

**B.TECH-PETROLEUM ENGG (UPSTREAM) COURSE STRUCTURE*****(In line with Oklahoma University)*****First Year, I Semester****ENGL - Principles of English Composition I (ENGL-1113)**

Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	--	--	3	3	--	--	--	--	--	100

Systematic analysis of the components of effective writing, with regular practice and close individual assistance. Study of expository prose models.

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**First Year, I Semester**

<b>CHEM - General Chemistry I (CHEM-1315)</b>										
<b>Teaching Scheme</b>					<b>Examination Scheme</b>					
<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Hrs/Week</b>	<b>Theory</b>			<b>Practical</b>		<b>Total Marks</b>
					<b>MS</b>	<b>ES</b>	<b>IA</b>	<b>LW</b>	<b>LE/Viva</b>	
4	1	--	5	5	30	60	10	--	--	<b>100</b>
<p><b>Unit I</b> <span style="float:right"><b>Hours: 10</b></span></p> <p><b>Water and its Treatment:</b> Introduction, sources of water Impurities in water, hard and soft water, Degree of hardness, Types of hardness, Scale and sludge formation in boiler, Priming and Foaming, Softening of water.</p> <p><b>Unit II</b> <span style="float:right"><b>Hours:12</b></span></p> <p><b>Corrosion and its Control:</b> Introduction, Theories of corrosion, Types of corrosion, Protection of metals from corrosion – organic and inorganic materials, Inhibitors, Cathodic protection.  <b>Chemistry of Fuels:</b> Origin, Classification and properties of Solid, Liquid, Gaseous Fules, Proximate and Ultimate analysis, Petroleum- Distillation and Uses, Calorific Value, Determination of Calorific Value of solid and liquid fuels, Fuel Cell and Fuel Cell technology</p> <p><b>Unit III</b> <span style="float:right"><b>Hours:10</b></span></p> <p><b>Cements:</b> Introduction, Manufacturing of Portland cement, chemical composition of cement, Properties and application of different types of cement, Setting and hardening of cement, Heat of hydration, Environmental impact of cement manufacturing.</p> <p><b>Green Chemistry:</b> Principles of Green Chemistry, Acid rain, Green house effect, Depletion of Ozone layer, Green chemical technology</p> <p><b>Unit IV</b> <span style="float:right"><b>Hours:12</b></span></p> <p><b>Polymers:</b> Classification, Types of polymerization reactions, Preparation of some commercially important polymers, Resins- Phenol formaldehyde Resins, Urea formaldehyde resin, Epoxy resins. Some aspects of supramolecular chemistry.</p> <p><b>Texts and References</b></p> <ol style="list-style-type: none"> <li>Jain and Jain, Engineering Chemistry, Dhanpat Rai Publication</li> <li>James G. Speight, The Chemistry and Technology of Petroleum, CRC Press, New York.</li> <li>Vasily Simanzhenkov &amp; Raphael Idem, Crude Oil Chemistry, Marcel Dekker, New York.</li> <li>James G. Speight, Fuel Science and Technology Hand Book, Marcel Dekker, New York.</li> <li>M.A. Famin, T.A. Al-Sahhaf, A.S. Elkilani, Fundamental of Petroleum Refining, , Elsevier</li> <li>S. N. Banerjee, An introduction to science of corrosion and its inhibition, Oxonian Press,</li> </ol>										

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**First Year, I Semester**

1985

7. Mars Guy Fontana , *Corrosion Engineering*, 3/E, Tata McGraw-Hill Education

**CHEM - General Chemistry I (CHEM-1315)**

Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
5	--	--	5	5	--	--	--	--	--	100

Basic measurement, gas laws and changes in state, stoichiometry, atomic theory, electron configuration, periodicity, bonding, molecular structure and thermochemistry.

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**B.TECH-PETROLEUM ENGG (UPSTREAM) COURSE STRUCTURE***(In line with Oklahoma University)***First Year, I Semester****MATH - Mathematics I**

Teaching Scheme					Exam Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	1	--	4	4	30	60	10	--	--	100

**Unit I****Hours: 10**

**Systems of Linear Equations and Matrices:** Matrix, Some Definitions Associated with Matrices Systems of Linear Equations, Matrices and Elementary Row Operations, The Inverse of a Square Matrix, Matrix Equations, Rank of the Matrix, Applications of Systems of Linear Equations.

**Linear Transformation:** Linear Transformations, Composition of Linear transformation The Null Space and Range, Isomorphisms, Inverse Linear Transformation, Matrix Representation of Linear Transformations, Similarity.

