

MIPET



8th Edition **MMXVII**

















Sponsors







Mastering Industrial Plant Engineering and Technologies is an initiative promoted by a joint Team of Academic Institutions, Industries and Associations. MIPET includes an International Master focused on these Issues. The MIPET Excellence is based on the strong cooperation among Academic and Technical Experts coming from Prestigious Universities and Leading Companies operating in this area with special attention to Energy, Iron & Steel, EPC, Large **Industrial Plants and Process Industries, Oil & Gas**





















Academia, Institutions & Industries

MIPET ORGANIZERS & SUPPORTING INSTITUTIONS













SPONSOR COMPANIES







PAUL WURTH



























WHAT IS MIPET



The International Master in Industrial Plant Engineering and Technologies (MIPET) is a one-year degree program organized in Genoa University focusing on preparing new generations of top quality engineers to be dedicated to process and plant engineering, projects and activities within Industrial Plants, EPC and construction companies.

The Master Program is directed by the DIME Engineering Department and Polytechnic School in close cooperation with a number of industrial partners which represent some of the best reputed global players in the Engineering and Construction market.

The main goal of MIPET is to meet the requirements of such industrial partners in terms of professional skills and technological competencies for young leading engineers.

As a matter of fact, this project it is part of a larger program devoted to exploit the synergy among Genoa University Engineering Faculty and top level Engineering & Construction

Companies and to pursue the Innovation and Excellence in processes and products through a continuous enhancement of their competitive assets: technologies, human capital, know how, models and skills.









Jack Welch (GE CEO 1981-2001 from \$14 billions market value to over \$410 billions): Globalization has changed us into a company that searches the world, not just to sell or to source, but to find Intellectual Capital - the World's Best Talents and Greatest Ideas

















Scientists investigate that which already is; Engineers create that which has never been Albert Einstein (Physics Nobel Price 1921, Princeton University)

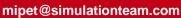


















MIPET OUTCOME



This Master is devoted to create System and Process Engineers, Technical Coordinators operating effectively in Project Teams in Global Engineering and Construction.

MIPET provides a deeper insight in Industrial Plants and enables the students to get a complete overview of a project with all its technical aspects along each project stage: Proposal, Basic and Detailed Engineering, Procurement, Manufacturing, Erection, Commissioning and Service. MIPET graduates acquire capabilities in all the critical areas (mechanical, materials, processes and components, electrical, instrumentation & automation, cost estimate, project management, risk & safety, quality assurance) combined with a specific training in specific industrial sectors (i.e. Power Equipment, Iron & Steel) as well as with Internship Experiences in Companies.





www.itim.unige.it/mipet













WHO SHOULD ATTEND



- Young Engineers with strong potential and technical background
- International Excellent Students of Engineering Departments from all around the world
- Engineers with experience in Plant Engineering from world-wide
- Engineers already employed in Engineering and Construction Companies who are interested in attending specific Operative Modules of the MIPET Master Program such as Project Management, Constructions, Standards and Regulations, Safety, Security & Risks























MIPET ADDED VALUE



BENEFITS FOR YOUNG ENGINEERS















EPC Engineering, Procurement & Construction



















INVESTEMENTS & SELECTION



- The Master is based on MIPET agreement among Genoa University the Sponsoring Companies and Genoa University. In fact MIPET Industrial Sponsors financed extensively the past editions (from 80% till 100%), confirming the strong interest in this initiative and its ROI*
- To attend the Master, each applicant is requested to pass a selection process based on Interview (Live or by Phone/Skype) and Qualification (i.e. Curriculum Vitae).
- The MIPET Selection combines Technicians, Human Resource, Experts from Academia and Industry to identify best candidates (e.g. 120 applications, 60 selected interviews, 15 selected master attendees)
- The MIPET Tuition Fee is 7'500.00 Euro, but a full coverage of tuition fee is available for best candidate and many scholarships & grants are available for good students
- In all past MIPET editions each student received at least a 6'000.00 Euro grant in advance from Companies and/or Governmental Institutions and have to pay only 1'500.00 Euro for being enrolled at selection procedure completion (no extra payment required)
- In previous MIPET Editions, the Students successfully achieving the Master Degree and hired by MIPET Sponsors received a full refund (100%) of Tuition Fees
- MIPET is establishing agreements with major Universities around the World for promoting this education initiative as well as the cooperation on Industrial Plant Engineering & Technologies * ROI Return of Investments





