

Date: 02nd March 2023

A special Board of Studies of Department of Petroleum Engineering was held on 2nd March 2023 (Thursday) from 1.30 PM onwards, where the following BoS members of Department of Petroleum Engineering (SoET), the invited Dean SoET, and Department faculty members were present as special invitees to provide inputs for the agenda items.

Agenda 1:

Offering of Minor Specialization from Department of Petroleum Engineering:

The committee members discussed on the following agenda and unanimously decided to offer minor program entitled "Costal and Offshore Engineering" with the following details.

Broad name of the minor specialization: Coastal and Offshore Engineering

Name of the department offering this program: Department of Petroleum Engineering

Couse No	Course code	Course Name	L	T	P	Credit	To be offered in semester
1	XX - 01	Marine Geosciences	3	0	1	4	III
2	XX - 02	Physical Oceanography and Modelling	3	0	0	3	IV
3	XX - 03	Ocean Engineering and Technology	3	1	0	4	V
4	XX - 04	Design of Coastal Structures and Pipelines	3	0	0	3	VI
5	XX - 05	Advanced Design and Monitoring of Offshore Energy Systems	3	1	0	4	VII
					Total credit	18	

KDP

Minimum no of students for the course to be run: 30 (Thirty)

Agenda 2:

Offering of value-added professional Certificate courses for B. Tech. students of various engineering disciplines

The committee members discussed and debated on the above mentioned agenda 2 and unanimously decided to offer “value added certificate courses from the Department of Petroleum Engineering:

‘Sustainable Future’ in general means to achieve a supply of energy that is sustainable over long periods of time with manageable or no negative environmental impacts where a mix energy basket is the solution at least for the foreseeable future. Sustainability of the Earth with respect to energy security and green environment in the context of ever-increasing population is not an easy task but required a multidisciplinary team effort from many disciplines. The increasing demand for clean energy with minimum emission of hazardous greenhouse gases towards carbon-neutral future is driving the need for clean energy generation from unconventional resources or for development of efficient usage of carbon-based energy sources of fossil fuels i.e., crude oil and coal. This has been clearly evidenced by continuous decrease in fossil fuel resources and shifting towards renewable resources for production of alternative energies in greener way. Unfortunately, the ‘renewable’ options do not appear as attractive close up, as they do on first mention. Overall, the present picture we face is one of a gradually degrading environments and of a diminishing resource base of fossil fuels. Against this background of uncertain supply, a major long-term share for coal and petroleum crude oil for power generation and as a source of chemical feedstock appears inevitable. The paradigm shift from fossil fuel to bio-based feedstock provides a promising alternative to be converted to fuels, chemicals and carbon-based materials which are strongly linked with greener and environmentally friendly processes. The increasing demand for clean energy towards carbon-neutral future is driving the need for clean energy generation from unconventional and renewable resources. The present state of affairs would definitely improve our knowledge and stimulate further discussion in future to provide a multidisciplinary approach for educating the budding scientist and engineers and their understanding of global problems for the progress and sustainable development of human civilization. Moreover, with introduction of internet of things (IoT), artificial intelligence (AI) and Machine learning (ML) for easy and automated Industry 4.0 environment of every engineering sector, School of Energy Technology would like to offer the following value-added professional courses for B. Tech. students of various engineering branches.

1. Earth System Science for Energy and Environment
2. Petroleum Drilling and Production Engineering
3. Petroleum Reservoir Engineering
4. Fossil Fuels: Molecular Characterization for future sustainability

KBP

5. Renewable Energy

Salient features of each course:

- Designed for developing global perspective for global problems.
- 30 hours deliberation with tutorials and assignments.
- Certificate would be awarded after successful course completion.
- Courses shall be handled by Expert faculty members.

1. Earth System Science for Energy and Environment

The earth's dynamic system is the source of our all comforts and probably the sink of our all worries in terms of energy resources be it conventional or unconventional as well as environmental remediation. Earth's natural resources like minerals, rocks, fossil fuels and biomass to find out comfort of peaceful, energy sufficient living with sustainable development in an environmentally friendly habitable earth. Earth System Science deals with understanding the geological processes and their interaction with biosphere and atmosphere which helps to deepen the technical knowhow of specific practical challenges we face in our day-to-day life. The course contents focus virtually all aspects of understanding the earth processes particularly endogenic and surface processes of our mother earth as well as management of its resources and the environment in sustainable manner. This course focuses on many important aspects of mineral production and mining, geotechnology including construction, environmental protection, transportation, energy, water, and natural hazards management. After completion of this course the students would prepare themselves to do cutting edge research for solving complex problems of our earth and environment.

The main areas of coverage in the course:

- Energy and Environmental Engineering
- Engineering geology/geotectonic.
- Groundwater engineering.
- Mineral and mining geological engineering

2. Petroleum Drilling and Production Engineering:

The continuous and ever-increasing demand for fossil fuels and in particular oil and gas has pushed drilling and exploration industry to drill in ultra-deep waters (water depths more than 2000 m) with the wells drilled to depths in excess of more than 7500 m. These wells are very expensive to drill and complete with very high costs. Reservoir challenges are pore pressures that exceed 138 MPa beyond the limit of some current logging tools while the temperatures are not as extreme being around 125°C. Production and Maintenance strategies for subsea oil and gas production installations entail the use of specialized equipment and vessels to carry out

KBmi

subsea interventions. Development of technology intensive huge infrastructure in deep oceanic environment with high water depth pose challenge to every engineering discipline for petroleum drilling and production related activities.