**Eigen Value and Eigen Vectors:** Eigen value and Eigen Vectors, Diagonalization, Cayley-Hamilton Theorem, Quadratic Form.

**Unit II****Hours:12**

**Vector Spaces:** Euclidean Vector Space, Vector Spaces, Subspaces, Linear Combination, Span, Linear Dependence and Independence, Basis, Finite Dimensional Vector Space, Basis and Dimension for Solution Space of the Homogeneous Systems, Reduction and Extension of Basis, Coordinate Vector Relative to Basis, Change of Basis, Row Space, Column Space and Null Space, Rank and Nullity

**Unit III****Hours: 10**

**Inner Product Spaces:** Introduction, The Dot Product on  $\mathbb{R}^n$  and Inner Product Spaces, Orthogonal Basis Orthonormal Bases, Gram-Schmidt Process, Orthogonal Complements, Application: Least Squares Approximation, Orthogonal Projection Diagonalization of Symmetric Matrices, Application: Quadratic Forms

**Unit IV****Hours:10**

**Complex Analysis:** Complex numbers, Exponential, Trigonometric, De Moivre's Theorem, Roots of a complex number Function of a Complex variable, Analytic function, Cauchy Riemann equations, Laplace Equation, Harmonic Functions, Harmonic Conjugate functions and their Engineering Applications Conformal mapping and its type, Some standard & special conformal mappings, Definition of a Complex line integral, Cauchy's integral theorem, Cauchy's Integral formula, Residue theorem, Calculation of residues, Evaluation of real definite integrals.

**Total Hours: 42**

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**B.TECH-PETROLEUM ENGG (UPSTREAM) COURSE STRUCTURE**

**(In line with Oklahoma University)**

**First Year, I Semester**

**Textbook For Calculus:**

1. Higher Engineering Mathematics, by B. S Grewal, Khanna Publication, Delhi

**Reference Books for Elements of Mechanical Engineering:**

1. Higher Engineering Mathematics Vol. 1 by Dr. K.R.Kachot, Mahajan Publishing House
2. Higher Engineering Mathematics Vol. 2 by Dr. K.R.Kachot, Mahajan Publishing House
3. Complex Variables and Applications, by R. V. Churchill and J. W. Brown (7th Edition), McGraw-Hill.
4. Complex Analysis, by J. M. Howie, Springer-Verlag (2004)
5. Complex Variables-Introduction and Applications, by M. J. Ablowitz and A.S. Fokas, Cambridge University Press, 1998 (Indian Edition).
6. Introduction to Linear Algebra with Application, by Jim Defranza, Daniel Gagliardi, Tata McGraw-Hill
7. Elementary Linear Algebra, Applications version, by Anton and Rorres, Wiley India Edition.
8. Advanced Engineering Mathematics, by Erwin Kreysig, Wiley Publication.
9. Elementary Linear Algebra, by Ron Larson, Cengage Learning.
10. Calculus, Volumes 2, by T. M. Apostol, Wiley Eastern.
11. Linear Algebra and its Applications, by David C. Lay, Pearson Education

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**B.TECH-PETROLEUM ENGG (UPSTREAM) COURSE STRUCTURE*****(In line with Oklahoma University)*****First Year, I Semester****MATH - Differential and Integral Calculus I (MATH 1914)**

Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
4		--	4	4	--	--	--	--	--	<b>100</b>

Limits and continuity, differentiation, applications of differentiation to optimization and curve sketching, integration, the fundamental theorem of calculus, the substitution rule, applications of integration to computation of areas.

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**B.TECH-PETROLEUM ENGG (UPSTREAM) COURSE STRUCTURE****(In line with Oklahoma University)****First Year, I Semester****HIST - Swami Vivekananda:Life and Teachings**

Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	--	--	3	3	30	60	10	--	--	100

**Unit I: Life of Young Naren****Hours: 10**

Early years – Young Naren and his friends, At the feet of Sri Ramakrishna, Training of the disciple, As a wandering monk, On the World Stage - Trip to America, The parliament of Religions, Vedanta in America, Experiences in the West, Triumphal Return to India – Calcutta and North India, The Himalayas, At Belur Math, Second visit to The West, To Europe, The Journey's End – Last Days, The passing.

**Unit II : Insights – Karma, Raja, Jnana and Bhakti Yoga****Hours: 10**

*Karma Yoga* - Karma and its effect on character, The secret of work, Duty, Freedom. *Raja Yoga* – Prana, Control of Psychic Prana, Dharana, Dhyana and Samadhi. *Jnana Yoga* – Real Nature of man, Maya and Illusion, God in Everything, Realisation, Cosmology, Freedom of the soul. *Bhakti Yoga* – Need of Guru, Incarnate teachers and incarnations, Om: Word and Wisdom.

