

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

- Course Name: Differential Calculus
- Course coordinator: Pintu Debnath
- Course Outcomes:
  - CO-1. Learn  $\epsilon$  and  $\delta$  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*
Jul	Tangents and normal.	BS	05	Theoretical – 04 Tutorial - 01
	Rolle's theorem, Mean Value theorems.	SM	05	Theoretical – 04 Tutorial - 01
	Limit and Continuity ( $\epsilon$ and $\delta$ definition), Types of discontinuities.	PD	05	Theoretical – 04 Tutorial - 01
Aug	Curvature, Asymptotes.	BS	11	Theoretical – 09 Tutorial - 02
	Taylor's theorem with Lagrange's and Cauchy's forms of remainder.	SM	05	Theoretical – 04 Tutorial - 01
	Differentiability of functions.	PD	07	Theoretical – 06 Tutorial - 01
1 <sup>st</sup> Internal Assessment				
Sep	Singular points, Tracing of curves. Parametric representation of curves and tracing of parametric curves.	BS	12	Theoretical – 11 Tutorial - 01
	Taylor's series, Maclaurin's series of $\sin x$ , $\cos x$ , $e^x$ , $\log(l+x)$ , $(l+x)^n$ , Maxima and Minima.	SM	10	Theoretical – 08 Tutorial - 02
	Successive differentiation, Leibnitz's theorem, Partial differentiation.	PD	11	Theoretical – 09 Tutorial - 02
Oct	Polar coordinates and tracing of curves in polar coordinates.	BS	09	Theoretical – 08 Tutorial - 01
	Indeterminate forms.	SM	05	Theoretical – 04 Tutorial - 01
	Euler's theorem on homogeneous functions.	PD	05	Theoretical – 04 Tutorial - 01
2 <sup>nd</sup> Internal Assessment				
Nov				Theoretical – 00 Tutorial - 00
Dec	End Semester Examination			
	Assessment: Internal Assessment & Assignment		Total: 90 Hrs	Theoretical – 75 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-I) (GE) Code: MTMHGEC01T Credit: 6**

- Course Name: Differential Calculus
- Course coordinator: Pintu Debnath
- Course Outcomes:

CO-1. Learn  $\varepsilon$  and  $\delta$  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*
Jul	Tangents and normal.	BS	05	Theoretical – 04 Tutorial - 01
	Rolle's theorem, Mean Value theorems.	SM	05	Theoretical – 04 Tutorial - 01
	Limit and Continuity ( $\varepsilon$ and $\delta$ definition), Types of discontinuities.	PD	05	Theoretical – 04 Tutorial - 01
Aug	Curvature, Asymptotes.	BS	11	Theoretical – 09 Tutorial - 02
	Taylor's theorem with Lagrange's and Cauchy's forms of remainder.	SM	05	Theoretical – 04 Tutorial - 01
	Differentiability of functions.	PD	07	Theoretical – 06 Tutorial - 01
1 <sup>st</sup> Internal Assessment				
Sep	Singular points, Tracing of curves. Parametric representation of curves and tracing of parametric curves.	BS	12	Theoretical – 11 Tutorial - 01
	Taylor's series, Maclaurin's series of $\sin x$ , $\cos x$ , $e^x$ , $\log(l+x)$ , $(l+x)^n$ , Maxima and Minima.	SM	10	Theoretical – 08 Tutorial - 02
	Successive differentiation, Leibnitz's theorem, Partial differentiation.	PD	11	Theoretical – 09 Tutorial - 02
Oct	Polar coordinates and tracing of curves in polar coordinates.	BS	09	Theoretical – 08 Tutorial - 01
	Indeterminate forms.	SM	05	Theoretical – 04 Tutorial - 01
	Euler's theorem on homogeneous functions.	PD	05	Theoretical – 04 Tutorial - 01
2 <sup>nd</sup> Internal Assessment				
Nov				Theoretical – 00 Tutorial - 00
Dec	End Semester Examination			
	Assessment: Internal Assessment & Assignment		Total: 90 Hrs	Theoretical – 75 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: MTMGCOR03T Credit: 6**

- Course Name: Real Analysis
- Course coordinator: Sudip Mondal
- Course Outcomes:
  - Understand some properties of countable and uncountable sets.
  - Apply Archimedean property of  $\mathbb{R}$  and Bolzano-Weierstrass theorem of limite point.
  - To prove Cauchy convergence criterion for sequences and Cauchy's theorem.
  - Learn some Tests of Convergence such as Comparison test Root test, Ratio test.
  - Apply Leibnitz's test of alternating series.
  - Learn Pointwise and uniform convergence. Mn-test, M-test.
  - Able to find radius of convergence of power series.

