

# THERMAL ENERGY RECOVERY TECHNOLOGIST LEVEL 1: USER

[ 3 Days, 24 Hours Total ]



Training	Date	Requirement
<b>Method:</b> Online training <b>Course Fee:</b> RM1700/pax	Refer to Website Announcement <small>(Speak with us for confirmed date on brochure)</small>	stable internet microphone webcam
<b>Training Summary</b> <p>Process integration using pinch analysis provides facility and site planners, plant designers and process engineers with practical knowledge, skills and step-wise method for the integrated optimal planning, design and retrofit of processes, facilities and manufacturing sites to promote industrial symbiosis and achieve triple-bottom line benefits of minimised utilities (e.g. thermal energy), minimised costs (operating, maintenance and investment costs) and minimised wastes (CO<sub>2</sub>, gaseous emissions).</p> <p>This Thermal Energy Recovery Technologist (TERT) workshop covers our copyrighted and patented trade mark technologies on Process Integration Based On Pinch Analysis that delves deep into process operation covering furnaces, reactors, separators, heaters, coolers and heat exchanger network retrofit.</p>		
<b>Past Projects</b> <p>The industrial sector accounts for about one-third of the global energy consumption, with up to 50% of energy ultimately lost in the form of waste heat in hot exhaust gases, in cooling water and on heated surfaces and products [US Department of Energy]. Recovery of thermal energy from waste heat presents the biggest cost saving opportunity for energy efficiency improvement in the industrial sector.</p>		
<b>Real Examples from Past Projects</b> <ol style="list-style-type: none"> <li>1. USD 12.8 million/year on energy savings by Retrofit of Heat Recovery System (Refinery)</li> <li>2. USD 4.1 million/year on energy savings by Total Site Heat Integration Retrofit Study (Middle Distillate)</li> <li>3. USD 0.75 million/year on energy and water recovery savings (Oleochemical)</li> </ol>		
<b>Past Project Testimonials</b> <ul style="list-style-type: none"> <li>• "The training has been an eye opener for me on pinch analysis and the different methods that can be applied to the process plant I worked at" - <b>(Sustainability Program Leader at FPG Oleochemicals)</b></li> <li>• As an engineer, this help me to understand energy saving &amp; ways to improve plant performance as an overall. Excellent training! - <b>(Ahmad Muzammil, Research Officer at UTP)</b></li> <li>• An excellent training! I learned a lot, and it inspired me to look at the way thermal energy works. A very high pedagogical standard. Well done! - <b>(Mohd Lutfi, Electrical Engineer at Petronas)</b></li> <li>• "An efficient technique for analysis and reduction of utilities leading to significant savings" - <b>(Senior Process Engineer, Riau Pulp and Paper Mill)</b></li> <li>• "I am impressed on the power of pinch for energy and utility reductions" - <b>(Senior Process Engineer, Shell Middle Distillate Synthesis)</b></li> </ul>		

## Level 1 Course Objectives

1. Understand the benefits and application of heat integration.
2. Understand the basic concept on heat integration and Pinch Analysis.
3. Target maximum energy recovery by using Composite Curves and Problem Table Algorithm.
4. Extract correct stream data for heat integration analysis.
5. Design heat exchanger network that achieves the maximum energy recovery target.
6. Design heat exchanger network that achieves the maximum energy recovery target with stream splitting.
7. Determine the minimum number of units.
8. Design heat exchanger network that achieves the minimum number of units.
9. Make the correct placement for multiple utilities
10. Familiarise with Optimal Heat software for heat integration.

## Reason to Join this Course

If you are an energy manager, energy auditor or energy service company.

