



Phone 0474 2712240  
Fax 0474 271181  
E-mail tkmarts@gmail.com  
PB NO 1300  
Website www.tkmcas.ac.in

## T. K. M. COLLEGE OF ARTS AND SCIENCE

Kollam-691005, Kerala

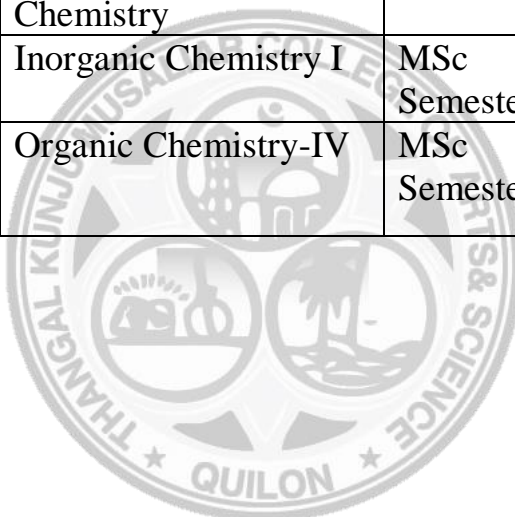
<b>DEPARTMENT OF ENGLISH</b>			
<b>Items offered under the syllabus</b>	<b>Course</b>	<b>Semester</b>	<b>Module which include the content</b>
Environment and Sustainability	Writings on Contemporary Issues	BA/BSc Semester I	Module 1, 6 and 8
	Writings on Contemporary Issues	BA English Language and Literature Semester I	Module 1 and 2
	Environmental Studies	BA/BSc Semester II	Module 1 to 4
Professional Ethics	Writings on Contemporary Issues	BA/BSc Semester I	Module 2 and 3
Gender	Writings on Contemporary Issues	BA/BSc Semester I	Module 4 and 7
	Writings on Contemporary Issues	BA English Language and Literature Semester I	Module 4

	Gender Studies	BA Semester VI	Module 1 to 4
Human Values	Writings on Contemporary Issues	BA/BSc Semester I	Module 4 and 6
	Writings on Contemporary Issues	BA English Language and Literature Semester I	Module 3
	Gender Studies	BA Semester VI	Module 4
Women	British Literature II	BA Semester IV	Module 4
	20th Century Malayalam Literature in English Translation	BA Semester III	Module 3
	20th Century Malayalam Literature in Translation	BA Semester V	Module 2
Gender	Critical Studies I	MA Semester II	Module 5
	Critical Studies II	MA Semester III	Module 5
Women	Critical Studies I	MA Semester II	Module 5
	Critical Studies II	MA Semester III	Module 5
<b>DEPARTMENT OF ECONOMICS AND MATHEMATICS</b>			
<b>Items offered under the syllabus</b>	<b>Course</b>	<b>Semester</b>	<b>Module which include the content</b>
Human Values	Economic Growth and Development	Semester III	Module 2

<b>DEPARTMENT OF COMMERCE</b>			
<b>Items offered under the syllabus</b>	<b>Course</b>	<b>Semester</b>	<b>Module which include the content</b>
Environment and Sustainability	Environmental Studies	Semester I	Module 1 to 5
Professional Ethics	Methodology and Perspectives of Business Education	Semester I	Module 4
	Functional Application of Management	Semester I	Module 5
	Methodology and Perspectives of Business Education	Semester I	Module 1 to 5
	Informatics and Cyber Laws	Semester II	Module 4
	Business Communication and Office Management	Semester II	Module 2
	Business Ethics and Corporate Governance	MCOM Semester I	Module 1 to 5
<b>DEPARTMENT OF BOTANY</b>			
<b>Items offered under the syllabus</b>	<b>Course</b>	<b>Semester</b>	<b>Module which include the content</b>
Environment and Sustainability	Plant Physiology, Ecology, Plant Biotechnology and Horticulture	Semester IV	Module 1 to 4
	Environmental studies & Phytogeography	Semester V	Module 1 to 6
<b>DEPARTMENT OF ZOOLOGY</b>			
<b>Items offered under the syllabus</b>	<b>Course</b>	<b>Semester</b>	<b>Module which include the content</b>
Environment and Sustainability	Biostatistics and Bioinformatics	Semester III	Module 1 to 6
	Functional Zoology	Semester III	Module 2

