DEPARTMENT OF STATISTICS ACADEMIC PLAN 2021-2022
ODD SEMESTER

Week		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Name	Sem/ paper	14/06/2021-19/06/2021	21/06/2021-26/06/2021	28/06/2021-3/7/2021	5/7/2021-10/7/2021	12/7/2021-17/07/2021	19/07/2021-24/07/2021	26/07/2021-31/07/2021-	2/8/2021-7/8/2021	9/8/2021-14/08/2021	16/08/2021-21/08/2021	23/08/2021-28/08/2021	30/08/2021 4/9/2021	6/9/2021-12/9/2021	13/09/2021-18/09/2021	20/09/2021-26/09/2021
Mr. Prashant Shah	Sem.V Theory	SEC-M-1 Structure of c-program, numeric & nonnumeric constants, Keywords, identifiers and Variables, Data types, Data type Qualifiers, Declaration of variables, Assigning values to variables, Escape sequences,	SEC-M-1 Defining symbolic constants, Declaring and initializing String variables, Arithemetic and relational operators, Precedence and Associativity, c-Logical, Increment, Decrement & conditional operators	SEC-M-1&2 C –Expressions, Automatic and Explicit type conversion, Formatted I/O, Character I/O functions, Control statements for decision making: if statement, if...else statement, else... if statement, nested if statement, switch statement, goto statement,	P-IV-M-I Introduction to demography and the link with health sciences, Present population situation in the world and in the world and in developed countries, Introduction to Indian and International statistical systems	P-IV-M-I Role, function and activities of central and state statistical organizations, organization of large scale sample surveys, role of national sample survey organization general and special data dissemination systems,	P-IV-M-I & II Populationcensus; Uses and limitations; various sources of nuptiality, fertility and mortality data and its quality; Vital registration, National Sample Survey Sample Registration System and Demographic Health Surveys (DHS) and other sources	P-IV-M-II "Basic Concepts and Measures of Current/Period Fertility/Fecundity/ Natural Fertility Measures of reproduction(GRR, NRR), Age pattern of fertility and its importance in understanding fertility transition, Concepts and Basic Measures of Mortality Techniques of standardization Rates/Ratio, Child and Infant mortality estimation procedure, calendar/cohort concept of rate, International migration"	P-IV-M-II & III "Concept of mobility and migration, sources and quality of data, types of migration, census definition of migrants, limitations, Measures of Migration – Direct estimation of lifetime and inter-censal migration rates from census data Basic concept of a life table; types and forms of life table; Brief history of life tables; Model life tables; Anatomy of life table; uses of life table in demographic analysis, "	P-IV-M-III "Construction of Life tables based on Age- specific death Rates (ASDRs) , Definition and Scope; historical trends in population situation in the world; Underlying assumptions of life table construction using ASDRs of a community during a specified period; Methods of interpolation; extrapolation using linear, exponential, polynomial, logistics, Gompertz curves and growth rate models Definition of deaths and fetal deaths according to WHO; Need and Importance of the study of Mortality"	P-IV-M-III Methods of life table Construction—Conventional approach, and those proposed by Greville and Chiang, Concepts of population projections; population estimates, forecasts and projections, uses of population projections.	SEC-M-1I Looping statement, Arrays: Single dimension, Arrays: double dimension,	SEC-M-1I User-defined Functions, Storage classes, Structure			
	Sem III Theory															
	Sem V															
