



KNOWLEDGE INCUBATION FOR TEQIP, IIT KANPUR

Systems Engineering

December 16-20, 2014

A TEQIP sponsored workshop on Systems Engineering was held at IIT Kanpur between 16th and 20th December 2013. The workshop emphasized the development and establishment of system during its nascent stage while focusing on customer requirements and keeping in mind the constraints of operation, quality and cost.

TOPICS DISCUSSED

- Introduction to Systems Engineering
- Systems Engineering Process
- Quality function Deployment
- New Product Deployment risk
- Design Structure Matrix
- Requirement Analysis
- Design Synthesis
- Work Breakdown Structure
- Configuration Management
- Technical review and audits
- Modelling and Simulation
- Systems Engineering and Planning

- Product Improvement Strategies
- System Costing
- Integration Definition for Functional Modelling
- Product Lifecycle Management
- Aerospace Systems
- Activity based costing
- Simulation Lab

LIST OF SPEAKERS

- Dr. J. Ramkumar, Department of Mechanical Engineering, IIT Kanpur
- Dr. Deepu Philip, Industrial and Management Engineering Department, IIT Kanpur
- Dr. B.V. Phani, Finance and Entrepreneurship Coordinator, SIDBI Innovation Incubation Center, IIT Kanpur
- Dr. A.K. Ghosh, Department of Aerospace Engineering, IIT Kanpur

PARTICIPATING INSTITUTES

Institute	Number of Participants
HBTI, Kanpur	1
Aligarh Muslim University	2
MMMEC, Gorakhpur	1
MJP, Rohilkhand	1
G.B. Pant, Pantnagar	1
N.C College of Engineering, Panipat	2
ISRO, Bangalore	3

Schedule of the Workshop

16-December-2013

TIME	TALKS
9:00 AM-9:30 AM	Registration
9:30 AM-10:00 AM	Inauguration
10:00 AM-11:00 AM	Inauguration
11:00 AM-11:15 AM	High Tea
11:15 AM-12:15 PM	Dr. Deepu philip Introduction Systems Engineering
12:15 PM-1:00 PM	Dr. Deepu Philip Systems Engineering Process
1:00 PM-2:00 PM	Lunch
2:00 PM-3:00 PM	Dr. Atanu Chaudhury Quality function Deployment
3:00 PM-4:00 PM	Dr. Atanu Chaudhury New Product Deployment Risk
4:00 PM-4:15 PM	Tea
4:15 PM-5:15 PM	Dr. Atanu Chaudhury New Product Deployment Risk
5:15 PM-6:15 PM	Dr. Atanu Chaudhury Design Structure Matrix

17-December 2013

TIME	TALKS
9:00 AM-9:30 AM	Dr. J Ramkumar Requirement Analysis
9:30 AM-10:00 AM	Dr. J Ramkumar Requirement Analysis
10:00 AM-11:00 AM	Dr. J Ramkumar Design Synthesis

11:00 AM-11:15 AM	Tea
11:15 AM-12:15 PM	Dr. Deepu Philip Systems Engineering
12:15 PM-1:00 PM	Dr. Deepu Philip Work Breakdown Structure
1:00 PM-2:00 PM	Lunch
2:00 PM-3:00 PM	Dr. J Ramkumar Configuration Management
3:00 PM-4:00 PM	Dr. J Ramkumar Technical Review and Audits
4:00 PM-4:15 PM	Tea
4:15 PM-5:15 PM	Dr. Deepu Philip Modeling & Simulation
5:15 PM-6:15 PM	Dr. Deepu Philip Modeling & Simulation

