

**TELECOMMUNICATION ENGINEERING
SCHOOL OF ELECTRICAL ENGINEERING AND INFORMATICS
INSTITUT TEKNOLOGI BANDUNG**

**COURSE SYLLABUS
ET 1201 DISCRETE MATHEMATICS**

1. Instructors Information

Irma Zakia, Radio Telecommunication & Microwave Laboratory, Tel: +62222501661, email: irma.zakia@staff.stei.itb.ac.id

2. Prerequisites:

Course Prerequisite: -

3. Instructor Assistance

(by appointment)

4. Class Hours

Tuesday 08:00-10:00

5. Text Book(s)

[1] Kenneth H. Rosen, Discrete Mathematics and its Applications, 7th Edition.

[2] Jonathan L. Gross and Jay Yellen, Graph Theory and its Applications, 2nd Edition.

[3] Lecture slides at Edunex

6. Course Description

This course provides students with the ability and competency to understand knowledge about mathematical logic, number theory, graph theory, and its applications in the field of engineering, especially telecommunications engineering by studying and understanding: Sets and logic, Functions, Algorithms, Big-O Notation, Applications of Number Theory, Mathematical Reasoning and Induction, Recursive, Recurrence Relations, Relations and their properties, Closure relations, Graph Theory: Graph Structure and Representation, Graph operations, Isomorphic Graphs, Connectivity, Paths and Euler circuits, Hamiltonian paths and circuits, Shortest path problems, Dijkstra's algorithm, Planar graphs, Graph coloring, Rings and sequences, TSP problems.

7. Student Learning Outcome (SLC)

SLC1 : Ability to apply knowledge of mathematics, natural and/or materials science, information technology and engineering to gain a thorough understanding of engineering principles.

8. Course Learning Outcome (CLO)

No	CPMK
C1	Ability to understand scientific and mathematical relationships (principles or laws) and the input required for logic, sets, algorithms, number theory, relations, and graphs
C2	Ability to apply scientific and mathematical relationships (principles or laws) and the input required for logic, sets, algorithms, number theory, relations, and graphs

9. Evaluasi Mata Kuliah

Unsur	Frekuensi	Bobot
Kuis	1	15%
UTS	1	35%
UAS	1	50%

10. Course Policies

- Gadgets (smartphone, tablets, laptop) are not allowed during class.
- Attendance does not influence the final grade. However, students are encouraged to attend at least 80% of class hours.
- Excused students who miss quizzes are granted to have a replacement schedule at the end of the semester. It is not guarantee that the test material is dedicated to a specific chapter only.
- Students who miss quizzes and exams are required to ask for a reschedule by giving formal excuse such as doctor's certificate, permit letter from authorized person (e.g. Kaprodi), etc.
- During evaluation (e.g quizzes, exams, individual assignments) you are expected to comply with professional honesty. Any breach of integrity will be taken seriously and reported to the appropriate higher authority.
- Unexcused tardiness of more than 15 minutes will count as an absence, except during quizzes and exams.

11. Ethics of a Student as Community Member

According to the Student Ethics at the Institut Teknologi Bandung chapter II first part article 3 that students of ITB must be able to manifest the spirit of upholding academic and professional honesty and integrity by restraining from dishonest and unfair acts in any form, both inside and outside of the campuses.

12. TENTATIVE CLASS SCHEDULE S

	Topics	Lecture/ Quiz/Exam	Reading Textbook
Wk 1 – Februari 18	Introduction: scope of lectures, schedule, lecture rules and assessment methods	Lecture/Responsi	[1][2][3]

	Introduction: mathematical devices, logic, propositions and non-propositions, logical operators, equivalent statements, tautologies and contradictions, propositions, universal quantification, existential quantification, disproof, negation.		
Wk 2 – Februari 25	Set theory: the concept of sets, similarity of sets, subsets, cardinality of sets, power sets. Cartesian multiplication, operations on sets.	Lecture	[1][2][3]
Wk 3 – March 4	Functions: concept of function, properties of function, inverse function, composition, graph, floor, and ceiling.	Lecture/Responsi	Oppenheim, Haykin
Wk 4 – March 11		Lecture/Responsi	[1][2][3]
Wk 5 - March 18	Pengantar teori bilangan, teorema pembagian, bilangan prima, algoritma pembagian, GCD (greatest common multiples) dan LCM (least common divisor), prima relatif.	Lecture/Responsi	[1][2][3]
Wk 6 – March 25	Definition of algorithm, search algorithms such as linear search, binary search, algorithm complexity, function growth, big-O notation	Quiz 1	[1][2][3]
<i>Wk 7 – April 1</i>	<i>Holiday Idul Fitri</i>		
Wk 8 – April 8	Modular arithmetic, congruence, euclid's algorithm		
Wk 9 – April 15		Mid-term exam	[1][2][3]
Wk 10 – April 22	Representation of integers, addition of integers, matrices, addition of matrices, multiplication of matrices, identity matrix, powers and transpose of matrices, boolean matrices.	Lecture/Responsi	[1][2][3]
Wk 11 – April 29	Aturan-aturan interferensi, argument, aturan interferensi dari pernyataan terkuantifikasi, pembuktian theorem, Induksi matematika dan rekursif	Lecture/Responsi	[1][2][3]
Wk 12 –Mei 6		Lecture/Responsi	[1][2][3]
<i>Wk 13 – Mei 13</i>	<i>Waisak Holiday</i>		
Wk 14 – Mei 20	Recurrence relations, modeling with recurrence relations, solving recurrence equations, “divide and conquer” technique. The concept of relations, functions as relations, relations on a set, properties of relations, enumeration of relations, combinations on relations, n-ary relations, relations and database systems.	Lecture//Responsi	[1][2][3]
Wk 15 – Mei 27	Introduction to graphs, graph models, special graphs: cycles, wheels, n-cubes, bipatites, operations on graphs, graph structures and representations: adjacency	Lecture//Responsi	[1][2][3]

	matrices and incidence matrices, isomorphic graphs, connectivity, Euler paths and circuits, Hamilton paths and circuits.		
Wk 16 – Juni 4	Shortest path problem, Dijkstra's algorithm, TSP (traveling salesman problem). Planar graphs, graph coloring, rings and their sequences.	Lecture//Responsi	[1][2][3]

Exam materials

Quiz : Week 1 to week 5 course materials
 UTS : Week 1 to week 8 course materials
 UAS : All course materials