No. KU/Aca(S&T)/SSL-394A/2022-23/1056   Date: 23 SEP 2022

ಅಧಿಸೂಚನೆ

ವಿಷಯ: 2022–23ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಎಲ್ಲ ಸ್ನಾತಕ ಕೋರ್ಸ್‌ಗಳಿಗೆ 3 ಮತ್ತು 4ನೇ ಸೆಮೆಸ್ಟರ್
NEP-2020 ಮಾದರಿಯ ಪಠ್ಯಕ್ರಮವನ್ನು ಅಳವಡಿಸಿರುವ ಕುರಿತು.

ಉಲ್ಲೇಖ: 1. ಸರ್ಕಾರದ ಅಧೀನ ಕಾರ್ಯದರ್ಶಿಗಳು(ವಿಶ್ವವಿದ್ಯಾಲಯ 1) ಉನ್ನತ ಶಿಕ್ಷಣ ಇಲಾಖೆ ಇವರ
ಆದೇಶ ಸಂಖ್ಯೆ: ಇಡಿ 260 ಯುಎನ್‌ಇ 2019(ಭಾಗ–1), ದಿ:7.8.2021.
2. ವಿಜ್ಞಾನ & ತಂತ್ರಜ್ಞಾನ ನಿಖಾಯ ಸಭೆಯ ಠರಾವುಗಳ ದಿನಾಂಕ: 06.09.2022
3. ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರ್ಣಯ ಸಂ. 01, ದಿನಾಂಕ: 17.09.2022
4. ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶ ದಿನಾಂಕ: 22-09-2022

ಮೇಲ್ಕಾಣಿಸಿದ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಿಗಳನ್ವಯ ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶದ ಮೇರೆಗೆ, 2022–23ನೇ
ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಅನ್ವಯವಾಗುವಂತೆ, **ವಿಜ್ಞಾನ & ತಂತ್ರಜ್ಞಾನ** ನಿಖಾಯದ ಎಲ್ಲ ಸ್ನಾತಕ ಕೋರ್ಸ್‌ಗಳ ರಾಷ್ಟ್ರೀಯ ಶಿಕ್ಷಣ ನೀತಿ
(NEP)-2020 ರಂತೆ 3 ಮತ್ತು 4ನೇ ಸೆಮೆಸ್ಟರ್‌ಗಳಿಗಾಗಿ ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಅನುಮೋದಿತ
ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಪ್ರಕಟಪಡಿಸಿದ್ದು, ಸದರ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಕ.ವಿ.ವಿ. www.kud.ac.in ಅಂತರ್ಜಾಲದಿಂದ ಡೌನಲೋಡ
ಮಾಡಿಕೊಳ್ಳಲು ಸೂಚಿಸುತ್ತಾ, ವಿದ್ಯಾರ್ಥಿಗಳು ಹಾಗೂ ಸಂಬಂಧಿಸಿದ ಎಲ್ಲ ಬೋಧಕರ ಗಮನಕ್ಕೆ ತಂದು ಅದರಂತೆ
ಕಾರ್ಯಪ್ರವೃತ್ತರಾಗಲು ಕವಿವಿ ಅಧೀನದ / ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ ಸೂಚಿಸಲಾಗಿದೆ.

ಅಡಕ: ಮೇಲಿನಂತೆ

ಕುಲಸಚಿವರು.

ಗೆ,
ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಬರುವ ಎಲ್ಲ ಅಧೀನ ಹಾಗೂ ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ
ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ. (ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ ಹಾಗೂ ಮಿಂಚಂಚೆ ಮೂಲಕ ಬಿತ್ತರಿಸಲಾಗುವುದು)

ಪ್ರತಿ:
1. ಕುಲಪತಿಗಳ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
2. ಕುಲಸಚಿವರ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
3. ಕುಲಸಚಿವರು (ಮೌಲ್ಯಮಾಪನ) ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
4. ಅಧೀಕ್ಷಕರು, ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ / ಗೌಪ್ಯ / ಜಿ.ಎ.ಡಿ. / ವಿದ್ಯಾಂಡಳ (ಪಿ.ಜಿ.ಪಿಎಚ್.ಡಿ) ವಿಭಾಗ, ಸಂಬಂಧಿಸಿದ
ಕೋರ್ಸ್‌ಗಳ ವಿಭಾಗಗಳು ಪರೀಕ್ಷಾ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
5. ನಿರ್ದೇಶಕರು, ಕಾಲೇಜು ಅಭಿವೃದ್ಧಿ / ವಿದ್ಯಾರ್ಥಿ ಕಲ್ಯಾಣ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