Prof. A.G.Bruzzone

MIPET President







GRANTS & PLACEMENT



- The job placement is very good both in terms of numbers and quality; placement statistics confirm that more than 80% of students from previous Editions were hired by leading industries and major companies operating in industrial sector after graduation.
- All MIPET Sponsor Companies are interested and committed to evaluate the best MIPET students for job positions and, in case of selection, the Sponsors will hire these people and recognize them the efforts for attending MIPET, at least, by refunding the full tuition fee including the 1st Payment 1'500.00 Euro
- Master Students and Companies have the opportunities to know each other during the Internship & Project Work improving professional Curriculum and placement opportunities

 MIPET organizes periodic group and individual meetings between Sponsor Companies and MIPET Students, as well as orientation meetings, in order to finalize internship and

cooperation agreements



Prof. A.G.Bruzzone

MIPET President









GENERAL PROGRAM



The Master in Industrial Plants includes:

- Basic Modules for Industrial Plant Engineering and Construction, including Process Engineering, Plant Automation, Materials & Technologies, etc.
- Operative Modules on Critical Issues for Industrial Plants (e.g. Engineering Standards and Regulations, Project Management, Quality Assurance etc.)
- Thematic Modules on Innovative Solution for Specific Plant Sectors (e.g. Power, Iron and Steel, Water Treatment, Sustainability)
- Company Internships devoted to acquire on-field experience, including the development of the Project Work related to a Real Case
- Visits to Industrial Plants and Engineering, Research & Development Centers and Labs.
- Tests for certifying individual skills and capabilities acquired by the attendees on specific topics at the end of each single module.
- Professional Modules, integrated in the Master Program, but open for external attendees as stand alone courses. These modules include individual and team Projects Works to be carried out in competition/cooperation interacting with experts.





Prof. A.G.Bruzzone



OPERATIVE MODULES



Operative Modules are compact and specific courses (1-5 days), which are an integral part of the Master and at the same time are open and offered to external companies, technical employees or professionals interested in these subjects. MIPET Sponsors get 2 free seats in each Operative Module and are entitled to get discounts and opportunities for further registrations into Operative and Thematic Modules.

These modules are carried out jointly by the Industry and the Academy and are characterized by strong interaction between students and teachers through simulations and Role Play Games performed on specific case studies. Among the others the following modules are foreseen:

- **Engineering Standards and Regulations**
- Construction
- **Project Management**
- Safety & Risks
- Innovative Technologies, Techniques and Methodologies for Industrial Plants











EDUCATIONAL PATH



Educational Framework









Basic Modules 80 hours

Operative Modules 180 hours

Thematic Modules 160 hours

Internship & PW 480 hours

420 hours in Classroom and Labs

480 hours as Internship and Project Work (PW)

120 hours in International Seminars, Language, Orientation & Other Courses

Int.Seminars 30 hours

Languages 70 hours

Orientation 20 hours



The Education framework of MIPET is focusing on industrial plant engineering and technologies by adopting different methods such as lectures, case study, exercises, common experiences, RPG (Role Play Games), simulations, use of models and software tools, interactive blended education (i.e. clickers), industrial plant guided visits and R&D* Lab experiences









MODULES





Educational Module Topics

Basic Modules 80 hours

Fundamental Concepts related to Industrial Plants Projects

Fundamentals of Financial Analysis for Industrial Plants

Processes Engineering and Components in Industrial Plants

Design and Engineering for Industrial Plant Systems

Material Technology, Mechanical **Design and Industrial Plants**

Automation in Industrial Plants

Software Systems for Supporting Industrial Plant Design & Evaluation

Operative Modules 180 hours

Standards & Regulations

Project Management

Construction

Safety & Risks

R&D in Industrial Plants

M&S in Industrial Plants

Comm. & Team Building

MIPET International Seminars ~40 hours

Thematic Modules 160 hours

Power Plants

Iron & Steel Plants

Plants for Environment

Processes & Machines in Industrial Plants

> **Desalination & Water Treatments**

Environment & Sustainability for Industrial Plant Engineering

MIPET Other Modules ~90 hours English, Chinese, Italian, Spanish, Orientation



















Engineering Standards













Operative Module of MIPET









Industrial Plant Engineering & Technologies

Objectives

Enaineerina Standards & Regulations devoted to organically present the existing and future norms to be adopted for the design and construction of Industrial plants; the course provides knowledge for supporting problem solving for companies facing for the first time regulations and codes in National and International industrial plant projects

Course Attendees

Engineering Standards & Regulations is designed for young engineers, specialists and professionals active in Industrial Plants enabling them to make use of the state-ofthe-art norms, codes and standards for the design of equipment and systems.

