DEPARTMENT OF STATISTICS				*CLASS: I M.Sc. Statistics*				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/week**	**CIA**	**Ext**	**Total**
II	Practical – 3	21P2SMP3	Statistical Practical – II (Calculated based)	2	4	40	60	100

Nature of Course				
Knowledge and skill	✓		Employability oriented	✓
Skill oriented	✓		Entrepreneurship oriented	

Units	Description	Hours	K-Level	CLO(s)
1	Simple random sampling methods of drawing sample,Estimation of the population total and variance estimation.	7	K2	1
2	PPSWR Hurwitz -Thompson estimator - Des Raj ordered estimator, Murthy's unordered estimator Midzuno scheme. Linear and circular systematic sampling. Stratified sampling SRS,PPSWR,PPSWOR	15	K3	2
3	Ratio Estimator (including ratio estimator for stratified sampling – separate and combined) , Regression Estimator (including regression estimator for stratified sampling – separate and combined) , Cluster Sampling (Cluster of Equal sizes)	15	K3	3
4	MLE and Standard error of ML estimators, MLE through the method of successive approximation, MLE for truncated distribution. Method of Moments	15	K4	4
5	Interval estimation: Confidence interval for mean, difference of means, variance and ratio of variances.	8	K4	5

Books for Reference:

1. Singh, D and Choudhary, F.S. (1977) Theory and Analysis of Sample Survey Designs.Wiley Eastern, New Delhi.
2. Cochran, W.G, (2007), Sampling Techniques, Third Edition, John Wiley & Sons, New Delhi.
3. Ardilly, P. and Yves T. (2006) Sampling Methods: Exercise and Solutions. Springer, New York.
4. Desraj (1976) Sampling Theory, McGraw Hill, New York.
5. Mukhopadyay, P. (2007) Survey Sampling.Narosa, New Delhi.
6. Sukhatme, P.V. and Sukhatme, B.V. (1970) Sampling Theory Surveys with Applications, 2/e, Iowa State University Press,Iowa.
7. Kish, L. (1961) Survey Sampling, Wiley, New York.
8. Murthy, M.N (1997) Sampling Theory and methods, Statistical Publishing Society, Calcutta.
9. Thompson, S.K, (2012), Sampling, John Wiley and Sons, New York.
10. Sampath S (2001), Sampling Theory and Methods, The new age international ltd. New Delhi.
11. Rajagopalan M and Dhanavanthan P, (2012), Statistical Inference, PHI Learning Pvt. Ltd., New Delhi.
12. Rohatgi, V.K and Saleh, A.K.Md.E, (2011), An Introduction to Probability and Statistics Second Edition, John Wiley & Sons, New York.

13. Mukhopadhyay, P, (2002), Mathematical Statistics, Book and Allied Publishers, New Delhi.
14. Casella G and Berger R L, (2002). Statistical Inference, Second Edition, Thompson Learning, New York. (Reprint, 2007).
15. Goon, A M, Gupta M.K and Dasgupta B, (1989), An Outline of Statistical Theory, Vol. II, World Press, Kolkata.
16. Mood A.M, Graybill F.A and Boes D.C, (1974), Introduction to Theory of Statistics, Third Edition, McGraw-Hill International Edition.
17. Berger, J.O, (1985), Statistical Decision Theory and Bayesian Analysis, Second Edition, Springer Verlag, New York.
18. Kale, B.K, (2005), A First Course in Parametric Inference, Second Edition, Narosa Publishing House, New Delhi. (Reprint, 2007).
19. Kale, B.K., and Muralidharan, K, (2015), Parametric Inference, Narosa Publishing House, New Delhi.
20. Keith, K, (2000), Mathematical Statistics, Chapman and Hall/CRC, New York.
21. Rao, C.R, (2009), Linear Statistical Inference and Its Applications, Second Edition, John Wiley & Sons, New York, US.

Web references (Sampling Techniques):

1. sampling methods
   https://uca.edu/psychology/files/2013/08/Ch7-Sampling-Techniques.pdf
   http://iced.cag.gov.in/wp-content/uploads/C-07/SAMPLING_TECHNIQUES.pdf
2. Ratio Estimator
   http://182.18.165.51/Fac_File/STUDY183@323405.pdf
3. Regression Estimators
   https://nptel.ac.in/content/storage2/courses/111104073/Module6/Lecture20.pdf
   http://home.iitk.ac.in/~shalab/sampling/chapter6-sampling-regression-method-estimation.pdf
4. Varying probability sampling
   http://150.107.117.36/NPTEL_DISK4/NPTEL_Contents/Web_courses/Phase2_web/111104073/Module7/Lecture24.pdf
   https://nptel.ac.in/content/storage2/courses/111104073/Module7/Lecture23.pdf
5. Cluster Sampling
   https://nptel.ac.in/content/storage2/courses/111104073/Module9/Lecture30.pdf
   http://home.iitk.ac.in/~shalab/sampling/chapter9-sampling-cluster-sampling.pdf
6. Two stage sampling
   http://home.iitk.ac.in/~shalab/sampling/chapter10-sampling-two-stage-sampling.pdf
   https://nptel.ac.in/content/storage2/courses/111104073/Module10/Lecture33.pdf
7. Sources of errors in Surveys
   http://web.hku.hk/~plhyu/7006/chap3.pdf
8. Point Estimation **http://web.mit.edu/14.381/www/Estimation.pdf**
9. Unbiased estimator **https://www.math.arizona.edu/~jwatkins/N_unbiased.pdf**
10. Properties of Point Estimators and Methods of Estimation
    http://www.utstat.toronto.edu/~olgac/sta255_2013/notes/sta255_Lecture9.pdf
11. Interval estimation **http://www.yorku.ca/ptryfos/ch5000.pdf**
12. Prior and posterior distributions
    https://www.probabilitycourse.com/chapter9/9_1_1_prior_and_posterior.php

Rationale for Nature of the course

This course helps the students to learn the Statistical Techniques with real time problems and interpretation of the data on Sampling Techniques and Statistical Estimation theory.

Activities having direct bearing on Skill development / Employability / Entrepreneurship

Problem solving session using calculator will be conducted. Interpretation on the data and its analysis will be focused lot with real time problems.

Course Designers:

1. **Dr. M. Venkatewaran**
2. **Dr.M.Rabert**