KARNATAKUNIVERSITY, DHARWAD

04-YearB.Sc.(Hons.)Program

***SYLLA

BUS

Subject:Mathematics[Eff

ectivefrom2022-23]

DISCIPLINESPECIFICCORECOURSE (DSCC)FOR SEMIII &IV

AND OPENELECTIVE COURSE (OEC) FOR SEM III & IV.

ASPER NEP-2020

KarnatakUniversity,Dharwad
Four Years Under Graduate Program in Mathematics for B.Sc.(Hons.)
With Effect from2022-23

Sem	TypeofCourse	Theory/Practical	Instructionhourper week	TotalhoursofSyllabus/Sem	DurationofExam	FormativeAssessmentMarks	Summative Assessment Marks	Total Marks	Credits
III	DSCC: 5 033MAT011	Theory	04hrs	56	02hrs	40	60	100	04
	DSCC:6 033MAT012	Practical	04hrs	52	03hrs	25	25	50	02
	OEC:3 003MAT051	Theory	03hrs	42	02hrs	40	60	100	03
IV	DSCC: 7034MAT011	Theory	04hrs	56	02hrs	40	60	100	04
	DSCC: 8034MAT012	Practical	04hrs	52	03hrs	25	25	50	02
	OEC-4 004MAT051	Theory	03hrs	42	02hrs	40	60	100	03

IIISemester

DSCC-5(033MAT011)   **:Ordinary Differential Equations and Real Analysis–I**

DSCC-6(033MAT012)   **: Practicals on Ordinary Differential Equations and Real Analysis–I**

OEC-: 3(003MAT051)   **: Quantitative Mathematics**
(for other students)

IV Semester

DSCC-7(034MAT 011)   **: Partial Differential Equations and   Integral Transforms**

DSCC-8(034MAT012)   **: Practicalson Partial Differential Equations and   Integral Transforms**

OEC- 4(004MAT05) : Mathematical Finance
(for other students)

B.Sc.Semester–III

Subject: Mathematics
Discipline Specific Course(DSC)

The course Mathematics in III semester has two papers (Theory Paper–033MAT011 for 04 credits & Practical Paper-033MAT012 for 2 credits) for 06 credits: Both the papers are compulsory. Detail soft he courses are as under.

Course No.: 5
Course Code (Theory): 033MAT011

Course Code	Type of Course	Theory/ Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours /Semester	Duration of Exam	Formative Assessmen t Marks	Summative Assessmentt Marks	Total Marks
033MAT011	DSCC	Theory	04	04	56hrs	2hrs	40	60	100

Title of the Course (Theory):**DSCC-5 :Ordinary Differential Equations and Real Analysis–I(033MAT011)**

CourseOutcome(CO):

After completion of the course(Theory), students will be able to:

CO1: Solve first-ordernon-lineardifferentialequationsandlineardifferentialequations.

CO2: To model problems in nature using Ordinary Differential Equations.

CO3: Formulate differential equations for various mathematical models

CO 4: Apply these techniques to solve and analyze various mathematical models.

CO 5: Understandthefundamental properties of the real numbers that lead todefine sequenceandseries intheformaldevelopmentofrealanalysis.

CO 6: Learnthe concept ofConvergenceandDivergenceofasequence.

CO 7: Able to handle and understand limits and their use in sequences, series, differentiation, and integration.

CO 8: Apply the ratio, root, alternating series, and limit comparison tests for convergence andabsolute convergenceofaninfiniteseries.

