

Lesson Plan for Course: B.Sc (Sem-I) (DSC) Code: MTMGCOR01T Credit: 6

- Course Name: Differential Calculus
- Course coordinator: Dr. Pintu Debnath
- Course Outcomes:
 - CO-1. Learn ε and δ definition of limit and continuity of a real-valued function.
 - CO-2. Apply Leibnitz's theorem to derive successive differentiation.
 - CO-3. Concept of Euler's theorem and its application on homogeneous function.
 - CO-4. Able to find out tangents, normals, curvature, asymptotes, singular points of any curves.
 - CO-5. To understand Rolle's theorem and several mean value theorems and their applications including the problems related to maxima minima and indeterminate form.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
Nov	Tangents and normals.	BS	08	Theoretical – 07 Tutorial - 01
	Rolle’s theorem, Mean Value theorems, Taylor’s theorem with Lagrange’s and Cauchy’s forms of remainder,	SM	05	Theoretical – 04 Tutorial - 01
	Limit and Continuity (ε and δ definition), Types of discontinuities.	PD	06	Theoretical – 05 Tutorial - 01
Dec	Curvature, Asymptotes.	BS	06	Theoretical – 05 Tutorial - 01
	Taylor’s series, Maclaurin’s series of $\sin x$, $\cos x$, e^x , $\log(l + x)$, $(l + x)^n$.	SM	04	Theoretical – 02 Tutorial - 02
	Differentiability of functions, Successive differentiation, Leibnitz’s theorem.	PD	04	Theoretical – 03 Tutorial - 01
	1 st Internal Assessment			
	Asymptotes, Singular points.	BS	06	Theoretical – 04 Tutorial - 02
	Maxima and Minima.	SM	03	Theoretical – 02 Tutorial - 01
	Partial differentiation.	PD	04	Theoretical – 03 Tutorial - 01
Jan	Tracing of curves. Parametric representation of curves and tracing of parametric curves.	BS	02	Theoretical – 02
	Indeterminate forms.	SM	02	Theoretical – 02
	Euler’s theorem on homogeneous functions.	PD	03	Theoretical – 03
	2 nd Internal Assessment			
	Revision	BS	02	Theoretical – 06 Tutorial - 00
		SM	02	
PD		02		
	End Semester Examination			
	Assessment: Internal Assessment & Assignment		Total: 59 Hrs	Theoretical – 48 Tutorial - 11

Books:

- B. Pal, S. Raychowdhury, S. Jana, Differential Equation, Semester-III, Santra Publication Pvt. Ltd., Kolkata-700073.
- S. K. MAPA, Introduction to Real Analysis, Sarat Book Distributor, India, 2019.

Lesson Plan for Course: B.Sc(Sem-I) (GE) Code: MTMHGEC01T Credit: 6

- Course Name: Differential Calculus
- Course coordinator: Dr. Sudip Mondal
- Course Outcomes:
 - CO-1. Learn ϵ and δ definition of limit and continuity of a real-valued function.
 - CO-2. Apply Leibnitz's theorem to derive successive differentiation.
 - CO-3. Concept of Euler's theorem and its application on homogeneous function.
 - CO-4. Able to find out tangents, normals, curvature, asymptotes, singular points of any curves.
 - CO-5. To understand Rolle's theorem and several mean value theorems and their applications including the problems related to maxima minima and indeterminate form.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
Nov	Tangents and normals.	BS	08	Theoretical – 07 Tutorial - 01
	Rolle's theorem, Mean Value theorems, Taylor's theorem with Lagrange's and Cauchy's forms of remainder.	SM	05	Theoretical – 04 Tutorial - 01
	Limit and Continuity (ϵ and δ definition), Types of discontinuities.	PD	06	Theoretical – 05 Tutorial - 01
Dec	Curvature, Asymptotes.	BS	06	Theoretical – 05 Tutorial - 01
	Taylor's series, Maclaurin's series of $\sin x$, $\cos x$, e^x , $\log(l+x)$, $(l+x)^n$.	SM	04	Theoretical – 02 Tutorial - 02
	Differentiability of functions, Successive differentiation, Leibnitz's theorem.	PD	04	Theoretical – 03 Tutorial - 01
	1 st Internal Assessment			
	Asymptotes, Singular points.	BS	06	Theoretical – 04 Tutorial - 02
	Maxima and Minima.	SM	03	Theoretical – 02 Tutorial - 01
	Partial differentiation.	PD	04	Theoretical – 03 Tutorial - 01
Jan	Tracing of curves. Parametric representation of curves and tracing of parametric curves.	BS	02	Theoretical – 02
	Indeterminate forms.	SM	02	Theoretical – 02
	Euler's theorem on homogeneous functions.	PD	03	Theoretical – 03
	2 nd Internal Assessment			
	Revision	BS	02	Theoretical – 06
		SM	02	Tutorial - 00
		PD	02	
End Semester Examination				
	Assessment: Internal Assessment & Assignment		Total: 59 Hrs	Theoretical – 48 Tutorial - 11

