

Visvesvaraya Technological University, Belagavi  
**Bachelor of Science (B.Sc.)**  
 Scheme of Teaching and Examinations 2021 – 2025  
 Outcome-Based Education(OBE) and Choice Based Credit System (CBCS)  
 (Effective from the academic year 2021 – 22)

**IV SEMESTER (Mathematics Major)**

Sl. No	Course and Course Code		Course Title	Teaching Department	Teaching Hours /Week				Examination			Credits	
					Theory Lecture	Tutorial	Practical	Self-Study Component	Duration in hours	CIE Marks	SEE Marks		Total Marks
					L	T	P	S					
1	DC	21BSM41	Numerical Analysis	Maths	2	2	--		03	50	50	100	3
2	DC	21BSM42	Operation Research	Maths	2	2	--		03	50	50	100	3
3	SSE	21BSS43x	<b>Stream Specific Elective</b>	Chemistry/ Physics	2	1	--		03	50	50	100	2
4	DC	21BSML44	Numerical methods Lab.	Maths	1	--	2		03	50	50	100	2
5	ESC	21BSO45x	Open Elective (Eng. Stream)	Eng. Faculty	2	1	--		03	50	50	100	2
6	SEC	21SFH46	Scientific foundation of Health	Any department	2				03	50	50	100	2
7	SEC	21BCS47	<b>Concepts of Biomathematics</b>	<b>Maths and Biology</b>	2	1	--		03	50	50	100	2
8	SEC	21CIP48	Constitution of India and Political Science	Humanities	2	--	--		03	50	50	100	2
<b>Total</b>					<b>15</b>	<b>05</b>	<b>02</b>		<b>24</b>	<b>400</b>	<b>400</b>	<b>800</b>	<b>18</b>

<b>Note:</b>	(1)	<b>DC:</b> Discipline Course, <b>ESC:</b> Engineering Science Course, <b>SEC:</b> Skill Enhancement Course, <b>SSE-</b> Stream Specific Elective
	(2)	<b>Summer Internship – 1</b> All the students shall undergo a mandatory internship of 03 weeks during the intervening period of IV and V semesters. The Internship shall be slated for CIE only and will not have SEE. The grade earned through CIE shall be included in the V semester grade card. A Viva-voce, Report submission and Presentation shall be conducted during V <sup>th</sup> semester and the prescribed credit shall be included in the V <sup>th</sup> semester. The summer internship -1 shall be considered as a head of passing, vertical progression and for the award of the degree. Those who do not take up/complete the internship shall be declared fail and shall have complete Summer Internship-1 during the subsequent examination/s after satisfying the internship requirement.
		<b>Open Electives:</b> ((a)21BSO451- Mathematical Modelling (b)21BSO452- Solar Energy Utilization (c) 21BSO453-Print Technology (Any One)
		<b>Stream Specific Elective</b> (a) 21BSS431 Concepts of Condensed Matter Physics (b) 21BSs432-Soil and Water Chemistry(Any One)

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**V SEMESTER (Mathematics Major )**

Sl. No	Course and Course Code		Course Title	Teaching Department	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical	Self-Study Component	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	DC	21BSM51	Real Analysis	Maths	2	2	--		03	50	50	100	3
2	DC	21BSM52	Fourier Analysis & Integral Transforms	Maths	2	2	--		03	50	50	100	3
3	SSE	21BSS53x	<b>Stream Specific Elective</b>	Chemistry/ Physics	2	1	--		03	50	50	100	2
4	DC	21BMATL54	Fourier Analysis and Integral Transforms Lab	Maths	1	--	2		03	50	50	100	2
5	ESC	21BSO55x	Open Elective (Engg. Stream)	Any Stream	2	--			03	50	50	100	2
6	OEC	21BSO561	Indian History	Humanities.	2	--			03	50	50	100	2
		21BSO562	Economics										
7	AEC	21BRM57	Research Methodology	P/C/M.	2	--	--		03	50	50	100	2
8	INT	21INT58	<b>Summer Internship-1 (Inter/Intra Research Internship)</b>	Completed during the intervening vacation of IV and V semester				03	100	---	100	2	
9	DC	21BSPR59	Research project1, Phase-1	Maths/ Multidisciplinary		2*	--		02	50	---	50	-
<b>Total</b>					<b>13</b>	<b>06</b>	<b>02</b>		<b>26</b>	<b>450</b>	<b>400</b>	<b>850</b>	<b>18</b>