Syllabus-Course(Theory): DSCC-5	TotalHrs:56
Title-033MAT011:OrdinaryDifferentialEquationsandRealAnalysis–I	
Unit-I	**14hrs**
OrdinaryDifferentialEquations: Recapitulation of Differential Equations of the first order and first degree, Exact Differentialequations, Necessary and sufficientcondition for the equations to be exact, Reducibleto theexact differential equations. Differential equations of the first order and higher degree: Equationssolvable for p, x, y.Clairaut's equation and singular solution.Orthogonal trajectories ofCartesianandpolarcurves.	

Unit-II	14hrs
Linear differential equations: Linear differential equations of the nth order with constant coefficients. ParticularIntegrals when the RHS is of the form e^{ax}, $\sin(ax+b)$, $\cos(ax+b)$, x^n, e^{ax} V and x V (with proofs),where V is a function of x. Cauchy – Euler equations, Legendre differential equations, Methodof variation of parameters.Simultaneous differential equations with two and more than twovariables.Conditionfor integrabilityoftotaldifferentialequationsPdx+Qdy+Rdz =0.	
Unit-III	14hrs
Sequences: Sequences of real numbers,Bounded sequences. Limit of a sequence.convergent, divergent, and oscillatory sequences.Monotonic sequences. Algebra of convergentsequences. Limit points of a sequence. Bolzano Weierstrass theorem for sequence.Limit superiorand limit inferior of sequences. Cauchy's first and second theorem on limits of a sequence. Cauchy's general principle for convergence of a sequence. Subsequence and their properties.	
Unit-IV	14hrs
Infinite Series: Definition of convergent, divergent,and oscillatoryseries. Series ofnon-negativeterms,Cauchy'sgeneralprincipleofconvergence.Geometricseries,P-series(Harmonic series). Comparison tests for positive term series. D'Alembert's ratio test, Raabe'stest.Cauchy'sRoottestandCauchy'sintegraltest.Alternatingseries.Leibnitz'stheorem. Absolute convergence and conditional convergence of a series.Summation of series: Binomial,exponential,andlogarithmic.	

Booksrecommended:

1. M. D. Raisinghania,OrdinaryDifferentialEquations&PartialDifferential Equations,S.Chand&Company,NewDelhi.
2. J.SinhaRoyandSPadhy:AcourseofOrdinaryandPartialDifferentialEquation,KalyaniPublishers,NewDelhi.
3. D.Murray,IntroductoryCourseinDifferentialEquations,Orient Longman (India)
4. W. T.Reid,OrdinaryDifferentialEquations,JohnWiley, NewDelhi.
5. M.LKhannaandL.S.Varhiney,RealAnalysis by, JaiPrakashNath&Co.Meerut.
6. M. L.Khanna,DifferentialEquations,JaiPrakashNath&Co.Meerut
7. S.L.Ross,DifferentialEquations,3rdEd.,JohnWileyandSons,1984.
8. R.G.BartleandD.R.Sherbert,IntroductiontoRealAnalysis,3rdEd.,JohnWileyandSons(Asia)Pvt.Ltd.,Singapore,2015.
9. GeraldG.Bilodeau,PaulR.Thie,G.E.Keough,AnIntroductiontoAnalysis,2ndEd.,Jones&Bartlett,2010.
10. K.A.Ross,ElementaryAnalysis:TheTheoryofCalculus, (2nd edition),Springer,2013
11. S.K.Berberian,A First CourseinRealAnalysis,SpringerVerlag,NewYork,1994.
12. T.Apostol,MathematicalAnalysis,NarosaPublishingHouse.
13. E. Kreyzig,AdvancedEngineeringMathematics,JohnWiley,NewDelhi.

B.Sc.Semester–III

Subject: MathematicsDisciplineSpecificCourse(DSC)

Course No.: 6
CourseCode (Practical): 033MAT012

Course Code	TypeofCourse	Theory/Practical	Credits	Instructionhour perweek	Total No. ofLectures/Hours /Semester	Duration ofExam	FormativeAssessmentMarks	Summative Assessment Marks	Total Marks
033MAT012	DSCC	Practical	02	04	52hrs	3hrs	25	25	50

TitleoftheCourse(Practical):**DSCC-6: PracticalsonOrdinaryDifferentialEquationsandReal Analysis–I (033MAT012)**

CourseOutcome(CO):

Aftercompletionofthe course(Practical),studentswillbeableto:

This course will enablethestudents togainhands-onexperienceof

CO 1: Freeand Open Source software (FOSS)tools or computer programming.