Books:

- B. Pal, S. Raychowdhury, S. Jana, Differential Equation, Semester-III, Santra Publication Pvt. Ltd., Kolkata-700073.
- S. K. MAPA, Introduction to Real Analysis, Sarat Book Distributor, India. 2019.

Lesson Plan for Course: B.Sc (Sem-III) (DSC) Code: MTMGCOR03T Credit: 6

- Course Name: Real Analysis
- Course coordinator: Biswajit Sarkar
- Course Outcomes:
 - CO-1. Understand some properties of sets in \mathbb{R} .
 - CO-2. Able to solve problems related with real sequence.
 - CO-3. Learn about infinite series and their tests of convergence.
 - CO-4. To understand about Sequences and series of functions.
 - CO-5. Able to find radius of convergence of power series.

Course planner

Course planner				
Month	Course Topic	Teacher	Class-hour	Remarks*
Sept	Finite and infinite sets, examples of countable and uncountable sets, Real line, bounded sets, suprema and infima.	BS	04	Theoretical – 03 Tutorial - 01
	Real Sequence.	SM	06	Theoretical – 05 Tutorial - 01
	Infinite series. Cauchy convergence criterion for series.	PD	03	Theoretical – 02 Tutorial - 01
Oct	Completeness property of \mathbb{R} , Archimedean property of \mathbb{R} , intervals.	BS	02	Theoretical – 01 Tutorial - 01
	Bounded sequence.	SM	06	Theoretical – 05 Tutorial - 01
	Positive term series, geometric series.	PD	03	Theoretical – 02 Tutorial - 01
Nov	Concept of cluster points and statement of Bolzano-Weierstrass theorem.	BS	03	Theoretical – 02 Tutorial - 01
	Cauchy convergence criterion for sequences.	SM	06	Theoretical – 05 Tutorial - 01
	Comparison test, convergence of p-series, Root test, Ratio test,	PD	02	Theoretical – 01 Tutorial - 01
	1 st Internal Assessment			
	Cauchy’s theorem on limits, order preservation and squeeze theorem.	BS	03	Theoretical – 02 Tutorial - 01
	Sequences and series of functions, Pointwise and uniform convergence.	SM	07	Theoretical – 06 Tutorial - 01
	Alternating series, Leibnitz’s test (Tests of Convergence without proof).	PD	03	Theoretical – 02 Tutorial - 01
Dec	Monotone sequences and their convergence (monotone convergence theorem without proof). Power series and radius of convergence.	BS	03	Theoretical – 02 Tutorial - 01
	M_n -test, M-test, Statements of the results about uniform convergence and integrability and differentiability of functions.	SM	14	Theoretical – 13 Tutorial - 01
	Definition and examples of absolute and conditional convergence of infinite series.	PD	06	Theoretical – 05 Tutorial - 01
	2 nd Internal Assessment			
Jan	Revision	BS	02	
		SM	02	
		PD	02	
End Semester Examination				
	Assessment: Internal Assessment & Assignment		Total: 77 Hrs	Theoretical – 62 Tutorial - 15

Books:

- B. Pal, S. Raychowdhury, S. Jana, Differential Equation, Semester-III, Santra Publication Pvt. Ltd., Kolkata-700073.
- S. K. MAPA, Introduction to Real Analysis, Sarat Book Distributor, India, 2019.

