



EXPRESS ENGINEERING SOLUTIONS
& TRANSHEAT TECHNOLOGIES



THERMAL DESIGN OF **SHELL & TUBE** **HEAT EXCHANGERS** **(STHE)**



No one can de-code the code like us...!



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training@express-engg.com



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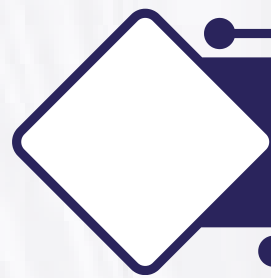


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Course Content



Duration : 40 hours

- Modes of heat transfer
- Thermal expansion & differential thermal expansion
- Basic overview of different types of heat transfer equipment
- Classification of STHes –
 - ✓ **Based on service,**
 - ✓ **Based on TEMA type**
- Components of STHE units
- General guidelines of fluid allocation
- Basic heat transfer equations
- Tube pitch and tube layout patterns
- Types of baffles
- Flow arrangements – Counter-current, Co-current & Cross flow
- Series and Parallel arrangements
- Shell side flow fractions and their importance
- Type of tube-to-tube sheet joints & their importance
- Design codes – TEMA & ASME
- Mechanical design aspects of STHes that have an impact on thermal design.
- Purpose of thermal design & minimum data required
- Logical steps for doing manual thermal design calculations
- Vibration analysis in STHE units
- Using software for thermal design of STHE units
- Case study (One only)

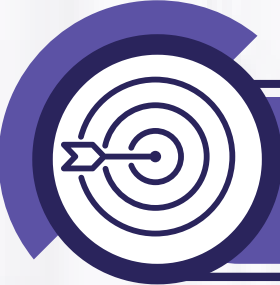


About Us



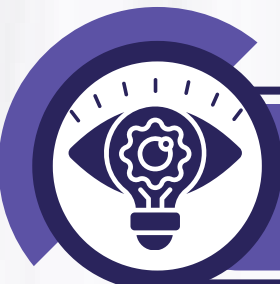
Why Choose Us

With vast domain experience, highly capable & equipped Engineering Team we are specialized in providing the most professional Engineering services with fast turn around time. We also help businesses meet their goals with our cutting edge Engineering & Training services.



Mission

Our mission is to deliver world-class engineering solutions with simplicity, precision, and speed, while empowering professionals through comprehensive training that meets global industry standards.



Vision

To create a future where our cutting-edge expertise in engineering solutions and professional training empowers both clients and the industry, making us an indispensable partner in their success.



Our Core Values

1) INNOVATION

We consistently challenge the status quo by exploring new ideas & technologies to deliver creative, cutting-edge solutions.

2) INTEGRITY

We operate with unwavering honesty & transparency, building lasting trust with every client and partner.

3) CUSTOMER FOCUS

We are committed to understanding our clients' unique challenges & providing tailored, value-driven solutions.

4) ETHICS

We collaborate & support one another, believing our collective strength drives the best results for our clients.



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KNOW THE TRAINER



Ramakrishna K

Ramakrishna is a distinguished Heat Transfer Specialist and a veteran in the engineering industry with an illustrious career spanning more than 33 years. He holds a Bachelor of Technology in Chemical Engineering and has further sharpened his expertise with specialized training in Piping Analysis from IIT Mumbai and Project Delivery Systems (PDS).

Throughout his career, Ramakrishna has demonstrated unparalleled mastery in the thermal design of 1000+ pieces of equipment, including fired heaters, shell and tube heat exchangers, and air-cooled heat exchangers, which are currently operational in refineries and process plants across the globe. His profound technical knowledge covers the mechanical design and simulation of fluid flow, pressure vessels, and complex piping systems.

He has held key roles at esteemed global organizations such as BHPV, ISGEC, Thermax, CH2M Hill, and Jord. His project portfolio is extensive, ranging from the complete designing of VDU and NHT heaters in the UAE to contributing to a USD 1.2 million saving through innovative process design modifications for a major desalination plant.

Beyond his technical design prowess, Ramakrishna is a strong functional mentor with a proven ability to manage national and international interactions between consultants, customers, and vendors. He specializes in system analysis, energy conservation projects, and root cause failure analysis, ensuring that every project meets the highest standards of safety and efficiency.

With his vast experience from concept to commissioning, Ramakrishna provides engineers with deep, "real-world" insights into thermal design, performance optimization, and the practical application of international engineering standards.



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ABOUT TRAINER



KEY STRENGTHS

- Heat transfer specialist with more than 33 years of rich experience in designing heat transfer equipment.
- Performed thermal design of 1000+ Equipment fired heaters, shell and tube heat exchangers, Air cooled heat exchangers – till date which are under successful operations at various refineries & process plants across the globe.
- Process, Mechanical Design and Simulation expertise. Design and analysis of fluid flow and heat transfer systems – fired and unfired, pressure vessels and piping systems.
- Piping flexibility, stress analysis and support design / specifications.
- System analysis – energy balance, PFDs, P & IDs, control philosophy, HAZOP studies, root cause failure analysis.
- Energy conservation projects (concept studies, feasibility reports, measurement and verification protocols, savings methodologies).
- Strong functional, mentoring and management abilities.
- Interactions with consultants, customers and vendors at the national and international level.
- Good communication skills and team management.



EDUCATION

Bachelor of Technology in Chemical Engineering.