18-Dec-2013

TIME	TALKS
9:00 AM-9:30 AM	Dr. Deepu Philip Systems Engineering Planning
9:30 AM-10:00 AM	Dr. Deepu Philip Systems Engineering Planning
10:00 AM-11:00 AM	Dr. J Ramkumar Product Improvement Strategies
11:00 AM-11:15 AM	Tea
11:15 AM-12:15 PM	Dr. B V Phani System Costing
12:15 PM-1:00 PM	Dr. B V Phani System Costing
1:00 PM-2:00 PM	Lunch
2:00 PM-3:00 PM	Dr. Deepu Philip Integration Definition for Functional Modeling
3:00 PM-4:00 PM	Dr. Deepu Philip Product Lifecycle Management
4:00 PM-4:15 PM	Tea
4:15 PM-5:15 PM	Dr. J Ramkumar Product Lifecycle Management Lab
5:15 PM-6:15 PM	Dr. J Ramkumar Product Lifecycle Management Lab

19-Dec-2013

TIME	TALKS
9:00 AM-9:30 AM	Dr. A K Ghosh Aerospace Systems
9:30 AM-10:00 AM	Dr. A K Ghosh Aerospace Systems
10:00 AM-11:00 AM	Dr. B V Phani Activity Based Costing
11:00 AM-11:15 AM	Tea
11:15 AM-12:15 PM	Dr. B V Phani Activity Based Costing
12:15 PM-1:00 PM	Dr. A K Ghosh Aerospace Systems
1:00 PM-2:00 PM	Lunch
2:00 PM-3:00 PM	Dr. Deepu Philip Sim Lab
3:00 PM-4:00 PM	Dr. Deepu Philip Sim Lab
4:00 PM-4:15 PM	Tea
4:15 PM-5:15 PM	Dr. J Ramkumar Product Lifecycle Management Lab
5:15 PM-6:15 PM	Dr. J Ramkumar Product Lifecycle Management Lab

20-Dec-2013

TIME	TALKS
9:00 AM-9:30 AM	Dr. Deepu Philip System Engineering verification
9:30 AM-10:00 AM	Dr. Deepu Philip System Engineering verification
10:00 AM-11:00 AM	Dr. Deepu Philip Integrated Product and Process Development
11:00 AM-11:15 AM	Tea
1:00 PM-2:00 PM	Lunch
2:00 PM-3:00 PM	Conclusion Ceremony and Certificates

Summary of Faculty Feedback

Workshop

Questions	Excellent	Good	Ordinary
Clarity of communication about workshop	06	03	00
Organization of the sessions	03	05	01
Quality of lectures	06	03	00
Quality of labs	07	02	00
Effectiveness of discussions	05	03	00
Effectiveness of learning experience	05	03	00
	Appropriate	Short	long
Duration of workshop	08	01	00
	Definitely	Maybe	No
Would you like to have more such sessions?	08	01	00
Would you like e-lectures by experts on special topics?	07	02	00
Suggest specific topic that you would like additional expert lectures on	<ul style="list-style-type: none"> • Ergonomics, welding • QFD, Risk management, DSM • Application on thermal engg. • Complex integrated manufacturing. • Project management. • Knowledge management. 		
Additional Suggestions	<ul style="list-style-type: none"> • Some students (B.Tech) of our college should be absorbed as part of 30 days practical training to have a feel of higher studies. • Would appreciate an opportunity to project our (ISRO) requirements on an internal basis and to assess common areas where collaborative work could be taken up, first informally and later formalise it. 		

Teaching

Which subjects do you teach?	<ul style="list-style-type: none"> • Workshop teaching, Welding • I.C Engines, Air Pollution Technology • Manufacturing Engg. Industrial Engg. • Signals & System. • D.S.P , Network Analysis & Synthesis. • Mechanical Engg. • Power Electronics. 			
What is average student to teacher ratio in your institute?	<ul style="list-style-type: none"> • 30:1 • 15:1 • 15:1 • 18:1 • 4:1 • 18:1 			
Questions	YES	NO		
Do you have additional support for teaching (tutors, graders, teaching Assistants, etc)?	04	01		
Do you give class projects for UG classes?	06	00		
Do you give class projects for PG classes?	05	01		
Do you have sufficient resources for laboratory courses?	01	05		
	Sufficient	Inadequate		
Is the library/journal/e-connection support adequate?	01	05		
	Definitely	May be	No	
Would you like to have common (TEQIP) repository of course material?	07	00	00	
Would you like to visit IITK to participate in and develop course material (existing or new)	07	01	00	
Would you like to participate in creation of the repository material	05	02	00	
	e-courses	Workshops	Content	none
How can IITK effectively help you prepare for teaching?	03	04	04	00
How can TEQIP help improve your teaching?	<ul style="list-style-type: none"> • By participating in different workshop. • Providing better infrastructure. • Helping in organizing interactive session for lectures at IIT's. • providing platform to deliver lecture at 			