CO 2: Solvingexact differentialequations

CO 3: Plotting orthogonaltrajectories

CO 4: Finding complementaryfunctionsandparticularintegraloflinearandhomogeneous differentialequations.

CO 5: Acquireknowledgeofapplicationsofrealanalysisanddifferentialequations.

CO 6: Verificationofconvergence/divergenceofdifferenttypesofseries

ListoftheExperimentsfor52hrs/Semesters

Introduction to the software and commands related to the topic.

1. Fundamentals ofOrdinarydifferential equationsandRealanalysisisusingFOSS.
2. Verificationofexactnessofadifferentialequation
3. PlotorthogonaltrajectoriesforCartesianandpolarcurves
4. Solutionsofdifferentialequationsthataresolvableforx,y,p.
5. TofindthesingularsolutionbyusingClairaut'sform.
6. Finding the Complementary Function and Particular Integral of linear and Homogeneous differential equations with constant coefficients and plot the solutions.
7. Finding the Particular Integral of differential equations upto second order and plot the solutions.
8. Solutions to the Total and Simultaneous differential equations and plot the solutions.
9. Testtheconvergenceofsequences
10. Verification of exponential, logarithm, and binomial series.
11. Verification of geometric series, p-series, Cauchy's Integral test, root test, and D Alembert's Test
12. Examplesonaseriesofpositiveterms.
13. Examplesonalternatingseriesusing Leibnitz'stheorem.
14. FindingtheconvergenceofseriesusingCauchy's criterionforpartialsums.

Pedagogy

Generalinstructions:SuggestedSoftware:Maxima/Scilab/Maple/MatLab/Mathematica/Phython/R.

Schemeof PracticalExamination (distributionof marks):25 marks for Semester end examination

1. **Programmewritingandproblem-solving:10Marks**

2. **ProgrammeExecution:5Marks**

3. **Viva:5Marks**

4. **Journal:5Marks**

   Total25marks

Note:SameSchememaybeusedforIA(FormativeAssessment)examination

Booksrecommended:
1. Scilabbyexample:M.Affouf2012,ISBN:978-1479203444
2. Scilab(AfreesoftwaretoMatlab):H.Ramchandran,A.S.Nair.2011S.ChandandCompany
3. Scilabforverybeginners.-www.scilab-enterprises.com
4. M. Kanagasabapathy, Introduction to Maxima for Scientific Computers, BPB Publishers.
5. KalyanaraoTakale, Computational Mathematics using Maxima Software, Nirali Publishers.
6. Vaisak Vena, Maxima, The Computer Algebra System, Notion Press.
7. M. D. Raisinghania,OrdinaryDifferentialEquations&PartialDifferential Equations,S.Chand&Company,NewDelhi.
8. J.SinhaRoyandSPadhy:AcourseofOrdinaryandPartialDifferentialEquation,KalyaniPublishers,NewDelhi.
9. D.Murray,IntroductoryCourseinDifferentialEquations,Orient Longman (India)
10. W. T.Reid,OrdinaryDifferentialEquations,JohnWiley, NewDelhi.
11. M.LKhannaandL.S.Varhiney,RealAnalysis, JaiPrakashNath&Co.Meerut.
12. M. L.Khanna,DifferentialEquations,JaiPrakashNath&Co.Meerut.

B.Sc. Semester–III

Subject: Mathematics

Open Elective Course (OEC-3)
(OEC for other students)
Course Code(OEC):): 003MAT051

Course Code	Type of Course	Theory/ Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
003MAT051	OEC	Theory	03	03	42hrs	2hrs	40	60	100

OEC-3 (OEC for other students): 003MAT051

Title of the Course: **Quantitative Mathematics**

Course Outcome (CO):

After completion of the course, students will be able to:
   CO1: Understand number system and fundamental operations
   CO2: Understand the concept of linear quadratic and simultaneous equations and
      their applications in real-life problems.
CO3: Understand and solve the problems based on Age.
   CO4: Solve Speed and Distance related problems.

