

Centre for Energy Studies
Department of Mechanical Engineering
JNTUH College of Engineering, Hyderabad-85

Energy in all forms has become indispensable for fulfilling the needs of the ever increasing population. The energy consumption, mostly in the electrical form has increased with industrial growth widening the gap between energy demand and supply. Energy conversion, transmission and utilization in the most efficient way have gained importance for sustainability of the future needs. The use of renewable energy in all parts of the world and in different forms is on the rise. There is a growing awareness amongst the people, especially in the developing world to have cleaner air, water and better living conditions. To meet these requirements, scientists and engineers have been working world wide to find solutions to face these challenges. The requirements may vary regionally. However, the solutions can be adopted suitably. I hope, you wish to be a part of the select group!

The Centre offers this unique opportunity to get exposed to the technical intricacies through interdisciplinary P.G and doctoral programs offered. Graduate students of Chemical, Electrical and Mechanical Engineering streams are given excellent opportunity to acquire new competencies through fluids, renewable and computer laboratories are well equipped catering to the needs of both students and scholars. The achievements of the alumni and the contribution by the faculty in framing curriculum of National Level Energy Managers and Energy Auditors examination would vouch for the research and development activities carried out. In this era of globalization, the Centre is planning to build national and international partnerships to make this truly international program.

Vision and Mission:

- To provide quality education for graduate students by dissemination knowledge in inter disciplinary areas of science and technology
- To carry out both basic and applied research in solving diverse problems in energy sector.
- To develop innovative measures leading to technology up gradation and energy conservation.
- To undertake development, testing and transfer of technology to stake holders for sustainable development.
- Act as a nodal Centre for promoting sponsored research and industrial consultancy.

About the Centre:

Energy availability at economic cost is the driving force for any economy. In recent years, the growth in industrial/service sector has resulted in enhanced energy consumption widening the gap between the energy demand and supply. Energy conservation has attained priority as it is regarded as additional energy resource. A few organizations engaged in the field of energy studies confined their activities to the area of consultancy. Realizing this limitation, the School of Energy was established by the University in the year 1989.

Prior to the starting of the School of Energy, the University was offering a five semester part-time program in Energy Management. Academic Link Interchange Scheme (ALIS) existed with the Scottish Energy Centre (SEC) at Napier Polytechnic, Edinburgh, U.K in collaboration with the British Council Division, Madras. The outcome of ALIS was the establishment of the School of Energy in the year 1989 with the expertise of core faculty drawn from the constituent units of the University. The School of Energy commenced a 3-semester M.Tech program in Energy Systems in 1990. The School was later renamed as Center for Energy Studies (CES) in 1996. The Centre is brought under the administration of the college in 2003.

Unique Feature of the Centre:

The Centre offers M.Tech Energy Systems and PhD programs on regular and part time basis with a view to train personnel in efficient conversion and conservation of both conventional and renewable energy sources.

Graduate Engineering students of Electrical, Mechanical and Chemical branches are eligible to join M.Tech Energy Systems program which is unique in state of Andhra Pradesh. The course structure is reviewed once in three years and the subject content suitably modified to make the program not only challenging but also invigorating and inspiring.

Students are given excellent opportunity to acquire new competencies through innovative learning during their stay. The laboratories are well equipped catering to the needs of both students and scholars. In this era of globalization, the Centre is planning to build national and international partnerships through MOUs to make this a truly international program.

1. Faculty profile, adequacy and competency of faculty

S. No	Name of the staff	Qualification	Designation	Experience Teaching	Memberships of Professional bodies
1	Dr.M.T.Naik	M.Tech.Ph.D	Professor& Coordinator	19 Years	MISTE
2	Dr.K V Sharma	M.Tech.Ph.D	Professor	24Years	MISTE
2	Dr.A.Latha	M.Tech.Ph.D	Asst. Professor	10 Years	MISHMT, MISTE
3	P.S.Vijay Sagar	M.Tech.	Lecturer	6 Years	----
4	Sri. G Ravi	M.Tech.	Lecturer	2 Years	----

2. Student profile according to programmes of study, gender, region etc

Programme	Level of Study	Cut-off % of Marks at entry	Student Strength	Region (Andhra Pradesh/ Other states/NRI)
M.Tech (Reg.) (ES)	PG	GATE/PGCET	25	18/0/0
M.Tech (PTPG) (ES)	PG	University Entrance Test	30	30/0/0
Ph.D.	Ph.D	JNTUH ENTRANCE	18	14/0/0