**Course planner**

Month	Course Topic	Teacher	Class-hour	Remarks*
Jul	Real Sequence, Bounded sequence, Cauchy convergence criterion for sequences.	SM	10	Theoretical – 08 Tutorial - 02
	Finite and infinite sets, examples of countable and uncountable sets.	PD	03	Theoretical – 02 Tutorial - 01
Aug	Cauchy's theorem on limits, order preservation and squeeze theorem, monotone sequences and their convergence (monotone convergence theorem without proof).	SM	10	Theoretical – 08 Tutorial - 02
	Real line, bounded sets, suprema and infima, completeness property of $\mathbb{R}$ , Archimedean property of $\mathbb{R}$ , intervals. Concept of cluster points and statement of Bolzano-Weierstrass theorem.	PD	13	Theoretical – 11 Tutorial - 02
	<b>1<sup>st</sup> Internal Assessment</b>			
Sep	Sequences and series of functions, Pointwise and uniform convergence. Mn-test, M-test, Statements of the results about uniform convergence and integrability and differentiability of functions.	SM	15	Theoretical – 13 Tutorial - 02
	Infinite series. Cauchy convergence criterion for series, positive term series, geometric series, comparison test, convergence of $p$ -series.	PD	14	Theoretical – 12 Tutorial - 02
Oct	Power series and radius of convergence.	SM	10	Theoretical – 08 Tutorial - 02
	Root test, Ratio test, alternating series, Leibnitz's test (Tests of Convergence without proof).	PD	12	Theoretical – 11 Tutorial - 01
	<b>2<sup>nd</sup> Internal Assessment</b>			
	Definition and examples of absolute and conditional convergence.	PD	03	Theoretical – 02 Tutorial - 01
Dec	<b>End Semester Examination</b>			
	<b>Assessment:</b> Internal Assessment & Assignment		<b>Total: 90 Hrs</b>	<b>Theoretical – 75 Tutorial - 15</b>

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

**Course planner**

Month	Course Topic	Teacher	Class-hour	Remarks*
Jul	<b>Unit 1 : Basics of Computer Programming:</b> Definition, Requirement of programming language,	PD	02	Theoretical – 02 Tutorial - 00
Aug	<b>Unit 1 :</b> Machine language, high-level programming languages, machine code of a program: compilation process,	PD	04	Theoretical – 04 Tutorial - 00
Sep	<b>Unit 1 :</b> Problem solving approaches: algorithm and flowchart.	PD	06	Theoretical – 04 Tutorial - 02
	<b>Unit 2 : Fundamentals of Programming:</b> Built in Data Types: int, float, double, char; Constants and Variables; first program: printf(), scanf(), compilation etc., keywords, Arithmetic operators: precedence and associativity, Assignment Statements: post & pre increment/decrement, logical operators: and, or, not.	SM	06	Theoretical – 05 Tutorial - 01
Oct	<b>Unit 3 : Statements:</b> Relational operators.	PD	04	Theoretical – 04 Tutorial - 00
	<b>Unit 3 : Statements:</b> if-else statement, Iterative Statements: for loop, while loop and do-while loop;	SM	05	Theoretical – 04 Tutorial - 01
Nov	controlling loop execution: break and continue, nested loop.	PD	03	Theoretical – 02 Tutorial - 01
Dec	<b>End Semester Examination</b>			
	<b>Assessment:</b> Internal Assessment & Assignment		<b>Total: 30 Hrs</b>	<b>Theoretical – 25 Tutorial - 05</b>

**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: Pintu Debnath
- Course Outcomes:
  - Understand some properties of countable and uncountable sets.
  - Apply Archimedean property of  $\mathbb{R}$  and Bolzano-Weierstrass theorem of limite point.
  - To prove Cauchy convergence criterion for sequences and Cauchy's theorem.
  - Learn some Tests of Convergence such as Comparison test Root test, Ratio test.
  - Apply Leibnitz's test of alternating series.
  - Learn Pointwise and uniform convergence. Mn-test, M-test.
  - Able to find radius of convergence of power series.

