

## **SCHEDULE**

### **GIAN Course on Robotics Systems: Design Analysis and Fabrication**

**Dec 20-30, 2016**

<b>Dec 20, 2016</b>		
<b>Venue: L-3</b>	9:00 – 10:00	Registration
	10:00- 12:00	Welcome Note ( <i>HS</i> ) Interdisciplinary Learning ( <i>ES</i> ) Teams formation
	2:00 – 3:15	Prelims: Simulation learning through MATLAB ( <i>AS</i> )
	3:30 – 5:00	<b>KeyNote Lecture</b> Mobility exoskeletons for elderly persons, <i>Prof Gurvinder Singh Virk, InnotecUK, UK.</i>
<b>Dec 21, 2016</b>		
<b>Venue: L-3</b>	9:30 – 10:15	Inauguration Ceremony
	10:30 – 11:30	<b>KeyNote Lecture</b> Machine Design Innovation through technology and education, <i>Prof Anurag Purwar, Stony Brook, USA</i>
	11:30 – 12:30	Robotics holistically and overview of InnotecUK ( <i>GS Virk</i> )
	2:00 – 3:15	Automation machinery to industrial manufacturing robots ( <i>GS Virk</i> )
<b>MP Hall</b>	3:15-5:00	Practice session 1: Basic Linkages developments using professional kits.
<b>Dec 22, 2016</b>		
<b>Venue: L-3</b>	9:30 – 11:00	Industrial robots to mobile robots ( <i>GS Virk</i> )
	11:30 – 12:30	Indian Perspective: Health care [Physiotherapist Dr Narkesh viewpoint]
	2:00 – 3:15	NXT Programming ( <i>AS</i> )
<b>MP Hall</b>	3:15 – 5:00	Practice Session 2: Prototype development through professional kits: Development of warehouse scenario navigational strategies for mobile robots.
<b>Dec 23, 2016</b>		
<b>Venue: L-3</b>	9:30–11:00	Forward kinematics: Planar and Spatial Robots ( <i>ES</i> )
	11:15– 12:15	Inverse kinematics: Planar and Spatial Robots ( <i>ES</i> )
	2:00-3:00	Kinematic analysis of 6-link Industrial Robotic Arm ( <i>PM</i> )
<b>MP Hall</b>	3:15-5:00	Practice Session 3: Forward/Inverse Kinematics of a 3-dof manipulator prototype (Team work)
<b>Dec 24, 2016</b>		
<b>Venue: L-3</b>	9:30–11:00	Velocities and static forces, Jacobians, Concept of duality ( <i>ES</i> )
	11:15– 12:15	Performance criteria for robotic manipulators design ( <i>ES</i> )
	2:00-3:00	Performance analysis of planar hybrid manipulators ( <i>SG</i> )
<b>Computer Lab</b>	3:15-5:00	Practice Session 4: Program making exercise for performance analysis.

**Dec 25: Sunday Break / Excursion trip****Dec 26, 2016**

<b>Venue:</b> <b>L-3</b>  <b>Computer Lab</b>	9:30 – 11:00	Path planning, Local and global planning techniques ( <i>ES</i> )
	11:30– 12:30	Dynamics Modelling and Analysis ( <i>AS</i> )
	2:30-3:30	Robot Control Strategies ( <i>AS</i> )
	<b>3:45-5:00</b>	Practice Session 5: Simulation and Real-Time Control of Robotic Systems ( <i>AS</i> )

**Dec 27, 2016 (GS Virk)**

L-3	9:30 – 11:00	Modelling and control
L-3	11:30– 12:30	Robot design process
L-3	2:30-3:30	Robot design assessment and benchmarking
MP Hall	3:45-5:00	Practice Session 6: Conceptual robot design assignment (GS Virk)

**Dec 28, 2016 (GS Virk)**

L-3	9:30 – 11:00	Robot sub-systems: Sensors and actuators
L-3	11:30– 12:30	Robot sub-systems: Localisation and navigation
L-3	2:30-3:30	Robot sub-systems. User interfaces
MP Hall	3:45-5:00	Practice Session 7: Warehouse mobile robots: Demonstrations of solutions realised and assessment

**Dec 29, 2016 (GS Virk)**

L-3	9:30 – 11:00	Emerging robot markets
L-3	11:30– 12:30	Robot safety and robot ethics
L-3	2:30-3:30	Technical communication
MP Hall	3:45-5:00	Practice Session 8: Assignment on preparing Robotic R&D proposal

**Dec 30, 2016**

L-3	9:30 – 11:00	R&D proposal presentations and assessment: Part 1
L-3	11:30– 12:30	R&D proposal presentations and assessment: Part 2
L-3	2:30-3:30	Feedback and Networking