3. Changes made in the courses or programmes during the past five years and the contribution of the faculty to those changes

Programme	Year	Faculty	Constitution of BOS and Faculty contribution
M.Tech	2005, 2009 & 2012	Energy Systems	Changes in the course structure and contents in the syllabus have been made thrice in the last eight years. The Board of Studies was constituted with members drawn from IITS, NITS, Universities, senior faculty of the Department and industry. Through discussions were taken place during the Board of studies meetings and syllabus content was designed as per the industry and R&D requirements. Faculty members of the Centre for Energy studies actively involved in the discussions and preparation of the draft of the syllabi.

4. Trend in the success rate and drop out rate of students during the last five years

Year	M.Tech Success Percentage (%)
2003-04	100
2004-05	100
2005-06	100
2006-07	100
2007-08	100
2008-09	100

5. Learning resources of the department like library, computers, laboratories and other such resources

Library

S.No	Name of the course	Text Books/Reference Books
1.	M.Tech.(ES)	200
2.	Indian Journals	30
3.	Foreign Journals	On line ASME, Elsevier, IEEE, Springer, Taylor & Francis

Computers

Sl No.	Particulars	Qty
1	Desktop Computers	18
2	Printers	3
3	Color printer	1

Laboratories

S.No.	Name of the Lab.	Available floor area (Sq.m)	Max. Batch Size	Weekly hours
1	Computer Lab	100	25	3 +3
2	Energy Lab	300	25	3+3
3	Thermo Fluids Lab	100	Research Lab	

Other Resources

- LCD projector - 1

- OHP (Over Head Projector) - 1

6. Enhancement of the learning resources during the past five years

Online journals access, Addition of text books and reference books in the central library concerned to the center. The Laboratories are Strengthened by the addition of the equipment viz. Weather station, boiling heat transfer unit, Mechanical heat pump, and infrared thermometer. Presentation methods are improved through power point and video lectures from different higher level institutions.

7. Modern Teaching methods in practice other than the lecture method

- Using audio visuals for effective teaching.
- Career Guidance and students counseling by the faculty
- Industrial visits
- Conducting expert lectures, seminars and workshops on current trends and emerging areas
- In-plant training for students during vacation
- Internet facility is made accessible to every student in addition to the conventional Library facility
- In addition to conventional teaching methods modern teaching methods like Collaborative and interactive teaching methods have been adopted.
- New teaching aids like PPT presentation etc. are incorporated in the teaching methods

8. Participation of teachers in academic and personal counseling of students

Faculty members of the Centre actively involve in the academic activities like conducting conferences, seminars and short term courses and published papers in the conferences and journals. Students are encouraged to participate in quiz competitions, debates, Group discussions and seminars. The faculty members also advice the students about job opportunities and their career growth.

9. Collaborations with other departments and institutions at the national and international level and their outcome during the past five years

The faculty interacts regularly with others working in Universities and institutions to undertake both academic and sponsored research and organizes programs in areas of mutual and current interest.

A sponsored research project “ Failure Analysis of BLISK at Blade Root” funding by Naval Science and Technological Laboratory; Visakhapatnam, is ongoing

A sponsored research project “The estimation of Heat Transfer Coefficient in two-phase flow condensation in semi-closed cycle” funded by naval Science and Technological Laboratory; Visakhapatnam with GITHAM University has been undertaken as a collaborative program.

Academic link with Andhra University have culminated in the award of PhD for two research scholars.

10. If research is a significant activity, the thrust areas of the department

- 1) Research in the areas of Renewable Solar Energy – Solar
- 2) Heat transfer in two phase flow
- 3) Enhancement of Heat transfer by using Nano fluids.
- 4) Energy Management / Energy Audits
- 5) Co-generation projects.

11. Details of the projects completed at the Centre for Energy studies last five years

Projects Completed

1. The estimation of Heat Transfer Coefficient in two-phase flow condensation in semi-closed cycle”
2. Failure Analysis of BLISK at Blade Root
3. CAD projects sponsored by BHEL Ramachandrapuram, Hyderabad
4. Experimental Design, Fabrication and analysis of solar flat plate collector system of different configurations and different working fluids
5. Theoretical Analysis of solar Flat Plate Collectors for performance estimation using neural networks
6. Performance Evaluation of Duct type Air heater with and without twisted tape insert for solar thermal application
7. Theoretical evaluation of the performance of symmetric and cambered aerofoil blades

12) Publication of the faculty for the past five years Details regarding citation index and impact factor analysis.