Syllabus-003MAT051: Title-Quantitative Mathematics	TotalHrs:42
Unit-I	**14hrs**
Number System: Numbers, Operations on Numbers, Tests on Divisibility, HCF, and LCM of numbers. Decimal Fractions, Simplification, Square roots, and Cube roots - Problems thereon. Surds and Indices. Illustrations thereon.	
Unit-II	**14hrs**
Theory of equations Linear equations, quadratic equations, simultaneous equations in two variables, simple application problems - Problems on Ages, Problems on conditional Age calculations, Present &Past age calculations.	
Unit-III	**14hrs**
Quantitative Aptitude Percentage, Average, Average Speed-problems. Time and distance, problems based on trains, problems on work and time, work and wages, clock and calendar.	

Books recommended:

   1. R.S.Aggarwal, Quantitative Aptitude, S. Chand and Company Limited, New Delhi-110055.

2. AbhijitGuha, Quantitative Aptitude,5thEdition,Mc.Grawhillpublications.2014.

3. R. V. Praveen,Quantitative Aptitude and Reasoning,PHIpublishers.

4. R. S. Aggarwal,ObjectiveArithmetic,S.Chand&CompanyLtd.

5. QaziZameerddin,VijayK. Khanna,S. K. Bhambri,Business Mathematics-II Edition, S. Chand & Company Ltd.

6. S.K.SharmaandGurmeetKaur, BusinessMathematics,S.Chand&Sons.

7. HazarikaPadmalochan,ATextBookofBusinessmathematicsforB.Com. andBBACourse, S. Chand & Company Ltd.

8. J. K. Thukrol,BusinessMathematics,abcibook:2020,FirstEdition, The world book depot, India

9. N. G. Das and J.K.Das, Business Mathematics and Statics, McGraw Hill Education,2017.

DetailsofFormativeassessment(IA)forDSCCtheory/OEC:40%weightagefortotalmarks

TypeofAssessment	Weightage	Duration	Commencement
Writtentest-1	10%	1hr	8th Week
Writtentest-2	10%	1hr	12th Week
Seminar	10%	10minutes	--
Casestudy/Assignment / Fieldwork/ Projectwork/Activity	10%	------	--
Total	40%ofthemaximummarksallottedforthe paper		

FacultyofScience
04-YearUGHonorsprogramme:2022-23

GENERALPATTERNOFTHEORYQUESTIONPAPERFORDSCC/OEC
(60marksforsemesterendExaminationwith2hrsduration)

Part-A

1. Questionnumber1-6carries2markseach.Answerany5questions   :10marks

Part-B

2. Questionnumber7-11carries5 markseach.Answerany4questions   :20marks

Part-C

3. Questionnumber12-15carries10 markseach.Answerany3questions

:30marks(Mini

mum1questionfromeachunitand10marksquestionmayhavesub
questionsfor7+3or6+4or5+5ifnecessary)

Total:60Marks

Format for Model question paper Unit wise

033MAT011:OrdinaryDifferentialEquationsandRealAnalysis–I

Question Number	Number of questions to be set in Unit	Number of questions to be answered	Marks for each question	Max marks for the question
1	Unit-I ------2 Unit-II ------1 Unit-III------1 Unit-IV------2 Total: 6	5	2	10
2	Unit-I ------1 Unit-II------2 Unit-III------1 Unit-IV------1 Total: 5	4	5	20
3	Unit-I ------1 Unit-II------1 Unit-III------1 Unit-IV------1 Total: 4	3	10	30

003MAT051 Quantitative Mathematics

Question Number	Number of questions to be set in Unit	Number of questions to be answered	Marks for each question	Max marks for the question
1	Unit-I ------2 Unit-II ------2 Unit-III------2 Total: 6	5	2	10
2	Unit-I ------1 Unit-II------2 Unit-III------2 Total: 5	4	5	20
3	Unit-I ------2 Unit-II------1 Unit-III------1 Total: 4	3	10	30

B.Sc.Semester–IV

ThecourseMathematicsinIVsemesterhastwopapers(TheoryPaperfor04credits&Practicalpaperfor 2credits)for06credits:Bothpapersarecompulsory.Detailsofthecoursesareasunder.