Ms.Madhavi Jardosh	Sem III Theory	Discussion of Baisc results. Skewness and Kurtosis revision	LMGF, various theorems of MGF	Problems of MGF, CGF, various theorems of CGF	Relationship between cumulants and moments, problems. Assignment	Bernoulli distribution, MGF, CGF, various measures	Binomial distribution, MGF, CGF, various measures	Poisson distribution, MGF, CGF, various measures	Uniform distribution, MGF, mean, variance. Geometric distribution, MGF, CGF, various measures	Negative binomial distribution, MGF, CGF, various measures	Derivation of Hypergeometric distribution, mean, variance	Truncated binomial and Poisson distribution. Bivariate distribution	Bivariate distribution - 1	Bivariate distribution - 2	Revision	
	Sem V Theory.	Intoduction to Estimation, Assignment on estimation diagram. Definitions and terms used. Unbiasedness property	Unbiased problesms	Unbiased problesms and Definition of consistency. Problems on consistency	Efficienecy definition and theorems	Likelihood function. Practice exercises on likelihood	Definition of Fisher Information, Score. CRLB theorem with proof	MVUE problems	Definition of Sufficiency. theorems, problems.	Maximum likelihood estimation method, problems	Problems on MLE. Method of moments and problems	Method of minimum chi square and method of modified minimum chi square. Problems	Bayes Estimation - 1	Bayes Estimation - 2	Confidence Interval - 1	
	Sem III Pract															
Ms. Aarti Kore	Sem III Theory	Introduction to OR, Mathematical formulation of LPP	Graphical solution to LPP	Simplex method	Big M method	Duality, construction of dual, Its advantages, Finding Solution to dual/ primal by solving primal / dual, Test Based on LPP	Introduction to Transportation Problem, North west corner rule, Matrix Minima Method, VAM	Optimum solution by MODI method	Unbalanced, Degeneracy	Assignment problem and method of solving it	Unbalanced, maximization Problem in AP, Test based on TP and AP	Sequencing Problem, Methods of solving it	Game theory, pure strategies, saddle point	Mixed Strategies, Graphical solution	Dominance propert	
	Sem V Theory.	Basic Concepts in probability	Probability of happening of at least one event	Probability of happening of exactly m events	Probability of happening of at least m events	Baye's Theorem				Markov and Chebyscheve's inequality	Cauchy SChwartz and Boole's Inequality	WLLN	Order Statistics: Introduction, pdf of rth order statistic, Joint pdf	Examples based on order statistics	Joint PDF of order statistics and examples based on it.	
	Sem V DSE Theory.						Decision Theory: Basic concepts, Laplace criterion, Maximin, Minimax	Savage/ Minimax Regret , Hurvicz criterion	Decision under Risk, EMV and EOL, EVPI	EVPI, Posterior probabilities, Bayesian Approach, Decision Tree						

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Ms. Namarata Nagwekar	Sem III Theory	basic definitions involved in sampling	designing questionnaire & errors in sampling	thms on probability	SRSWOR	SRSWOR for attributes	SRSWR	determination of sample size	Intro to startified & thms on stratified	allocation problem	cluster sampling	intro to systematic & thms on systematic	intro to ratio estimator	thms on ratio estimator	intro to regression & thms	comparison of all sampling techniques
	SemV Theory	intro to distributions & laplace distribution	expectation & variance of laplace, relation with other distributions	intro to weibull, expectation & variance	problems on weibull	lognormal distribution	cauchy distribution	pareto & truncated distribution	bivariate distribution & mgf	intro to trinomial	multinomial distribution	bivariate normal distribution	mgf, pdf, condnal	standard BVN	fishers transformation	examples onBVN
	SemV DSE Theory.	costs involved in inventory	factors affecting inventory & advantages	model-1 a & model 1 b	model-2a & 2b	prob model 1a	model 1b(cont)	model 2a(discrete)	model 2b (cont)	price break 1 & price break 2	limitations of inventory models	Replacement money value not considered	Replacement money value considered	Group Replacement		
	Sem V Pract.															
