SCHEME OFCOURSEWORK

CourseDetails:

CourseTitle	Probability,Statistics andNumericalMethods		
CourseCode	15BM1103	L T P C	3 0 0 3
Program:	B.Tech.		
Specialization:	InformationTechnology		
Semester	IV Semester		
Prerequisites	• Fundamentals ofSettheory and calculus. • Basicconcepts ofProbabilityand DiscreteRandomVariables.		
Coursestowhichitis a prerequisite	IT, CSEand CivilEngg.		

PROGRAMOUTCOMES:

AgraduateofInformationTechnologyEngineeringwillbeableto

PO1:Applytheknowledgeofmathematics,science,engineeringfundamentalsandprinciplesofInformationTec hnologytosolveproblemsindifferentdomains.

PO2:Analyzeaproblem,identifyandformulatethecomputingrequirementsappropriatetoits solution.

PO3:Designanddevelopsoftwarecomponents,patterns,processes,Frameworksandapplicationsthatmeetspe cificationswithintherealisticconstraintsincludingsocietal,legalandeconomictoservetheneedsofthesoci ety

PO4:Designandconductexperiments,aswellasanalyzeandinterpretdata PO5:Useappropriatetechniquesandtoolstosolveengineeringproblems.

PO6:UnderstandtheimpactofInformationtechnologyonenvironmentandtheevolutionandimportanceofgree ncomputing.

PO7:Analyzethelocalandglobalimpactofcomputingonindividualaswellasonsocietyandincorporatetheresultsi ntoengineeringpractice.

PO8:Demonstrateprofessionalethicalpracticesandsocialresponsibilitiesinglobalandsocietalcontexts.

PO9:Functioneffectivelyasanindividual,andasamemberorleaderindiverseandmultidisciplinaryteams.

PO10:Communicateeffectivelywiththeengineeringcommunityandwithsocietyatlarge.

PO11:Understandengineeringandmanagementprinciplesandapplythesetoone'sownwork,asa memberandleaderinateam,tomanageprojects.

PO12:Recognizetheneedforupdatingtheknowledgeinthechosenfieldandimbibinglearningtolearnskills.

CourseOutcomes(COs):Attheend oftheCourse,Studentwillbeableto

1	examine,analyze, and comparevariousProbabilitydistributions.
2	determineconfidenceintervalsforpopulationparameters..
3	preparenullandalternativehypothesisandtestitsvaliditybased onrandomsamples.
4	determinenumericalsolutionofalgebraicandtranscendentalequationsanddiscussdifferentdifference operators.
5	use interpolationtechniquesfordataanalysis andnumericallysolveinitialvalueproblems.

CourseOutcome versusProgramOutcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3				2										
CO-2	2				3										
CO-3	2				3										
CO-4	3				2										
CO-5	2														

S -Stronglycorrelated,M-Moderatelycorrelated,Blank-No correlation

Assessment Methods:	Assignment/Quiz /Seminar / Mid-Test/End Exam

Teaching-LearningandEvaluation

Week	Topic/Contents	Course Outcomes	SampleQuestions	Teaching - Learning Strategy	Assessment Method&Schedule
1	Review of basicconceptsinProbabilityand DiscreteRandomvariables	---	1	Lecture/ Problem solving	---
2	ContinuousRandomvariables-Probabilitydensity,Distribution.CalculatingprobabilitiesfromProbabilitydensity,DeterminingMeanandVarianceusingProbabilitydensity,	CO-1	1. If□(□)= (2□+3),□□□2≤ 18 □≤4is densityfunction,find □(2≤□≤3) 2. FindMean andVarianceof the – continuousdensityfunction□(□)=	Lecture/ Problem solving	Assignment(Week3 - 4)/QuizI(Week-8)/Mid-Test1 (Week9)
3	NormalDistribution-DensityandProperties.Calculating NormalProbabilities,	CO-1	InaNormaldistribution,7%oftheitemsare under35and 89%are under63.Determinethemeanandvariance ofthe distribution.	Lecture/ Problem solving	MidTest1(Week9)/Assignment (Week3 - 4)/QuizI(Week-8)