S. No	Name of the staff	International		National		No of Short term courses attended/ Workshops	Countries visited
		J	C	J	C		
1	Dr.M.T.Naik	15	4		4	11	France, Thailand
2	Dr K V Sharma	20	36	--	5	3	Malaysia, Singapore
3	A.Latha	--	1	--	4	2	US,England
4	M Vijaya Sagar						--
5	G.Ravi		1				---

13) Participation of the Department in the extension activities of the University

- NSS activities: Blood donation camps, Clean and green programs, Awareness programs on Climatic changes, Wealth out of waste.
- The centre has been in the forefront for the cause of sustainable development and working with organizations such as Winrock International, Energy Conservation Mission, Municipal Utilities in propagating the use of Renewable Energy resources and energy conservation

14) Method of continuous student assessment

- Conduct of two mid-semester examinations as part of the internal assessment of the student performance in each subject

- Giving and Evaluation of regular assignments
- Seminar presentations by students
- Assignment of Mini Projects in addition to main projects

15) Placement record of the past students and the contribution of the department to the Student placement

- There are separate Training and placement Officers at University and College levels taking care of students training programs, inviting Companies for conducting campus interviews for placement of students.
- Around 25% of our M.Tech. are getting placement through campus interviews
- More than 90% of the remaining students are getting jobs within one year of their completing the course

16) Significant achievements of the department or faculty or students during the past five years

- Six research scholars obtained their Ph.D. from the centre so far
- Eighteen more scholars are working for their Ph.D. in the Centre
- The centre is actively engaged in taking and execution of sponsored and R&D projects

17) Plan of action of the department for the next five years

- The centre is having plans of installation of solar power plant for catering the power needs of the centre
- The centre is planning to create a renewable energy park in the University Campus
- Further strengthening of the existing Laboratories with the addition of new equipment with state of the art Technologies
- Conduct of awareness programs on energy conservation methods and renewable energy resources

18) Any other highlights

- The centre has organized an International Conference on Heat and Mass Transfer in January 2008

19) Energy Laboratory (Renewable Energy Lab)

Experimental Setups for Solar Thermal Energy Conversion for M.Tech Energy and Thermal Students

- ★ Two Flat Plate Collectors working on thermosyphon principle of dimensions (1 x 1) and (2 x 1) m
- ★ Flat Plate Collector working with Forced convection principle
- ★ Evacuated Tube Collector (working on thermosyphon principle)
- ★ Evacuated Tube with Concentration (working with forced convection principle)
- ★ Solar distillation plant with (2 x 1) m collector
- ★ Solar Air heating with (2 x 1) m collector



(A) Solar Water Heating Systems



B).Solar Parabolic Concentrator



C) Solar Fuel Cell Trainer

20) Thermo Fluids Laboratory

Equipment fabricated / procured to estimate

- ★ Nucleate boiling heat transfer with refrigerant R114a as the working medium
- ★ Performance of mechanical heat pump
- ★ Nanofluid Forced convection heat transfer coefficients in plain tube and with twisted tape insert
- ★ Condensation heat transfer coefficient on a fin array
- ★ Emissivity of coated and uncoated surfaces
- ★ Natural convection heat transfer from a fin array
- ★ Heat transfer from a stationary or rotating cone
- ★ Efficiency of energy conversion to air flowing in a rectangular duct under laboratory conditions
- ★ Efficiency of energy conversion in evacuated and finned tube under laboratory conditions

21) Photograph of the Experimental setup fabricated by the Centre

Aim: To estimate the outlet temperature of the fluid at different simulated solar heat flux input condition. To study certain augmentation techniques



22) Photograph of the Experimental Set-up fabricated by the Centre

Experimental setup to demonstrate heat transfer along the conical surface with timer with application in spray drying



23) Computer Laboratory

- ★ Twenty five Computer systems and Five Work Stations with student computer ratio of 1:1 is available for class work.
- ★ The faculty is provided with computer for their research work