

## MODULE OF INCHALL 2017



## “INDUSTRIAL CHALLENGE 2017”

### The 8<sup>th</sup> Industrial Challenge

#### *Zero Losses : A Goal Towards Business Process*

#### *Sustainability*

### INDUSTRIAL CHALLENGE

Industrial Challenge (INCHALL) is a competition regarding Industrial and System Engineering competence among universities held by Himpunan Mahasiswa Teknik Industri (HMTI), Industrial Engineering Department, Institut Teknologi Sepuluh Nopember. The competition is made for several purposes, such as applying the core competences of Industrial Engineering knowledge, developing student's ability to solve industrial problems, improving ability to design and engineer the elements that affect industrial system as a preparation for working environment, and supporting knowledge and insight exchange among the participants of the competition.

The main topic that will be the focus on INCHALL 2017 is **Zero Losses**. This topic will mostly discuss about continuous improvement

## THEME: ZERO LOSSES

Nowadays, zero losses is absolutely a challenge for most industries to sustain the global market. In industrial term, losses are defined as something that decrease the company revenue because of non-adding value activities and the inability of the company to fulfill the consumer needs. To achieve zero losses, companies have to conduct continuous improvement on every single value chain element. However, it is difficult to find the best method, therefore companies need to keep searching the better method to achieve zero losses.

One of the common losses found in companies' value chain is the bullwhip effect. Bullwhip effect is the effect due to the unsynchronized information flow within the value chain element. In value chain, input process, transformation process, and output process should be integrated well to each other to avoid the bullwhipeffect.

If it is not integrated well, one of the bullwhip effect will result in the overproduction or stockout. At the end, companies will lose the revenue.

Additionally, there are other methods to achieve zero losses, such as optimizing the production system, improving the communication and information flow within the value chain elements, as well as utilizing the available facilities optimally.

## PARTICIPANTS & SCHEDULE

### GENERAL REQUIREMENT

- Each team consists of three people and their membership in the team could not be changed in the future for any particular reason.
- Each member of the team must be registered as undergraduate student (S1) of Industrial Engineering Department or related major from the same university.\*
- Each member of the team must be listed as an active student until March 31<sup>st</sup> 2017

- Each university or institute is allowed to register maximum of 5 teams in preliminary stage.

\*Any related major must covers minimum 3 of the INCHALL Competences

## REGISTRATION PROCEDURE

- Each team must register for an account at [www.iefair-its.com/inchall](http://www.iefair-its.com/inchall). Account will be made by fulfilling the registration and requirements, such as photo and student card of each member of the team.
- After registration process done, the participants will get an activation email.
- When the activation is done, the participants will get additional menu in INCHALL 2017 website titled Team Page that consists of Participants Data and an access to join preliminary stage.
- The Online Registration will be free, no payment is needed.
- Registration will be opened from November 14<sup>th</sup> 2016 to December 31<sup>st</sup> 2016.

## PRELIMINARY STAGE

Preliminary stage in INCHALL 2017 is testing the participant's knowledge about Industrial Engineering Science through Online Competition. In this stage every participant that has been registered will get account to join the Online Test through Team Page menu.

The Top 15 teams will continue to Semifinal Stage in Surabaya.

## RE-REGISTRATION

Every team who has been announced as semifinalist of INCHALL 2017 must do re-registration. The Re-registration due date is at February 26<sup>th</sup> 2017 and requires every team to prepare some documents below:

- Data forms of each participant
- Payments evidence of registration fee
- Certificate of Active Student

Each document should be sent by softcopy form **.zip/.rar** format, with subject and filename format **team name\_name of university** and sent to **industrialchallengeITS@gmail.com**.

For this Re-registration procedure each team needs to pay Registration Fee of USD 250 for the international participant and IDR 3,000,000 for the national participants. The payments should be transferred to:

**PANIN BANK**

In the name of :Afiola Nurhidayati

Account Number :417-200-2456

## FINAL STAGE

Final stage is stage that be held after online test. 15 best teams from all teams in online test will continue this competition to final stage. Final stage will be held at Institut Teknologi Sepuluh Nopember (ITS) Surabaya, Indonesia in February 28<sup>th</sup>2017 until March 4<sup>th</sup> 2017. Final stages will consist of elimination stages and grand final stage. Elimination stages are consist of 1<sup>st</sup> stage and 2<sup>nd</sup> stage. In this stage, participant must have communication skill, analytic skill, and courage to make decision about industrial engineering science. Committee will provide accommodation and transportation during

competition in Surabaya. The further information will be announced by committee through official website.

## GRAND FINAL

Grand final stage is the last stage of INCHALL 2017. **Best five teams** from elimination stage may solve the Case Study which goal is to solve problems related to the theme. We expect each team to give a feasible recommendation in solving the problem. The biggest challenge in this stage is that the participant needs to have broad insights of what is it really happening in Indonesia right now and using Industrial Engineering competences as tools to help solving it. The best team with best performance and feasible solution will be the winner of INCHALL 2017. Put your game face on and get ready to compete!