<b>Note:</b>	(1)	DC: Discipline Course, <b>SSE:</b> Stream Specific Elective <b>ESC:</b> Eng. Science Course, <b>OEC:</b> Open elective Course, <b>AEC:</b> Ability Enhancement Course, <b>INT:</b> Internship . <b>SEC:</b> Skill Enhancement Course *Refers to contact hours between student and guide.	
	(2)	<b>Research Project 1, Phase – 1:</b> All the students admitted shall have to undergo a phase1of mandatory Research project 1 during the V <sup>th</sup> Semester. In Phase-1 the students are required to submit the title, synopsis, Literature Survey and work plan. Based on the ability/abilities of student/students and the recommendations of the mentor, a single discipline or a multidisciplinary research project 1 can be assigned to an individual student or to a group having not more than 4 students. The project is a laboratory-oriented course that will provide a platform to students to enhance their practical knowledge and skills by the development of small systems/ applications.	
	(3)	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> <b>Open Electives in Engineering Stream</b>  <b>(a)21BSO551-Concepts of Cyber Security</b>  <b>(b) 21BSO552-Data Science</b>  <b>(c) 21BSO553- Food and Nutrition (Any One)</b> </td> <td style="width: 50%; border: none; vertical-align: top;"> <b>Stream Specific Elective</b>  <b>(a) 21BSS531- Solid State Physics</b>  <b>(b) 21BSS532- Geo Chemistry (Any One)</b> </td> </tr> </table>	<b>Open Electives in Engineering Stream</b> <b>(a)21BSO551-Concepts of Cyber Security</b> <b>(b) 21BSO552-Data Science</b> <b>(c) 21BSO553- Food and Nutrition (Any One)</b>
<b>Open Electives in Engineering Stream</b> <b>(a)21BSO551-Concepts of Cyber Security</b> <b>(b) 21BSO552-Data Science</b> <b>(c) 21BSO553- Food and Nutrition (Any One)</b>	<b>Stream Specific Elective</b> <b>(a) 21BSS531- Solid State Physics</b> <b>(b) 21BSS532- Geo Chemistry (Any One)</b>		

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**VI SEMESTER (Mathematics Major)**

Sl. No	Course and Course Code		Course Title	Teaching Department	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical	Self-Study Component	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	DC	21BSM61	Group Theory	Maths	2	2	--		03	50	50	100	3
2	DC	21BSM62	Probability & Statistics	Maths	2	2	--		03	50	50	100	3
3	DC	21BSML63	Mathematics Lab 1	Maths	1	--	2		03	50	50	100	2
4	DSE	21BSM641	Number Theory	Maths	2	1			03	50	50	100	2
		21BSM642	Infinite series, Special functions and Analytical Geometry										
5	SSE	21BSS65x	Stream Specific Elective	Chemistry/ Physics	2	1			03	50	50	100	2
6	OEC	21BSO661	Sociology	Humanities.	2	--			03	50	50	100	2
		21BSO662	Finance & Banking										
7	SEC	21IPR67	Intellectual Property Rights (IPR)	Interdisciplinary	2	--	--		03	50	50	100	2
8	DC	21BSRP68	Research Project-1 Phase 2	Physics/ Multidisciplinary	---	4*			03	50	50	100	4
<b>Total</b>					<b>13</b>	<b>10</b>	<b>02</b>		<b>24</b>	<b>400</b>	<b>400</b>	<b>800</b>	<b>20</b>

<b>Note:</b>	(1)	<b>DC:</b> Discipline Course, <b>DSE:</b> Discipline Specific Elective, <b>OEC:</b> Open Elective Course <b>SEC:</b> Skill Enhancement Course. <b>SSE:</b> Stream Specific Elective, *Refer to contact hours between student and guide.
	(2)	<b>Research Project1, Phase -2:</b> Semester end examination of research project 1 will have the submission of project report and viva voce presentation. The research project1 shall be considered as head of passing for the award of degree. Those who do not take up/complete the project shall be declared fail and shall have to complete Research project during the subsequent examination/s.
	(3)	<b>Summer Internship – 2 Internship of 04 weeks during the intervening period of VI and VII semesters; 21INT77 Innovation/ Entrepreneurship/ Societal based Internship.</b> (1)All the students shall undergo a mandatory internship of 04 weeks during the intervening period of VI and VII semesters. The internship shall be slated for CIE only and will not have SEE. The grade earned through CIE shall be included in the VII semester grade card. The internship shall be considered as a head of passing, vertical progression and award of degree. Those, who do not take up / complete the internship shall be considered under F (fail) grade and shall have to complete during subsequently after satisfying the internship requirements. (2)Innovation/Entrepreneurship/Societal Internship shall be carried out at industry, State and Central Government /Non-government organizations (NGOs), micro, small and medium enterprise (MSME), Innovation centres or Incubation centres. Societal/Rural internship is a work-based activity in which students will have a chance to identify the problems facing by the rural community and solve/reduce the identified problems through innovative ideas/projects/mechanisms.
	(4)	<b>Stream Specific Elective</b> (a)21BSS651- Spectroscopy (b)21BSS652- Industrial Chemistry (Any One)

