



# Indian Institute of Technology

## Course Details Report

**Course No: PE6090**

**Course Name: HSE Management in Petroleum & Offshore Engineering**

**Course Type:**

Theory

**Description:**

The main objective is to extend an overview of safety and environmental issues in the offshore industry. It will provide detailed understanding of the methods and techniques to resolve the key issues related to oil and gas exploration, processing, storage and transportation.

**Course Content:**

Safety assurance and assessment: Importance of safety in industrial practices- Objectives of HSE- need for safety- organizing safety Risk assessment and safety assurance: Risk and hazard- Logical risk analysis- Hazop- case studies of Hazop- Hazid analysis-accidents in offshore platforms- case studies  
Environmental issues and Management Marine pollution- oil spill- environmental management issues- atmospheric pollution- plume and puff models-  
Accident modeling: Fire and explosion- fire loads- FLED- Fire spread control and mitigation- Emergency Response Planning Guidelines (ERPG)- Flammability diagrams-Blast loads- explosion modeling- Damage consequences- NFPA recommendations-Ventilation design and Sprinkler design- Industrial hygiene- QRA methods: Fatality risk assessment- societal risk- environmental risk-Probabilistic risk assessment  
Safety measures in design and operation: inerting and purging- explosion prevention systems- hot work permit- Process hazard analysis- FMEA, FMECA

**Text Books:**

Jan Erik Vinnem. 2007. Offshore Risk Assessment: Principles, Modeling and Applications of QRA studies. Springer, 577pp. Patin Stanislav, 1999. Environmental Impact of the Offshore Oil and Gas Industry. Eco Monitor Publishing, USA, 425pp. Ramamurthy, K. 2011. Explosions and explosion safety, Tata McGraw Hill, New Delhi, INDIA, pp. 288.  
Skelton, B. 1997. Process safety analysis, Gulf Publishing Company, Houston, 210pp.  
Srinivasan Chandrasekaran. 2016a. Offshore structural engineering: Reliability and Risk Assessment. CRC Press, Florida, ISBN:978- 14-987-6519-0  
Srinivasan Chandrasekaran. 2016b. Health, Safety and Environmental Management in Offshore and Petroleum Engineering, John Wiley & Sons, ISBN: 978-11-192-2184-5.  
Srinivasan Chandrasekaran, Gaurav Srivastava 2022. Fire-resistant design of structures, CRC Press, Florida, USA, pp. 212, ISBN: 9781003328711.  
Terje Aven and Jan Erik Vinnem. 2007. Risk Management with applications from Offshore Petroleum Industry. Springer, 200pp. William J. Cairns (Ed), 1992. North Sea Oil and the Environment: Development Oil and Gas Resources, Environmental Impacts and Responses, International Council of Oil and the Environment.

**Reference Books:**

Ale B. J. M. 2002. Risk assessment practices in The Netherlands Safety Science, 40, 105-126.

Crawley, F., M. Preston, and B. Tyler: "HAZOP: Guide to best practice. Guidelines to best practice for the process and chemical industries". European Process Safety Centre and Institution of Chemical Engineers, 2000

IEC 61882. "Hazard and operability studies (HAZOP studies) Application guide". International Electra technical Commission, Geneva, 151656:2006, Indian Standard Hazard Identification and Risk Analysis-Code of Practice, Bureau of Indian Standards, 2006

Kyriakdis, I.: "HAZOP — Comprehensive Guide to HAZOP in CSIRO", CSIRO Minerals, National Safety Council of Australia, 2003

Srinivasan Chandrasekaran 2015. HSE in offshore and petroleum engineering, Lecture notes of online web course, Mass Open-source Online Courses (MOOC), National Program on Technology Enhancement and Learning (NPTEL), Govt. of India.

Lees, F.R 1996. Loss Prevention in Process Industries: Hazard identification, Assessment and Control, Vol. 1-3, Butterworth-Heinemann, Oxford, 1245pp.

OGP Risk Assessment Data Directory: Report No.434-1, Process Release Frequencies, March 2010.

OISD — GDN — 169, OISD Guidelines on Small LPG bottling plants (Design and Fire Protection Facilities), Oil Industry Safety Directorate, Amended edition, 2011.

OISD Standard — 116, Fire Protection Facilities for Petroleum Refineries and Oil/Gas Processing Plants, Oil Industry Safety Directorate, Amended edition, 2002

OISD Standard — 144, Liquefied Petroleum Gas (LPG) Installations, Oil Industry Safety Directorate, Second edition,

OISD Standard — 150, Design and Safety Requirements for Liquefied Petroleum Gas Mounded Storage Facility, Oil Industry Safety Directorate, 2013.

INC (1999) Guidelines for quantitative risk analysis, The Director General of Labour, The Hague, Netherlands.

Trevor Kletz. 2003. Still going wrong: Case histories and plant disasters, Elsevier, pp. 230.

Valerie J. Sutherland, Cary L Cooper. 1991. Stress and accidents in offshore, oil and gas industries, Gulf Publishing Co., Houston, pp. 227.