**Unit III: Swamiji's Thoughts and Story****Hours: 10**

On The Ramayana and Mahabharata, Thoughts on the Gita, The story of Prahalada and Jada Bharata, The Great teachers of the World, On Lord Budhha, Christ, Indian Religious Thoughts, Art in India, The Claims of Religion, Concentration and Meditation, Spiritual Research.

**Unit IV: Modern, Rational and Universal Teachings****Hours: 9**

Divinity of man, Call to the youth of India, Self confidence, Faith-The source of strength, The power of will, The power of mind, Self motivation, Education, Religion, Love and purity, Give Up Superstition, True Effort, Be Brave, Service, Way to success, Leader and Organization, Secret of work.

**Total Hours: 39****Texts and References:**

1. Banhatti, G.S.; Life and Philosophy of Swami Vivekananda; New Delhi: Atlantic Publishers & Dist, 1995.
2. Desh Raj Sirswal; Value Education and Philosophy (A tribute issue to Swami Vivekananda); Milestone Education Review, 2014
3. Swami Vivekananda; Living at the Source: Yoga Teachings of Vivekananda; Shambhala Editions, 1993.

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HIST - U.S. 1942 – 1865 , or U.S. 1865 – Present (HIST-1493)										
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	--	--	3	3	30	60	10	--	--	<b>100</b>
<p>A general survey of United States history from the Civil War to the present day, with emphasis upon national political, diplomatic, economic, constitutional, social and intellectual developments.</p>										

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**B.TECH-PETROLEUM ENGG (UPSTREAM) COURSE STRUCTURE*****(In line with Oklahoma University)*****First Year, I Semester**

<b>Elective - Basic Environmental Studies</b>										
<b>Teaching Scheme</b>					<b>Examination Scheme</b>					
<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Hrs/Week</b>	<b>Theory</b>			<b>Practical</b>		<b>Total Marks</b>
					<b>MS</b>	<b>ES</b>	<b>IA</b>	<b>LW</b>	<b>LE/Viva</b>	
3	--	--	3	3	30	60	10	--	--	<b>100</b>
<p><b>Unit-I</b> <span style="float: right;"><b>Hours: 09</b></span>            Multidisciplinary nature of environmental studies, Ecosystems, Biodiversity and conservation, Indicators of environmental pollution, Environment and human health</p> <p><b>Unit-II</b> <span style="float: right;"><b>Hours: 10</b></span>            Consumption of natural resources and environmental degradation (forests, water, minerals, energy, and land), Sustainable development, Environmental policy and legislation, Environmental impact assessment</p> <p><b>Unit-III</b> <span style="float: right;"><b>Hours: 10</b></span>            Pollution of lakes, rivers, ground water, coasts, and oceans, Science and technology for drilling waste water and wastewater treatment and issues in management of systems, Solid and hazardous waste management (causes, effects and control measures)</p> <p><b>Unit-IV</b> <span style="float: right;"><b>Hours: 10</b></span>            Air and noise pollution (science and engineering of pollution control), Global Issues including climate change, global warming, acid rain, ozone layer depletion, nuclear hazards, Disaster management (industrial accidents, floods, earthquakes, cyclones and landslides)</p> <p style="text-align: right;"><b>Total Hours: 39</b></p>										
<b>References:</b>										
<ol style="list-style-type: none"> <li>1. Principles of Environmental Science, Cunningham W.P. and Cunningham M.A. (Tata McGraw-Hill Publishing Company, New Delhi.</li> <li>2. Basic Environmental Technology, Nathanson, J.A. (2002), Prentice Hall of India, New Delhi.</li> <li>3. Wastewater Treatment for Pollution Control and Reuse, Arceivala, S.J. and Asolek S.R. (2006), 3rd Edition, Tata McGraw Publishing Co. Ltd., New Delhi.</li> <li>4. Preventive Environmental Management – An Indian Perspective, Asolekar, S.R. and Gopichandran, R. Foundation Books Pvt. Ltd., New Delhi, 2005.</li> <li>5. Environmental Studies: R. Rajagopalan, Oxford University Press</li> </ol>										

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Elective - Social Science										
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	--	--	3	3	30	60	10	--	--	<b>100</b>
<b>The detailed course need to be taken from Oklahoma University</b>										

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