

Instructions:

Who should fill this form?

- The form is to be filled out by the instructors teaching a course offered to the undergraduate students in the Monsoon 2025 semester. In case multiple instructors are teaching a course, the form needs to be filled out just once.

Filling up the form:

- Please fill in all the sections.
- The fillable space is marked as:
- Double click and use the backspace key on the greyed-out region to remove the default text. Use the tab key to move to the next fillable field.
- Hover your mouse over the **text in this colour** in the form to get details about the fillable field, wherever highlighted.
- In case of multiple instructors teaching a course, details about all the faculty are to be filled in the same box in section C. Please check the details by hovering your mouse over the highlighted text. Details on Teaching Assistants / Lab Assistants can be provided under Section L.
- Please note this form does NOT accept Rich Text Format

Usability of the form:

- A subset of the form data will be used to populate the course catalogue in the ERP, the SNU web page and for accreditation requirements, as applicable.
- This form can be used as a course handout or a course outline as well.

Using the form (IMPORTANT):

- Before opening the file, right click the file >> Click Properties >> Check 'Unblock' under the General Tab >> Click Apply >> Click OK.
- After opening the file, click 'Enable Content' to edit the editable portions of the file.

Saving the form:

- Before submitting the form, please name the file as <course-code>-25MO.pdf e.g. Esc101 code should be saved as esc101-25MO.pdf (all small letters, no blanks and no special characters). CCC courses as <course-code>-25MO1.pdf for session1 and <course-code>-25MO2.pdf for session 2.
- Please retain the Word file for future reference. The office of the Dean of Academics may request it in the future.
- While saving the PDF format, please exclude the first instruction page and the reference included at the end.

Form submission date:

Last date to submit the form is

Section A:								
Course Code	MAT1100							
Course Title	Advanced Calculus And Linear Algebra							
Course Credits	4	No. of Contact Hours/week	L:	3	T:	1	P:	0
School	School Of Natural Sciences							
Offered By	Mathematics							
Method of Instruction:	In Person		Offered in:	Spring Semester	Full Semster			
Check each box, when applicable, if the course covers one or more of the below listed attributes								
<input type="checkbox"/>	REALS	<input type="checkbox"/>	VELS	<input type="checkbox"/>	DISE			
Prerequisites	Mat1001							
None								
Fill this, if applicable: A Similar Course Was Offered With Code In Year								

NOTE:

Section B: This course is offered as (use checkbox) for which Programs				
<input checked="" type="checkbox"/>	Major Core for:	Economics And Finance	Not required	
<input type="checkbox"/>	Major Elective for:	Enter The Name Of The Program(S) For Which This Is A Major Elective	Instructor's Approval	
<input type="checkbox"/>	UWE for:	None	Not required	
<input type="checkbox"/>	Project /UG Thesis / Internship	Any Other Information	Instructor's Approval	
<input type="checkbox"/>	CCC for:	Choose a Category	Instructor's Approval	
<input type="checkbox"/>	Specialization (If applicable)	Mention The Specialization	Instructor's Approval	
<input type="checkbox"/>	Minor (If applicable)		Not required	
Estimated No. of Seats:		110	Estimated Number of Sections	4

Section C: State the Program Learning Goals of the Major Degree Program mapped to the Core Course (Applicable to Major Core courses only)
PLG = 2 [Use Quantitative Tools for Analysis: Employ mathematics, statistical software, econometric

Section D: State the Course Objectives / Aim (Specific details of what the course intends to achieve in terms of student knowledge and ability. Items should begin with phrases such as “To provide students with ...”, “To enable students to ...”, “To develop students’ skills in ...” and so on.)
<ol style="list-style-type: none"> 1. To provide students with an understanding of the fundamental concepts of sequences and series, multivariable calculus and linear algebra, as required for applications in probability, economics and finance. 2. To develop students' view of calculus to integrate geometrical and physical intuition. 3. To equip students with techniques for solving multivariable optimization problems. 4. To introduce students to vectors, matrices and linear transformations. 5. To enable students to exploit the properties of symmetric matrices in applications.

Section E: State the Learning Outcomes (A list of what students will know or be able to do as a result of successfully completing the course. Should be expressed as knowledge, skills, or attitudes.)
On successful completion of the course, students will be able to:
<ol style="list-style-type: none"> 1. Understand the geometric content of the gradient and be able to apply It to optimization. 2. Compute Double Integrals using iterated integration in cartesian and polar coordinates. 3. Determine the convergence and divergence of Sequences and Series. 4. View matrices as linear transformations of vectors. 5. Compute eigenvalues and eigenvectors and choose coordinates that simplify calculations. 6. Diagonalise symmetric matrices and use this in applications.

Section F: State if course contributes to any skill development

[Click Here To List Course Contribution To Skill Development](#)

Section G: Module-wise Curriculum Content (Syllabus, Lab work, Project, Term paper, Group work, etc.)

