

NATIONAL INSTITUTE OF TECHNOLOGY SIKKIM

Syllabus of Common Courses from Second Year Onwards

(Effective from 2017 Admitted Batch Onwards)

III SEMESTER

Course Code: MA 13101

L-T-P-C

Course Title: MATHEMATICS – III

3-1-0-4

Module 1: Complex Numbers and Functions

Complex functions, Derivative, Analytic function, Cauchy- Reimann equations, Laplace's equation, Geometry of Analytic functions: Conformal mapping, Linear fractional Transformations, Schwarz - Christoffel transformation, Transformation by other functions. **12**

Module 2: Complex Integration

Line integral in the Complex plane, Cauchy's Integral Theorem, Cauchy's Integral formula, Derivatives of analytic functions. Power series, Functions given by power series, Taylor series and Maclaurin's series. Laurent's series, Singularities and Zeros, Residue integration method, Evaluation of real Integrals. **12**

Module 3: Partial Differential Equations

First order partial differential equations, solutions of linear and nonlinear first order PDEs, classifications of second order PDEs, Method of characteristics, boundary and initial value problems(Dirichlet and Neumann type) involving wave equation, heat conduction equations, Laplace's equations and solutions by method of separation of variables (Cartesian coordinates). **12**

Module 4: Laplace and Fourier Transforms

Laplace and inverse Laplace transforms, properties, convolutions, solution of ODE and PDE by Laplace transform, Fourier series, Fourier Integrals, Fourier transforms, sine and cosine transforms, solution of PDE by Fourier transform. **06**

Texts:

NATIONAL INSTITUTE OF TECHNOLOGY SIKKIM

1. J. W. Brown and R.V. Churchill, Complex Variables and Applications, 7th edn., McGraw Hill, 2004.
2. I.N. Sneddon, Elements of Partial Differential Equations, McGraw Hill, 1957.
3. D. Bhatta and L. Debnath, Integral Transforms and their applications, 3rd edn.,CRC, 2014.

References:

1. J.H. Mathews and R.W. Howell, Complex Analysis for mathematics and engineering, 3rd edn., Narosa, 1998.
2. S.J. Farlow, Partial Differential Equations for Scientists and Engineers, Dover Publications, 1993.
3. Dennis G. Zill and Patrick D. Shanahan, A first course in Complex analysis with applications, 2nd edn., Jones and Bartlett, 2010.

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IV SEMESTER

Course Code: MA 14101

L-T-P-C

Course Title: MATHEMATICS – IV

3-1-0-4

Module 1: Probability distributions

Random experiments, sample space, events, probability and conditional probability, Bayes theorem. Probability space, random variables, probability distribution and density functions, expectation (mean and variance). Standard distributions: Binomial distribution, Hypergeometric, Poisson. Continuous distributions: uniform, normal and exponential. Bivariate and multivariate distributions (joint distributions and densities), conditional distributions. **12**

Module 2: Statistical Inference

Population and population parameters. Samples and sampling distributions (normal, chisquare, t-, and F-distributions). Estimation of parameters (estimators and estimates) – point and interval estimation. Maximum likelihood estimation. Tests of hypothesis – simple and composite; types of errors (type I and type II), power of test, p-value and its interpretation; tests for comparison of proportions, means and variances. **12**

Module 3: Regression analysis

Correlation and regression, simple linear regression, estimation of parameters, regression diagnostics (analysis of errors), confidence and prediction intervals. Multiple linear regression, multiple regression coefficient, R^2 . **06**

Module 4: Numerical Analysis

Solution of nonlinear equation: bisection method, secant method, Regula falsi method, Newton's method, Interpolation: Lagrange interpolation, Newton interpolation, inverse interpolation. Numerical Integration; finite differences, Newton cotes rules, trapezoidal rule, Simpson's rule. Numerical solution of ordinary differential equations: Euler's method, Runge-Kutta method. **12**

Texts:

NATIONAL INSTITUTE OF TECHNOLOGY SIKKIM

1. Conte and De Boor, Elementary numerical analysis: an algorithmic approach, McGraw-Hill, 1972.

References:

1. Johnson, R. A ., Miller and Freund's Probability and Statistics for Engineers, 6th edition. PHI, 2004.
2. Levin R. I. & Rubin D. S., Statistics for Management, 7th edition, PHI, New Delhi, 2000.
3. S.M. Ross, Introduction to Probability and statistics for Engineers, 3rd edition, Academic Press, Delhi, 2005.