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**VII SEMESTER (Mathematics Major )**

Sl. No	Course and Course Code		Course Title	Teaching Department	Teaching Hours /Week				Examination				Cred.
					Theory Lecture	Tutorial	Practical	Self-Study Component	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	DC	21BSM71	Complex Analysis	Maths	2	2	--		03	50	50	100	3
2	DC	21BSM72	Advanced Linear Algebra	Maths	2	2	--		03	50	50	100	3
3	DC	21BSML73	Mathematics Lab 2	Maths	1	--	2		03	50	50	100	2
4	DSE	21BSM741	Discrete Mathematical Structures	Maths	2	2			03	50	50	100	3
		21BSM742	Fluid Mechanics										
5	DSE	21BSM751	Graph Theory	Maths	2	2			03	50	50	100	3
		21BSM752	Tensors & Differential Geometry										
6	SEC	21BSO761	<b>Geography</b>	Humanities	2	--	--		03	50	50	100	2
		21BSO762	Mass Communication & Journalism.										
<b>7</b>	<b>INT</b>	<b>21INT77</b>	<b>Summer Internship-2 Innovation/ Entrepreneurship/ Societal based Internship</b>	<b>Completed during the intervening vacation of VI and VII semester</b>				<b>03</b>	<b>100</b>	<b>---</b>	<b>100</b>	<b>2</b>	
8	DC	21BSPR78	Research Project -2 Phase -2	Maths/ Multidisciplinary		2*			03	50	---	50	-
<b>Total</b>					<b>13</b>	<b>11</b>	<b>02</b>		<b>24</b>	<b>450</b>	<b>300</b>	<b>750</b>	<b>18</b>

<b>Note:</b>	(1)	<b>DC:</b> Discipline Course, <b>DSE:</b> Discipline Specific Elective, <b>SEC:</b> Skill Enhancement Course. *Refer to contact hours between student and guide.
	(2)	<b>Research project 2, Phase-1.</b> All the students are required to submit the Title, synopsis and work plan. The objective of the project work is – To encourage the independent learning and innovative attitude of the students. To develop interactive communication, organization time management and presentation skills. To inspire independent and team working. To train the students to present the topic of project work in a seminar without any fear, and face the audience confidently.

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**VIII SEMESTER(Mathematics major )**

Sl. No	Course and Course Code		Course Title	Teaching Department	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical	Self-Study Component	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	DC	21BSM81	Advanced Mechanics	Maths	2	2	--		03	50	50	100	3
2	DC	21BSM82	Set theory & Metric Space	Maths	2	2			03	50	50	100	3
3	DC	21BSML83	Mathematics Lab 3	Maths	1	--	2		03	50	50	100	2
4	DSE	21BSM841	Information Theory & Coding	Maths	2	2			03	50	50	100	3
		21BSM842	Mathematical Logic										
5	DC	21BSPR85	Research Project 2, Phase-2	Maths		6*			03	50	50	100	6
6	NCMC	21NS86	NSS and PE	NSS and PE	Completed during the intervening period of III semester to VIII semester.				--	50	50	100	--
		21NS86	NSS and Fine Arts	NSS and Humanities									
<b>Total</b>					<b>07</b>	<b>12</b>	<b>2</b>		<b>15</b>	<b>300</b>	<b>300</b>	<b>600</b>	<b>17</b>

<b>Note:</b>	(1)	<b>DC:</b> Discipline Course, <b>DSE:</b> Discipline Specific Elective *Refer to contact hours between student and guide.
	(2)	<b>Research Project2, Phase 2</b> – The semester end examination of research project phase 2 will have the submission of research project report and viva voce presentation The research project shall be considered as head of passing for the award of the degree. Those who do not take up/complete the research project shall be declared fail and shall have to complete the research project 2 during the subsequent examination/s, after satisfying the project requirements.

**Non-credit mandatory courses (NCMC):****National Service Scheme/Physical Education (Sport and Athletics)/ Yoga/Fine Arts:**

- (1) Securing 40 % or more in CIE, 35 % or more marks in SEE, and 40 % or more in the sum total of CIE + SEE leads to successful completion of the registered course.
- (2) In case, students fail to secure 35 % marks in SEE, they have to appear for SEE during the subsequent examinations conducted by the University.
- (3) In case, any student fails to register for NSS, PE or Yoga/fails to secure the minimum 40 % of the prescribed CIE marks, he/she shall be deemed to have not completed the requirements of the course. In such a case, the student has to fulfill the course requirements during subsequently to earn the qualifying CIE marks subject to the maximum program period.
- (4) Successful completion of the course shall be indicated as satisfactory in the grade card. Non-completion of the course shall be indicated as Unsatisfactory.
- (5) These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses shall be mandatory for the award of a degree.