	Ecology, Habitat Destruction & Disaster Management	Semester IV	Module 1 to 10
	Public Health and Hygiene	Semester V	Module 1 to 6
	Immunology and Microbiology	Semester V	Module 7
	Economic Zoology – Vermiculture and Apiculture	Semester VI	Module 1 to 6
	Ecology, Ethology, Evolution and Zoogeography	Semester VI	Module 1 to 12
<b>DEPARTMENT OF ISLAMIC HISTORY</b>			
<b>Items offered under the syllabus</b>	<b>Course</b>	<b>Semester</b>	<b>Module which include the content</b>
Gender	Contemporary Debates on Islam	Semester VI	Module 4
Women	Foundations of Islamic Culture	Semester II	Module 2
	Life and Times of Prophet Muhammad	Semester II	Module 4
	Islamic Culture and Civilization	Semester III	Module 1
	The Abbasiya Caliphate	Semester IV	Module 4
	Contemporary Debates on Islam	Semester VI	Module 4
Professional Ethics	Informatics	Semester III	Module 3 and 4
	Islamic Culture and Civilization	Semester III	Module 3
Human Values	Contemporary Debates on Islam	Semester VI	Module 6

<b>DEPARTMENT OF BIOCHEMISTRY</b>			
<b>Items offered under the syllabus</b>	<b>Course</b>	<b>Semester</b>	<b>Module which include the content</b>
Professional Ethics	Tools and Techniques in Biochemistry	MSc Semester I	Module 4
	Methods in Research	MSc Semester II	Module 2
<b>DEPARTMENT OF CHEMISTRY</b>			
<b>Items offered under the syllabus</b>	<b>Course</b>	<b>Semester</b>	<b>Module which include the content</b>
Environment and Sustainability	Theoretical Chemistry	Semester I	Module 4
	Inorganic Chemistry I	Semester I	Module 5
	Environmental Chemistry	Semester V	Module 1 to 6
	Inorganic Chemistry I	MSc Semester I	Module 5
	Organic Chemistry-IV	MSc Semester IV	Module 5



## Course Material

### Modules 1-3

Core Reading: *English Language Skills for Communication I*

### Module 4

Core Reading: *Dramatic Moments: A Book of One Act Plays*. Orient Black Swan, 2013

The following one act plays are prescribed:

H.H.Munro	<i>The Death Trap</i>
Philip Moeller	<i>Helena's Husband</i>
Serafin and Joaquin Alvarez Qunitero	<i>Sunny Morning: A Comedy of Madrid</i>
Margaret Wood	<i>Day of Atonement</i>

### For further Reading

Marks Jonathan. *English Pronunciation in Use*. New Delhi: CUP, 2007.

Lynch, Tony. *Study Listening*. New Delhi. CUP, 2008.

Kenneth, Anderson, Tony Lynch, Joan Mac Lean. *Study Speaking*. New Delhi: CUP, 2008.

### Reference

Jones, Daniel. *English Pronouncing Dictionary 17th edition*. New Delhi: CUP, 2009.4

## SEMESTER I

### FIRST DEGREE PROGRAMME IN ENGLISH (CBCS System)

#### Foundation Course I for BA/BSc - WRITINGS ON CONTEMPORARY ISSUES: EN 1121

No. of credits: 2

No. of instructional hours: 4 per week (Total 72 hrs.)

### AIMS

1. To sensitize students to the major issues in the society and the world.
2. To encourage them to read literary pieces critically.