Course in **Piping Analysis** from **IIT Mumbai**. Training on Project Delivery Systems (PDS) at CH2M Hill, Dubai



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ABOUT TRAINER



KEY PROJECTS HANDLED (SINCE THE YEAR 1990 - DURING WORK WITH BHPV, ISGEC, THERMAX, CH2M HILL, JORD)

- Complete designing & sizing of Fired heaters – VDU heater & NHT – SRR heaters for EPC in UAE, hot oil heaters
- Complete design of NHT fired heater for refinery in Iraq
- Design of various shell & tube heat exchangers, pressure vessels, piping stress analysis and process skid systems.
- Optimization, debottleneck, trouble
- Shooting of various heat exchangers
- Heat recovery system designs for efficiency improvement
- Optimization in the design of numerous air-cooled heat exchangers for various clients in the refinery, petrochemical, power & process industries. Reduced costs & secured many orders due to innovative designs.
- Piping layouts, stress analysis and support design for various jobs related to high temperature thermic fluid heating systems & boilers. Handled stress analysis for hot oil heating systems (480oC, 600 NB pipe size), process steam piping (40 kg/cm2g, 350oC) & turbine inlet / outlet piping with NEMA analysis for nozzle loads.
- Thermal and mechanical design for fired heaters, shell & tube heat exchangers, waste heat recovery modules, steam coil air preheaters, etc
- System analysis & resolution of performance issues for two purge gas heaters installed at Reliance, Hazira plant.
- Mechanical lead for three high pressure reverse osmosis sea water desalination plants for the Sharjah municipality. Contributed to a saving of USD 1.2 million due to changes in process design.



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ABOUT TRAINER



KEY PROJECTS HANDLED (SINCE THE YEAR 1990 - DURING WORK WITH BHPV, ISGEC, THERMAX, CH2M HILL, JORD)

- Advance Waste Water Treatment Plant in Brisbane, Australia.
- Root cause failure analysis and recommendations for modifications in a high temperature thermic fluid heating system for a textile industry client in Indonesia.
- Operational safety assessment and recommended modifications in piping routing and support design for a thermic fluid heating system in a glove plant in Sri Lanka.
- 2 x 12 MMkcal/hr Dowtherm based hot oil system for a textile mill. Involved in heater design, external flash vaporization of Dowtherm, air preheater, fuel oil system, piping layout and stress analysis. Total involvement from concept to commissioning.
- A 1.2 MW cogeneration unit using rice husk as the fuel for steam generation. Responsible for the complete system integration and piping.
- Walk-through studies, basic concepts, detailed feasibility reports & generation of baseline data for energy conservation projects with implementation under guaranteed performance & saving model through modifications in the process & piping systems, steam generation & distribution, cogeneration, compressed air systems & waste heat recovery units. Prepare detailed equipment specifications, layouts and P & IDs', monitor project performance and savings after commissioning. Worked in various industries - chemical plants, glass units, steel mills, paper production units, glove manufacturing unit, textile mills, etc.
- Design of vessels for pressure swing adsorption systems with all interconnected piping network.



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Who Should Do This Course?



How We Can Help..!

The course is structured in a manner which covers **the basics of heat transfer and fluid flow principles** & goes on to **include advanced topics** on thermal & hydraulic calculations, fluid allocation, TEMA type selection, flow induced & acoustic vibrations, mechanical design aspects which influence heat exchanger performance, etc.

This course is designed for professionals who are involved in **specifying, designing, analysing, review & optimization of shell & tube heat exchangers**. Professionals who are interested in gaining a deeper understanding of the **manual calculation logics and utilize these skills** together with **software tools to produce highly optimized & efficient designs** will benefit from the course.



Recommended Participants

1) Process / Mechanical Engineers -

- Working in **Oil & Gas, Petrochemical, Chemical, Power, & Process Industries**.
- Responsible for **specifying, designing, reviewing, or operating shell & tube heat exchanger**.

2) Design & Project Engineers

- Involved in **EPC / EPCM projects** where heat exchanger design & performance is a critical deliverable.
- Need to ensure designs meet **industry codes & project specifications**.

3) Equipment & Mechanical Designers

- Looking to enhance skills in **manual thermal design calculations** for **sizing, rating, & performance verification**.
- Want to cross-check **software-based designs** with fundamental engineering calculations.



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Who Should Do This Course?



Recommended Participants

4) Project & Engineering Managers

- Who want a **solid understanding of shell & tube heat exchanger design principles** as well as available software tools & features to help them supervise engineering teams as well as validate designs.

5) Technical Consultants / Auditors

- Engaged in **technical audits, equipment specification reviews, or thermal performance evaluations.**
- Benefit from the ability to **review and verify software design reports & / or manual calculations to ensure equipment performance.**

6) Engineering Trainees / Fresh Graduates

- Engineers who wish to build a **practical foundation in design & sizing of shell & tube heat exchangers & bridge theory with real-world practices and software tools.**



Key Advantages

- Understand the basis of **TEMA shell type selection & fluid allocation** & their impact on the overall heat exchanger performance.
- Gain mastery in **manual thermal design logics & calculations** for shell & tube heat exchangers.
- Understand features & make good use of **software tools for designing, rating & simulation of thermal & hydraulic performance of Shell & Tube Heat Exchangers.**
- Understand **critical design considerations**, including fouling, pressure drop, shell-side & tube-side flow, acoustic & flow induced vibration, optimization strategies & good engineering practices.



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Design Services



About Us

With vast experience in Static Equipment Engineering, we offer the best, cost-efficient solutions to our customers. Our Engineering team is capable to deliver Design of Pressure Vessel, Heat Exchanger, Condenser, Reactor, Column, Storage Tank, and other static equipment, as per various national and international codes and standards.

The team is well experienced and trained to deliver Design as per ASME Sec VIII Div-1, Div-2, PED, ADMerk Blatter, PD5500, AS1210, GOST, TEMA, API 660, API 650, API 620, IBR, EN13445, etc.

We have successfully completed many ASME U-stamp audits and worked on hundreds of U-stamp vessels closely with many certifying agencies.



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Training Services

About Us

Our training program offers a unique and professional platform for engineers to master their skills to meet the demanding requirements of industries. As an Authorized Training Provider for ASME, we stand firmly behind our mission: **“No one can decode the code like us.”** This expertise is rooted in our deep understanding of various national and international standards, delivered by **seasoned industry veterans** who are currently active in their fields to bridge the gap between theory and real-world application.

