

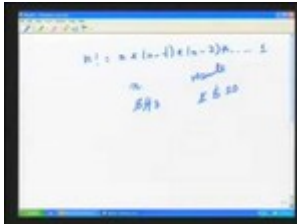
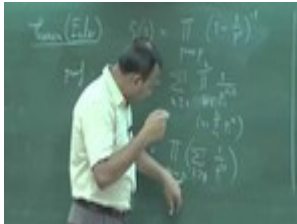


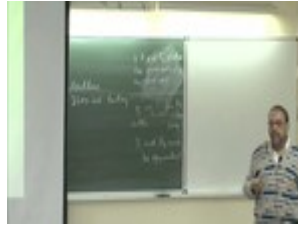


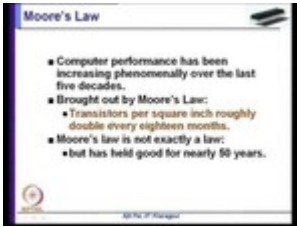



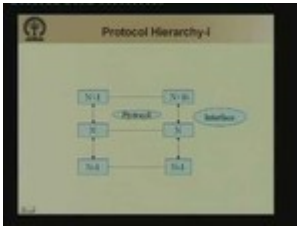

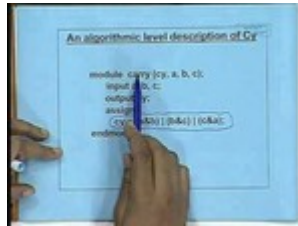

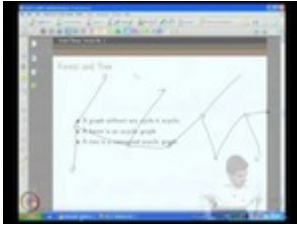
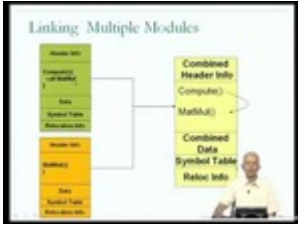

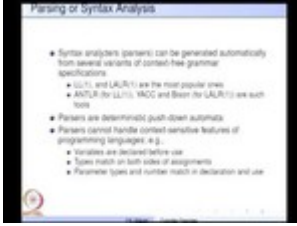



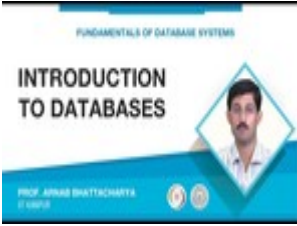


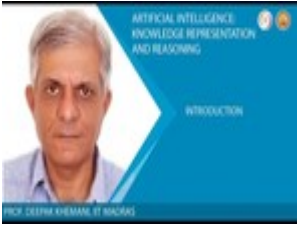
















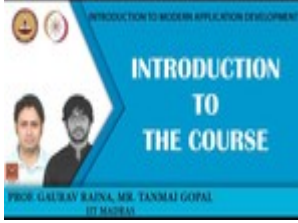
# COMPUTER SCIENCE AND ENGINEERING (149 COURSES)















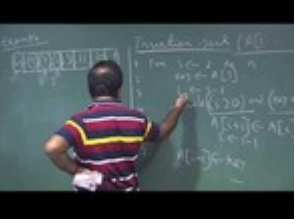
<p>Natural Language Processing</p>	<p>Design and Analysis of Algorithms</p>	<p>Software Engineering</p>	<p>Computational Geometry</p>	<p>Logic for CS</p>
 <p><a href="#">106101007</a></p>	 <p><a href="#">106101060</a></p>	 <p><a href="#">106101061</a></p>	 <p><a href="#">106102011</a></p>	 <p><a href="#">106102013</a></p>
<p>Computer Architecture</p>	<p>Data Structures And Algorithms</p>	<p>Introduction to Computer Graphics</p>	<p>Principles of Programming Languages</p>	<p>Parallel Computing</p>
 <p><a href="#">106102062</a></p>	 <p><a href="#">106102064</a></p>	 <p><a href="#">106102065</a></p>	 <p><a href="#">106102067</a></p>	 <p><a href="#">106102114</a></p>
<p>Design Verification and Test of Digital VLSI Circuits</p>	<p>Computer Algorithms - 2</p>	<p>Theory of Computation</p>	<p>Introduction to Problem Solving and Programming</p>	<p>Riemann Hypothesis and its Applications</p>
 <p><a href="#">106103116</a></p>	 <p><a href="#">106104019</a></p>	 <p><a href="#">106104028</a></p>	 <p><a href="#">106104074</a></p>	 <p><a href="#">106104118</a></p>