The main areas of coverage in the course:

- Drilling engineering: involvement of all engineering disciplines
- Recent challenges in HTHP drilling environment.
- Production engineering: offshore infrastructure
- Smart production system and management
- Offshore production automation and monitoring

3. Petroleum Reservoir Engineering

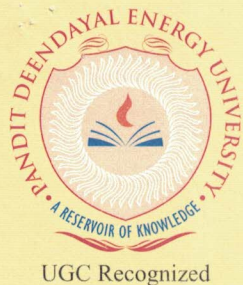
As significant amounts of crude oil remain trapped as residual oil inside the nano to micro-sized pores of the oil reservoirs, a small increment in the oil recovery efficiency would yield enormous economic benefits while enhanced oil recovery (EOR) techniques could provide better visualization for selection of optimized EOR methods once the molecular level interaction phenomenon among rock materials-crude oils and injection fluids is properly understood. Within the value chain of crude oil business, right from producing reservoir to refinery even in the downstream activities, various challenges are faced which could be addressed through molecular level chemical and structural characterization of crude oil components. Crude oil of different chemical composition and water intermixed in different points in the production and transportation system and caused serious flow assurance issues where molecular level characterization of crude oils is really helpful for designing proper remedial measure of all the issues related to flow assurance and demulsification.

The main areas of coverage in the course:

- Reservoir Thermodynamics
- Petrophysics and Reservoir Engineering.
- Enhanced Oil Recovery.
- Sensing Reservoir Dynamics
- Integrated Reservoir Management.

4. Fossil Fuels: Molecular Characterization for future sustainability

ABP



PANDIT DEENDAYAL ENERGY UNIVERSITY

Formerly

PANDIT DEENDAYAL PETROLEUM UNIVERSITY

Raisan, Gandhinagar – 382 426, Gujarat - INDIA. Website : www.pdpu.ac.in

NAAC Accredited 'A++' Grade (CGPA 3.52 out of 4.00)

NIRF India Rankings 2022: 89th in Management & 106th in Engineering category.

28753

Conversion of old plant and biomass through natural cooking processes within mother earth provide us fossil fuels, while contemporary biomass is used for hydrocarbon products like bio-chemicals and bio-fuels. Though, crude oil and coal is supplied the major shares of the energy demand of the civilized world, even today, the molecular architecture as well as the constituent components are not properly known in much details. Crude oil is a liquid by-product while coal is the residual solids of natural cracking process of bio-mass having complex mixture consisting predominantly of four main classes i.e., saturates, aromatics, resins and asphaltenes. Petroleum crude contain problematic asphaltene having different nature. The molecular structure in coal varies interestingly during the coalification process where molecular architecture vis-à-vis rank of coal has got a tremendous significance in determining the quality and suitability for specific applications such as feedstock for chemicals and synthetic fuels. Coal has shown optimistic results as a raw material to produce carbon nanofibers (CNF), nanotubes, nano-balls, graphene oxides (GO) and a variety of carbon-based nanomaterials where proper delineation of chemical moieties with rank of coal is also very important to generate these new era biomaterials. Microstructural characterization of different rank clearly demonstrated their strong potential for energy storage capability in lithium-ion battery (LIB) or in sodium-ion battery (NIB) application as well as electronic materials, in organic photovoltaics etc. Fossil fuels, a major source of energy and cheap feedstock of carbon and carbon-based materials, could provide a feasible solution for long-term sustainable application in different spheres of human civilization.

The main areas of coverage in the course:

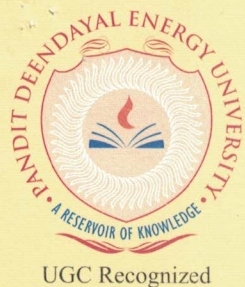
- Fossil Fuel: origin and composition
- Molecular architecture of fossil fuel system
- Molecular characterization and property understanding of fossil fuels.
- Synthesis for property tuning of components
- Application in modern advanced civilization.

5. Renewable Energy

The increasing demand for clean energy with minimum emission of hazardous greenhouse gases towards carbon-neutral future is driving the need for clean energy generation from unconventional and renewable resources. Renewable energy is derived from resources that are replenished naturally on a human timescale. Such resources include biomass, geothermal heat, sunlight, water, and wind. From sunlight, we get energy in the form of solar energy, from the wind we get wind power energy, from the force of the river flow we get hydro energy. There is also geothermal energy available in nature. Those energies are called renewable as the source of those energies will not get finished anyway.

