Lesson Plan for Course: B.Sc (Sem-II) (DSC) Code: MTMGCOR02T Credit: 6

- Course Name: Differential EquationsCourse coordinator: Biswajit Sarkar
- Course Outcomes:
 - CO-1. To solve first order first degree ODEs including exact and non-exact equations and higher-order ODEs including properties of Wronskian.
 - CO-2. To solve linear homogenous and non-homogeneous ODEs including Cauchy-Euler equation.
 - CO-3. To solve simultaneous and total differential equations.
 - CO-4. Able to form first order partial differential equations, to solve PDE by Lagrange's method and Charpit's method.
 - CO-5. To classify second order partial differential equations.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
January	First order exact differential	BS	10	Theoretical – 09
	equations. Integrating factors, rules			Tutorial - 01
	to find an integrating factor.	SM	05	Theoretical – 04
	Linear homogenous equations with constant coefficients.	5111	03	Tutorial - 01
	Order and degree of partial	PD	06	Theoretical – 05
	differential equations, Concept of			Tutorial - 01
	linear and non-linear partial			
F 1	differential equations.	DC	00	TTI .: 1 07
February	First order higher degree equations	BS	08	Theoretical – 07 Tutorial - 01
	solvable for <i>x</i> , <i>y</i> , <i>p</i> . Linear non-homogenous equations	SM	05	Theoretical – 04
	Linear non-nomogenous equations	5111	0.5	Tutorial - 01
	Formation of first order partial	PD	04	Theoretical – 03
	differential equations.			Tutorial - 01
3.7.1		nal Assessm		
March	Methods for solving higher-order differential equations.	BS	08	Theoretical – 07 Tutorial - 01
	The method of variation of parameters.	SM	05	Theoretical – 04 Tutorial - 01
	Linear partial differential equation	PD	05	Theoretical – 04
	of first order by Lagrange's method			Tutorial - 01
April	Basic theory of linear differential	BS	12	Theoretical – 11
	equations, Wronskian, and its properties.			Tutorial - 01
	The Cauchy-Euler equation, Simultaneous differential equations.	SM	06	Theoretical – 05 Tutorial - 01
	Linear partial differential equation	PD	06	Theoretical – 05
	of first order by Charpit's method.			Tutorial - 01
		nal Assessm	ent	
May	Solving a differential equation by	BS	05	Theoretical – 04
	reducing its order.			Tutorial - 01
	Total differential equations.	SM	02	Theoretical – 01
	Classification of accord and a way!	DL	03	Tutorial - 01
	Classification of second order partial differential equations into elliptic,	PD	03	Theoretical – 02 Tutorial - 01
	parabolic and hyperbolic through			2 0001101 01
	illustrations only.			

June	End Semester Examination			
	Assessment: Internal Assessment &		Total: 90	Theoretical – 75
	Assignment		Hrs	Tutorial - 15

- > Shepley L. Ross, Differential Equations, 3rd Ed., John Wiley and Sons, 1984.
- > Sneddon, Elements of Partial Differential Equations, McGraw-Hill, International Edition,1967.
- ➤ B. Pal, S. Raychowdhury, S. Jana, Differential Equation, Semester-II, Santra Publication Pvt. Ltd., Kolkata-700073.

Lesson Plan for Course: B.Sc(Sem-II) (GE) Code: MTMHGEC02T Credit: 6

- Course Name: Differential EquationsCourse coordinator: Biswajit Sarkar
- Course Outcomes:
 - CO-1. To solve first order first degree ODEs including exact and non-exact equations and higher-order ODEs including properties of Wronskian.
 - CO-2. To solve linear homogenous and non-homogeneous ODEs including Cauchy-Euler equation.
 - CO-3. To solve simultaneous and total differential equations.
 - CO-4. Able to form first order partial differential equations, to solve PDE by Lagrange's method and Charpit's method.
 - CO-5. To classify second order partial differential equations.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
January	First order exact differential equations. Integrating factors, rules to find an integrating factor.	BS	10	Theoretical – 09 Tutorial - 01
	Linear homogenous equations with constant coefficients.	SM	05	Theoretical – 04 Tutorial - 01
	Order and degree of partial differential equations, Concept of linear and non-linear partial differential equations.	PD	06	Theoretical – 05 Tutorial - 01
February	First order higher degree equations solvable for x, y, p .	BS	08	Theoretical – 07 Tutorial - 01
	Linear non-homogenous equations	SM	05	Theoretical – 04 Tutorial - 01
	Formation of first order partial differential equations.	PD	04	Theoretical – 03 Tutorial - 01
March	Methods for solving higher-order differential equations.	l Assessmen BS	08	Theoretical – 07 Tutorial - 01
	The method of variation of parameters.	SM	05	Theoretical – 04 Tutorial - 01
	Linear partial differential equation of first order by Lagrange's method	PD	05	Theoretical – 04 Tutorial - 01
April	Basic theory of linear differential equations, Wronskian, and its properties.	BS	12	Theoretical – 11 Tutorial - 01
	The Cauchy-Euler equation, Simultaneous differential equations.	SM	06	Theoretical – 05 Tutorial - 01
	Linear partial differential equation of first order by Charpit's method.	PD	06	Theoretical – 05 Tutorial - 01
	2 nd Interna	l Assessmen	t	
May	Solving a differential equation by reducing its order.	BS	05	Theoretical – 04 Tutorial - 01
	Total differential equations.	SM	02	Theoretical – 01 Tutorial - 01
	Classification of second order partial differential equations into elliptic, parabolic and hyperbolic through illustrations only.	PD	03	Theoretical – 02 Tutorial - 01
June	End Semeste	er Examinati	on	
	Assessment: Internal Assessment & Assignment		Total: 90 Hrs	Theoretical – 75 Tutorial - 15