Course No.: 7
CourseCode(Theory): 034MAT011

CourseCode	TypeofCourse	Theory/ Practical	Credits	Instructionhour perweek	Total No. ofLectures/Hours /Semester	Duration ofExam	FormativeAssessmentMarks	Summative Assessmentt Marks	Total Marks
034MAT011	DSCC	Theory	04	04	56hrs	2hrs	40	60	100

TitleoftheCourse(Theory)::**DSCC-7:Partial Differential Equations and Integral Transforms(034MAT011)**

CourseOutcome(CO):

Aftercompletionofthe course(Theory),studentswillbeableto:

- **CO1:** Solve the Partial Differential Equations of the first order and second order.
- **CO2:** Formulate, classify and transform partial differential equations into canonical form.
- **CO3:** Solve linear and non-linear partial differential equations using various methods; and apply these methods to solving some physical problems.
- **CO4:** Able to take more courses on wave equation, heat equation, and Laplace equation.
- **CO5:** Solve PDE by Laplace Transforms and Fourier Transforms.

Syllabus-(Theory): DSCC-7	TotalHrs:56
Title-034MAT011: Partial DifferentialEquations and Integral Transforms	
Unit-I	**14hrs**
Basic concepts–Formation of partial differential equations by elimination of arbitrary constants and functions, Solution of partial differential equations –Solution by Direct integration, Lagrange's linear equations of the form Pp + Qq = R, Standard types of first order non-linear partial differential equations. The integrals of the non-linear equation by Charpit's method	
Unit-II	**14hrs**
Homogeneous linear partial differential equations with constant coefficients. Partial differential equations of the second order. Classification of second-order partial differential equations, canonical forms. Classification of second-order linear equations as hyperbolic, parabolic, and elliptic. Solutions of the Heat equation, Laplace equation, and Wave equation (usingseparationofvariables).	
Unit-III	**14hrs**

Laplace Transforms Definition**,** Basic Properties. Laplace transforms of some standard functions. Laplace transform of Periodic functions. Laplace transform of derivative and integral of a function. Heaviside function. Dirac-delta function. Convolution theorem. InverseLaplace transforms and its properties. Solution of differential equations by using Laplacetransforms	
Unit-IV	**14hrs**
Fourier Series and Transforms: Periodic functions. Fourier Coefficients. Fourierseries of functions with period 2πand period 2L. Fourier series of even and odd functions. Halfrange Cosine and Sine series. Fourier Transforms - Finite Fourier Cosine and Sine transform.Transformsofderivates**.**ApplicationsofFourierTransforms**.**	

Booksrecommended:

1. D. A. Murray, Introductory Coursein Differential Equations, Orientand Longman

2. H.T.H.Piaggio, Elementary Treatiseon Differential Equations and their Applications,CBS Publisher & Distributors, Delhi,1985.

3. G.F.Simmons, Differential Equations, TataMcGraw Hill.

4. S.L.Ross, Differential Equations, 3rd Ed.,JohnWiley and Sons,India,2004.
5. M. D. Raisinghania, Ordinary Differential Equations & Partial Differential Equations, S.Chand& Company, New Delhi.
6. K. SankaraRao, Introductionto Partial Differential Equations, PHI,Third Edition, 2015.
7. I.N.Sneddean, Elements of Partial differential equations, McGraw-Hill International Editions,1986.
8. Murray R. Spiegal(Schaum'sSeries), LaplaceTransforms, McGraw-Hill International Editions.
9. Goel and Gupta, LaplaceTransform, PragatiPrakashan, Meerut, India.
10. Sudhir KumarPundir, Integral Transform Methods in Science & Engineering, CBS Engineering Series, 2017, New Delhi.
11. Murray R.Spiegal(Schaum'sSeries), Fourier Transforms,McGraw-Hill International Editions.
12. Earl David Rainville and Philip Edward Bedient–A short course in Differential Equations,Prentice Hall College Div;6thEdition.
13. SathyaPrakash, Mathematical Physics, S. ChandandSons, New Delhi.