different institutions.

- The above mentioned area are sufficient.

Research

Questions	Definitely	Maybe	No
Would you like to visit an IIT for a visiting-faculty/post-doctoral fellow ,if offered(via TEQIP)?	08	01	00
Would you like to share/use research infrastructure at IITK, if made available?	07	02	00
Would you like to conduct collaborative research with IITK?	07	02	00
Would you like lectures by experts (Indian and international) on niche research areas/topics?	09	00	00
Do you want special-topic conferences?	09	00	00
How can TEQIP help improve your research?	<ul style="list-style-type: none">• By giving proper exposure to young teachers.• Collaboration with our institute.• Help in collaborative research.• These suggestions are sufficient• Through TEQIP collaborative research required.• Due to more exposure & quality of teaching it may be improve.		

Summary of Student Feedback

Workshop

Questions	Excellent	Good	Ordinary
Clarity of communication about workshop	00	01	00
Organization of the sessions	00	01	00
Quality of lectures	01	00	00
Quality of labs	01	00	00
Effectiveness of discussions	00	01	00
Effectiveness of learning experience	00	01	00
	Appropriate	Short	long
Duration of workshop	01	00	00
	Definitely	Maybe	No
Would you like to have more such sessions?	01	00	00
Would you like e-lectures by experts on special topics?	01	00	00
Suggest specific topic that you would like additional expert lectures on			
Additional Suggestions	<ul style="list-style-type: none"> • We should provide more example of system engineering • The course material should be more so that we understand it clearly. 		

Learning

Questions	Yes	No	
Do you get enough class projects?	01	00	
Is the learning adequate?	01	00	
Do you have sufficient resources for laboratory courses?	01	00	
What is your area of specialization	•Industrial Optimization		
	Sufficient	inadequate	
Is the library/journal support/e-connection adequate?	01	00	
	Definitely	Maybe	No
Would you like to have common (TEQIP) repository of course material?	01	00	00
Would you like to visit IITK to attend specialized courses?	01	00	00
Would you like MOOCS/e-resources based courses?	01	00	00
How can TEQIP help improve your learning?	<ul style="list-style-type: none"> • By conducting such type of short term course which are more based upon practicals. 		

Research

Questions	Definitely	Maybe	No
Would you like to visit an IIT for a short visit /internship/post-doctoral stint ,if offered(via TEQIP)?	01	00	00
Would you like to share/use research infrastructure at IITK, if made available?	01	00	00
Would you like to conduct collaborative research with IITK faculty?	01	00	00
Would you like lectures by experts (Indian and international) on niche research areas/topics?	01	00	00

Do you want special-topic conferences?	00	01	00
How can TEQIP help improve your research?	<ul style="list-style-type: none"> • By giving proper exposure to young teachers. • Collaboration with our institute. • Help in collaborative research. • These suggestions are sufficient • Thorough TEQIP collaborative research required. • Due to more exposure & quality of teaching may be improved. 		

OUTCOME

At the end of the workshop, participants had a better understanding of various aspects of system engineering. They had a better idea on how to propose systems considering the customer requirements and cost structure. Some participants suggested that more collaborative research is required to help them improve their research; they also suggested that more exposure is needed by the faculties to improve their teaching techniques.