## PRIZE

1 <sup>st</sup> place	: USD 1450
2 <sup>nd</sup> place	: USD 950
3 <sup>rd</sup> place	: USD 600
4 <sup>th</sup> place	: USD 300
5 <sup>th</sup> place	: USD 200

## TIMELINE

### Registration

November 14<sup>th</sup> 2016 – December 31<sup>st</sup> 2016

### Preliminary Schedule

January 5<sup>th</sup> 2017

### Preliminary Stage

January 16<sup>th</sup> 2017 – January 23<sup>rd</sup> 2017

### Finalist Announcement

January 30<sup>th</sup> 2017

### Re-Registration

January 31<sup>st</sup> 2017 – February 26<sup>th</sup> 2017

### Semifinal & Grand Final

February 28<sup>th</sup> 2017 – March 4<sup>th</sup> 2017

## SYLLABUS

This syllabus consists of the courses which relevant with Industrial Engineering Competences. It also become a guidance for all of the participants of this competition.

- **QUANTITATIVE MODELLING AND INDUSTRIAL POLICY ANALYSIS**

QUANTITATIVE MODELLING AND INDUSTRIAL POLICY ANALYSIS COMPETENCES				
Operational Research	Industrial Statistics	Industrial System and Simulation	Decision Analysis	System Dynamics
<ul style="list-style-type: none"> <li>➤ Optimization Mathematics</li> <li>➤ Linear Programming</li> <li>➤ Goal Programming</li> <li>➤ Dynamic Programming</li> <li>➤ Markov Chain</li> <li>➤ Game Theory</li> <li>➤ Duality Theory</li> <li>➤ Sensitivity Analysis</li> </ul>	<ul style="list-style-type: none"> <li>➤ Descriptive Statistics</li> <li>➤ Probability</li> <li>➤ Discrete &amp; Continuous Probability Distribution</li> <li>➤ Hypothesis Testing</li> <li>➤ ANOVA</li> <li>➤ Regression</li> <li>➤ Non-Parametric Statistics</li> <li>➤ Data Mining</li> </ul>	<ul style="list-style-type: none"> <li>➤ Discrete Event Simulation</li> <li>➤ Input and Output Analysis</li> <li>➤ Comparing System and Scenarios</li> </ul>	<ul style="list-style-type: none"> <li>➤ Modelling Decision Structure</li> <li>➤ Decision Making Technique</li> <li>➤ Uncertainty in Modelling Decision Technique</li> <li>➤ Modelling Preferences</li> <li>➤ Multi-criteria Decision Making</li> </ul>	<ul style="list-style-type: none"> <li>➤ Continuous Simulation</li> <li>➤ Causal – Loop Diagram</li> <li>➤ Flow Diagram</li> </ul>

● **MANUFACTURING SYSTEM**

<b>MANUFACTURING SYSTEM COMPETENCES</b>				
<b>Maintenance and Reliability Engineering</b>	<b>Quality Control Engineering</b>	<b>Manufacturing System</b>	<b>Productivity Analysis</b>	<b>Environmental Business Management</b>
<ul style="list-style-type: none"> <li>➤ Failure Phenomenon Description</li> <li>➤ Maintenance Strategy</li> <li>➤ Maintenance Scheduling</li> <li>➤ System Reliability</li> <li>➤ Component Replacement Decisions</li> <li>➤ Inspection Decisions</li> <li>➤ Failure Prediction</li> <li>➤ Complex System</li> </ul>	<ul style="list-style-type: none"> <li>➤ Quality Improvement</li> <li>➤ Statistical Process Control</li> <li>➤ Attribute Control Chart</li> <li>➤ Variable Control Chart</li> <li>➤ Acceptance Sampling</li> <li>➤ Design of Experiment</li> <li>➤ Capability Process</li> </ul>	<ul style="list-style-type: none"> <li>➤ Manufacturing Process</li> <li>➤ Production Layout</li> <li>➤ Material Handling System</li> <li>➤ Assembly Line</li> <li>➤ Production Configuration System</li> <li>➤ Production Key Performance Indicator</li> <li>➤ Process Planning and Concurrent Engineering</li> </ul>	<ul style="list-style-type: none"> <li>➤ Productivity Measurement</li> <li>➤ Total Productivity Model</li> <li>➤ Business Process Re-engineering</li> <li>➤ Green Productivity</li> <li>➤ Data Envelopment Analysis</li> </ul>	<ul style="list-style-type: none"> <li>➤ Sustainable Development</li> <li>➤ Ecological Footprint</li> <li>➤ Sustainable Manufacturing Principles</li> <li>➤ Product Lifecycle</li> <li>➤ Lean, Green, and Clean Business</li> <li>➤ Life Cycle Management, Design for Environment</li> </ul>