B.Sc.Semester–IV

Subject:
MathematicsDisciplineSpecificCourse(DSCC)
Course No.: 8
CourseCode (Practical): 034MAT012

CourseCode	TypeofCourse	Theory/Practical	Credits	Instructionhour perweek	Total No. ofLectures/Hours /Semester	Durationo fExam	Formative Assessme ntMarks	Summative Assessment Marks	Total Marks
034MAT012	DSCC	Practical	02	04	52hrs	3hrs	25	25	50

TitleoftheCourse(Practical)**DSCC-8:PracticalsonPartial Differential Equations and Integral Transforms(034MAT012)**

CourseOutcome(CO):

Aftercompletionofthe course(Practical),studentswillbeableto:

CO1: Learn Free and Open Source software(FOSS) tools or computer programming.
CO2: Solve problemson Partial Differential Equations and Integral Forms.
CO3: To find Laplace transformof various functions.
CO 4: To find the Fourier Transform of periodic functions
CO 5: To solve partial differential equations by using Integral transforms.

ListoftheExperimentsfor52hrs/Semesters

1 Solutions of Linear Partial differential equationsof type1 to type4 and Lagrange's method.
2 Solutions of the partial differential equation using Charpit's method.
3 Solutions of Second-order homogenous partial differential equation with constant coefficients.
4 Solutions to thepartial differential equations using the separation of variables method (Heat/ Wave/ Laplace).
5 Finding the Laplace transforms of some standard and periodic functions.
6 Finding the inverse Laplace transform of simple functions
7 Verification of Convolution Theorem.
8 To solve ordinary linear differential equations using Laplace transforms.
9 To solve the Integral equation using Laplace transform.
10 To find full range Fourier series ofsome simple functions with period 2π and 2L
11 To find Half range sine and cosine series of some simple functions and ploting them.
12 To find Cosine Fourier transforms.
13 To find Sine Fouriertransforms.

Generalinstructions:SuggestedSoftwares:Maxima/Scilab/Maple/MatLab/Mathematica/Phython/R.

Schemeof PracticalExamination (distributionof marks):25 marks for Semester endexamination

1. **Programmewritingandproblemsolving:10Marks**

2. **ProgrammeExecution:5Marks**

3. **Viva:5Marks**

4. **Journal:5Marks**

    Total25marks

Note:SameSchememaybeusedforIA(FormativeAssessment)examination

Booksrecommended.

1. Scilabbyexample:M.Affouf2012,ISBN:978-1479203444.
2. Scilab(AfreesoftwaretoMatlab):H.Ramchandran,A.S.Nair.2011S.ChandandCompany.
3. Scilabforverybeginners.-www.scilab-enterprises.com
4. M. Kanagasabapathy, Introduction to Maxima for Scientific Computers, BPB Publishers.
5. KalyanaraoTakale, Computational Mathematics using Maxima Software, Nirali Publishers.
6. Vaisak Vena, Maxima, The Computer Algebra System, Notion Press.
7. P.N.de Souza. R.J. Fateman, J.Moses and C. Yapp, The Maxima Book.
8. M. D. Raisinghania, Ordinary Differential Equations & Partial Differential Equations, S.Chand & Company, New Delhi.
9. I.N.Sneddean, Elements of Partial differential equations, McGraw-Hill International Editions,1986.
10. Murray R.Spiegal(Schaum'sSeries), LaplaceTransforms, McGraw-Hill International Editions.
11. Murray R.Spiegal(Schaum'sSeries), Fourier Transforms, McGraw-Hill International Editions.

B.Sc.Semester –IV

Subject:
MathematicsOpenElectiveCourse(OEC -4)
(OECforotherstudents)

Course Code(OEC): 004MAT051

CourseCode	TypeofCourse	Theory/ Practical	Credits	Instructionhour perweek	Total No. ofLectures/Hours /Semester	Duration ofExam	FormativeAssessmentMarks	Summative Assessment Marks	Total Marks
004MAT051	OEC	Theory	03	03	42hrs	2hrs	40	60	100

OEC-4(forotherstudents): 004MAT051:

TitleoftheCourse:**Mathematical Finance**

CourseOutcome(CO):

Aftercompletionofthe course,studentswillbeableto:

- **CO1:**Understandhowto computeprofitandloss,discount,andBanker'sdiscount.
- **CO2:** Understand the concept of Linear equations and inequalities and their use in the Solvingthe Linear Programming Problems.
- **CO3:** Formulation of Transportation Problem and its application in the routing problem Integratethe conceptinbusinessconceptwiththe functioningofglobaltrade.
- **CO4:** Understandcommercialarithmetic.
- **CO5:** Applydecision-supporttoolstobusinessdecision-making.
- **CO6:**Applyknowledgeofbusinessconceptsandfunctionsinanintegratedmanner.