Drawing on extensive multi-disciplinary expertise, we provide **comprehensive** courses tailored to the rigorous demands of today's market. In a remarkably short time, our **commitment to excellence** has established us as the most trusted and preferred training partner for leading corporations and ambitious individuals globally.



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Corporate Training

Onsite Corporate Trainings

We have been instrumental in developing the workforce for organizations through our onsite training under our corporate training program. These training has helped the corporates to develop the skills and knowledge of their resources and as a result increase the output with better and optimized design of equipment.



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Corporate Customers

Our Corporate Customers

We have been instrumental in developing the workforce for organizations through our onsite training under our corporate training program. These training has helped the corporates to develop the skills & knowledge of their resources & as a result increase the output with better & optimized design of equipment.



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Our Track Record



How We Have Been Doing..!



100+

Corporate Customers



4000+

Satisfied Trained Individual
Online & Offline Combined



20+

Countries With Beneficiaries
Across The Globe

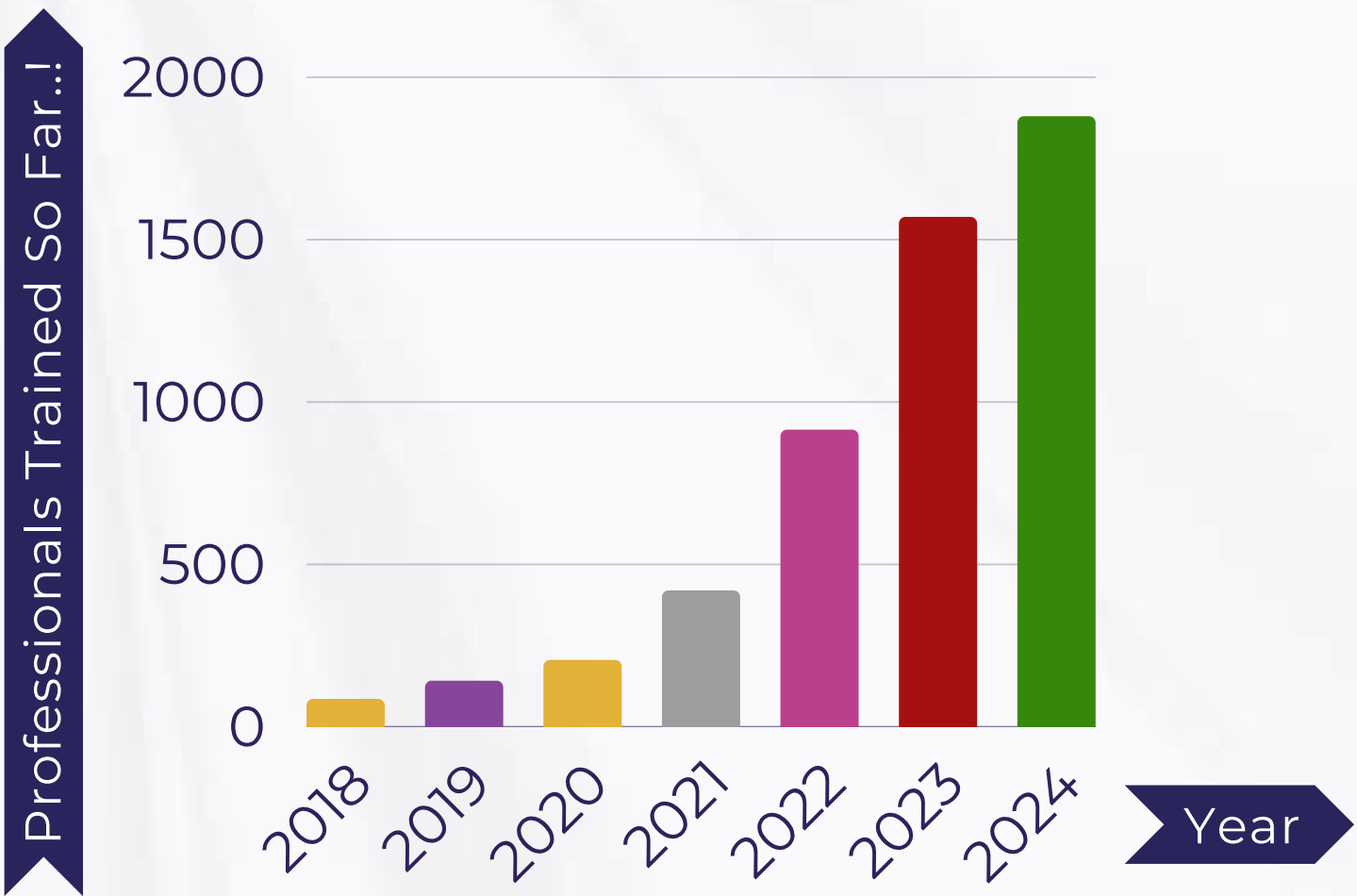


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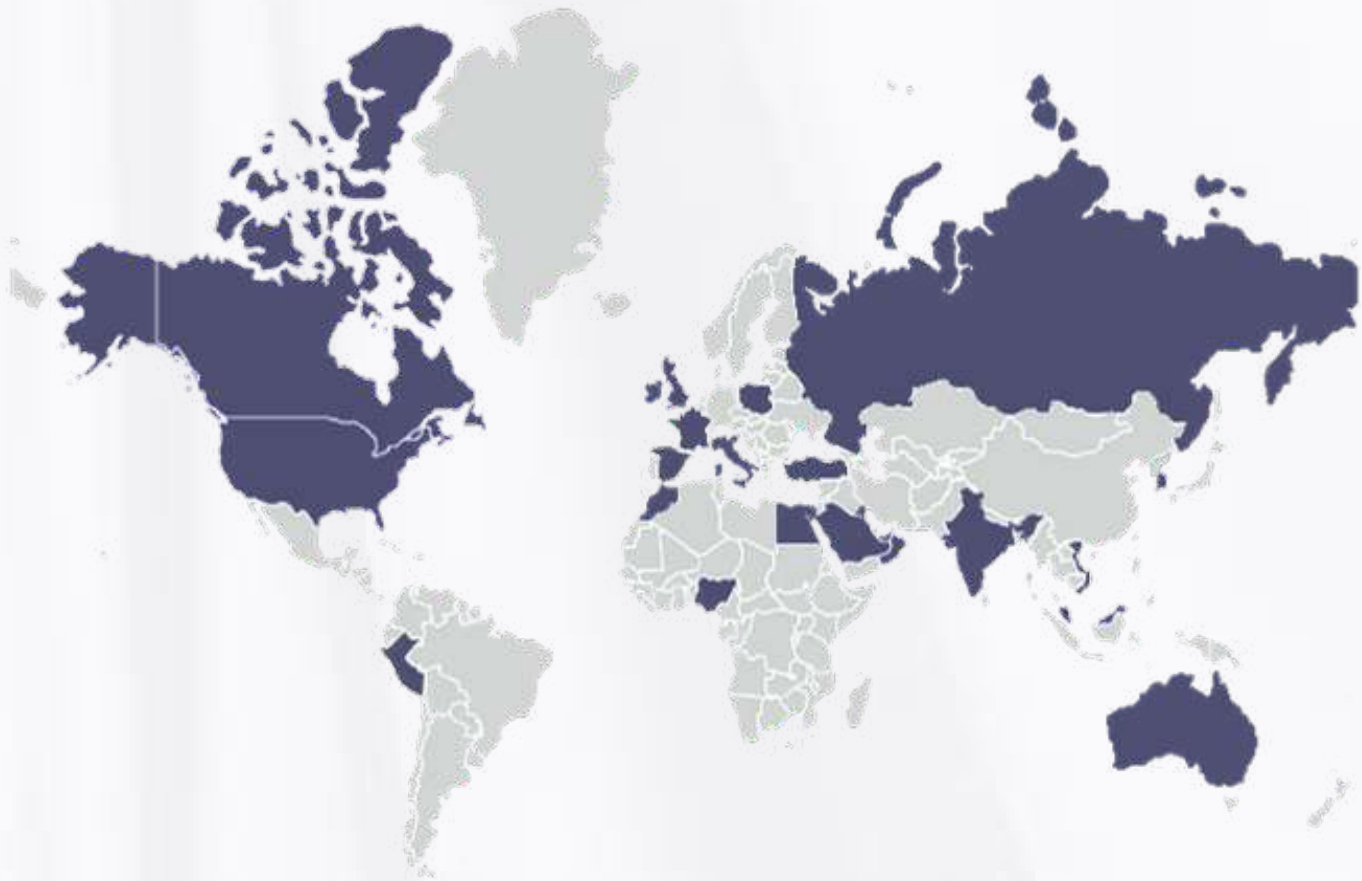
Experience Range Of
Engineers Trained



Over The Year...!



Beneficiaries Across The Globe



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About Training Platform



Mobile & Laptop/ Desktop

Expert and Professional training available at your convenience, with our Mobile & Desktop application.