### OBJECTIVES

On completion of the course, the students should be able to

1. have an overall understanding of some of the major issues in the contemporary world.
2. respond empathetically to the issues of the society.
3. read literary texts critically.

### COURSE OUTLINE

#### Module I: Globalization and its Consequences

Essays: (1) "The Globalized World" – Avinash Jha.

(2) "Globalization and Education: Third World Experience" – Amit Bhaduri.

Poem: "Unending Love" - Rabindranath Tagore

**Module II: Environmental Issues**

Essay: “Forests and Settlements” - Romila Thapar Poems: (1) “God’s Grandeur” - G.M.Hopkins  
(2) “The World is too Much with Us” - Wordsworth

**Module III: Human Rights**

Essay: “Thinking about Human Rights” - Manisha Priyam, Krishna Menon & Madhulika Banerjee,  
Poem: “London” - William Blake  
Fiction: *Untouchable* [an extract] – Mulk Raj Anand

**Module IV: The Gender Question**

Essays: “Gender, Culture and History” – Manisha Priyam, Krishna Menon & Madhulika Banerjee,  
Fiction: “The Elder Sister” – M. T. Vasudevan Nair

**COURSE MATERIAL****Modules 1 - 4**

**Core reading:** *Meeting the World: Writings on Contemporary Issues*. Pearson, 2013.

**Semester II****First Degree Programme in English (CBCS System)****Common for B.A/B Sc [EN1211.1] & 2(a) [CG1271]**

**No. of Credits: 4**

**No. of instructional hours: 6 per week (Total 90 hrs)**

**ENVIRONMENTAL STUDIES****Module 1**

Environmental studies: Definition, Need, Scope and Importance, Need for public awareness. Natural resources- Forest resources, water resources, mineral resources, food resources, energy resources, land resources- over exploitation, case studies.

**Module 2**

Eco-system- structure and function, producers, consumers and decomposers energy flow in the ecosystem, ecological succession, forest ecosystem, grassland ecosystem, desert ecosystem and aquatic ecosystem. Biodiversity and its value and conservation, hot spots of biodiversity, India as a mega-diversity nation, endangered and endemic species of India, conservation of bio-diversity. In-situ and Ex-situ conservation of bio-diversity. Sustainable use of forest – water- land -resources –Human population and its impact on environment.

**Module 3**

Pollution: air, water, soil and marine, noise, thermal and nuclear hazards. Solid waste management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management. Social issues and the Environment: from unsustainable to sustainable development, water conservation-rain water harvesting; global warming; consumerism and waste products: various acts to protect the environment; Environment protection Act; Air (Prevention and Control of Pollution) Act; Water (Prevention and Control of pollution) Act; Wild Life Protection Act; Forest Conservation Act:

## Module 4

Human population and Environment: Population explosion, Family Welfare Programmes, Environment and human health; human rights, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human health.

Field work and Project- Visit to ecologically polluted spots: Study of nature: study of forest, insects, animals, birds and plants. Project Report on the basis of field work about 15 pages.

**Total Marks: 100**

**Written Exam: 60 Marks**

Internal Assessment: 15 Marks (Attendance- 5 marks+ 10 test paper)

Field work and project: 25 Marks

### Books for Reference:

- Adams, W.M. Future Nature: A Vision for Conservation. London: Earthscan, 2003.
- Arnold, David and Ramachandra Guha, ed. Nature, Culture and Imperialism: Essays on the Environmental History of South Asia. New Delhi: Oxford UPM 2001.
- Bahuguna, Sunderlal. "Environment and Education". The Cultural Dimension of Ecology. Ed. Kapila Vatsyayan. New Delhi: D.K. Printworld. 1998.
- Crson, Rachel. Silent Spring. Boston: Houghton Mifflin, 1962.
- Guha, Ramachandra- Environmentalism: A Global History, New Delhi: Oxford UP, 2000.
- Hayward, Tim. Ecological Thought: An Introduction: Cambridge; polity, 1994.
- Merchant, Crolyn. The Death of Nature. New York: Harper, 1990.
- Gleick H.P. 1993. Water in Crisis, Pacific Institute for Studies in development Environment and security. Stockholm Env Institute. OUP 473 p.
- Heywood V and Watson R.E. 1995. Global biodiversity Assessment. CUP 1140p
- Odum FP. 1971. Fundamentals of Ecology. W.B Saunders Co. USA 574p
- Rao. M. N and Dutta A.K. 1987. Waste Water Treatmentt. Oxford and IBH Publ Co Pvt.
- Wagner K.D. 1998. Environmental Management. WB Saunders Co. Philadelphia, USA. 499p.