<p>Biometrics</p>	<p>Parallel Algorithm</p>	<p>Computer Architecture</p>	<p>Compiler Design</p>	<p>NOC:Introduction to Programming in C</p>
 <p><a href="#">106104119</a></p>	 <p><a href="#">106104120</a></p>	 <p><a href="#">106104122</a></p>	 <p><a href="#">106104123</a></p>	 <p><a href="#">106104128</a></p>
<p>Cryptography and Network Security</p>	<p>High Performance Computer Architecture</p>	<p>Low Power VLSI Circuits and Systems</p>	<p>Real Time Systems</p>	<p>Artificial Intelligence</p>
 <p><a href="#">106105031</a></p>	 <p><a href="#">106105033</a></p>	 <p><a href="#">106105034</a></p>	 <p><a href="#">106105036</a></p>	 <p><a href="#">106105077</a></p>
<p>Artificial Intelligence (Prof.P. Dasgupta)</p>	<p>Computer Networks</p>	<p>Data Communication</p>	<p>Electronic Design Automation</p>	<p>Internet Technology</p>
 <p><a href="#">106105079</a></p>	 <p><a href="#">106105081</a></p>	 <p><a href="#">106105082</a></p>	 <p><a href="#">106105083</a></p>	 <p><a href="#">106105084</a></p>

<p>Programming and Data Structure</p>  <p><a href="#">106105085</a></p>	<p>Pattern Recognition</p>  <p><a href="#">106106046</a></p>	<p>Performance Evaluation of Computer Systems</p>  <p><a href="#">106106048</a></p>	<p>Theory of Automata, Formal Languages and Computation</p>  <p><a href="#">106106049</a></p>	<p>Computer Graphics</p>  <p><a href="#">106106090</a></p>
<p>Computer Organization</p>  <p><a href="#">106106092</a></p>	<p>Database Design</p>  <p><a href="#">106106093</a></p>	<p>Discrete Mathematical Structures</p>  <p><a href="#">106106094</a></p>	<p>Artificial Intelligence</p>  <p><a href="#">106106126</a></p>	<p>NOC:Programming, Data Structures and Algorithms</p>  <p><a href="#">106106127</a></p>
<p>NOC:Introduction to Information Security I</p>  <p><a href="#">106106129</a></p>	<p>NOC:Programming and Data structures (PDS)</p>  <p><a href="#">106106130</a></p>	<p>NOC:Design and Analysis of Algorithms</p>  <p><a href="#">106106131</a></p>	<p>NOC:Programming, Data Structures and Algorithms (Aricent)</p>  <p><a href="#">106106133</a></p>	<p>Combinatorics</p>  <p><a href="#">106108051</a></p>

Compiler Design	Graph Theory	High Performance Computing	Numerical Optimization	Storage Systems
 <p><a href="#"><u>106108052</u></a></p>	 <p><a href="#"><u>106108054</u></a></p>	 <p><a href="#"><u>106108055</u></a></p>	 <p><a href="#"><u>106108056</u></a></p>	 <p><a href="#"><u>106108058</u></a></p>
System Analysis and Design	Principles of Compiler Design	NOC:Computer Architecture	NOC:Model Checking	NOC:Functional Programming in Haskell
 <p><a href="#"><u>106108102</u></a></p>	 <p><a href="#"><u>106108113</u></a></p>	 <p><a href="#"><u>106106134</u></a></p>	 <p><a href="#"><u>106106136</u></a></p>	 <p><a href="#"><u>106106137</u></a></p>
NOC:Fundamentals of Database Systems	NOC:Information Security - II	NOC:Introduction to Machine Learning (Sponsored by Arihant)	NOC:Artificial Intelligence: Knowledge Representation and Reasoning	Virtual Reality
 <p><a href="#"><u>106104135</u></a></p>	 <p><a href="#"><u>106106141</u></a></p>	 <p><a href="#"><u>106106139</u></a></p>	 <p><a href="#"><u>106106140</u></a></p>	 <p><a href="#"><u>106106138</u></a></p>