Syllabus-OEC Title-004MAT051: Mathematical Finance	TotalHrs:42
Unit-I	**14hrs**
Commercial Arithmetic Bill of exchange, Bill of the discounting procedure.Basic formula related to profit, loss, discount and brokerage, Successive discount,True discount, Banker's discount.	
Unit-II	**14hrs**
LinearProgramming Linear equations and inequalities- Rectangular coordinates, straight line, parallel and intersecting lines, and linear inequalities. Introduction to linear programming, Mathematical formulation of LPP, Solution of an LPP by graphical method, special cases in the graphical method.	

Unit-III	14hrs
Transportationproblem Introduction, Formulation of Transportation problem, Initial basic feasible solution, Steps in solving a transportation problem, optimality check, special cases in Transportation problem. The Traveling salesman Problem (RoutingProblem).	

Booksrecommended:

1. R. S. Aggarwal, Objective Arithmetic, S.Chand& Company Ltd.
2. A. Mizrahi and M. Sullivan, Mathematics for Business and Social Sciences and Application approach, JohnWiley and Sons, India.
3. QaziZameeruddin, Vijay K. Khanna, S. K. Bhambri, Business Mathematics- II Edition, Vikas Publishing House.
4. S.Kalavathy,OperationResearch, Fourth edition,Vikas publication house Pvt. Ltd.
5. Sreenivasa Reddy M, Operations Research, 2[nd]edition, Sanguine Technical publishers Bangalore.
6. S.D.Sharma, OperationResearch,KedarNath Ram Nath, Meerut.

DetailsofFormativeassessment(IA)forDSCCtheory/OEC:40%weightagefortotalmarks

TypeofAssessment	Weightage	Duration	Commencement
Writtentest-1	10%	1hr	8thWeek
Writtentest-2	10%	1hr	12thWeek
Seminar	10%	10minutes	--
Casestudy/Assignment/Field work/Projectwork/Activity	10%	------	--
Total	40%ofthemaximummarks allottedforthepaper		

FacultyofScience
04-YearUGHonorsprogramme:2022-23

GENERALPATTERNOFTHEORYQUESTIONPAPERFORDSCC/OEC
(60marksforsemesterendExaminationwith2hrsduration)

Part-A

1. Questionnumber1-6carries2markseach.Answerany5questions   :10marks

Part-B

2. Questionnumber7-11carries5Markseach.Answerany4questions   :20marks

Part-C

3. Questionnumber12-15carries10Markseach.Answerany3questions

                                                                                                          :30marks(

   Minimum1questionfromeachunitand10marksquestionmayhavesub
   questionsfor7+3or6+4or5+5ifnecessary)

Total:60Marks

Format for Model question paper Unit wise

DSCCTheory: 034MAT011: Partial Differential Equations and   Integral Transforms

Question Numbers	Number of questions to be set in Unit	Number of questions to be answered	Marks for each question	Max marks for the question
1	Unit-I: ------ 2 Unit-II ------ 1 Unit: III-------1 Unit: IV-------2 Total: 6	5	2	10
2	Unit-I ------1 Unit-II ------1 Unit-III -----2 Unit-IV ------1 Total: 5	4	5	20
3	Unit-I ------1 Unit-II ------1 Unit-III------1 Unit-IV------1 Total: 4	3	10	30

OEC4:004MAT051: Mathematical Finance

Question Number	Number of questions to be set in Unit	Number of questions to be answered	Marks for each question	Max marks for the question
1	Unit-I ------2 Unit-II ------2 Unit-III------2 Total: 6	5	2	10
2	Unit-I ------2 Unit-II ------1 Unit-III------2 Total : 5	4	5	20
3	Unit-I ------1 Unit-II ------2 Unit-III------1 Total: 4	3	10	30