Lesson Plan for Course: B.Sc (Sem-III) (DSC) Code: MTMSSEC01M Credit: 6

- Course Name: C-Programming Language
- Course coordinator: Biswajit Sarkar
- Course Outcomes:
 - CO-1. Learn high-level programming languages.
 - CO-2. Able to construct flowchart.
 - CO-3. To know about some arithmetic operators and logical operators.
 - CO-4. Able to use for loop, while loop and do-while loop in C-programming.
 - CO-5. Capable to write programming for finding out maximum, minimum of a given set of numbers.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
Sept	Unit-1: Basics of Computer Programming	SM	03	Theoretical-02 Tutorial-01
Oct	Unit-2: Fundamentals of Programming	SM	03	Theoretical-02 Tutorial-01
Nov	Unit-2: Fundamentals of Programming	SM	01	Theoretical-01
Dec	Unit-3: Statements	SM	03	Theoretical-02 Tutorial-01
End Semester Examination (By Department)				
	Assessment: Assignment		Total: 10 Hrs	Theoretical-07 Tutorial-03

Books:

- Yashavant Kanetkar, Let Us C , BPB Publications, 2016.
- Kamthane AN. Programming in C, 2/e. Pearson Education India; 2011.
- Satbir Mehla, Vishakha Gupta, M.L. Jain, Amit Sehgal, New College Programming in C and Numerical Methods For B.A./B.Sc., Jeevansons Publications, India, Ninth Revised Edition, 2015

Lesson Plan for Course: B.Sc(Sem-III) (GE) Code: MTMHGEC03T Credit: 6

- Course Name: Real Analysis
- Course coordinator: Dr. Pintu Debnath
- Course Outcomes:
 - CO-1. Understand some properties of sets in \mathbb{R} .
 - CO-2. Able to solve problems related with real sequence.
 - CO-3. Learn about infinite series and their tests of convergence.
 - CO-4. To understand about Sequences and series of functions.
 - CO-5. Able to find radius of convergence of power series.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
Sept	Finite and infinite sets, examples of countable and uncountable sets, Real line, bounded sets, suprema and infima.	BS	04	Theoretical – 03 Tutorial - 01
	Real Sequence.	SM	06	Theoretical – 05 Tutorial - 01
	Infinite series. Cauchy convergence criterion for series.	PD	03	Theoretical – 02 Tutorial - 01
Oct	Completeness property of \mathbb{R} , Archimedean property of \mathbb{R} , intervals.	BS	02	Theoretical – 01 Tutorial - 01
	Bounded sequence.	SM	06	Theoretical – 05 Tutorial - 01
	Positive term series, geometric series.	PD	03	Theoretical – 02 Tutorial - 01
Nov	Concept of cluster points and statement of Bolzano-Weierstrass theorem.	BS	03	Theoretical – 02 Tutorial - 01
	Cauchy convergence criterion for sequences.	SM	06	Theoretical – 05 Tutorial - 01
	Comparison test, convergence of p-series, Root test, Ratio test,	PD	02	Theoretical – 01 Tutorial - 01
	1st Internal Assessment			
	Cauchy's theorem on limits, order preservation and squeeze theorem.	BS	03	Theoretical – 02 Tutorial - 01
	Sequences and series of functions, Pointwise and uniform convergence.	SM	07	Theoretical – 06 Tutorial - 01
	Alternating series, Leibnitz's test (Tests of Convergence without proof).	PD	03	Theoretical – 02 Tutorial - 01
Dec	Monotone sequences and their convergence (monotone convergence theorem without proof). Power series and radius of convergence.	BS	03	Theoretical – 02 Tutorial - 01
	M_n -test, M-test, Statements of the results about uniform convergence and integrability and differentiability of functions.	SM	14	Theoretical – 13 Tutorial - 01
	Definition and examples of absolute and conditional convergence of infinite series.	PD	06	Theoretical – 05 Tutorial - 01
	2nd Internal Assessment			
Jan	Revision	BS SM PD	02 02 02	
	End Semester Examination			
	Assessment: Internal Assessment & Assignment		Total: 77 Hrs	Theoretical – 62 Tutorial - 15