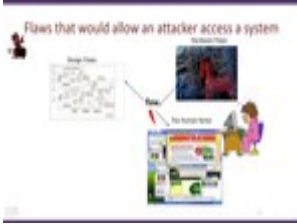

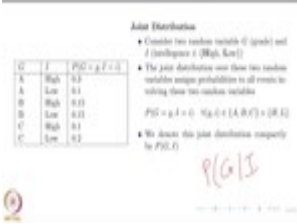
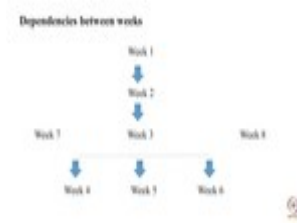
NOC:Algorithms for Big Data	NOC:Complex Network : Theory and Application	NOC:Object-Oriented Analysis and Design	NOC:Introduction to Machine Learning	NOC:Programming in C++
 <p>Having understood our possibilities, let's introduce some probabilities.</p> <p>Definition: Probability Space</p> <ol style="list-style-type: none"> <li>1. A sample space <math>\Omega</math>.</li> <li>2. A family <math>\mathcal{F}</math> of subsets of <math>\Omega</math>. Each <math>E \in \mathcal{F}</math> is an event.</li> <li>3. A probability function <math>P: \mathcal{F} \rightarrow \mathbb{R}</math> such that <ol style="list-style-type: none"> <li>i. <math>\forall E \in \mathcal{F}, 0 \leq P(E) \leq 1</math>.</li> <li>ii. <math>P(\Omega) = 1</math> and</li> <li>iii. For any finite or countably infinite sequence of pairwise disjoint events <math>E_1, E_2, \dots</math> (i.e., for all <math>i \neq j, E_i \cap E_j = \emptyset</math>), <math display="block">P\left(\bigcup_i E_i\right) = \sum_i P(E_i)</math> </li> </ol> </li> </ol> <p><b>106106142</b></p>	 <p>COMPLEX NETWORKS: THEORY AND APPLICATION</p> <p>INTRODUCTION</p> <p>PROF. ANKESH BUCHHARE, IIT CHANGRUPUR</p> <p><b>106105154</b></p>	 <p><b>106105153</b></p>	 <p>INTRODUCTION TO MACHINE LEARNING</p> <p>INTRODUCTION</p> <p>PROF. SUDESHNA SARKAR</p> <p><b>106105152</b></p>	 <p>PROGRAMMING IN C++</p> <p>RECAP OF C</p> <p>PROF. PARTHA PRATIM DAS, IIT CHANGRUPUR</p> <p><b>106105151</b></p>
NOC:Software Testing	NOC:Theory of Computation	NOC:Introduction to Cryptology	NOC:Modern Algebra	NOC:Privacy and Security in Online Social Networks
 <p>SOFTWARE TESTING</p> <p>INTRODUCTION</p> <p>PROF. RAJIB MALLI, IIT KANPUR</p> <p><b>106105150</b></p>	 <p><b>106104148</b></p>	 <p>INTRODUCTION TO CRYPTOLOGY</p> <p>INTRODUCTION CAESAR CIPHER</p> <p>PROF. SUGATA GANGOPADHYAY, IIT KANPUR</p> <p><b>106107155</b></p>	 <p><b>106104149</b></p>	 <p>topics that we will cover</p> <ul style="list-style-type: none"> <li>• Overview of OSM</li> <li>• Linux / Python / Twitter API / Mongo DB / MySQL (hands-on)</li> <li>• Trust &amp; Credibility</li> <li>• Privacy</li> <li>• Social Network Analysis, NTK (hands-on)</li> <li>• e-crime</li> <li>• Plotly / Highcharts / Geo-location analysis (hands-on)</li> <li>• Policing</li> <li>• Identity resolution</li> <li>• What next - Deep learning, machine learning, NLP, image analysis</li> </ul> <p><b>106106146</b></p>
NOC:Programming, Data Structures and Algorithms in Python	NOC:Introduction to Operating Systems	NOC:Mobile Computing	NOC:Reinforcement Learning	NOC:Introduction to Modern Application Development
 <p>PROGRAMMING, DATA STRUCTURES AND ALGORITHMS IN PYTHON</p> <p>ALGORITHMS AND PROGRAMMING: SIMPLE GCD</p> <p>PROF. MADHURAN MUKUND, IIT CHANGRUPUR</p> <p><b>106106145</b></p>	 <p><b>106106144</b></p>	 <p><b>106106147</b></p>	 <p>Alpha Go</p> <p>Given a sample space <math>\Omega</math>, a <math>\sigma</math>-algebra is a collection <math>\mathcal{F}</math> of subsets of <math>\Omega</math> with the following properties:</p> <ol style="list-style-type: none"> <li>i. <math>\Omega \in \mathcal{F}</math>.</li> <li>ii. If <math>A, B \in \mathcal{F}</math>, then <math>A \cap B \in \mathcal{F}</math>.</li> <li>iii. If <math>A \in \mathcal{F}</math>, then <math>\Omega \setminus A \in \mathcal{F}</math>.</li> </ol> <p>It is if that belongs to <math>\mathcal{F}</math> is called as <math>\mathcal{F}</math>-measurable set (event).</p> <p>Example: Consider <math>\Omega = \{1, 2, 3, 4\}</math>.</p> <p><math>\mathcal{F}_1 = \{\emptyset, \Omega, \{1, 2\}, \{3, 4\}\}</math></p> <p><math>\mathcal{F}_2 = \{\emptyset, \Omega, \{1, 2, 3\}, \{4\}\}</math></p> <p><math>\mathcal{F}_3 = \{\emptyset, \Omega, \{1, 2, 4\}\}</math></p> <p><b>106106143</b></p>	 <p>INTRODUCTION TO MODERN APPLICATION DEVELOPMENT</p> <p>INTRODUCTION TO THE COURSE</p> <p>PROF. GAURAV RAJNA, MR. TANMAY GOPAL, IIT MADRAS</p> <p><b>106106156</b></p>















