NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF SCIENCES
MATHEMATICS PROGRAM

CM314 – INTRODUCTION TO TOPOLOGY

I. GENERAL INFORMATION

CODE	: CM314 Introduction to Topology
SEMESTER	: 5
CREDITS	: 5
HOURS PER WEEK	: 6 (Theory – Practice)
PREREQUISITES	: CM214 Real Analysis
CONDITION	: Mandatory

II. COURSE DESCRIPTION

The student must handle the concepts metric spaces, topological spaces, in general and must also manage the topologies generated in various ways which are frequent in the courses of analysis.

III. LEARNING UNITS

1. Metric Spaces

Definition and examples. Open and closed sets. Convergence, completion and the Baire's Theorem. Continuous applications. Spaces of continuous functions. Euclidean and unitary spaces.

2. Topological Spaces

Definition and examples. Elementary concepts. Bases and Sub-bases.

3. Compactness

Compact spaces. Product spaces. Tychonoff's theorem and locally compact spaces. Compactness for metric spaces. Ascoli's theorem.

4. Separation Theorems (T-spaces)

T_1 spaces and Haussdorff spaces (T_2). Completely regular spaces (T_3) and normal spaces (T_4). Uryshon lemma and Tietze's extension theorem. The Uryshon Immersion Theorem. Stone-Cech's Compacting. T_{2n} Spaces and T_{2n-1} Spaces. Applications.

5. Connected spaces

Connected spaces. Components of a space. Totally disconnected spaces. Locally connected spaces.

6. Approximation

Weierstras's approximation theorem. Stone-Weiesrtras's theorems. Locally compact Hausdorff spaces. Stone-Weiesrtras's extension theorem.

IV. BIBLIOGRAPHY

- Lipschutz, S., General Topology.
- Simmons, G. Topology and Modern Analysis.
- Kolmogorov, A. and Fomin V., Elements of the Theory of Functions and Functional Analysis.
- Sze-Tsen Hu., Introduction to General Topology.
- Bourbaki, N., General Topology.
- Dugundji, Topology.
- Mansfield, M. Introduction to Topology.
- Hocking, J. Topology.