Books:

- B. Pal, S. Raychowdhury, S. Jana, Differential Equation, Semester-III, Santra Publication Pvt. Ltd., Kolkata-700073.
- S. K. MAPA, Introduction to Real Analysis, Sarat Book Distributor, India. 2019.

Lesson Plan for Course: B.Sc (Sem-III) (GE) Code: MTMSSEC01M Credit: 6

- Course Name: C-Programming Language
- Course coordinator: Biswajit Sarkar
- Course Outcomes:
 - CO-1. Learn high-level programming languages.
 - CO-2. Able to construct flowchart.
 - CO-3. To know about some arithmetic operators and logical operators.
 - CO-4. Able to use for loop, while loop and do-while loop in C-programming.
 - CO-5. Capable to write programming for finding out maximum, minimum of a given set of numbers.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
Sept	Unit-1: Basics of Computer Programming	SM	03	Theoretical-02 Tutorial-01
Oct	Unit-2: Fundamentals of Programming	SM	03	Theoretical-02 Tutorial-01
Nov	Unit-2: Fundamentals of Programming	SM	01	Theoretical-01
Dec	Unit-3: Statements	SM	03	Theoretical-02 Tutorial-01
End Semester Examination (By Department)				
	Assessment: Assignment		Total: 10 Hrs	Theoretical-07 Tutorial-03

Books:

- Yashavant Kanetkar, Let Us C , BPB Publications, 2016.
- Kamthane AN. Programming in C, 2/e. Pearson Education India; 2011.
- Satbir Mehla, Vishakha Gupta, M.L. Jain, Amit Sehgal, New College Programming in C and Numerical Methods For B.A./B.Sc., Jeevansons Publications, India, Ninth Revised Edition, 2015

Lesson Plan for Course: B.Sc (Sem-V) (DSC) Code: MTMGDSE01T Credit: 6

- Course Name: Matrices
- Course coordinator: Dr. Sudip Mondal
- Course Outcomes:
 - CO-1. To form vector space and subspace over \mathbb{R} and to find their standard basis.
 - CO-2. To conceptualize translation, dilation, rotation, reflection in a point, line and plane (in matrix form) and able to interpret eigen values and eigen vectors of these transformations including eigen spaces.
 - CO-3. Able to calculate rank of matrices, to reduce in normal form and to solve linear homogeneous and non-homogeneous equations.
 - CO-4. Able to reduce matrices to diagonal form through eigen values and eigen vectors.
 - CO-5. Capable to applying elementary row operations to compute matrix rank and inverses, and to solve system of linear equations.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
Sep	Unit-1: R, R ² , R ³ as vector spaces over R.	PD	04	Theoretical – 03 Tutorial - 01
	Unit-2: Translation, Dilation.	BS	04	Theoretical – 03 Tutorial - 01
	Unit-3: Types of matrices. Rank of a matrix. Invariance of rank under elementary transformations.	SM	06	Theoretical – 05 Tutorial - 01
Oct	Unit-1: Standard basis for each of vector spaces R, R ² , R ³ .	PD	04	Theoretical – 03 Tutorial - 01
	Unit-2: Rotation.	BS	07	Theoretical – 06 Tutorial - 01
	Unit-3: Reduction to normal form.	SM	04	Theoretical – 03 Tutorial - 01
Nov	Unit-1: Concept of Linear Independence and examples of different bases.	PD	02	Theoretical – 01 Tutorial - 01
	Unit-2: Reflection in a point, line and plane.	BS	02	Theoretical – 01 Tutorial - 01
	Unit-3: Solutions of linear homogeneous and non-homogeneous equations with number of equations and unknowns up to four.	SM	03	Theoretical – 02 Tutorial - 01
	1st Internal Assessment			
	Unit-1: Subspaces of R ² .	PD	03	Theoretical – 02 Tutorial - 01
	Unit-2: Matrix form of basic geometric transformations.	BS	05	Theoretical – 04 Tutorial - 01
	Unit-4: Matrices in diagonal form. Reduction to diagonal form upto matrices of order 3.	SM	04	Theoretical – 03 Tutorial - 01
Dec	Unit-1: Subspaces of R ³ .	PD	06	Theoretical – 05 Tutorial - 01
	Unit-2: Interpretation of eigen values and eigen vectors for such transformations and eigen spaces as invariant subspaces.	BS	08	Theoretical – 07 Tutorial - 01
	Unit-4: Computation of matrix inverses using elementary row operations. Rank of matrix. Solutions of a system of linear equations using matrices. Illustrative examples of above concepts from Geometry, Physics, Chemistry, Combinatorics and Statistics.	SM	10	Theoretical – 09 Tutorial - 01
2nd Internal Assessment				