<p>Fundamental Algorithms:Design and Analysis</p>	<p>NOC:AI:Constraint Satisfaction</p>	<p>NOC:Computer Architecture</p>	<p>NOC:Information Security-3</p>	<p>NOC:Wireless Ad Hoc and Sensor Networks</p>
 <p><a href="#"><u>106105157</u></a></p>	 <p><a href="#"><u>106106158</u></a></p>	 <p><a href="#"><u>106102157</u></a></p>	 <p><a href="#"><u>106106157</u></a></p>	 <p><a href="#"><u>106105160</u></a></p>
<p>NOC:Natural Language Processing</p>	<p>NOC:VLSI Physical Design</p>	<p>NOC:Embedded Systems Design</p>	<p>NOC:Internetwork Security</p>	<p>NOC:Hardware Modeling using Verilog</p>
 <p><a href="#"><u>106105158</u></a></p>	 <p><a href="#"><u>106105161</u></a></p>	 <p><a href="#"><u>106105159</u></a></p>	 <p><a href="#"><u>106105162</u></a></p>	 <p><a href="#"><u>106105165</u></a></p>
<p>NOC:Introduction to Internet of Things</p>	<p>NOC:Computer Organization and Architecture</p>	<p>NOC:Distributed Systems</p>	<p>NOC:Computer Architecture and Organization</p>	<p>NOC:Introduction to Algorithms and Analysis</p>
 <p><a href="#"><u>106105166</u></a></p>	 <p><a href="#"><u>106106166</u></a></p>	 <p><a href="#"><u>106106168</u></a></p>	 <p><a href="#"><u>106105163</u></a></p>	 <p><a href="#"><u>106105164</u></a></p>

<p>NOC:Software Testing</p>	<p>NOC:Introduction to Wireless and Cellular Communications</p>	<p>NOC:Introduction to Parallel Programming in OpenMP</p>	<p>NOC:Social Networks</p>	<p>NOC:Cloud Computing</p>
 <p><a href="#">106101163</a></p>	 <p><a href="#">106106167</a></p>	 <p><a href="#">106102163</a></p>	 <p><a href="#">106106169</a></p>	 <p><a href="#">106105167</a></p>
<p>NOC:Real Time Operating System</p>	<p>NOC:An Introduction to Probability in Computing</p>	<p>NOC:Advanced Graph Theory</p>	<p>NOC:Introduction to Soft Computing</p>	<p>NOC:Data Mining</p>
 <p><a href="#">106105172</a></p>	 <p><a href="#">106106176</a></p>	 <p><a href="#">106104170</a></p>	 <p><a href="#">106105173</a></p>	 <p><a href="#">106105174</a></p>
<p>NOC:Data Base Management System</p>	<p>NOC:Introduction to Human Computer Interaction</p>	<p>NOC:Information Security-IV</p>	<p>NOC:Data Science for Engineers</p>	<p>NOC:Computer Organization and Architecture - A Pedagogical Aspect</p>
 <p><a href="#">106105175</a></p>	 <p><a href="#">106106177</a></p>	 <p><a href="#">106106178</a></p>	 <p><a href="#">106106179</a></p>	 <p><a href="#">106103180</a></p>