WATCH FREE
LECTURE VIDEOS



PLAYSTORE



IOS APP

use organization code **yatgi**



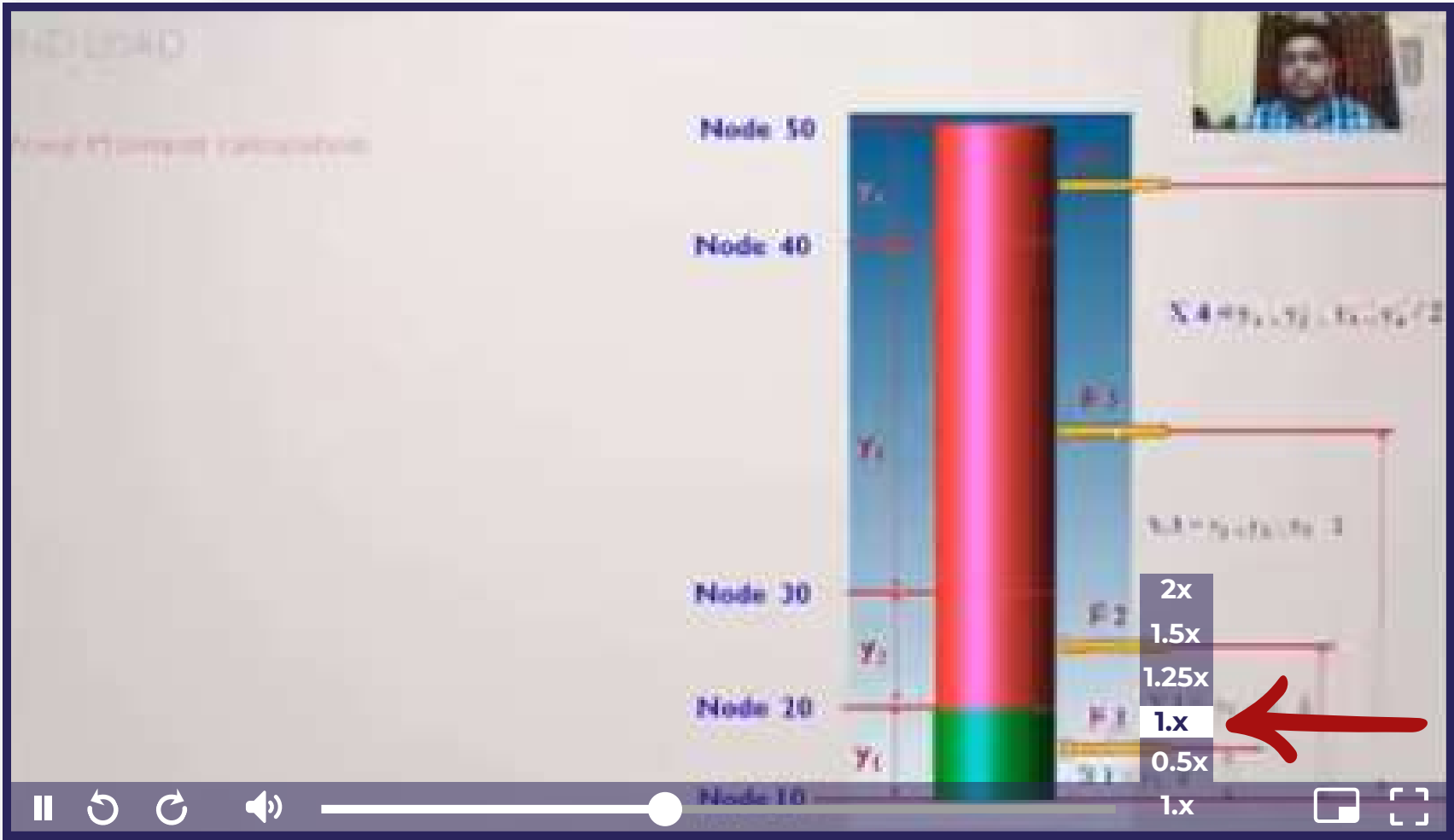
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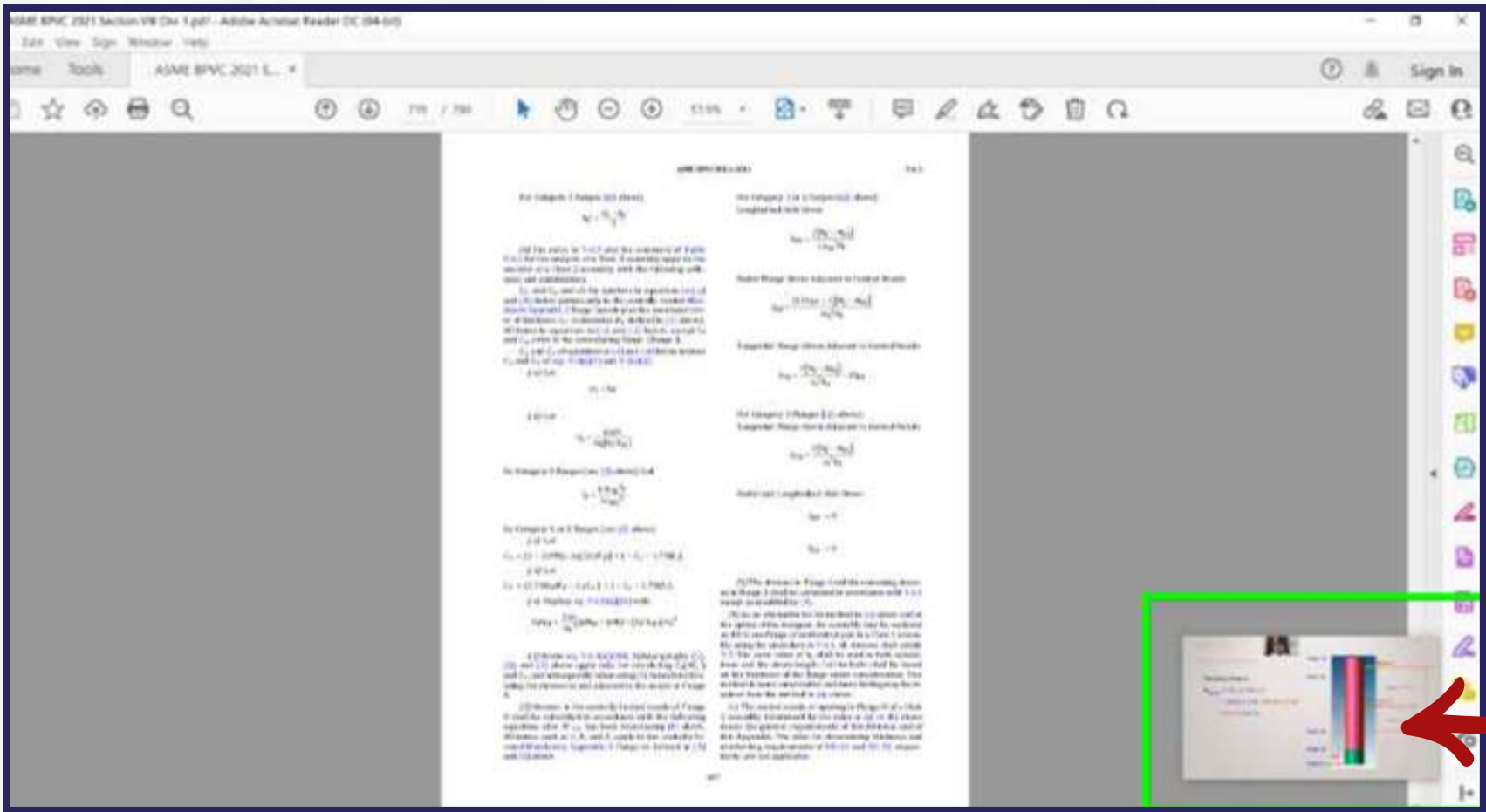
About Training Platform



It has never been so convenient to learn...! Check out some special features of our Training Platform. Adjust video speed from 0.5x to 2x to suit your requirement.



PIP mode enables you to work or practice simultaneously while watching the lectures.



Advantages Over Offline Courses



Benefits Of Online Training

Offline

Online

No more compromise on work or personal schedule

Getting late for the class. **Need to rush** or I'll miss the lecture.



I can **save travelling time** and **avoid stress** by watching lectures online **as per my convenience**.



Get answers on the go...!

I am stuck in the Project. But this topic is scheduled after 4 weeks in the live class. **How can I solve it now?**



I was stuck..! But I **just watched this topic online** and bingo..! **the problem is solved**. I simply love this platform.