The main areas of coverage in the course:

BBhwi



PANDIT DEENDAYAL ENERGY UNIVERSITY

Formerly
PANDIT DEENDAYAL PETROLEUM UNIVERSITY

Raisan, Gandhinagar – 382 426, Gujarat - INDIA. Website : www.pdpu.ac.in

NAAC Accredited 'A++' Grade (CGPA 3.52 out of 4.00)

NIRF India Rankings 2022: 89th in Management & 106th in Engineering category.

28752

- Solar Energy
- Wind Energy.
- Geothermal Energy.
- Ocean Energy.
- Bio-fuels.
- Energy storage and Transmission
- Electric Vehicle

Summary Table: Offering of value-added professional certificate courses for B. Tech. students of various engineering disciplines from the Department of Petroleum Engineering

Sl. No	Name of the course	Major area covered	Contact hours (L/T/P)	Minimum eligibility of students	Minimum number of students to run the course
1	Earth System Science for Energy and Environment	<ul style="list-style-type: none"> • Energy and Environmental Engineering • Engineering Geology/Geotectonic. • Groundwater Engineering. • Mineral and Mining Geological Engineering 	30 hours	B.Tech in any engineering discipline	15
2	Petroleum Drilling and Production Engineering:	<ul style="list-style-type: none"> • Drilling Engineering: involvement of all Engineering disciplines • Recent challenges in HTHP Drilling Environment. • Production Engineering: Offshore Infrastructure • Smart Production System and Management • Offshore Production Automation and Monitoring 	30 hours	B.Tech in any Engineering discipline	15

KBP

PANDIT DEENDAYAL ENERGY UNIVERSITY

Formerly

PANDIT DEENDAYAL PETROLEUM UNIVERSITY

Raisan, Gandhinagar – 382 426, Gujarat - INDIA. Website : www.pdpu.ac.in

NAAC Accredited 'A++' Grade (CGPA 3.52 out of 4.00)

NIRF India Rankings 2022: 89th in Management & 106th in Engineering category.

28751

3	Petroleum Reservoir Engineering	<ul style="list-style-type: none"> • Reservoir Thermodynamics • Petrophysics and Reservoir Engineering. • Enhanced Oil Recovery. • Sensing Reservoir Dynamics • Integrated Reservoir Management. 	30 hours	B.Tech in any Engineering Discipline	15
4	Fossil Fuels: Molecular Characterization for Future Sustainability	<ul style="list-style-type: none"> • Fossil Fuel: Origin and Composition • Molecular Architecture of Fossil Fuel System • Molecular Characterization and Property Understanding of Fossil Fuels. • Synthesis for Property Tuning of Components • Application in Modern Advanced Civilization. 	30 hours	B.Tech in any Engineering Discipline	15
5	Renewable Energy	<ul style="list-style-type: none"> • Solar Energy • Wind Energy. • Geothermal Energy. • Ocean Energy. • Bio-fuels. • Energy Storage and Transmission • Electric Vehicle 	30 hours	B.Tech in any Engineering discipline	15

The Chairman thanks to all the participated members for their valuable suggestions and inputs to prepare the 'minor specialization' and value added certificate courses to be offered from Department of Petroleum Engineering.



Department of Petroleum Engineering, School of Energy Technology
Board of Studies Meeting

Venue: Earth Science Lab, C Block, FF

Time: 1:30 pm

Date: 02nd March 2023

S.No.	Name of the Faculty	Designation	Signature
1	Dr. Uttam Kumar Bhui	Chairman - BoS	Uttam K. Bhui
2	Prof. (Dr.) Anirbid Sircar	Professor, Petroleum Engg.	Anirbid Sircar
3	Dr. Bhawanisingh Desai	Associate Professor, Petroleum Engg.	Bhawanisingh Desai
4	Dr. Lakshmanarao Jeeru	Assistant Professor (Invitee)	Lakshmanarao Jeeru
5	Dr. Praghmesh Bhatt	Dean - SoET	Praghmesh Bhatt
6	Manav D. Patel	B.Tech Petroleum 7th Sem. Student	
7	Tithee Bhavsar	B.Tech Petroleum 5th Sem. Student	Tithee Bhavsar
8	C.H. Prakash	M.Tech Petroleum 1st Sem. Student	C.H. Prakash
9	Dr. Rohit Srivastava	Invitee	Rohit Srivastava
10	Dr. Namrata Bist	Invitee	
11	Dr. Sivakumar P	Invitee	Sivakumar P
12	Dr. Hari Sreenivasan	Invitee	Hari Sreenivasan
13	Dr. Shanker Krishna	Invitee	Shanker Krishna
14	Dr. Paul Naveen	Invitee	Paul Naveen
15	Mr. Gaurav Hazarika	Invitee	
16	Dr. Amit Verma	Invitee	Amit Verma
17	Dr. Maunish Shah	Invitee	Maunish Shah
18	Dr. R Balasubramanian	Invitee	R Balasubramanian
19	Dr. Ranjan Sengupta	Invitee	
20	Dr. R K Vij	Invitee	R K Vij
21	Dr. Vivek Ramalingam	Invitee	Vivek Ramalingam
22	Dr. Achinta Bera	Invitee	Achinta Bera
23	Dr. N Madhavan	Invitee	N Madhavan