Mr. Ashish Mhatre	Sem III Theory	Introduction to time series analysis	Introduction to smoothing methods, moving average and weighted moving average smoothing	First and second order exponential smoothing	Holt's linear exponential smoothing	Holt-Winter's exponential smoothing	Introduction to regression analysis, correlation, difference between regression and correlation	Regression model with one explanatory variable	Regression model with two explanatory variable	Coefficient of determination, Variable selection in Multiple regression	Assumptions checking	Introduction to time series modeling, Stationarity, ACF, PACF	AR Model, MA Model	ARMA and ARIMA model	Parameter estimation, Box-Jenkins methodology, Diagnostic checking	Forecasting using different stationary models, AIC, BIC
	Sem V Theory	Introduction to regression analysis, correlation analysis	Review of simple linear regression model	Review of regression model with two explanatory variables	Assumptions checking	Residual analysis, Detection and treatment of outliers	Review of Multiple linear regression model	Review of Multiple linear regression model	Variable selection and model building	Variable selection and model building	Residual diagnostics	Polynomial regression models	Logistic regression model: Binary response variable, logit transformation, estimation of parameters and interpretation	Logistic regression model: Binary response variable, logit transformation, estimation of parameters and interpretation	Test of hypotheses of model parameters	AIC and BIC criteria, multiple logistic regression
	Sem V DSE 2	Basic principles of designs of experiments, Review of CRD and RBD	Introduction to GBD and statistical analysis of GBD	C-matrix, Properties of design-Connectedness	Properties of design: balancedness and orthogonal	Optimality of designs	Revision	BIBD design								
Ms. Asmita Kubal	Sem V Theory	"Introduction to econometrics & its type and basic concepts involving in econometrics : Methodology and Tools used in study of econometrics Introduction to Econometric	Estimation of parameters of single equation models Assumptions and properties of single equation model, estimation of parameters of Multiple linear regression	Test of significance of model, Confidence interval building, applicability of estimated model in forecasting	Heteroscedasticity: sources, effect,tests and remedies	Autocorrelation : sources, effect,tests and remedies	Multicollinearity : sources, effect,tests and remedies	Demand function: definition and estimation	production function: definition and estimation	Inter Industry Accounting system: Assumptions and estimation	"Closed model Dynamic model "					
	Sem V DSE Theory											Split plot design : example and statistical analysis	2^k factorial design:introduction single replicate, blocing	confounding and partial confounding		
	Sem I Pract															

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DEPARTMENT OF STATISTICS ACADEMIC PLAN 2021-2022
EVEN SEMESTER

Name	Sem/paper	1 (15/11/2021-20/11/2021)	2 (22/11/2021-2611/2021)	3 (28/11/2021-04/12/2021)	4 (06/12/2021-11/12/2021)	5 (13/12/2021-18/12/2021)	6 (20/12/2021-24/12/2021)	7 (03/01/2022-08/01/2022)	8 (10/01/2022-15/01/2022)	9 (17/01/2022-22/01/2022)	10 (24/01/2022-29/01/2022)	11 (31/01/2022-05/02/2022)	12 (07/02/2022-12/02/2022)	13 (14/02/2022-19/02/2022)	14 (21/02/2022-26/02/2022)	15 (28/02/2022-05/03/2022)
Mr. Prashant Shah	Sem.VI Theory	SEC-M-1 Introduction to R, preliminaries, Saving Storing and Retrieving work, c function, Sequence operator and seq function, scan function, rep function, data.frame function, matrix function, class function, Importing data from Excel.,	SEC-M-1 "Built-in functions: length(), max(), min(), range(), sum(), cumsum(), mean(), median(), var(), sort() , Diagrammatic and Graphical representation of data, Descriptive Statistics using R software: Frequency table (univariate and bivariate),Measures of central tendency, dispersion, moments, skewness and kurtosis, Correlation and regression analysis, "	SEC-M- I & 1I "Discrete probability distributions: Binomial, Poisson, Hypergeometric, Continuous probability distributions: Normal distribution, t-distribution, chi-square distribution, exponential distribution, "	P-IV-M-I "Simple and compound Interest, relation between nominal and effective rate of interest , present value (p.v.), accumulated value (a.v.), discount and discounted value, "	P-IV-M-I" p.v. and a.v. for varying rates of interest, equation of value, Annuities: different types of annuity, derivations