- Equip yourself as a TERT to manage thermal energy  
The anticipated enactment of Malaysia Energy Efficiency & Conservation Act (EECA) shall unlock opportunities for energy managers with competency to audit, manage and optimise thermal energy systems apart from electrical energy.
- Gain competency to perform practical retrofit of existing facilities  
Learn from certified experts and practitioners on how to perform optimal thermal energy recovery analysis to retrofit existing facilities practically, and gain the support of top management to achieve triple bottom line benefits.
- Offer value-added energy audit services for the ASEAN community  
If you are an energy auditor, you will be able to offer value-added energy audit services to your customer by incorporating thermal energy recovery of the process. You can also offer energy audit services under the newly announced Energy Audit Conditional Grant (EACG) which supports energy auditing of both electrical and thermal energy. Widespread and holistic implementation of Energy Management System cover-ing thermal and electrical energy in region is expected to significantly increase the demand for thermal energy analysis experts in Malaysia and across ASEAN.

If thermal energy is the leading energy cost in your manufacturing site.

- Huge potential reduction in energy bills from thermal heat recovery  
Over 7000 successful process integration applications worldwide, including our project experiences have resulted in thermal energy savings of between 10 to 50%, and payback period of less than 3 years. Our recent petroleum refinery retrofit project for example amassed an annual savings of USD 12 Million.
- “We already have heat recovery systems in place. How could we benefit more?”  
Our experience shows that plant renovation, plant expansion, addition of new product lines, consideration of total site and area-wide integration could lead to ample energy cost saving potentials.

## TERT Competency Level

1. **TERT Level 1: User (Current)**
2. TERT Level 2: Advanced
3. TERT Level 3: Expert
4. TERT Level 4: Industrial Practitioner

\*\* This TERT course consists of level 1-3, participant can attend all 3 levels at their respective dates to receive Certification for Thermal Energy Recovery Technologist. Attending Level 1 or 2 will only receive a certificate of attendance for the course. For Level 3, you are required to at least join level 2: advanced level before proceeding.

## For Registration

Registration via online: [bit.do/optimise-training-register](https://bit.do/optimise-training-register)

Registration via offline: Fill up the form attached and send to the email as stated.

For more info: Contact us on **Whatsapp** at +6016-716 7248

Visit the website: [bit.do/optimise-training](https://bit.do/optimise-training)



### Trainer 1

Prof Ir Ts Dr Zainuddin  
Abdul Manan

Prof Ir Ts Dr Zainuddin Abdul Manan is a professor of chemical engineering, the founding director of UTM Process Systems Engineering Centre (PROSPECT), founding Dean of the UTM Faculty of Chemical and Energy Engineering, founder of UTM Sustainable Energy Management Program, and the founder of OPTIMISE Sdn Bhd, a UTM spin-off company. He began his career as an engineer in PETRONAS and Hume Industries and has been an academic leader, educator, researcher, consultant and professional coach for 25 years. He completed over 100 R & D & consultancy projects serving local and multinational companies, has numerous patents and more than 450 publications that include 15 books/chapters, 200 refereed journals and 220 conference proceedings on energy and resource conservation using process integration techniques. He is a co-author of the globally referred Book on Process Integration and Intensification – Savings Energy, Water and Resources.

Zain is a UK/EU chartered engineer, a Fellow IChemE (UK), a Professional Engineer (PEng), a Professional Technologist, a certified energy manager, a registered electrical energy manager and a certified trainer for ASEAN energy managers. Zain was the winner of Saudi's Prince Sultan International Prize for Water (2008) and was awarded as a Top Research Scientist of Malaysia by the Academy of Science of Malaysia (2013). In 2014, he received the award as UTM Top Researcher, UTM Top Academician and the Honorary Award from Hungary. He has delivered over 400 invited talks in professional courses, conferences and seminars across the world, including the 2014 Imperial College Distinguished Chemical Engineering Sponsored Lecture.

Zain is currently the chair of the EECA (Energy Efficiency and Conservation Act) Thermal Energy drafting committee under the Malaysian Ministry of Energy. He founded and spearheaded the UTM Sustainable Energy Management initiative that led UTM to achieve more than USD 6 million energy savings between 2011 and 2019, and to win the ASEAN Energy Award in 2012.