## SEMESTER II

### FIRST DEGREE PROGRAMME (CBCS System)

### MODERN ENGLISH GRAMMAR AND USAGE

**Common for BA/BSc: EN 1212.1, BCom: 1211.2 & Career related 2(a):1211.3**

**(2012 Admission onwards)**

**No. of credits: 3**

**No. of instructional hours: 4 per week (Total 72 hrs.)**

**AIMS:** 1. To help students have a good understanding of modern English grammar.

2. To enable them produce grammatically and idiomatically correct language.
3. To help them improve their verbal communication skills.
4. To help them minimise mother tongue influence.

**SEMESTER III**  
**FIRST DEGREE PROGRAMME IN**  
**ENGLISH LANGUAGE AND LITERATURE (CBCS System)**

&

**CAREER RELATED FIRST DEGREE PROGRAMME 2(a) (CBCS System) ENGLISH & COMMUNICATIVE ENGLISH**

**Core Course IV –20<sup>th</sup> CENTURY MALAYALAM LITERATURE IN ENGLISH TRANSLATION**

**Common for EN 1342 & CG 1342**

**No. of Credits: 4**

**No. of instructional hours: 5 per week [Total: 90 hours]**

- Aims:**
1. To introduce the students to the richness of twentieth century Malayalam writing
  2. To provide the students a basic understanding of twentieth century Malayalam Writing
  3. To introduce to them some of the major twentieth century Malayalam writers
  4. To help them analyse and appreciate twentieth century Malayalam literature.

**Objective:** On completion of the course, the students should be able to

1. Discern the richness of twentieth century Malayalam writing
2. Discern the distinctiveness of twentieth century Malayalam writing
3. Discuss the salient features of the works of major twentieth century Malayalam writers
4. Analyse and appreciate twentieth century Malayalam writing

**COURSE OUTLINE**

**Module 1:** Introduction to Malayalam Literature in the twentieth century

**Module 2:** Malayalam Poetry in the twentieth century

**Module 3:** Malayalam Fiction in the twentieth century

**Module 4:** Malayalam Drama in the twentieth century

**COURSE MATERIAL**

**Module 1: Introduction to Malayalam Literature in the twentieth century.**

Malayalam Literature ‘After Independence’ - The modern age – characteristics – rise of the Malayalam novel – the Romantics in Malayalam poetry – major poets – rise of drama – novel and the short story in the 20<sup>th</sup> century – Malayalam literature after independence – poetry – fiction – drama.

**Reference Text:**

*A Short History of Malayalam Literature* - K. Ayyappa Paniker - Information & Public Relations Department, Kerala State, April 2006.

[ebook available on: [www.suvarnakeralam.kerala.gov.in/book.pdf](http://www.suvarnakeralam.kerala.gov.in/book.pdf)]

**Module 2: Malayalam Poetry in the twentieth century.**

The modern age – characteristics – the Romantics in Malayalam poetry – second generation of romantics and the early 20<sup>th</sup> century – modernist phase in malayalam poetry – O.N.V. Kurup, Vyloppilli Sreedhara

Menon, Ayyappa Paniker, Sugathakumari, Kadammanitta Ramakrishnan, Balamani Amma, Vishnu Narayanan Namboodiri, D. Vinayachandran, Sachidanandan, Balachandran Chullikad, etc.