4	NormalApproximationtoBinomialDistribution,UniformDistribution.	CO-1	1. Findthe meanandvariance ofuniformdistribution 2. If 62% of cloudsseededwithsilveriodideshow spectaculargrowth,whatistheprobability thatamong40 cloudsseededwithsilveriodideatmost20 willshowspectaculargrowth?	Lecture/ Problem solving	MidTest1(Week9)/QuizI(Week-8)
5	Population andsample,Samplingdistributionofthe mean (known),CentralLimittheorem(withoutProof) andProblems	CO-2	When wesamplefrominfinitepopulationwhathappenstothestandarderrorofthe meanifthesamplesizeis (i)increasedfrom50to 200(ii)decreasedfrom640 to40.	Lecture/ Problem solving	Mid-Test1 (Week9) /QuizI(Week-8)
6	Samplingdistributionofthemean(unknown),PointEstimation,Maximumerror anddeterminationofsamplesize.	CO-2	Thetensilestrengthof a newcompositecan bemodeled as anormaldistribution. A randomsample ofsize 25 specimens hasmean 45.3 and standarddeviation 7.9. Doesthisinformationtend tosupportorrefutetheclaimthatthem ean of thepopulationis 40.5?	Lecture/ Problem solving	MidTest1(Week9)/QuizI(Week-8)
7	IntervalEstimation (Largesampleand smallsample)	CO-2		Lecture/ Problem solving	MidTest1(Week9)/QuizI(Week-8)
8	Testsof Hypotheses(Introduction,Nullhypotheses,Alternativehypotheses,Type–I,IIerrors,Levelofsignificance,Hypothesesconcerningone mean (Large andSmallsamples)	CO-3	A sample of64studentshave ameanweightof 70Kgs.Canthissample be regardedas asamplefroma populationwithmeanweight65K gsand standarddeviation25Kgs.	Lecture/ Problem solving	MidTest1(Week9)/QuizI(Week-8)
9	Mid-Test1	CO-3	Arandomsample ofsize81 is		

10	Inferenceconcerningtwomeans(LargeandSmallsamples),Pairedt-test.	CO-3	takenfroma populationwith□= 0.9and□̄=20.8.Construct a95% confidenceintervalforthe populationmean.	Lecture/ Problem solving	Mid-Test2 (Week18) /QuizII(Week17)/Assignment(113-
11	Estimation ofVariances(pointandIntervalestimation),Hypothesesconcerningone variance,Hypothesesconcerningtwovariance	CO-4	If 11 determinations ofthespecificheatofironhave a standarddeviationof0.0076,testthen ull hypothesisthat□=0.008 forsuch determinations.Usethealternative hypothesis □≠0.008and thelevel	Lecture/ Problem solving	Assignment (Mid-Test2 (Week18) /QuizII(Week17)/Assignment(1314)
12	Estimation ofProportions,Hypothesesconcerningone Proportion,Hypothesesconcerningseveral Proportions	CO-4	of Themachineputsout16imperfectarticsignificance□=0.01. lesin asampleof 500.Aftermachine isoverhead , itputs out3imperfectarticlesin abatchof 100.Hasthemachineimproved Find therealrootoftheequation	Lecture/ Problem solving	Mid-Test2 (Week18) /QuizII(Week17)/Assignment(13-
13	Solutionofalgebraicandtranscendentalequations:bisectionmethod,methodoffalseposition,Newton'smethod.	CO-4	□□□□=□□ ⌊usingtheregularfalsimet hodcorrectedto fourdecimal places. Forma table ofdifferenceforthe	Lecture/ Problem solving	Mid-Test2 (Week18) /QuizII(Week-
14	Finitedifferences:Forwarddifferences,Backwarddifferences,Centraldifferences,Differencesof apolynomial,OtherDifferenceoperators,	CO-4	function□(□)=□^{3}+5□− 7for x= 1, 0, 1, 2, 3, 4,5. Continuethe tabletoobtainf(6).	Lecture/ Problem solving	17)Mid-Test2 (Week18) /QuizII(Week17)
15	Relationsbetweentheoperators,Newton'sinterpolationformulaeNewton'sforwardinterpolationformulaNewton's backwardinterpolationformula,	CO-5	UsingNewton,sinterpolationformulafindthe valueofthef(1.2)up tothreedecimals,giventhatf(1)=3.49 ,f(1.4)=4.82,f(1.8)=5.96,f(2.2)=6.5.	Lecture/ Problem solving	Mid-Test2 (Week18) /QuizII(Week17)

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<td>16</td>
<td>Interpolationwith un equalintervals:Lagrangeinterpolation ,Divideddifferences,Newton’sdivide ddifferenceformulaDifferenceformul a,Inverseinterpolation.</td>
<td>CO-5</td>
<td>UsetheLagrangesformulato findtheformof f(x)forthegivendata
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<tr><td>x</td><td>0</td><td>2</td><td>3</td><td>6</td></tr>
<tr><td>f(x)</td><td>648</td><td>704</td><td>729</td><td>792</td></tr>
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<td>17</td>
<td>NumericalsolutionsofOrdinarydiffe rentialequations:Euler’sMethod,M odifiedEuler’sMethod,Runge-Kuttamethod oforder4</td>
<td>CO-5</td>
<td>Applythe fourthorderRungrKuttamethod to findan approximatevalue ofywhenx=1.2in

stepsof □□—2+□2and 0.1,giventhat =□</td>
<td>Lecture/ Problem solving</td>
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<td>19/20</td>
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