**Course planner**

Month	Course Topic	Teacher	Class-hour	Remarks*
Jul	Real Sequence, Bounded sequence, Cauchy convergence criterion for sequences.	SM	10	Theoretical – 08 Tutorial - 02
	Finite and infinite sets, examples of countable and uncountable sets.	PD	03	Theoretical – 02 Tutorial - 01
Aug	Cauchy's theorem on limits, order preservation and squeeze theorem, monotone sequences and their convergence (monotone convergence theorem without proof).	SM	10	Theoretical – 08 Tutorial - 02
	Real line, bounded sets, suprema and infima, completeness property of $\mathbb{R}$ , Archimedean property of $\mathbb{R}$ , intervals. Concept of cluster points and statement of Bolzano-Weierstrass theorem.	PD	13	Theoretical – 11 Tutorial - 02
	<b>1<sup>st</sup> Internal Assessment</b>			
Sep	Sequences and series of functions, Pointwise and uniform convergence. Mn-test, M-test, Statements of the results about uniform convergence and integrability and differentiability of functions.	SM	15	Theoretical – 13 Tutorial - 02
	Infinite series. Cauchy convergence criterion for series, positive term series, geometric series, comparison test, convergence of $p$ -series.	PD	14	Theoretical – 12 Tutorial - 02
Oct	Power series and radius of convergence.	SM	10	Theoretical – 08 Tutorial - 02
	Root test, Ratio test, alternating series, Leibnitz's test (Tests of Convergence without proof).	PD	12	Theoretical – 11 Tutorial - 01
	<b>2<sup>nd</sup> Internal Assessment</b>			
	Definition and examples of absolute and conditional convergence.	PD	03	Theoretical – 02 Tutorial - 01
Dec	<b>End Semester Examination</b>			
	<b>Assessment:</b> Internal Assessment & Assignment		<b>Total: 90 Hrs</b>	<b>Theoretical – 75 Tutorial - 15</b>

**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:
  - To compute and interpret eigen values and eigen vectors linear transformations.
  - To calculate rank of matrices.
  - Able to solve linear homogeneous and non-homogeneous equations.
  - Reduce to diagonal form upto matrices of order 3.
  - To compute matrix inverses using elementary row operations.

**Course planner**

Month	Course Topic	Teacher	Class-hour	Remarks*
Jul	<b>Unit 1 : Basics of Computer Programming:</b> Definition, Requirement of programming language,	PD	02	Theoretical – 02 Tutorial - 00
Aug	<b>Unit 1 :</b> Machine language, high-level programming languages, machine code of a program: compilation process,	PD	04	Theoretical – 04 Tutorial - 00
Sep	<b>Unit 1 :</b> Problem solving approaches: algorithm and flowchart.	PD	06	Theoretical – 04 Tutorial - 02
	<b>Unit 2 : Fundamentals of Programming:</b> Built in Data Types: int, float, double, char; Constants and Variables; first program: printf(), scanf(), compilation etc., keywords, Arithmetic operators: precedence and associativity, Assignment Statements: post & pre increment/decrement, logical operators: and, or, not.	SM	06	Theoretical – 05 Tutorial - 01
Oct	<b>Unit 3 : Statements:</b> Relational operators.	PD	04	Theoretical – 04 Tutorial - 00
	<b>Unit 3 : Statements:</b> if-else statement, Iterative Statements: for loop, while loop and do-while loop;	SM	05	Theoretical – 04 Tutorial - 01
Nov	controlling loop execution: break and continue, nested loop.	PD	03	Theoretical – 02 Tutorial - 01
Dec	<b>End Semester Examination</b>			
	<b>Assessment:</b> Internal Assessment & Assignment		<b>Total: 30 Hrs</b>	<b>Theoretical – 25 Tutorial - 05</b>

**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.