**Detailed study of the following poems:**

- |    |                             |   |                             |
|----|-----------------------------|---|-----------------------------|
| 1. | ONV Kurup                   | – | “A Requiem to Mother Earth” |
| 2. | Balachandran Chullikkad     | – | “Where is John?”            |
| 3. | Vishnu Narayanan Namboodiri | – | “The Autograph Tree”        |
| 4. | Sugatha Kumari              | – | “The Temple Bell”           |
| 5. | Nalapat Balamani Amma       | - | “The Story of the Axe”      |
| 6. | Vyloppilli Sreedhara Menon  | - | “The Son of Sahyan”         |
| 7. | K. Ayyappa Paniker          | - | “Lay of the Anklet”         |
| 8. | D. Vinayachandran           | - | “Advent”                    |

**Core reading:** *In the Shade of the Sahyadri: Selections from Malayalam Poetry and Short Fiction.* OUP, 2012.

**Module 3: Malayalam Fiction in the twentieth century.**

Malayalam fiction in translation – socio-educational influences – conditions favouring birth of Malayalam novel – Appu Nedungadi and Chandu Menon – translation of *Indulekha* - modernity in Malayalam fiction - late forties: works of M. T. Vasudevan Nair, Malayattoor Ramakrishnan – development into the present - O.V.Vijayan, M. Mukundan, etc - characteristics of their fiction.

Malayalam short story in English translation – representative masters of the craft - Thakazhi, Basheer, Lalithambika Antharjanam, Paul Zacharia, etc. – new generation writers - modern women short story writers.

**Non-detailed study:**

**(a) Novels:**

- Malayattoor Ramakrishnan, *Roots* (Novel), Tr. V. Abdulla, Orient Blackswan, 2009.
- M. T. Vasudevan Nair, *Mist*. Orient Longman.

**(b) Short stories:**

- |     |                             |   |  |
|-----|-----------------------------|---|--|
| 1.  | Thakazhy Sivasankara Pillai | – | “In the Flood”                               |
| 2.  | Vaikkom Muhammed Basheer    | – | “The World Renowned Nose”                    |
| 3.  | T.Padmanabhan               | – | “The Girl Who Spreads Light”                 |
| 4.  | Paul Zacharia               | – | “The Last Show”                              |
| 5.  | Lalithambika Antharjanam    | – | “Wooden Cradles”                             |
| 6.  | C. Ayyappan                 | – | “Spectral Speech”                            |
| 7.  | Gracy                       | – | “Orotha and the Ghosts”                      |
| 8.  | Ashita                      | – | “In the Moonlit Land”                        |
| 9.  | Chandramati                 | – | “The (Postmodern) Story of Jyoti Vishwanath” |
| 10. | K.R. Meera                  | – | “The Vein of Memory”                         |

**Core reading:** *In the Shade of the Sahyadri: Selections from Malayalam Poetry and Short Fiction.* OUP, 2012.

**Semester I**

**Foundation Course 1- EN 1121 (B A/ B. Sc) and CG 1121.3 [Career Related 2 (a) Programme]**

**Course Title: WRITINGS ON CONTEMPORARY ISSUES**

**Credits: 2**

**Hours: 4/week (72 hrs)**

**Learning Objectives:**

1. To sensitize students to the major issues in the society and the world.
2. To provide students with a variety of perspectives on contemporary issues.
3. To encourage them to read literary pieces critically.