● INDUSTRIAL SYSTEM AND MANAGEMENT DEVELOPMENT

INDUSTRIAL SYSTEM AND MANAGEMENT DEVELOPMENT COMPETENCES					
Engineering Economics	Project Management	Organization and Human Resource Management	Financial Management	Performance Management	Risk Management
<ul style="list-style-type: none"> <li>➤ Time value of money</li> <li>➤ Interest formulas and equivalence</li> <li>➤ Economic analysis of alternatives</li> <li>➤ Accounting, depreciation and income taxes</li> </ul>	<ul style="list-style-type: none"> <li>➤ Project times and cost</li> <li>➤ Developing project plan</li> <li>➤ Scheduling resources and cost</li> </ul>	<ul style="list-style-type: none"> <li>➤ Organizational design and organizational structure</li> <li>➤ Human resources management</li> </ul>	<ul style="list-style-type: none"> <li>➤ Cash flow and taxes</li> <li>➤ Financial ratio</li> <li>➤ Financial forecasting, planning and budgeting</li> <li>➤ Risk and rates of return</li> </ul>	<ul style="list-style-type: none"> <li>➤ Company performance management</li> <li>➤ Performance management framework</li> <li>➤ Key performance indicator</li> <li>➤ Employee performance management</li> </ul>	<ul style="list-style-type: none"> <li>➤ Risk concept, types and analysis</li> <li>➤ Quantitative methods to identify and assess risk</li> </ul>

- ERGONOMICS AND WORK SYSTEM DESIGNS

ERGONOMICS AND WORK SYSTEM DESIGNS COMPETENCES				
Ergo Safety	Facilities Design	Methods Study and Work Measurement	Industrial Ergonomics	Human Reliability
<ul style="list-style-type: none"> <li>➤ Human Factors Theory in Accidents</li> <li>➤ Human- Personal Errors</li> <li>➤ Safety Statistics and Analysis</li> <li>➤ HSE Management</li> <li>➤ Quantitative and Qualitative Safety Analysis Tools</li> </ul>	<ul style="list-style-type: none"> <li>➤ Plant Design &amp; Location</li> <li>➤ Capacity Analysis</li> <li>➤ Material Flow Evaluation Methods</li> <li>➤ Qualitative and Quantitative Optimization Methods</li> <li>➤ Capacity Design</li> </ul>	<ul style="list-style-type: none"> <li>➤ Work Operations Analysis</li> <li>➤ Job Design and Analysis</li> <li>➤ Human Machine System</li> <li>➤ Stop Watch Time Study</li> <li>➤ Work Sampling</li> <li>➤ Method Time Measurement</li> </ul>	<ul style="list-style-type: none"> <li>➤ Biomechanics</li> <li>➤ Anthropometry</li> <li>➤ Cognitive Ergonomics</li> <li>➤ Environmental Factors</li> <li>➤ Energy Costs of Work</li> <li>➤ Manual Handling &amp; Back Safety</li> <li>➤ Ergonomics Interface Display</li> </ul>	<ul style="list-style-type: none"> <li>➤ Human Information Processing</li> <li>➤ Human Factors and Supervisory Control</li> <li>➤ Function and Task Analysis</li> <li>➤ Learning Curve</li> <li>➤ Human Reliability Assessment</li> </ul>

- LOGISTIC AND SUPPLY CHAIN MANAGEMENT

### LOGISTIC AND SUPPLY CHAIN MANAGEMENT COMPETENCES

Production Planning and Control	Logistics Management	Supply Chain Management	Distribution Management	Procurement and Material Management
<ul style="list-style-type: none"> <li>➤ Demand Forecasting</li> <li>➤ Aggregate Planning</li> <li>➤ Master Production Schedule</li> <li>➤ Material Requirement Planning</li> <li>➤ Inventory and Capacity Planning</li> <li>➤ Production Activity Control</li> </ul>	<ul style="list-style-type: none"> <li>➤ Logistic Strategy</li> <li>➤ Customer Service and Order Processing in Logistic</li> <li>➤ Inventory Service Level</li> <li>➤ Logistics Network Design</li> <li>➤ Transportation and Distribution</li> <li>➤ Warehousing</li> <li>➤ Outsourcing and Global Logistic</li> </ul>	<ul style="list-style-type: none"> <li>➤ Supply Chain Strategies</li> <li>➤ Coordinated Product and Supply Chain Design</li> <li>➤ Network Configuration</li> <li>➤ Demand Management</li> <li>➤ Measuring Supply Chain Performance</li> </ul>	<ul style="list-style-type: none"> <li>➤ Distribution Network Design Problems</li> <li>➤ Location-Allocation Decision Problems</li> <li>➤ Facilities Locations Problems</li> </ul>	<ul style="list-style-type: none"> <li>➤ Discrete Demand System</li> <li>➤ Distribution Inventory System</li> <li>➤ Inventory Valuation and Measurement</li> </ul>

## COMMITTEE CONTACT:

If you have any question about INCHALL 2017,  
please do not hesitate to contact us in these numbers:

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**Website** :www.iefair-its.com/inchall

*P.S :Any changes of the schedule, requirement, and  
regulation above will immediately announced through  
our website [www.iefair-its.com/inchall](http://www.iefair-its.com/inchall)*



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