Live Q&A session every week

The Classes are over. **Whom can I ask** the questions now?



My Course **validity is 18 months**. Also the **live Q&A session is twice a week**. I can get all the answers.



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Advantages Over Offline Courses



Benefits Of Online Training

Offline

Online

Never Miss Out On Any Lectures

I **missed** the last lecture, now I **cannot understand** this...!



This is so cool..! I can **watch any lecture anytime**.



Learn At Your Own Pace

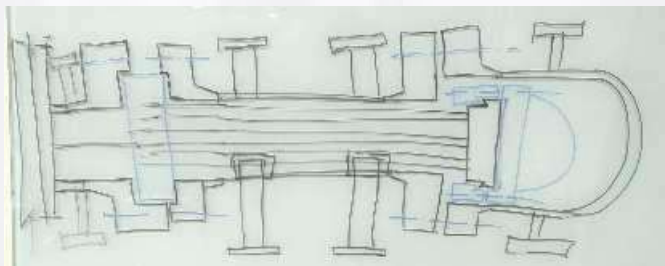
He is teaching **so fast**. It is **very difficult to understand**...!



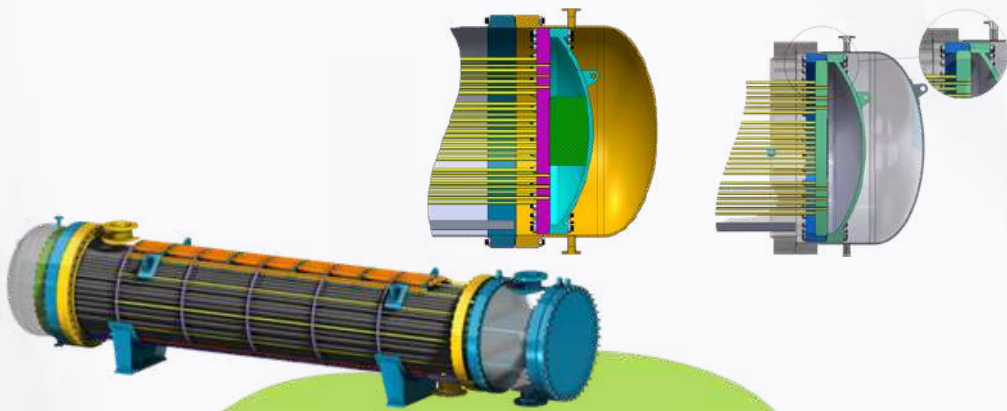
I can **speed up or speed down** the lecture videos as per my convenience.



No Disturbances | Video Lectures | Animations



This is so **disturbing**...! **Not able to visualize** the concept with these 2d hand sketches



Such **easy to understand** demonstrations with **3d animations** help me to visualize and clear my concepts..!

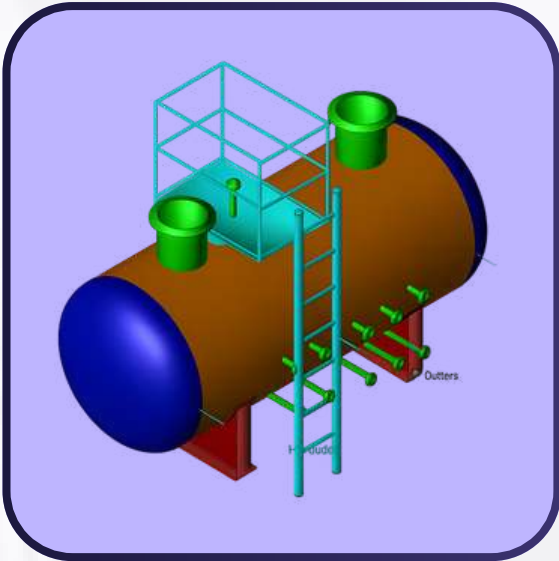


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Our Other Courses



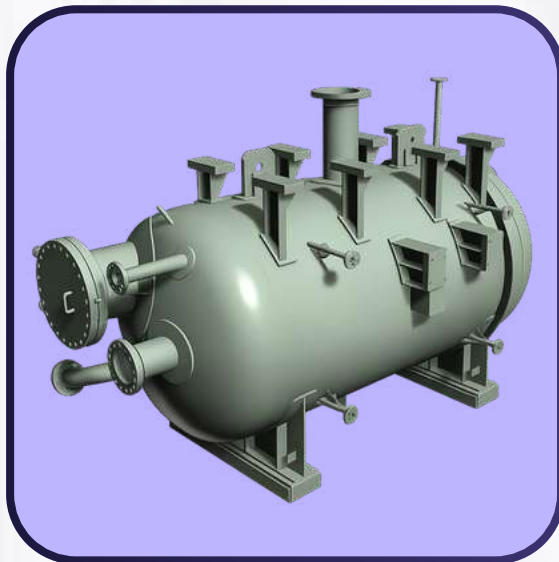
STATIC EQUIPMENT DESIGN



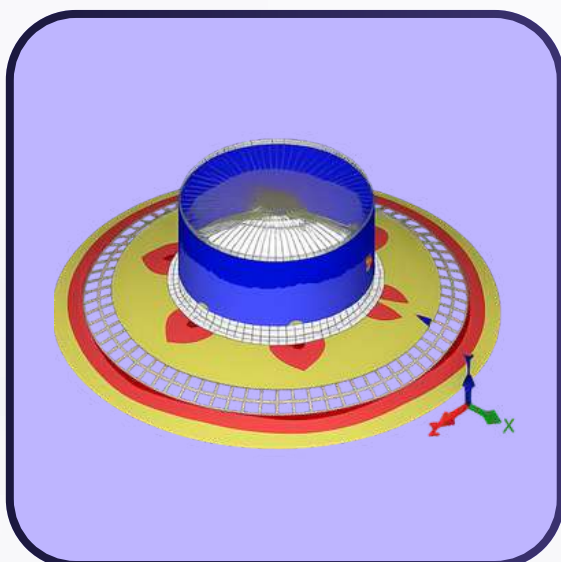
PRESSURE VESSEL
DESIGN (DIV 1) 



