

Foundational Maths and IT [B.Sc. Cyber Security] (Bridge Course)

Contact Classes [Min.6 hours Module]

- The Number Systems and Encoding system - Various number system used in Computer Science - Binary, Octal, Hexadecimal, BCD, ASCII, Unicode etc.
- Introduction to Matrix and Determinant – Properties of Determinants, minor and cofactors, expansion of determinants. Matrix addition, subtraction and multiplication, Singular and non-singular matrices, adjoint and inverse of a matrix etc.
- Modular Arithmetic & Logarithm – Modulo operation, Modular arithmetic examples, Congruence, Modular Exponentiation, basic logarithm operation etc.
- Introduction to basic Statistics - Arithmetic Mean, Median, Mode, Range, Standard Deviation, Variance etc.
- Introduction to Probability –
Concept of probability, sample space and events, conditional probability and independence of events, Bay's theorem.
- Introduction to Information Technology –
 - Data and Information, Logic gates, Truth Table.
 - Data Storage device: Primary storage – RAM, ROM, EEROM, PROM, EPROM; Secondary storage – direct access devices, serial access devices: Hard disks, CD-ROM, DVD
 - Central Processing Unit – ALU, Control Unit.
 - Computer languages, machine language, assembly language and high level language, role of assembler and compiler.
 - Software; broad classification of software; system Software and application software; utilities.
 - Operating systems: Brief introduction to different types of operating systems like Windows, Mac OS, Linux etc.,
 - Internet – Networking, WWW, Email, Client-Server, Cloud etc.
 - Cyber security – Introduction to Cyber security for the beginners
- **Spot Assessment & Remedial.**

Reference Books:

1. Reena Garg, Engineering Mathematics, Khanna Publishing House.
2. N G Das, Statistical Methods (Combined edition volume 1 & 2)
3. Computers and Information Technology (A Contemporary Perspective) By V K Kapoor
4. Introduction to Computers by Renu Kapoor

Self-Placed Learning [Min. 20 hours Module]

Through Massive Open Online Courses (MOOCs): (20 hours)

❖ Online Resources

1. Introduction to number system and encoding: (1.5 hours)
 - 1.1 Neso Academy <https://youtu.be/Nrw1vQrFSa8> (10 min)
 - 1.2 Neso Academy https://youtu.be/3pXr3N_Wwp8 (7 min)
 - 1.3 Neso Academy <https://youtu.be/MGu-P4OOnh0> (8 min)
 - 1.4 Neso Academy <https://youtu.be/WGN4NWICTpQ> (10 min)
 - 1.5 Neso Academy <https://youtu.be/AlMkuzzNMmg> (14 min)
 - 1.6 Neso Academy https://youtu.be/hCvAW_5-cJE (9 min)
 - 1.7 Neso Academy <https://youtu.be/B-irf7FZNHA> (11 min)
 - 1.8 Neso Academy <https://youtu.be/0rLiYpy2CqQ> (17 min)
 - 1.9 Studying with Alex <https://youtu.be/ut74oHojxqo> (11 min)
2. Modular Arithmetic and Logarithm: (1.5 hours)
 - 2.1 Neso Academy <https://youtu.be/M42uDLGRSpI> (11 min)
 - 2.2 Neso Academy <https://youtu.be/P7P03gg3msE> (12 min)
 - 2.3 Neso Academy https://youtu.be/_gYUlvnjs0 (10 min)
 - 2.4 Neso Academy https://youtu.be/bg0P_3UiG5I (20 min)
 - 2.5 Khan Academy https://youtu.be/Z5myJ8dg_rM (7 min)
 - 2.6 Khan Academy https://youtu.be/PupNgv49_WY (9 min)
 - 2.7 Khan Academy <https://youtu.be/TMmxKZaCqe0> (10 min)
3. Introduction to Determinant and Matrices: (2.5 hour)
 - 3.1 Khan Academy <https://youtu.be/ZAkmbOCiNqU> (4 min)
 - 3.2 Khan Academy https://youtu.be/OU9sWHk_dlw (1 min)
 - 3.3 Khan Academy <https://youtu.be/v4MenooI1J0> (3 min)
 - 3.4 Khan Academy <https://youtu.be/xyAuNHPsq-g> (11 min)
 - 3.5 Khan Academy <https://youtu.be/WR9qCSXJlyY> (6 min)
 - 3.6 Khan Academy <https://youtu.be/aKhhYguY0DQ> (14 min)
 - 3.7 Khan Academy <https://youtu.be/iUQR0enP7RQ> (14 min)

- 3.8 Sana Online Classes <https://youtu.be/bujW0fmNVtc> (19 min)
- 3.9 Vinit Kankriya Academy <https://youtu.be/rS9AwyRbB7g> (1 hour 32 min)
4. Introduction to Statistics: (1.5 hours)
- 4.1 The Organic Chemistry Tutor <https://youtu.be/XZo4xyJXCak> (56 min)
- 4.2 The Organic Chemistry Tutor https://youtu.be/k17_euuiTKw (11 min)
- 4.3 Khan Academy <https://youtu.be/HvDqbzu0i0E> (13 min)
- 4.4 Khan Academy <https://youtu.be/E4HAYd0QnRc> (13 min)
5. Introduction to Probability: (1.5 hour)
- 5.1 Learn Something <https://youtu.be/CBnGs9t6RxY> (30 min)
- 5.2 The Organic Chemistry Tutor <https://youtu.be/94AmzeR9n2w> (10 min)
- 5.3 The Organic Chemistry Tutor <https://youtu.be/X6usGgwXFyU> (11 min)
- 5.4 Mario's Math Tutoring <https://youtu.be/TBnPkKxXPu8> (21 min)
- 5.5 Mario's Math Tutoring <https://youtu.be/tnF9f3zCCKI> (21 min)
6. Introduction to Information Technology (11 hours)
- 6.1 FreeCodeCamp.org : Computer & Technology Basics Course for Absolute Beginners: FreeCodeCamp.org <https://youtu.be/y2kg3MOK1sY> (55 min)
- 6.2 FreeCodeCamp.org : How does the internet work <https://youtu.be/zN8YNNHcaZc> (1 hour 42 min)
- 6.3 Edureka: Cyber Security Training For Beginners <https://www.youtube.com/live/nzZkKoREEGo?feature=share> (8 hours 20 min)

• **Academic Orientation and Doubt Clearing Session (4 hours)**