1. Sequences and Series: Limits of sequences, algebra of limits, series, divergence test, comparison test, integral test, absolute convergence. [Lecture hours = 6]
2. Differential Calculus in Several Variables: Functions of several variables, level curves and surfaces, quadric surfaces, partial derivatives, chain rule, directional derivatives, gradient. [Lecture hours = 10]
4. Optimisation: Extreme values and saddle points, 1st and 2nd derivative tests, method of Lagrange multipliers. [Lecture hours = 5]
5. Integration: Improper integrals, double (iterated) integrals, polar coordinates, change of variables. [Lecture hours = 5]
6. Linear Algebra in Euclidean Space: Vectors and matrices, vector subspaces, span and linear independence, basis and dimension, row and column spaces, rank-nullity theorem, matrices and linear transformations, change of basis, determinant, eigenvalues and eigenvectors, diagonalisability, Gram-Schmidt orthogonalisation, orthogonal matrices, symmetric matrices and orthogonal diagonalisation. [Lecture hours = 13]

Add additional sheet(s), if required

Section H: Text Book(s), Reference book(s) and any other study material

Books:

1. Essential Calculus – Early Transcendentals by James Stewart, Cengage, India Edition.
2. Basic Multivariable Calculus by J E Marsden, A J Tromba and A Weinstein, 1st edition, Springer (India).
3. Calculus, II and III, by Jerrold Marsden and Alan Weinstein, Springer.
<http://www.cds.caltech.edu/~marsden/volume/Calculus/>
4. G B Thomas and R L Finney, Calculus and Analytic Geometry, Addison-Wesley.
5. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley, 9th edition.
6. F. Aleskerov, H. Ersel and D. Piontkovski, Linear Algebra for Economists, Springer.

Lecture Videos:

- Single Variable Calculus lectures by David Jerison, MIT Online.
https://ocw.mit.edu/courses/18-01-single-variable-calculus-fall-2006/video_galleries/video-lectures/
- Multivariable Calculus lectures by Denis Auroux, MIT Online.
https://ocw.mit.edu/courses/18-02-multivariable-calculus-fall-2007/video_galleries/video-lectures/

Section I: Please fill in all the rows for the applicable rows. For evaluation component not included in the list, use the last two rows and mention the evaluation component in the corresponding last column. Please see the NOTE below this box for the prorated policy.					
	Component	Weightage %	Missed Graded Component Policy	Use of Gen AI policy	Any Other Information
<input checked="" type="checkbox"/>	Mid Sem Exam	30.00	Retake of Graded Component	Prohibited: No Gen AI	other info
<input checked="" type="checkbox"/>	End Sem Exam	40.00	I grade awarded on approval from De	Prohibited: No Gen AI	other info
<input checked="" type="checkbox"/>	Quiz(s)	15.00	Choose the best n from m componer	Prohibited: No Gen AI	other info
<input checked="" type="checkbox"/>	Assignment(s)	15.00	Assign marks on a Prorated basis	Prohibited: No Gen AI	other info
<input type="checkbox"/>	Lab	0.00	Please Select	Please Select	other info
<input type="checkbox"/>	Project	0.00	Please Select	Please Select	other info
<input type="checkbox"/>	Case Studies	0.00	Please Select	Please Select	other info
<input type="checkbox"/>	Group Discussion	0.00	Please Select	Please Select	other info
<input type="checkbox"/>	Any Other Component	0.00	Please Select	Please Select	other info
<input type="checkbox"/>	Any Other Component	0.00	Please Select	Please Select	other info
	Total Weightage (%)	100.00			

Note:

- a) While you may mark multiple evaluation components for pro-rate. However, if a particular student misses multiple evaluations, *not more than 20% of the evaluation can be prorated for that student.*
- b) *The best n out of m: Please make sure that $n < m$.*
- c) *Award of 'I' grade is applicable only in the case of the End-term Exam. Additionally, end-term exams or final assessments cannot be prorated or waived.*
- d) *Individual faculty can decide the prorated policy for each component.*
- e) *'None' as an option can only be used in exceptional cases, for example lab evaluated by an external expert*

Section J: Grading Policy (Tick the one You intend to follow)			
<input checked="" type="checkbox"/>	Relative Grading	90% Will Guarantee A And 40% Will Guarantee D. Cutoffs May Be Lowered From These Based On Difficulty Level Of Assessment.	Total marks will be rounded up
<input type="checkbox"/>	Absolute Grading	Grade	Range (replace M's appropriately)
		A	M1 <= marks <= M2
		A-	M1 <= marks <= M2
		B	M1 <= marks <= M2
		B-	M1 <= marks <= M2
		C	M1 <= marks <= M2
		C-	M1 <= marks <= M2
		D	M1 <= marks <= M2
	E	M1 <= marks <= M2	Please Mention The Rounding Off Policy And Any Other Information
	F	M1 <= marks <= M2	

Section K: Details about instructors teaching this course. For multiple <i>instructors</i> in a course, mention each name once after the other				
Name of the Instructor(s):		Prof XYZ Prof ABC		Section(s) L1 L1, L2, L3
Office Location	K 120 L 325	Tel. Extension*		Email: abc@snu.edu.in xyz@snu.edu.in
About the Instructor(s): Click Here To Enter About 250 Words about each instructor teaching the course`				

* - Optional

Section L: Office Hours

Please let the students know the day(s) and time slot(s) for any consultation. You may update this at the start of the semester.

Section M: Any other information

Any other information you would like to specify in relation to the above course