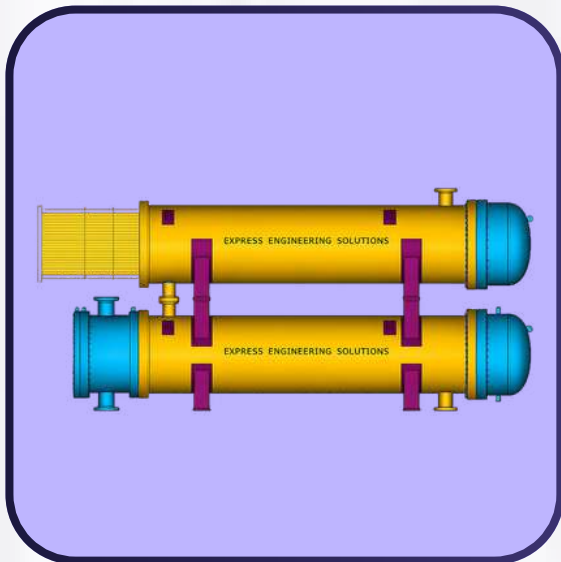
PRESSURE VESSEL
DESIGN (DIV 2) 



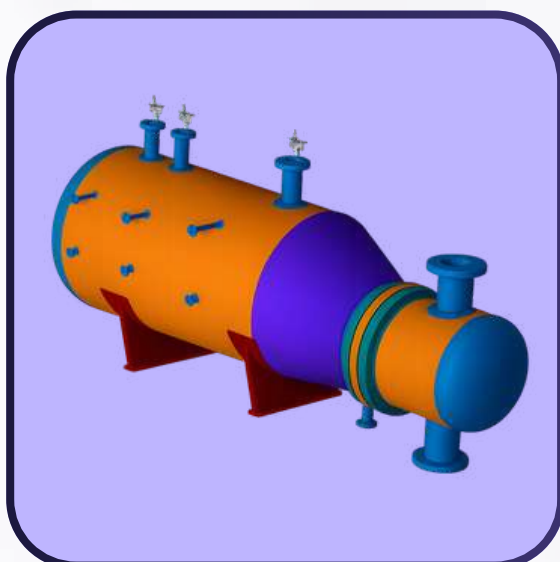
PREMIUM COMBO 



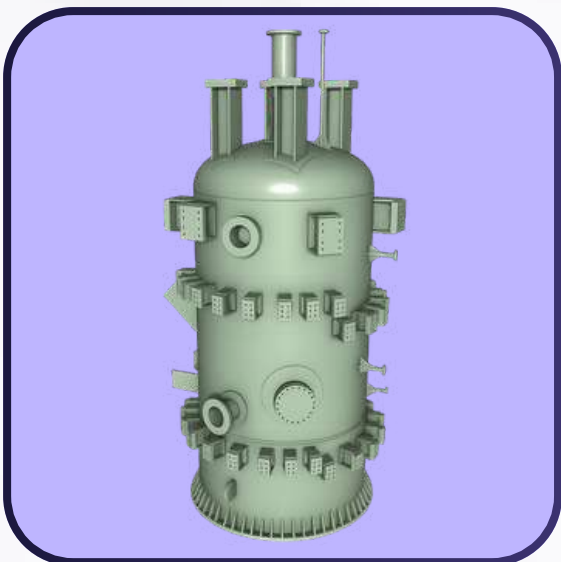
NOZZLE PRO FEA 



HEAT EXCHANGER
DESIGN 



PV ELITE
SOFTWARE 



DIV 1 & DIV 2
COMBO 



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Our Other Courses



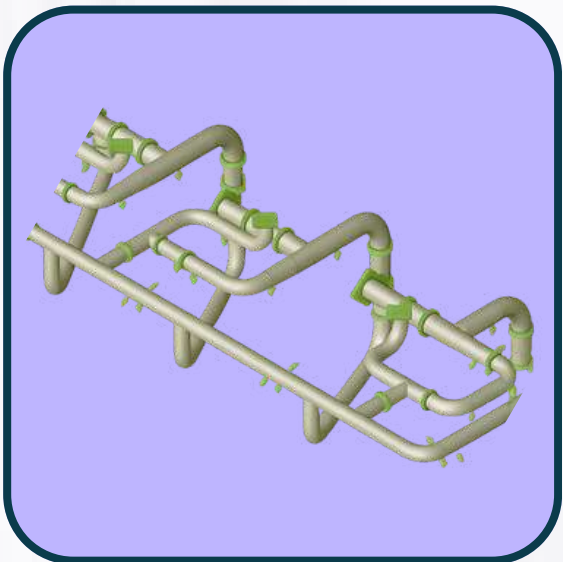
ASME AUTHORIZED COURSE



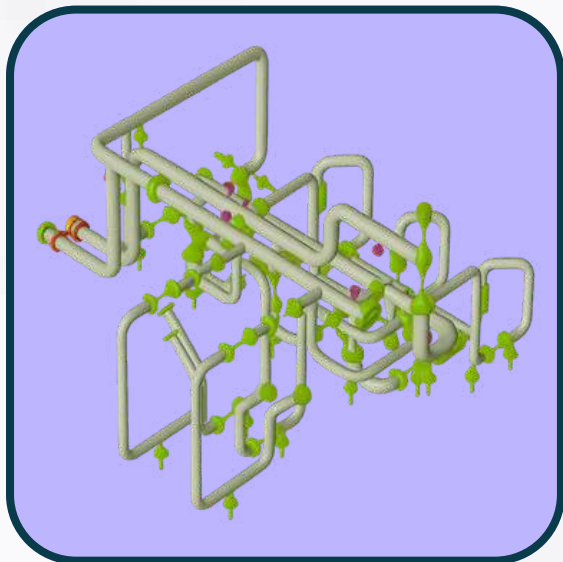
ASME PD442 



PIPE STRESS ANALYSIS



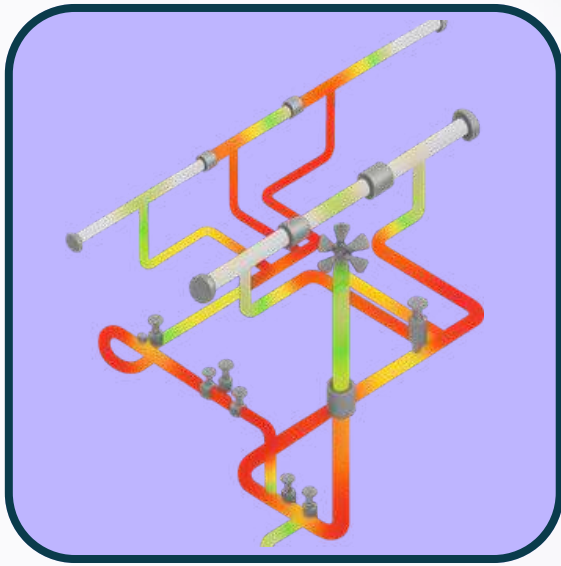
BASIC PIPE STRESS ANALYSIS 



ADVANCE PIPE STRESS ANALYSIS 



BURIED PIPELINE STRESS ANALYSIS 



COMBO PIPING & PIPELINE STRESS ANALYSIS 



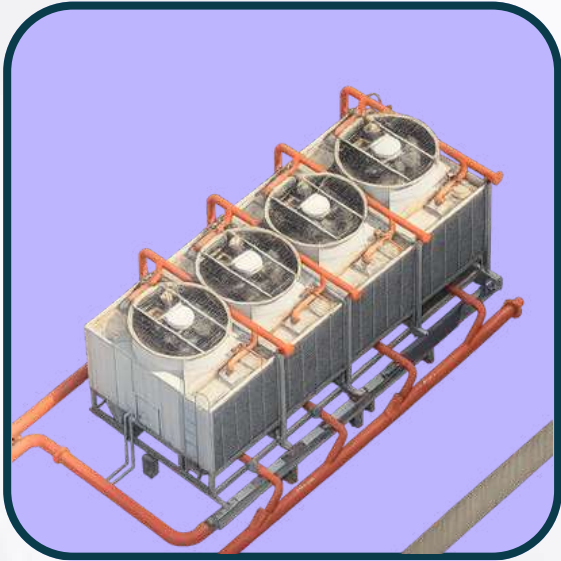
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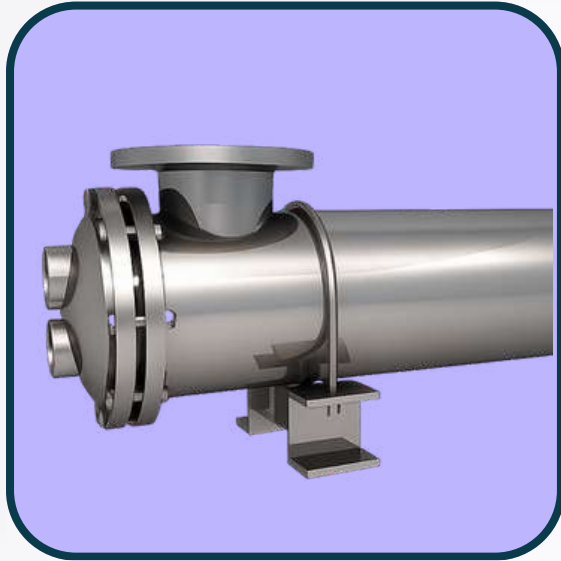
Our Other Courses