for p.v. and a.v. of different types of annuities, Variable annuity: p.v. and a.v. of an increasing annuity of different types, p.v. and a.v. of an increasing annuity certain where successive instalments form arithmetic progression/geometric progression "	P-IV-M-I & II p.v. and a.v. of annuity, where i) payments are made p-times a year ii) payments of amount y are made at each interval of 'r' years., Redemption of loan: Derivation for i) interest contained in mth yearly instalment ii) principal contained in the mth yearly instalment iii) principal outstanding at the end of m years	P-IV-M-II Commutation functions, p.v. of an immediate life annuity and life annuity due, p.v. of differed immediate life annuity and life annuity due, p.v. of temporary immediate life annuity and life annuity due	P-IV-M- II & III" p.v. of deferred temporary immediate life annuity and life annuity due, p.v. of increasing temporary immediate life annuity and life annuity due, Life annuity payable m times in a year Derivations for p.v. of benefits (single premium) under various assurance plans i) temporary assurance ii) Whole life assurance iii) Pure endowment assurance iv) Endowment assurance, "	P-IV-M-III" v) Double endowment assurance vi) Increasing temporary assurance vii) Increasing whole life assurance viii) Special endowment assurance ix) Deferred temporary assurance x) deferred whole life assurance "	P-IV-M-III Derivations for level annual premium under various assurance plans i) temporary assurance ii) Whole life assurance, iii) Pure endowment assurance iv) Endowment assurance v) Double endowment assurance	SEC-M-1I Sampling methods: SRSWR, SRSWOR, stratified random sampling, systematic sampling, Testing of hypothesis: Large Sample test, Testing of hypothesis: Small Sample test,	SEC-M-1I "Analysis of variance: One way classification, Two way classification e) R as a programming language: Grouping, loops and conditional execution, Functions. "			
	Sem III															
	Sem V															
Ms.Madhavi Jardosh	Sem IV Theory	Rectangular distribution, Normal distribution	Normal distribution	Normal distribution, Central Limit Theorem	Beta distribution of type I	Beta distribution of type II	Exponential distribution, Gamma distribution	Gamma distribution -2, Chi square distribution - 1	Chi Square distribution 2	Applications of chi square	t- distribution	Applications of t-distribution	F - distribution	Applications of F -dsitribution	Confidence Intervals	Confidence Interval , Revision
	Sem VI Theory.	Revision of null and alternative hypothesis, types of errors, level of significance, p-value, power of the test	various examples for undertaning all the concepts related to hypothesis	MP -test, NP lemma to obtain MP test	Various problems on MP test	UMP test and problems	Problems on UMP test	Likelihood Ratio test -1	Likelihood Ratio test -2	Likelihood Ratio test -3	SPRT -1 - Bernoulli, Binomial, Poisson	SPRT -2 - normal, exponential	Introduction to non parametric test	Sign, Wilcoxon signed rank test	Median test, M-W test	Run test, Revision
	Sem III Pract															
Ms. Aarti Kore	Sem Iv Theory	Introduction to project management, Network analysis	time estimates in PERT, finding Crical Path and probabilities	Time estimates in CPM, Float and its types, CP	Examples based on CPM	Project cost analysis	Introduction to SQC, 7 process control tools	Criteria to detect out of control, control charts	Variable control charts	Attribute control charts	Single sampling plan, probability of accepting lot, ASN , ATI, OC curve, AOQ	Double sampling plan, prob of accepting lot, ASN, ATI, OC curve, AOQ	Data Mining : introduction, data cleaning, data transformation	Methods of classification : KNN, Naive Baye's	Cluster Analysis	
	Sem VI Theory.	Introduction to Stochastic Processes, state space, time, classification	Poisson Process, Birth Process	Pure Birth Process with initial population 0 and a, Yule's Birth Process	Pure death Process and Yule's Death Process	Birth and Death Process, Linear Growth Model	Markov chain, Markov property, Examples	One step tpm, finding different probabilities, Joint and marginal distributions	Gambler's ruin problem, Ehrenfest problem	Classification of states, closed set, irreducible MC, Period of state	Recurrent and transient states,maen recurrence time	Queuing Theory: Introduction, Basic terms	(M/M/1):(GD/inf/inf) model	(M/M/1):(GD/inf/inf) model, (M/M/C):(GD/inf/inf) model	(M/M/C):(GD/N/inf) model and (M/M/inf):(GD/inf/inf) model	
	Sem VI DSE Theory.															