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VI SEMESTER

Course Code: HS 16101

L-T-P-C

Course Title: PROFESSIONAL COMMUNICATION

2-0-0-2

1. Communication: Communication Process, Effectiveness, Barriers in communication Verbal Communication & Non-verbal Communication soft skills (body postures, movements, gestures, facial expressions etc.) Listening skill, Speaking skill, Reading skill & Writing skill **07**

2. Technical Writing: A. Note making & note taking, Paraphrasing, Summarizing, Abstract writing, Technical description of tools, appliances and processes, Precis writing, Letter writing and Application writing.

B. Report writing, Paragraph writing, Essay writing, project writing & presentation writing **14**

3. Phonetics and Paralanguage: Language variety, Need for teaching pronunciation, Pitch, Tone group, Rhythm, Word stress, Syllable **07**

Essential Readings:

1. Asher, R.E. The Encyclopedia of Language and Linguistics Baner, L. English Word-Formation. CUP. 1983.
2. Gimson, A.C. An Introduction to the Pronunciation of English. London: Edward Arnold.1989. (Chapter 1, 2 & 3 only)

Suggested Readings:

1. Abercrombie, D. Elements of General Phonetics. Edingburgh: Edingburgh University Press. 1967. (Chapter 2, 4, & 6 only)
2. Robert M. Sherfield, Developing Soft Skills, Montgomery and Moody Fourth Edn. Pearson, 2009.

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VII SEMESTER

Course Code: HS 17101

L-T-P-C

Course Title: PRINCIPLE OF MANAGEMENT & ENTREPRENEURSHIP

2-0-0-2

Module I

Introduction to Management, Characteristics of Management, Management as an art – profession, Systems approach to management, Task and Responsibilities of a Professional Manager, Levels of Managers and Skill required, Planning & Decision Making. **06**

Module II

Management Process, Organizing Principles & Structures, Directing: Leadership, Motivation, Communication and Controlling **12**

Module III

Introduction to Functional areas of Management, Operations Management, Human Resources Management, Marketing Management, Financial Management **08**

Module IV

Introduction to Entrepreneurship: Starts ups, Prospects & Challenges. **02**

Suggested Readings:

1. Koontz, H., and Wehrich, H., Essentials of Management: An International Perspective, 8th ed., McGraw Hill, 2009.
2. Hicks, Management: Concepts and Applications, Cengage Learning, 2007.
3. Mahadevan, B., Operations Management, Theory and Practice, Pearson Education Asia, 2009.
4. Kotler, P., Keller, K.L, Koshy, A., and Jha, M., Marketing Management, 13th ed., 2009.

NATIONAL INSTITUTE OF TECHNOLOGY SIKKIM

VIII SEMESTER

Course Code: HS18101

L-T-P-C

Course Title: Engineering Economics

2-0-0-2

Module I

Introduction to basic economics, Relationship among Science, Engineering, Technology and Economic Development, Utility Analysis- Demand Analysis, Elasticity of Demand, Supply Analysis. **05**

Module II

Factors of Production, Theory of Firm: Production Function in the short and long run, Concept of Cost Analysis, Break Even Analysis **07**

Module III

Meaning of Market, Structure of markets: Pricing and Output Determination in Different Market Structure **07**

Module IV

Macroeconomics: Concepts of National Income, Measurement of National Income, Overview of Business Cycle, International Trade & Stock market, Monetary & Fiscal Policy, Current issues in Economic Development **10**

Suggested Readings:

1. Gregory. N. Mankiw, "Principles of Microeconomics", Cengage Learning, 6th Edition, 2012.
2. Hal R. Varian, "Microeconomic Analysis", Norton & Company Inc., 3rd Edition, 1992.
3. James M. Henderson and Richard E. Quandt, "Microeconomic Theory: A Mathematical Approach", McGraw-Hill Book Company, 3rd Edition, 1980.
4. Gregory. N. Mankiw, "Principles of Macroeconomics", Cengage Learning, 6th Edition, 2007.
5. JagdishHanda, "Monetary Economics", Routledge, 2nd Edition.