THERMAL DESIGN



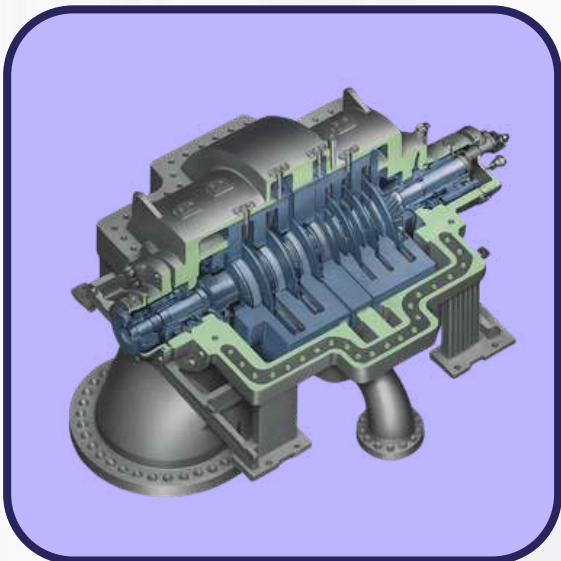
**AIR-COOLED
HEAT EXCHANGER
(ACHE)**



**THERMAL DESIGN
COMBO
(STHE & ACHE)**



ROTARY EQUIPMENT DESIGN



**CENTRIFUGAL
COMPRESSOR**



**CENTRIFUGAL PUMPS
IN OIL & GAS
INDUSTRY**



**ROTARY EQUIPMENT DESIGN
COMBO**



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Our Other Courses



OTHER COURSES



MS EXCEL 



POWER BI 



GD&T (BASIC) 



GD&T (ADVANCE) 

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PUNE

Sargam Tower, 1st & 2nd Floor,
Survey No - 43/1-9, Behind Girija
Hotel, DP Road, Near Rajaram
Bridge, Karvenagar, Pune - 411 052



SURAT

348, Green Palladia, Opposite Raj
World, Near Gaurav Path Road,
Palanpore, Surat, Gujarat - 395009



SCAN FOR
WEBSITE 



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WEBSITE 

