**Lesson Plan**

**Subject : AUTOMATION IN MANUFACTURING**

Lesson plan Duration : 15 Weeks

Work load lecture per week (in hours): Lectures:3 hours

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| **Lecture No** | **Theory** |
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| 1 | Brief detail regarding syllabus and overview of subject, books required. |
| 2 | Introduction and brief discussion of all units  |
| 3 | Production system, automation in production system |
| 4 | manual labour in production system, automation principle and strategies |
| 5 | manufacturing industries and products, manufacturing operations |
| 6 | product facilities, product/ production relationship, basic elements of an automation system |
| 7 | advance automation function, level of automation. |
| 8 | Industrial robotics: Robot anatomy and related attributes, joint and links |
| 9 | common robot configuration, joint drive system, sensors in robotics, |
| 10 | robot control system, end effectors, grippers and tools, applications of industrial robots, |
| 11 | material handling, processing operation, assembly and inspection, robot programming |
| 12 | Group technology and cellular manufacturing: Part families, parts classifications and coding, |
| 13 | production flow analysis, cellular Manufacturing- composite part concept |
| 14 | machine cell design, applications of group technology |
| 15 | grouping parts and machines by rank order clustering technique |
| 16 | arranging machines in a G.T. cell. |
| 17 | Flexible manufacturing: Introduction, FMS components, flexibility in manufacturing – machine, product |
| 18 | routing, operation, types of FMS, FMS layouts, FMS planning and control issues |
| 19 | deadlock in FMS, FMS benefits and applications. |
| 20 | Process planning: Introduction, manual process planning, computer aided process planning |
| 21 | variant, generative, decision logic decision tables, decision trees, |
| 22 | Introduction to artificial intelligence. |
| 23 | Shop floor control: Introduction, shop floor control features, major displays |
| 24 | major reports, phases of SFC, order release, order scheduling, order progress, |
| 25 | manufacturing control, methodology, applications,shop floor data collections |
| 26 | Types of data collection system, data input techniques |
| 27 | automatic data, collection system. |
| 28 | CNC basics and part programming: Introduction, historical, background, basic components of an NC, |
| 29 | steps in NC, verifications of numerical control machine tool programs, |
| 30 | classification of NC Machine tool, basics of motion control and feedback for NC M/C, |
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| NC part programming, part programming methods, modern machining system, |

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| 32 | automatically programmed tools, DNC, adaptive control. |
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| Automated guided vehicle and storage system: Functions of AGV, types of AGV |

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| 34 | safety consideration for AGV, design of AGV; Introduction to storage system, |
| 35 | storage system performance, storage location strategies, conventional storage method and equipment, |
| 36 | automated storage system, fixed aisle automated storage/ retrieval system, |
| 37 | carousel storage systems, analysis of storage system |
| 38 | fixed aisle automated storage/ retrieval systems, carousel storage systems. |