Ms. Namarata Nagvekar	Sem IV Theory	intro to ANOVA	one-way model expectation & variance of 1 way	two-way model	expectation & variance	intro to designs	principles of designs	crd	rbd with missing plot	efficiency of RBD with CRD	B.I.B.D	intro to LSD expectation & variance of LSD	LSD-missing plot	efficiency of LSD over RBD & CRD	2^2 factorial design	2^3 factorial design
	Sem VI DSE Theory	intro to epidemics & simple epidemic model	Carrier & Host Vector model	Green wood model	Reed Frost model	estimate of p & its S.E	intro to bio-assay	fillers thm	direct assay and indirect assay	2* 2 parallel line assay	3*3 parallel line assay	Quantal assays	intro to clinical trials	phases of clinical trials and blinding, randomisation & odds ratio	Bio-Equivalence-pk parameters	80-120 rule
	Sem V Pract.															
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Week		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Mr. Ashish Mhatre	Sem IV Theory	Introduction to research methodology, Research process	Observational studies	Experimental studies	Revision	Quantitative methods of data collection	Quantitative methods of data collection	Qualitative methods of data collection	Qualitative methods of data collection	Samling techniques(just review)	Samling techniques(just review)	Analysis part: Different techniques of analysing data	Analysis part: Different techniques of analysing data	Purpose of a proposal/report , Content of proposal/report	Review of literature	How to write research proposal/report
	Sem VI Theory	Basic concepts: pdf, cdf, survival function, Hazard function, cumulative hazard function	Basic concepts: pdf, cdf, survival function, Hazard function, cumulative hazard function	IFR, DFR, CFR, NBU, NWU, MTTF	Hazard models	Data plots	Revision	Concept of reliability, Parallel structure, Series structure	k out of n structure and problems	Equivalent structure for any system	Equivalent structure for any system	Reliability of the system of independent components	Concept of Censoring: Type-I,II and Random censoring	KM estimator, Properties of KM estimator	Approximate mean and variance of KM estimator, Approximate confidence intervals for survival function	Q-Q plot for survival function
	Sem VI DSE	ACF and PACF	AR(1), AR(2) processes	MA(1) , MA(2) processes	ARMA and ARIMA models	Smoothing techniques	Smoothing techniques	Forecasting			Matrix theory: Basic operations, determinants, inverse of a matrix	Rank of a matrix, canonical form	Solving linear equations, generalized inverse	Partitioned matrices, its determinant and inverse	Eigen values and eigen vectors	Introduction to ANOCOVA
Ms. Asmita Kubal	Sem V Theory															
	Sem VI DSE Theory	Introduction to data mining, KDD processss, Data understanding , attribute types,	Data visulization, Data Processing data cleaning: missing value and noisy data	Data integration, Data reduction: Principal component analysis, Minning	Market basket analysis, association rules and Revision	Introduction to clustering techniques crisp and seema concepts of	distinguised between supervisied and unsupervised learning :	k nearest neighbours cluster analysis using k means with example for	naive bayes rule for two class problem revision	Intoduction to time series, components of time series and decompositon of	Estimation of seasonal components	cyclic component, random component : variate difference method stationary	linear parametric function and its estimability , Gauss Markov Theorem Interval Estimates	Fundamental theorems on conditional error ss. Ancova		
	Sem I Pract															

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