Structure and Approach

This modules is organized as a 36 hours course to be completed in 5 days by interactive sessions with experts coming from Industry and R&D. The approach includes lecturing, case studies. exercises, experiences, RPG, competitive and cooperative simulations



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Safety & Risk











Operative Module of MIPET







Industrial Plant Engineering & Technologies

Objectives

Safety and Risk Module is devoted to present methodologies, techniques and technologies related to safety and risk evaluation during design, construction and operation of an Industrial Plant.



Course Attendees

Safety and Risk Module is designed for technicians engineers, voung and professionals active in the engineering of Industrial Plants enabling them to deal with safety rules and risk analysis according to the state-of-the-art legislation.

Structure and Approach

This modules is organized as a 36 hours course to be completed in 5 days by interactive sessions with experts coming from Industry and R&D. The approach includes lecturing, case studies, exercises, experiences, RPG, competitive and cooperative simulations



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MIPET Operative Modules





Standards & Regulations



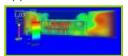








- Large Industrial Plants: an Overview on Standards, Regulations and Administration Authorization Processes along Project Life Cycle
- Case Study on Impact of International Regulations on Industrial Plants with Special Attention to Directive 2006/42/CE, ATEX, PED.
- Quality Assurance and Control in Industrial Plants
- · Quality, Safety and Environment Integrated Management in term of standards and regulations
- Environmental Impact Evaluation
- · Introduction on Fire Safety and Explosion Risk for Industrial Plants. Risk Analysis for Fires and Explosions: methods, documents and classification
- · Safety Concept. Innovative Engineering Solutions forn Fire and Explosions in Industrial Plants. Combination of Explosion/Fire Risks
- Fire Safety and Explosion Simulation
- · Actions: organization, prevention, protection and mitigation solutions
- EXPLOSAD (Experience on Process Plant Safety Design): Case Study based on Simulation applied to fire and explosion protection applied to an industrial plant





General Safety concepts related to Industrial Plants Life Cycle (accident pyramid, cause effect analysis, risk analysis, training and information, BBS, main indexes and matrixes, organization)

- Specific safety characteristics on Process Plants
- General Risks on Industrial Plants
- Methodologies and behavioral aspects related to safety and risks to be considered in plant design and construction
- Behavioral aspects influence on accident frequency
- Safety Design
- Quantitative and Qualitative methods to support risk evaluation and management
- Introduction to integrated safety and risk evaluation systems
- Case Study on Safety Integrated Solutions
- Introduction to SBRA Methodology
- Exercise: application of SBRA (Scenario Based Risk Assessment) Methodology on a Construction Yard
- Case Study Resolution on the Construction and Debriefing on SBRA (Scenario Based Risk Assessment) application
- Introduction to Industrial Plant Service impact on Safety along Plant Life Cycle: Availability and indexes, Alternative Approaches, EOH, Impact of Engineering on Service and Safety, Service Inventory, Consistency and Optimization of Inspection and Revision Policies
- Service for Complex Industrial Plants

Each Operative Module includes a knowledge assessment and the attendees successfully completing each single Module receive a certificate from Genoa University. The Educational Material specific of the course is provided to each attendee



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Project Management











Operative Module of MIPET







Industrial Plant Engineering & Technologies

Objectives

Management Module presents critical aspects related to Industrial Plant PM and provides concepts and methodologies in Project basic Management. The course provides knowledge for Risk Project Organization, facing issues in Management, Cost and Time Management, Planning & Control, Quality, HR and Communications

Course Attendees

Project Management Module is designed for engineers, technicians and young professionals intended to operate as Project Engineers in complex Industrial **Plants** projects;

Structure and Approach

This modules is organized as a 36 hours course to be completed in 5 days by interactive sessions with experts coming from Industry and R&D. The approach includes lecturing, case studies, exercises, experiences, RPG, competitive and cooperative simulations



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Construction











Operative Module of MIPET







Industrial Plant Engineering & Technologies

Objectives

Construction Module presents critical aspects related to Constructions in Industrial Plant and provides basic concepts and case studies as methodologies. The course provides knowledge for facing issues in Site Management, Erection Planning, Cost and Time Control, Safety and Risks during erection and commissioning.

Course Attendees

Construction Module is designed for young engineers, technicians and professionals active in Industrial Plants and dealing with Construction issues, enabling them to understand and make use of the key tools for the control and the management of the construction stage of an Industrial Plant.