### Trainer 2

Prof Ir Ts Dr Sharifah  
Rafidah Wan Alwi

Prof Ir Ts Dr Sharifah Rafidah Wan Alwi, PEng, MIEM, CEng, MICheE, is the Director of Process Systems Engineering Centre (PROSPECT) of Universiti Teknologi Malaysia (UTM). She holds a BEng in Chemical Engineering from UMIST, UK and PhD in Chemical Engineering from UTM. Sharifah has been extensively involved in 66 research projects, 23 industrial based projects for various companies and government agencies and has trained engineers from more than 200 companies in the field of energy and water minimisation.

Dr Sharifah is an expert in various Pinch Analysis techniques for the recovery of heat, water, mass, CO<sub>2</sub>, waste gases and hybrid power system. She is an expert Pinch consultant for various industries and is among the leading researchers in Pinch Analysis technique development. Her work has been filed for patents and featured in leading national and international chemical and engineering journals, magazines and conferences. She is a certified ASEAN Energy Management Scheme (AEMAS) Energy Manager trainer and a Registered Electrical Energy Manager under Malaysia Energy Commission. She is currently the energy advisor for UTM Energy Management System.

Together with her team, they have developed various Pinch software including Optimal Heat, Optimal Water and Optimal Audit. Sharifah has won various international and national awards such as Green Talents 2009 (Germany), IChemE Highly Commended Sir Frederick Warner Prize 2011 (UK), ASEAN Young Scientist and Technologist Award 2014, National Young Scientist Award 2015, ASEAN-US Science Prize for Women 2016 in Energy Sustainability, Malaysia Research Star Award 2016, 2018, 2019 and Top Research Scientists Malaysia 2018. Due to her various contributions globally and locally, she was promoted as Professor in 2016 at the age of 34 years old by Universiti Teknologi Malaysia. Dr Sharifah is also the Associate Editor for Journal of Cleaner Production.



### Trainer 3

Ir Dr Lim Jeng Shiun

Ir Dr Lim Jeng Shiun is the Products and Services Manager of Process Systems Engineering Centre (PROSPECT), Universiti Teknologi Malaysia. His core expertise is in the area of innovative development and application of process systems engineering techniques for resource conservation, and for energy and carbon planning. Dr Lim has published 82 Scopus indexed articles to date. His Scopus h-index is currently 21 with 1505 citations. He has also been appointed as the guest editor for Special Issue of JCLEPRO and Chemical Engineering Transactions (Scopus indexed).

He is also a professionally Certified Energy Manager, Certified Energy Auditor, Accredited Energy Measurement & Verification Professional and a Registered Electrical Energy Manager certified by Energy Commission of Malaysia. As an engineer in practice, he has applied the output of his research work in consultancy projects for the industrial community. He has been extensively involved in 22 research projects, 11 industrial based projects for various companies and government agencies. The key clients include local industries and multinational companies such as BERNAS, FABER MEDISERVE, SHELL, OLEON in Malaysia and PERTAMINA in Indonesia.

He has assisted those companies identify energy saving opportunities worth millions of dollar through the use of process integration and process systems engineering approach.

In commercialisation, Dr Lim is the cofounder and Director of Products and Services of a UTM Spin-off company. One of his product, e-SMART (an online energy monitoring system), have won the commercialisation grants that worth more than RM 800k.

# Training Registration Form

Course Title	Live with Instructor. Thermal Energy Recovery Technologist - Level 1: User
Course Date	

Registration Form email to [training@optimalsystems.my](mailto:training@optimalsystems.my)

Registration Type (Please √ in appropriate box)

☐

Individual

☐

Company – HRDF Registered

☐

Company – Non HRDF

☐

Government

## PARTICIPANTS' DETAILS

1.	Name			
	Position		Mobile No.	
	Email address		NRIC	
2.	Name			
	Position		Mobile No.	
	Email address		NRIC	
3.	Name			
	Position		Mobile No.	
	Email address		NRIC	
4.	Name			
	Position		Mobile No.	
	Email address		NRIC	

## ORGANIZATION DETAILS

Organization Name			
Organization Address			
PIC Email		PIC Telephone	

**Declaration** (Skip declaration 1 for Individual Registration)

1. I (name)\_\_\_\_\_ agree to send these particular trainees to attend the above training.

2. I agree to make full payment on the course fees stated at the invoice given to Optimal Systems Engineering Sdn Bhd before the training starts at the respective dates.