Jan	Revision	PD BS SM	02 02 02	Theoretical – 06 Tutorial - 00
End Semester Examination				
	Assessment: Internal Assessment & Assignment		Total: 78 Hrs	Theoretical –63 Tutorial - 15

Books:

- A.I. Kostrikin, *Introduction to Algebra*, Springer Verlag, 1984.
- S. H. Friedberg, A. L. Insel and L. E. Spence, *Linear Algebra*, Prentice Hall of India Pvt. Ltd., New Delhi, 2004.
- Richard Bronson, *Theory and Problems of Matrix Operations*, Tata McGraw Hill, 1989.
- S. K. MAPA, *Higher Algebra*, Sarat Book Distributor, India. 2019.

Lesson Plan for Course: B.Sc (Sem-V) (DSC) Code: MTMSSEC01M Credit: 6

- Course Name: C-Programming Language
- Course coordinator: Biswajit Sarkar
- Course Outcomes:
 - CO-1. To understand arrays and multi-dimensional arrays.
 - CO-2. Able to use arrays and multi-dimensional arrays in C-programming.
 - CO-3. To understand about functions.
 - CO-4. Capable to write programming by using functions.
 - CO-5. Able to write programming C languages like n!, nCr, etc.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
Sept	Unit-4: Arrays: Definition & requirement, declaration & initialization, indexing, one dimensional array: finding maximum, minimum, Simple sorting and searching.	BS	05	Theoretical-03 Tutorial-02
Oct	Unit-5: Multi-dimensional arrays: Matrix Manipulations (Addition, Multiplication, Transpose)	BS	03	Theoretical-02 Tutorial-01
Nov	Unit-5: Multi-dimensional arrays: Arrays and Pointers, Memory allocation and deallocation: <i>malloc()</i> and <i>free()</i> functions.	SM	03	Theoretical-02 Tutorial-01
Dec	Unit-6: Functions: Why?, How to declare, define and invoke a function, Variables' scope, local & global variables and function parameters, Pointers, arrays as function parameters, <i>return</i> statement, Header files and their role. Illustrate different examples like swapping values, compute n!, nCr, find max/min from a list of elements, sort a set of numbers, matrix addition/ multiplication etc.	SM	05	Theoretical-03 Tutorial-02
End Semester Examination (By Department)				
	Assessment: Assignment		Total: 16 Hrs	Theoretical-10 Tutorial-06

Books:

- Yashavant Kanetkar, Let Us C , BPB Publications, 2016.
- Kamthane AN. Programming in C, 2/e. Pearson Education India; 2011.
- Satbir Mehla, Vishakha Gupta, M.L. Jain, Amit Sehgal, New College Programming in C and Numerical Methods For B.A./B.Sc., Jeevansons Publications, India, Ninth Revised Edition, 2015.