- > Shepley L. Ross, Differential Equations, 3rd Ed., John Wiley and Sons, 1984.
- > Sneddon, Elements of Partial Differential Equations, McGraw-Hill, International Edition,1967.
- ➤ B. Pal, S. Raychowdhury, S. Jana, Differential Equation, Semester-II, Santra Publication Pvt. Ltd., Kolkata-700073.

Lesson Plan for Course: B.Sc(Sem-IV) (DSC) Code: MTMGCOR04T Credit: 6

- Course Name: Algebra
- Course coordinator: Dr. Pintu Debnath
- Course Outcomes:
 - CO-1. To understand equivalence relations and partitions of a set.
 - CO-2. To know about group, general linear group, permutation group, cyclic, general linear group and quaternion group.
 - CO-3. To understand subgroup, cyclic subgroups, normal subgroup, quotient group, Lagrange's theorem and its application.
 - CO-4. To define and understand rings and subrings.
 - CO-5. To conceptualize with ideals, integral domains and fields.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
January	Equivalence relations and partitions, Functions,	BS	10	Theoretical – 08
	Composition of functions, Invertible functions,			Tutorial - 02
	One to one correspondence and cardinality of a set.	G) (10	FT1 1 100
	Definition and examples of groups, examples of	SM	10	Theoretical – 08
	abelian and non-abelian groups, the group Zn of			Tutorial - 02
	integers under addition modulo n and the group U(n) of units under multiplication modulo n.			
Februar	Cyclic groups from number systems, complex	BS	09	Theoretical – 08
y	roots of unity, circle group, the general linear	DS	0)	Tutorial - 01
)	group $GL_n(n,R)$.			Tutoriur 01
	Subgroups, cyclic subgroups, the concept of a	SM	09	Theoretical – 08
	subgroup generated by a subset and the	5111	0)	Tutorial - 01
	commutator subgroup of group, examples of			Tutoriur 01
	subgroups including the center of a group.			
	1 st Internal As	sessment		
March	Groups of symmetries of (i) an isosceles triangle	BS	10	Theoretical – 08
	(ii) an equilateral triangle (iii) a rectangle and (iv)			Tutorial - 02
	a square. The permutation group Sym (n). Group			
	of quaternions.			
	Cosets, Index of subgroup, Lagrange's	SM	10	Theoretical – 09
	theorem, order of an element.			Tutorial - 01
April	Normal subgroups: their definition, examples,	BS	11	Theoretical – 09
	and characterizations.			Tutorial - 02
	Definition and examples of rings, examples of	SM	11	Theoretical – 09
	commutative and non-commutative rings: rings			Tutorial - 02
	from number systems, Zn the ring of integers			
	modulo n, ring of real quaternions, rings of			
	matrices, polynomial rings, and rings of			
	continuous functions, Subrings and ideals. 2 nd Internal As	saasamant		
May	Quotient groups.	BS	05	Theoretical – 04
wiay	Quotient groups.	טט		Tutorial - 01
	Integral domains and fields, examples of fields: Zp, Q,	SM	05	Theoretical – 04
	R, and C. Field of rational functions.			Tutorial - 01
June	End Semester E	xamination		
	Assessment: Internal Assessment & Assignment		Total: 90	Theoretical – 75
			Hrs	Tutorial - 15

- > John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002.
- S. K. Mapa, Higher Algebra, Asoke Prakasan, Kolkata-700007

Lesson Plan for Course: B.Sc(Sem-IV) (DSC) Code: MTMSSEC02M Credit: 6

• Course Name: Logic and Sets

• Course coordinator: Dr. Pintu Debnath

• Course Outcomes:

CO-1. To learn propositions and precedence of logical operators.

CO-2. Able to apply propositional equivalence,

CO-3. To apply predicates and quantifiers.

CO-4. To aware with sets and subsets.