<p>NOC:Problem Solving through Programming in C</p>	<p>NOC:Synthesis of Digital Systems</p>	<p>NOC:Design and pedagogy of the introductory programming course</p>	<p>NOC:Embedded Systems-Design Verification and Test</p>	<p>NOC:Multi-Core Computer Architecture-Storage and Interconnects</p>
 <p>106105171</p>	 <p>106102181</p>	 <p>106101182</p>	 <p>106103182</p>	 <p>106103183</p>
<p>NOC:Cloud Computing and Distributed Systems</p>	<p>NOC:Software Engineering</p>	<p>NOC:Computer Networks and Internet Protocol</p>	<p>NOC:Blockchain Architecture Design and Use Cases</p>	<p>NOC:Switching Circuits and Logic Design</p>
 <p>106104182</p>	 <p>106105182</p>	 <p>106105183</p>	 <p>106105184</p>	 <p>106105185</p>
<p>NOC:Scalable Data Science</p>	<p>NOC:The Joy of Computing using Python</p>	<p>NOC:Discrete Mathematics</p>	<p>NOC:Deep Learning</p>	<p>NOC:Randomized Algorithms</p>
 <p>106105186</p>	 <p>106106182</p>	 <p>106106183</p>	 <p>106106184</p>	 <p>106103187</p>



<p>NOC:Parallel Algorithms</p>	<p>NOC:Big Data Computing</p>	<p>NOC:Compiler Design</p>	<p>NOC:Programming in Java</p>	<p>NOC:Discrete Structures</p>
 <p><a href="#">106103188</a></p>	 <p><a href="#">106104189</a></p>	 <p><a href="#">106105190</a></p>	 <p><a href="#">106105191</a></p>	 <p><a href="#">106105192</a></p>
<p>NOC:Embedded System Design with ARM</p>	<p>NOC:Hardware Security</p>	<p>NOC:Introduction to Industry 4.0 and Industrial Internet of Things</p>	<p>NOC:Introduction to Automata, Languages and Computation</p>	<p>NOC:Foundations to Computer Systems Design</p>
 <p><a href="#">106105193</a></p>	 <p><a href="#">106105194</a></p>	 <p><a href="#">106105195</a></p>	 <p><a href="#">106105196</a></p>	 <p><a href="#">106106197</a></p>
<p>NOC:Machine Learning for Engineering and Science Applications</p>	<p>NOC:Information Security 5 - Secure Systems Engineering</p>	<p>NOC:Multimodal Interaction</p>	<p>NOC:Deep Learning - Part 2</p>	<p>NOC:Machine Learning, ML</p>
 <p><a href="#">106106198</a></p>	 <p><a href="#">106106199</a></p>	 <p><a href="#">106106200</a></p>	 <p><a href="#">106106201</a></p>	 <p><a href="#">106106202</a></p>

NOC:An Introduction to Programming Through C++	NOC:Demystifying Networking	NOC:Discrete Mathematics	NOC:Advanced Computer Architecture	NOC:Operating System Fundamentals
 <p>July - October 2019</p> <p><a href="#">106101208</a></p>	 <p>July - October 2019</p> <p><a href="#">106101209</a></p>	 <p>July - October 2019</p> <p><a href="#">106103205</a></p>	 <p>July - October 2019</p> <p><a href="#">106103206</a></p>	 <p>July - October 2019</p> <p><a href="#">106105214</a></p>
NOC:Deep Learning	NOC:Computer Vision	NOC:Ethical Hacking	NOC:Software Project Management	NOC:Spatial Informatics
 <p>July - October 2019</p> <p><a href="#">106105215</a></p>	 <p>July - October 2019</p> <p><a href="#">106105216</a></p>	 <p>July - October 2019</p> <p><a href="#">106105217</a></p>	 <p>July - October 2019</p> <p><a href="#">106105218</a></p>	 <p>July - October 2019</p> <p><a href="#">106105219</a></p>
NOC:C Programming and Assembly Language	NOC:Applied Natural Language Processing	NOC:Python for Data Science	NOC:Practical Machine Learning with Tensorflow	
 <p>July - October 2019</p> <p><a href="#">106106210</a></p>	 <p>July - October 2019</p> <p><a href="#">106106211</a></p>	 <p>July - October 2019</p> <p><a href="#">106106212</a></p>	 <p>July - October 2019</p> <p><a href="#">106106213</a></p>	