3. I agree for the course fee of training to be non-refundable but transferable in accordance to Optimise Training Policy, although our trainees withdraw after the confirmation letter has been issued.

By Signing below, I hereby agreed to attend and shall make the necessary payment as stipulated by the invoice from Optimal Systems Engineering. Except for individual registration, the signature below must be from either Chief Executive, Director, General Manager, HR / Training Manager or Assistant Manager.

Contact us : Mr Axel / Ms Thulasi  
Tel. No. : +60167167248 / +075536244  
Website : [www.optimalsystems.my](http://www.optimalsystems.my)  
Working Hours : Sunday - Thursday (9.00am - 5:00pm)

Organization Stamp / Signature\*

# COURSE SCHEDULE

This is a tentative schedule. Dates and assigned time are subject to changes.

Day 1	
8.30 am - 8.45 am	Participant Registration & Troubleshoot
8.45 am - 9.15 am	Online system briefing and familiarisation Ice Breaking
9.15 am - 10.15 am	Maximising Energy and Resource Cost Savings in Industry using Pinch Analysis
10.15 am - 10.45 am	Process Integration based on Pinch Analysis - The Basic Concepts
10.45 am - 11.00 am	Break
11.00 am - 1.00 pm	Setting the Minimum Energy Targets (Energy Targeting) using Composite Curves with working session
1.00 pm - 2.15 pm	Lunch and Prayer Break
2.15 pm - 3.15 pm	Significance of Composite Curves
3.15 pm - 3.30 pm	Break
3.30 pm - 5.00 pm	Energy Targeting using Problem Table Approach (PTA) with working session

Day 2	
8.30 am - 9.00 am	Tutorial
9.00 am - 9.30 am	Online Quiz
9.30 am - 10.30 am	Stream Data Extraction (SDE)
10.30 am - 10.45 am	Break
10.45 am - 11.15 am	Stream Data Extraction (SDE) Working Session
10.15 am - 1.00 pm	Design of Heat Recovery Network (HRN) by using Grid Diagram + Working Session
1.00 pm - 2.15 pm	Lunch and Prayer Break
2.15 pm - 3.15 pm	Transferring Grid Diagram back to Flowsheet + Working Session
3.15 pm - 3.30 pm	Break
3.30 pm - 5.00 pm	Design of Complex HRN (with Stream Splitting) + Working Session

For the latest training dates: kindly refer to [bit.do/optimize-training-register](https://bit.do/optimize-training-register)

**For online registration:** go to [bit.do/training-register](https://bit.do/training-register)

**For offline registration:** Fill up form and email to [training@optimalsystems.my](mailto:training@optimalsystems.my)

# COURSE SCHEDULE

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Day 3	
8.30 am - 9.00 am	Tutorial
9.00 am - 9.30 am	Online Quiz
9.30 am - 11.00 am	Minimum Units Targets
11.00 am - 11.15 am	Break
11.15 am - 12.15 pm	Reducing Number of Units + Working Session
12.15 pm - 1.00 pm	Economic Analysis + Working Session
1.00 pm - 2.15 pm	Lunch and Prayer Break
2.15 pm - 3.15 pm	Multiple Utility Targeting and Optimisation using Grand Composite Curve (GCC)
3.15 pm - 3.30 pm	Break
3.30 pm - 4.30 pm	Working Session
4.30 pm - 5.00 pm	Closing

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