Structure and Approach

This modules is organized as a 36 hours course to be completed in 5 days by interactive sessions with experts coming from Industry and R&D. The approach includes lecturing, case studies, exercises, experiences, RPG, competitive and cooperative simulations



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MIPET Operative Modules



Project Management











- Project Management and specific issues related to Industrial **Plants**
- Proiect Life Cycles
- Reporting & Metrics for Project Management: PMB & KPIs
- Cost and Time Management, Techniques and Methodologies for supporting planning and control
- Risk Analysis & Risk Management: Risk Source Identification, Quantification, Decisional Trees, Statistical Methods and Simulation
- Communications: Technological Solutions, Information **Distribution Policies**
- HR in Project Management, organizational planning, People Management
- Quality Management: methods, constraints and critical issues in Industrial Plants
- Project Management Networks and Certification Processes
- Coordination Engineering, Purchasing, Erection, Commissioning
- PM Certification, Societies and International Overview
- Role Play Game: Celebes (Cooperative Engineering Plant, Project Business Exercise and Simulation), work to be completed by coordinated teams concurrently working on a complex industrial plant under coordination of real Project Managers and operating on a distributed simulation

- Construction of Industrial Plants
- Industrial Plant Construction from Project Start, Precommissioning, Commissioning, Closing
- Case Studies on Project Logistics in National International Frameworks
- Interaction between Engineering and Purchasing
- Case Study on Engineering Purchasing interactions
- Managing Construction Projects on Site
- Case Studies on Construction Yard Management
- Planning and Control on Site Construction
- Case Study on Construction Yard Activities
- Safety on Erections, Heavy Transport and Heavy Lifting during Construction
- Babel Experience: competition between two teams each one divided between Site and Office on a Construction Project; the experience is devoted to outline the critical issues related to coordination/cooperation between engineering and constructions as well as aspects related to communication, human resource management and project documentation







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Operative Module of MIPET



industrial plant engineering and technologies





Industrial Plant Engineering & Technologies

Objectives

Industrial Plant Innovation Module presents innovative methodologies, techniques, models presented by experts at international level able to guarantee a competitive advantage in Industrial Plant. addresses course both technical The management issues in relation to different types of challenging problems in Sustainability, Oil and Gas, Smart Energy Management.

Course Attendees

Industrial Plant Innovation Module designed for young engineers, technicians and professionals intended to being updated on new Models and Innovative Methodologies to address complex Industrial Plants projects

Structure and Approach

This modules is organized as a 36 hours course to be completed in 5 days by interactive sessions with experts coming from Industry and R&D. The approach includes lecturing, case studies, exercises, experiences, RPG, competitive and cooperative simulations



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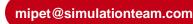
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MIPET Operative Modules



Innovation for Industrial Plants









R&D, Innovative Technologies, Techniques & Methodologies for Industrial Plants

- Research and Development for Industrial Plants
- Risk Analysis in R&D
- Opportunities in China: Innovation from Far East
- EU Project Case Study
- R&D in Industrial Plants, Patents, IPR and Competitiveness
- Smart Solutions in Industrial Plant Engineering
- Challenges for Engineering in Sustainability
- Smart Energy Management
- Smart Solutions in Industrial Plants based on innovative models
- Case Study: applying Innovative Techniques for Sustainability in Industrial Plants

Modeling & Simulation in Industrial Plants

- · Simulation for Industrial Plants
- · Modeling Mining in Australia
- Operational Training Simulators
- Examples: System Simulation in Iron and Steel Plants
- Models for Structural Analysis on Critical Sections of large Industrial Plants

Communication Skills & Team Building for Engineers

- Communication Skills
- Communication Channels
- Relationships
- Public Speaking
- People Management
- Team Building
- Interpersonal
- Leadership
- Lateral Thinking
- Managing Meetings and Relationships: how Young Engineers have to play

Seminars on Industrial Sectors and Emerging Opportunities

- System of Systems Engineering
- Modeling for Large Transportation Infrastructure Design
- Power Industry in Mexico and Latin America
- Process Control in Chemical Plants
- Topics and Areas for Engineers entering in Oil and Gas Industries
- Immersive Technologies for Oil & Gas Industries





Each Operative Module includes a knowledge assessment and the attendees successfully completing each single Module receive a certificate from Genoa University. The Educational Material specific of the course is provided to each attendee



















MASTER: FACULTY &

LABS









The Master Teachers are an effective mix of Academic & Industrial Experts

- Genoa University Professors
- Italian Top-Quality University Faculty
- International Professors & Experts
- Top Experts and Executives from Plant Industry
- Professional Experts from Institutes and Organizations



