**Learning Outcomes:**

On completion of the course, the students should be able to

1. Have an overall understanding of some of the major issues in the contemporary world
2. Respond empathetically to the issues of the society
3. Read literary texts critically

**Course Description**

1. Living in the Planet of the Apps by Khyrunnisa A.
2. Ageing in India: Some Social Challenges to Elderly India by Abhay B. Mane
3. India's Women: The Mixed Truth by Amartya Sen
4. Drug Abuse: Causes and Solutions by Samudranil Mukherjee
5. Artificial Intelligence by Gareth Southwell
6. Universal Declaration of Human Rights by Leah Levin
7. What Secularism is and is not by Romila Thapar
8. The Globalisation of Inequality by P. Sainath

**SEMESTER IV**  
**FIRST DEGREE PROGRAMME IN**  
**BA ENGLISH LANGUAGE AND LITERATURE (CBCS System)**

**Core Course 4:EN 1441 British Literature II**

**No. of Credits: 4**

**No. of instructional hours: 5 per week [Total: 90 Hours]**

**Aim:** Introduce the historical and philosophical shifts in English literature since 17<sup>th</sup> century.

**Objectives:**

1. Familiarize the history of English literature from the 18th century to the Victorian age
2. Understand the socio-political, historical and cultural contexts
3. Be able to identify the changing trends in English literature in the 18th and 19th centuries

**Course Outcome:**

CO 1: Sensitize students to the changing trends in English literature in the 18th and 19th centuries and connect it with the sociocultural and political developments.

CO 2: Develop the critical thinking necessary to discern literary merit

CO 3: Be able to recognize paradigm shifts in literature

CO 4: Be able to identify techniques, themes and concerns

CO 5: Connect literature to the historical developments that shaped the English history.

**COURSE OUTLINE**

**Module I**

History: Age of prose and reason– Critical/literary essay – Sentimental Comedy - anti-sentimental comedy –heroic drama - Neoclassical poetry

1. John Dryden: “A Song for St. Cecilia's Day, 1687”  
<https://www.poetryfoundation.org/poems/44185/a-song-for-st-cecilias-day-1687>
2. Lady Mary Wortley Montagu: “The Lover, A Ballad”  
<https://www.poetryfoundation.org/poems/44761/the-lover-a-ballad>
3. Oliver Goldsmith – *She Stoops to Conquer*  
<https://www.gutenberg.org/files/383/383-h/383-h.htm>

## Module II

Transitional Poets – Periodical essay – Rise of the English novel – Fielding, Richardson, Sterne and Smollett

1. Thomas Gray : “Elegy Written in a Country Churchyard”  
<https://www.poetryfoundation.org/poems/44299/elegy-written-in-a-country-churchyard>
2. Elizabeth Carter: “Written Extempore on the Sea Shore”  
<https://www.eighteenthcenturypoetry.org/works/o4984-w0350.shtml>
3. Richard Steele – “The Spectator Club”  
<https://www.bartleby.com/27/7.html>

## Module III

French Revolution – Romantic Revival – first and younger generations of Romantics - Lyrical Ballads – familiar/personal essay – Lamb, Hazlitt, De Quincey - fiction in the Romantic age– Walter Scott, Jane Austen

1. William Blake – “The Tyger”, “The Lamb”  
<https://www.poetryfoundation.org/poems/43687/the-tyger>  
<https://www.poetryfoundation.org/poems/43670/the-lamb-56d222765a3e1>
2. William Wordsworth – “The Kitten at Play”  
<https://www.poetrynook.com/poem/kitten-play>
3. Mary Lamb: “Choosing a Profession”  
<https://www.poetryfoundation.org/poems/51930/choosing-a-profession>
4. Charles Lamb – “Dream Children, a Reverie”  
[http://essays.quotidiana.org/lamb/dream\\_children\\_a\\_reverie/](http://essays.quotidiana.org/lamb/dream_children_a_reverie/)
5. Jane Austen – *Pride and Prejudice*

## Module IV

Victorian poets – Pre-Raphaelite Poetry - Victorian prose writers – Victorian Compromise - Victorian novelists – Women novelists

