |
| 2. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. II, 8th Edn. The World Press, Kolkata. |
| 3. Nagar A.L, Das R.K (1997): Basic statistics, Oxford University Press. 4. |
| 4. Montgomery, D.C. (2009): Introduction to Statistical Quality control, 6th edition, Wiley India, Pvt Ltd. |
| 5. Mukhopadhyay, P. (2011): Applied Statistics, 2nd edition revised reprint, Books and Allied(P) Ltd. |
| 6. Montgomery, D.C. and Runger, G.C. (2008): Applied Statistics and Probability for Engineers, 3rd edition reprint, Wiley India Pvt Ltd. |
| 7. Ehrlich, B. Harris (2002): Transactional Six sigma and Lean Servicing, 2nd edition, St Lucie Press. |
| 8. Hoyle, David (1995): ISO Quality systems Handbook, 2nd edition, Butterworth Heinemann Publication. |

Evaluation

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|------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| | CIA: 30 End-Sem: 70 Total: 100 | |
| Paper Structure for Theory Semester Exam | Module – 1 (35 marks) | Module – 2 (35 marks) |
| | Short Questions: 4 out of 6 (5 Marks Each) Long Questions: 1 out of 2 (15 Marks) | Short Questions: 4 out of 6 (5 Marks Each) Long Questions: 1 out of 2 (15 Marks) |

| CO | CO Description for Module I | Cognitive levels |
|------------|---------------------------------------------------------------------------------------------|-------------------------|
| CO1 | Remember the basic formulae for index numbers | K1 |
| CO2 | Understand the rationale behind the different index numbers in use | K2 |
| CO3 | Analyze real life economic data to derive meaningful insights with respect to price changes | K3 |
| CO4 | Apply the different formulae as applicable to the data at hand | K4 |
| CO5 | Evaluate the performance of the different index number formulae | K5 |
| CO6 | Create self - designed problems from relevant data for deeper economic insight | K6 |

| CO | CO Description for Module II | Cognitive levels |
|------------|----------------------------------------------------------------------------------------|-------------------------|
| CO1 | Remember the basic ideas of Statistical Quality Control | K1 |
| CO2 | Understand the basic difference in the approaches to Process and Product control | K2 |
| CO3 | Analyze real life industrial data to derive meaningful insights to process variability | K3 |
| CO4 | Apply the different control charts to real life data | K4 |
| CO5 | Evaluate the performance of the process from producer and consumer perspectives | K5 |
| CO6 | Create self - designed problems from industrial sphere to track process performance | K6 |