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All the MIPET Sponsor Companies have the possibility of being actively involved in Lecturing, driving Project Works, providing Case Studies, developing **Exercises and offering Internships & Project Works.**

MIPET includes experiences in up-to-date R&D Labs (e.g. Virtual Caves, Simulation, tenor) Combustion, Smart Grid) as well as visits to Industrial Plants tutored by Experts















ORGANIZATION



This Master is coordinated by a Technical Scientific Committee composed by the following members:

- **Agostino Bruzzone** (Full Professor of Industrial Plants in DIME, MIPET President)
- Matteo Agresta (Simulation Team University of Genoa)
- Giorgio Cannata (Professor of Automation, DIST)
- Micaela Caserza (MAILAB University of Genoa)
- Marco Del Borghi (Full Professor of Chemical Processes, DICHEP)
- Carla Gambaro (Professor of Technologies, DICHEP)
- Pietro Giribone (Full Professor Industrial Plants, DIME)
- Aleramo Lucifredi (Full Professor of Applied Mechanics, DIME)
- Andrea Reverberi (Professor of Chemical Processes, DICHEP)
- Luca Tagliafico (Full Professor of Thermo-Energy, DIME)
- Angela Taramasso (Professor of Civil Eng., DIST)
- Flavio Tonelli (Professor of Industrial Plants, DIME)



-Simulation Team, MITIM, DIME, Polytechnic School

- Maurizio Barabino (ABB Italia)
- Giovanni De Marchi (PW Italia)
- Alessandro Bongiovi` (ABB)
- Ferruccio Cerruti (ETEA)
- Alessandro Donetti (Danieli Centro Combustion)
- Piergiorgio Fontana (Consultant)
- Enrico Gastaldo (Prisma Impianti)
- Cesare Laviosa (Danieli Centro Combustion)
- Enrico Malfa (Consultant)
- Giorgio Migliorini (Fisia Italimpianti Gruppo Impregilo)
- Giorgio Minestrini (Stara Glass)
- Simonluca Poggi (Simulation Team)
- Carlo Raggio (Consultant)
- Massimo Romairone (Bombardier)
- Stefano Sadowski (RINA)





















SPONSOR COMPANIES











BENEFITS FOR SPONSORS

- Active role in selection processes of Master Candidates
- Opportunity for deep evaluation and selection of Master Attendees during Selection, Educational Modules, Internship and Project Work
- Opportunities to improve the skills of Engineers & Technicians already employed
- Free Seats and Discounted Rates for registering into the Operative Modules
- Sharing High Quality Education Costs within a Specific Qualified Community
- Cultural Interaction among the different Actors of this initiative: Industrial Companies, University and Local Institutions.
- Joint University-Industry stimulation of interest and research projects on subjects related to plant engineering.
- Development of a Fertile Background in Industrial Plant, Global Engineering and Construction devoted to enhance the competitiveness of the whole system.























MIPET & INDUSTRIES











HOW A COMPANY BECOMES SPONSOR OF MIPET

- Subscribing an Agreement that includes an annual fee and the commitment to provide resources (i.e. 15 hours of experts for specific contributions to educational modules to be developed under Technical Scientific Committee Coordination).
- Contributing with its requirements and preferences respect to the characteristics of Master Attendees to be selected and on the Topics to be addressed in the Program
- Registering its employees to the Master Program or to specific Operative Modules
- Offering Internships to Master Program Students
- Providing Expertise as well as Real Case Studies





Sponsors MIPET 8th Edition

























MIPET STRONGHOLDS











Excellence is the main goal of MIPET; in fact MIPET Partners are emphasizing following aspects:

- Strong commitment of all Partners in promoting MIPET at the National and the International level.
- International Approach in MIPET structure by involving teachers from foreign Excellence Centers and selecting engineers from other Countries.
- Introducing Innovative contents, especially through the Operative Modules, related to the Plant Engineering & Technologies























MIPET FEATURES











The ongoing cooperation among partners and sponsors aims at continuous improvement by guarantee MIPET top quality level:

- All Lectures and Material are in English
- Language Course for Attendees (English plus other optional Courses, i.e. Chinese)
- Agreements with Offices of Leading Companies for Cooperation and Enhancement of their top level engineers by involving them in MIPET Program
- Agreements with International Schools active in Plant Engineering and Technologies for Exchanging Trainers and Students
- **Development of a Plant Engineering Reference Book for MIPET**
- High Involvement of Foreign Students (e.g. India, Brazil, Iran)
- **Special Benefits for Sponsors (i.e. Operative & Thematic Modules)**























Sponsors MIPET 6th Edition

























References

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