CO-5. Able to understand standard operations on sets.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*		
Jan	Unit 1: Introduction, propositions, truth table, negation, conjunction and disjunction.	SM	07	Theoretical – 06 Tutorial- 01		
February	Unit 1: Implications, biconditional propositions, converse, contra positive and inverse propositions and precedence of logical operators. Propositional equivalence: Logical equivalences.	SM	06	Theoretical – 05 Tutorial- 01		
March	Unit 1: Predicates and quantifiers: Introduction, Quantifiers, Binding variables and Negations.	SM	06	Theoretical – 05 Tutorial- 01		
April	Unit 2: Sets, subsets, Set operations and the laws of set theory and Venn diagrams. Examples of finite and infinite sets.	SM	08	Theoretical – 07 Tutorial- 01		
May	Unit 2: Finite sets and counting principle.	SM	03	Theoretical – 02 Tutorial- 01		
	End Semester Examination (By Department)					
	Assessment: Internal Assessment		Total: 30 Hrs	Theoretical – 25 Tutorial - 05		

- R.P. Grimaldi, Discrete Mathematics and Combinatorial Mathematics, Pearson Education, 1998.
- > P.R. Halmos, Naive Set Theory, Springer, 1974.
- E. Kamke, Theory of Sets, Dover Publishers, 1950.

Lesson Plan for Course: B.Sc(Sem-IV) (GE) Code: MTMHGEC04T Credit: 6

- Course Name: Algebra
- Course coordinator: Dr. Pintu Debnath
- Course Outcomes:
 - CO-1. To understand equivalence relations and partitions of a set.
 - CO-2. To know about group, general linear group, permutation group, cyclic, general linear group and quaternion group.
 - CO-3. To understand subgroup, cyclic subgroups, normal subgroup, quotient group, Lagrange's theorem and its application.
 - CO-4. To define and understand rings and subrings.
 - CO-5. To conceptualize with ideals, integral domains and fields.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*	
January	Equivalence relations and partitions,	BS	10	Theoretical – 08	
	Functions, Composition of functions,			Tutorial - 02	
	Invertible functions, One to one				
	correspondence and cardinality of a set.	SM	10	Theoretical – 08	
	Definition and examples of groups, examples of abelian and non-abelian groups, the group	SIVI	10	Tutorial - 02	
	Zn of integers under addition modulo n and			Tutoriai - 02	
	the group U(n) of units under multiplication				
	modulo n.				
February	Cyclic groups from number systems,	BS	09	Theoretical – 08	
	complex roots of unity, circle group, the			Tutorial - 01	
	general linear group $GL_n(n,R)$.				
	Subgroups, cyclic subgroups, the concept of	SM	09	Theoretical – 08	
	a subgroup generated by a subset and the			Tutorial - 01	
	commutator subgroup of group, examples of				
	subgroups including the center of a group.				
7.7.1		Assessment	1.0		
March	Groups of symmetries of (i) an isosceles	BS	10	Theoretical – 08	
	triangle (ii) an equilateral triangle (iii) a			Tutorial - 02	
	rectangle and (iv) a square. The permutation group Sym (n). Group of quaternions.				
	Cosets, Index of subgroup, Lagrange's	SM	10	Theoretical – 09	
	theorem, order of an element.	SWI	10	Tutorial - 01	
April	Normal subgroups: their definition,	BS	11	Theoretical – 09	
Артп	examples, and characterizations.	ЪЗ	11	Tutorial - 02	
	Definition and examples of rings, examples of	SM	11	Theoretical – 09	
	commutative and non-commutative rings: rings	22.2		Tutorial - 02	
	from number systems, Zn the ring of integers				
	modulo n, ring of real quaternions, rings of				
	matrices, polynomial rings, and rings of continuous functions, Subrings and ideals.				
		Assessment			
May	Quotient groups.	BS	05	Theoretical – 04	
	Grand Browker		_	Tutorial - 01	
	Integral domains and fields, examples of fields:	SM	05	Theoretical – 04	
	Zp, Q, R, and C. Field of rational functions.			Tutorial - 01	
June					
	Assessment: Internal Assessment &		Total: 90	Theoretical – 75	
Rooks	Assignment		Hrs	Tutorial - 15	

- > John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002.
- S. K. Mapa, Higher Algebra, Asoke Prakasan, Kolkata-700007

Lesson Plan for Course: B.Sc(Sem-IV) (GE) Code: MTMSSEC02M Credit: 6

• Course Name: Logic and Sets

• Course coordinator: Dr. Pintu Debnath

• 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*
Jan	Unit 1: Introduction, propositions, truth table, negation, conjunction and disjunction.	SM	07	Theoretical – 06 Tutorial- 01
February	Unit 1: Implications, biconditional propositions, converse, contra positive and inverse propositions and precedence of logical operators. Propositional equivalence: Logical equivalences.	SM	06	Theoretical – 05 Tutorial- 01
March	Unit 1: Predicates and quantifiers: Introduction, Quantifiers, Binding variables and Negations.	SM	06	Theoretical – 05 Tutorial- 01
April	Unit 2: Sets, subsets, Set operations and the laws of set theory and Venn diagrams. Examples of finite and infinite sets.	SM	08	Theoretical – 07 Tutorial- 01
May	Unit 2: Finite sets and counting principle.	SM	03	Theoretical – 02 Tutorial- 01
	End Semester Exa	amination (B	y Department)	
	Assessment: Internal Assessment		Total: 30 Hrs	Theoretical – 25 Tutorial - 05

- R.P. Grimaldi, Discrete Mathematics and Combinatorial Mathematics, Pearson Education, 1998.
- > P.R. Halmos, Naive Set Theory, Springer, 1974.
- E. Kamke, Theory of Sets, Dover Publishers, 1950.