

<b>PROFESSOR'S NAME</b>	Prof. A.K. Chattopadhyay
<b>DEPARTMENT</b>	Department of Mechanical Engineering
<b>INSTITUTE</b>	Indian Institute Of Technology Kharagpur
<b>COURSE OUTLINE</b>	Significance of Surface engineered materials in modern engineering application, surface dependent engineering properties (mechanical, chemical, thermal, electrical, electronic, optical). Role of surface coating and surface modification technologies in obtaining required surface characteristics of a product. Various surface modification techniques (mechanically modified, thermally modified). Scope of their application. Different surface coating technologies: chemical vapour deposition, physical vapour deposition, electro – deposition, electro – less deposition, thermal spray process, coating deposition by wetting. Various process parameters controlling the yield of the coating and various surface properties of the coating. Criteria for selection of a surface coating technology. Product oriented surface coating technology. Different coating systems and function of various elements of coating system. Substrate technology and its significance in obtaining high performance coating. Physical and mechanical characterization of the coating. Various methods for evaluating the performance of the coating.

**COURSE DETAILS**

S. No	Module ID/ Lecture ID	Lecture Title/Topic
1.	Module 1_L1	Introduction
2.	Module 2_L2	CVD Reaction
3.	Module 3_L3	Adhesion of CVD Coating
4.	Module 4_L4	CVD System
5.	Module 5_L5	CDV of Tic

6.	Module 6_L6	Chemical Vapour Deposition of Nitride Coating
7.	Module 6_L7	Chemical Vapour Deposition of Carbo-Nitride Coating
8.	Module 7_L8	Chemical Vapour Deposition of Chromium
9.	Module 8_L9	Chemical Vapour Deposition of Aluminium Oxide
10.	Module 9_L10	Chemical Vapour Deposition of Diamond
11.	Module 10_L11	Vacuum Evaporation Deposition
12.	Module 11_L12	Reactive Evaporation Deposition
13.	Module 12_L13	Cathodic Arc Evaporation Deposition
14.	Module 13_L14	Sputtering
15.	Module 14_L15	Magnetron Sputtering
16.	Module 15_L16	Unbalanced Magnetron Sputtering
17.	Module 16_L17	Radio frequency and Pulsed DC sputtering
18.	Module 17_L18	Sputter Deposition of Nitride Coating
19.	Module 18_L19	Sputter Deposition of Molybdenum Di Sulphide Coating
20.	Module 19_L20	Influence of Architecture of Sputter Deposited Molybdenum Di Sulphide Coating
21.	Module 20_L21	Electro Plating, Anodizing and Electroless Plating
22.	Module 21_L22	Coating of Monolayer Abrasive Grain by Electro Plating
23.	Module 22_L23	Mechanism of Wetting
24.	Module 23_L24	Coating on Ceramics by Wetting
25.	Module 24_L25	Coating of Monolayer Abrasive Grain by Wetting
26.	Module 25_L26	Coating on Abrasive Grain
27.	Module 26_L27	Combustion Spray Process
28.	Module 27_L28	Plasma Spray Process
29.	Module 28_L29	Mechanical, Chemical and Ion-Assisted Method
30.	Module 29_L30	Special Techniques of Surface Layering and Surface Coating

<b>31.</b>	<b>Module 30_L31</b>	Production of Low Vacuum
<b>32.</b>	<b>Module 31_L32</b>	Production of High Vacuum
<b>33.</b>	<b>Module 32_L33</b>	Measurement of Low Pressure and Gas Flow in Coating Deposition System
<b>34.</b>	<b>Module 33_L34</b>	Physical Characterization
<b>35.</b>	<b>Module 34_L35</b>	Assessment of Coating Hardness
<b>36.</b>	<b>Module 35_L36</b>	Assessment of Friction and Wear of Coating
<b>37.</b>	<b>Module 36_L37</b>	Assessment of Surface Roughness and Thickness of Coating
<b>38.</b>	<b>Module 37_L38</b>	Assessment of Adhesion of Coating
<b>39.</b>	<b>Module 38_L39</b>	Performance Evaluation of TiN Coated Tool
<b>40.</b>	<b>Module 39_L40</b>	Performance Evaluation of HFCVD Diamond Coated Tool

**List of reference material/ books:**

**Name and contact details of two referees for the course:**