Introduction to Numerical Analysis

Course Information

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Spring 2023

Course Information

Syllabus and Texts

Pre-Midsem Syllabus

1. **Mathematical Preliminaries**
2. **Error Analysis**
3. **Numerical Linear Algebra**

Post-Midsem Syllabus

1. **Interpolation**
2. **Numerical Integration and Differentiation**
3. **Nonlinear Equations**
4. **Numerical Ordinary Differential Equations**

Text book / Lecture notes

- **S. Baskar and S. Sivaji Ganesh**, *Introduction to Numerical Analysis*

will be uploaded on the Moodle page.

References

- K. E. Atkinson and W. Han, *Elementary Numerical Analysis*, Wiley-India, 2003.
- S. D. Conte and C. de Boor, *Elementary Numerical Analysis - An Algorithmic Approach* (3rd edition), McGraw-Hill, 1981.
- R. L. Burden and J. D. Faires *Numerical Analysis: Theory and Applications*, Cengage Learning India Pvt Ltd, 2010.
- D. Kincaid and W. Cheney *Numerical Analysis: Mathematics of Scientific Computing*, 3rd Edition, AMS, 2002.
- Many more!

Course Information

Attendance Policy

Course Information: Attendance Policy

- Attendance in the lectures and tutorials is compulsory.
- Students who do not meet 80% attendance requirement may be given an DX grade.
- In case you miss lectures for medical / other valid reasons, get a certificate and **keep it with you**. You will need to produce it if you fall short of attendance. Medical certificates (**Pink slips**) from IITB hospital ONLY.
- In case you have X% attendance, and $X < 80$, then you need to produce valid justification for the remaining $(100 - X)\%$ classes.

Course Information

Evaluation Plan and Grading

Examination Schedule

Demo Quiz	:	17^{th} January 2023 (9:00 PM to 9:07 PM)	5 marks
Quiz 1	:	24^{th} January 2023	15 marks
MidSem	:	During 18^{th} to 25^{th} February 2023	35 marks
Quiz 2	:	18^{th} March 2023 (Saturday)	15 marks
EndSem	:	During 15^{th} to 25^{th} April 2023	35 marks

Examination Mode

- **Demo Quiz will be on SAFE, from your Hostel rooms, No Proctoring**.
- **All other exams will be offline.**
  - Answer sheets to be uploaded to SAFE at the end of the exam.
  - Evaluation on SAFE.
  - Answer sheets would be collected. Cross-checked with SAFE submissions

Surprize Quizzes

There will be many short quizzes on SAFE during class hours.

- **Each surprise quiz will be of 2 minutes duration.**
- **One question will be posed in the class and it carries half a mark.**
- **In a given class, there may be more than one such quiz.**
- **Total weightage will be of 10 marks.**

Make-up Examination

One make-up exam for any quiz/exam that you miss

- **Exam will be for 20 marks. Marks will be appropriately scaled**. Around the EndSem exam period
- **FULL syllabus**
- **At a higher Difficulty level**
- ONLY for those with admissible documentation like IITB Hospital pink slip, Authorization from Institute functionary

Grading Policy

- If the total marks is > 100, then the top n number of students will be given AP, where n is as per the norms of the institute.
- **If the total marks is ≥ 90, then AA.**
- **Let $M =$ 40% of the first mark (≤ 100). M will be fixed as the minimum mark for DD.**
- No FF grade.
- **All other grades will be fixed relatively.**

Course Information

Question paper pattern

Quizzes/Exams Question paper pattern

- **Quizzes:** Two 4 marks questions + Seven 1 mark questions

$$(2 \times 4) + (7 \times 1) = 8 + 7 = 15 \text{ Marks. } (30 \text{ Marks})$$

- **Midsem/Endsem Exams:** Six 4 marks questions + Eleven 1 mark questions

$$(6 \times 4) + (11 \times 1) = 24 + 11 = 35 \text{ Marks. } (70 \text{ Marks})$$

More information on Quizzes/Exams Questions

Class Weightage:

- at least 20% of the quiz+exam questions (either exact or similar) are discussed in the classes.
- at least 20% of the quiz+exam questions (either exact or similar) are discussed in the tutorial sessions.

More information on Quizzes/Exams Questions

Overall Difficulty Level:

- 40% of the quiz+exam questions are direct questions
- 20% of the quiz+exam questions are challenging questions.
- remaining are tuned as per the overall performance of the class.

Question paper pattern for Extra weightage

- **Demo Quiz:** Five 1 mark objective questions

$$5 \times 1 = 5 \text{ Marks.}$$

- **In-class Surprise Quizzes:** One objective question for 0.5 Marks

  If n is the number of surprize quizzes, and x is the marks scored by you, you will get

$$x \times \frac{10}{n/2} \text{ marks.}$$

Frequently Asked Questions

Question: How many problems should I solve?

Answer:

- It is **enough** to solve all the exercise problems in the lecture notes **on your own**.
- These problems are carefully chosen, by solving which you get the mathematical training / confidence to attempt any other problem in Numerical Analysis and to get a **AA** grade!

FAQ

Question: Can you supply solutions to all the tutorial sheet problems?

Answer: Wrong question.

Question: I solved some, and tried some. I want to know if my solutions are correct. May I know solutions to these problems?

Answer: Surely. You will know answers (and need not be complete solutions), and hints for all the problems during Tutorial classes.

Attending tutorial sessions, after trying out all the tutorial problems as well as the relevant exercise problems from notes is IMPORTANT.