VIDYASAGAR UNIVERSITY

Midnapore, West Bengal

PROPOSED CURRICULUM & SYLLABUS (DRAFT) OF

BACHELOR OF SCIENCE WITH MATHEMATICS

(MULTIDISCIPLINARY STUDIES)

3-YEAR UNDERGRADUATE PROGRAMME

(w.e.f. Academic Year 2023-2024)

Based on

Curriculum & Credit Framework for Undergraduate Programmes

(CCFUP), 2023 & NEP, 2020

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VIDYASAGAR UNIVERSITY

BACHELOR OF SCIENCE IN MATHEMATICAL & COMPUTER SCIENCES with MATHEMATICS

(*under CCFUP, 2023*)

Level	YR.	SEM	Course Type	Course Code	Course Title	Credit	L-T-P	Marks		
								CA	ESE	TOTAL
B.Sc. in Math. Comp. Sc. with Mathematics	1st	I	**SEMESTER-I**							
			Major (Disc.-A1)	MATPMJ101	**T: Calculus, Geometry & Ordinary Differential Equation** *(To be studied by the students taken Mathematics as Discipline-A)*	4	3-1-0	15	60	75
			SEC	SEC01	*To be chosen from SEC-01 of Discipline A/B/C of their Hons. prog.*	3	0-0-3	10	40	50
			AEC	AEC01	Communicative English-1 (*common for all programmes*)	2	2-0-0	10	40	50
			MDC	MDC01	Multidisciplinary Course-1 (*to be chosen from the list*)	3	3-0-0	10	40	50
			VAC	VAC01	VAC-01: ENVS (*common for all programmes*)	4	2-0-2	50	50	100
			Minor (Disc.-C1)	MAT MI 01/C1	**T: Calculus, Geometry & Ordinary Differential Equation** *(To be studied by the students taken Mathematics as Discipline-C)*	4	3-1-0	15	60	75
			Semester-I Total			20				400
		II	**SEMESTER-II**							
			Major (Disc.-B1)		*To be decided* *(Same as like A1 for students taken Mathematics as Discipline-B)*	4	3-1-0	15	60	75
			SEC	SEC02	*To be chosen from SEC-02 of Discipline A/B/C of their Hons. prog.*	3	0-0-3	10	40	50
			AEC	AEC02	MIL-1 (*common for all programmes*)	2	2-0-0	10	40	50
			MDC	MDC02	Multi Disciplinary Course-02 (*to be chosen from the list*)	3	3-0-0	10	40	50
			VAC	VAC02	VAC-02 (*to be chosen from the list*)	4	4-0-0	10	40	50
			Minor (Disc.-C2)	MAT MI 02/C2	**T: Algebra** *(To be studied by the students taken Mathematics as Discipline-C)*	4	3-1-0	15	60	75
			Summer Intern.	CS	Community Service	4	0-0-4	-	-	50
			Semester-II Total			24				400
			TOTAL of YEAR-1			44	-	-	-	800

P MJ= Major Programme (Multidisciplinary), MI = Minor, A/B = Choice of Major Discipline; C= Choice of Minor Discipline; SEC = Skill Enhancement Course, AEC = Ability Enhancement Course, MDC = Multidisciplinary Course, VAC = Value Added Course; CA= Continuous Assessment, ESE= End Semester Examination, T = Theory, P= Practical, L-T-P = Lecture-Tutorial-Practical, MIL = Modern Indian Language, ENVS = Environmental Studies

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MAJOR (MJ)

MJ A1/B1: Calculus, Geometry & Ordinary Differential Equation **Credits 04 (FM: 75)**

MJ A1/B1T: Calculus, Geometry & Ordinary Differential Equation **Credits 04 [60L]**

Course contents:

UNIT-1:
Hyperbolic functions, higher order derivatives, Leibnitz rule and its applications to problems of typeeax+bsinx, eax+bcosx, (ax+b)nsinx, (ax+b)ncosx, concavity and inflection points, curvature, envelopes, asymptotes, curve tracing in cartesian coordinates, tracing in polar coordinates of standard curves, L'Hospital's rule, applications in business, economics and life sciences.

UNIT-2:
Reduction formulae, derivations and illustrations of reduction formulae of the type ∫sin nx dx, ∫cosnx dx, ∫tan nx dx, ∫sec nx dx, ∫(log x)n dx, ∫sinnx sinmx dx, parametric equations, parameterizing a curve, arc length of a curve, arc length of parametric curves, area under a curve, area and volume of surface of revolution, techniques of sketching conics.

UNIT-3:
Reflection properties of conics, rotation of axes and second degree equations, classification of conics using the discriminant, polar equations of conics.
Spheres. Cylindrical surfaces. Central conicoids, paraboloids, plane sections of conicoids, generating lines, classification of quadrics, illustrations of graphing standard quadric surfaces like cone, ellipsoid.

UNIT-4:
General, particular, explicit, implicit and singular solutions of a differential equation. First order but not first degree. Exact differential equations and integrating factors, and equations reducible to this form, linear equation, Bernoulli equation and special integrating factors and transformations.

Suggested Readings:

1. G.B. Thomas and R.L. Finney, Calculus, 9th Ed., Pearson Education, Delhi, 2005.
2. M.J. Strauss, G.L. Bradley and K. J. Smith, Calculus, 3rd Ed., Dorling Kindersley (India) P. Ltd. (Pearson Education), Delhi, 2007.
3. H. Anton, I. Bivens and S. Davis, Calculus, 7th Ed., John Wiley and Sons (Asia) P. Ltd., Singapore, 2002.
4. R. Courant and F. John, Introduction to Calculus and Analysis (Volumes I & II), Springer- Verlag, New York, Inc., 1989.
5. S.L. Ross, Differential Equations, 3rd Ed., John Wiley and Sons, India, 2004.
6. Murray, D., Introductory Course in Differential Equations, Longmans Green and Co.
7. G.F.Simmons, Differential Equations, Tata Mcgraw Hill.
8. T. Apostol, Calculus, Volumes I and II.
9. S. Goldberg, Calculus and mathematical analysis.

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MINOR (MI)

MI-1/C1: Same as Minor-1 (MATMI01) of Mathematics (Hons) programme — **Credits 04**, **Full Marks: 75**

MI-2/C2: Same as Minor-2 (MATMI02) of Mathematics (Hons) programme — **Credits 04**, **Full Marks: 75**

SKILL ENHANCEMENT COURSE (SEC)

TO BE CHOSEN FROM THE BUCKET OF SECs OF SELECTED DISCIPLINE A/B/C
(As per A/B/C Hons. Prog. Syllabus)

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