1. Robert Browning – “My Last Duchess”  
<https://www.poetryfoundation.org/poems/43768/my-last-duchess>
2. Charlotte Bronte: “On the Death of Anne Bronte”  
<https://www.poetryfoundation.org/poems/43710/on-the-death-of-anne-bronte>
3. Christina Rossetti – “Goblin Market”  
<https://www.poetryfoundation.org/poems/44996/goblin-market>
4. R. L. Stevenson – “Walking Tour”  
<https://www.thoughtco.com/walking-tours-by-robert-louis-stevenson-1690301>
5. Charles Dickens – *A Tale of Two Cities*

**SEMESTER VI**  
**FIRST DEGREE PROGRAMME IN**  
**BA ENGLISH LANGUAGE AND LITERATURE (CBCS System)**

**Core Course 11: EN 1641                  Gender Studies**

**No: of Credits: 4**

**No of Instructional Hours: 5 [Total: 90hours]**

**Aim:** Introduce and problematize gender constructs.

**Objectives**

1. Explore the historical variables that have contributed towards the social norms of gender and sexuality
2. Understand the significance of making gender an integral concept of social analysis
3. Develop a conceptual understanding of the field of gender studies

**Course Outcome**

CO 1: Recognize the patriarchal bias in the formation of history and knowledge.

CO 2: Analyse the ways in which gender, race, ethnicity class, caste and sexuality construct the social, cultural and biological experience of both men and women in all societies.

CO 3: Recognize and use the major theoretical frames of analysis in gender studies

CO 4: CO 5: Interrogate the social constructions of gender and the limiting of the same in to the male-female binary in its intersections with culture, power, sexualities and nationalities

CO 5: Examine gender issues in relation to the sustainable goals of development

**COURSE OUTLINE**

**Module I Introduction to Gender Studies**

Gender, Patriarchy- Family- Identities- Essentialism- Difference- Ideology- Intersectionality- Feminisms-Womanism-Dalit Feminism-Islamic Feminism

1. bell hooks. "Feminist Politics:Where we Stand" *Feminism is for Everybody: Passionate Politics*. London: Pluto, 2000: pp.1-6.  
[https://excoradfeminisms.files.wordpress.com/2010/03/bell\\_hooks-feminism\\_is\\_for\\_everybody.pdf](https://excoradfeminisms.files.wordpress.com/2010/03/bell_hooks-feminism_is_for_everybody.pdf)
2. Judith Lorber. "The Social Construction of Gender."  
[https://ieas.unideb.hu/admin/file\\_9695.pdf](https://ieas.unideb.hu/admin/file_9695.pdf)
3. Vijila Chirappad: "Wasteland" (poem)  
<https://feminisminindia.com/2018/01/11/5-dalit-women-poets/>

## Module II Gender and Sexuality

Body-Sexualities-Performativity-Heterosexuality-Sexual Orientation-Non-normative Sexualities-Desire-Heteronormativity-Homosexuality-LGBTQI-Queer-Transgender-Pride Parade-Posthuman Orientation.

1. A. Revathi. *The Truth about Me: A Hijra Life Story* (Life Narrative)
2. Margaret Atwood: “Helen of Troy Does Countertaps” Dancing (poem)  
<https://apoemaday.tumblr.com/post/181494581744/helen-of-troy-does-countertop-dancing>
3. Kalki Subramaniam: “Breaking Binaries, Establishing Identity” TEDxDumas  
<https://www.youtube.com/watch?v=j1NzEGMNdo>

## Module III Gender and Culture

Culture, Modernity, Consumption, Sexual Economies, Commodity Culture

1. Nivedita Menon: “India: Section 377: How Natural is Normal?”  
<http://www.sacw.net/SexualityMinorities/nivedita01Jan2004.html>
2. Maya Angelou: “Phenomenal Woman” (poem)  
<https://www.poetryfoundation.org/poems/48985/phenomenal-woman>
3. Meena Kandasamy: “Mascara” (poem)  
<https://www.poemhunter.com/poem/mascara-4/>

## Module IV: Gender, Power and Human Rights

Power, Sexual Politics, Discourse, Sexual Citizenship, Discrimination, Human Rights, Gender Justice

1. Alice Walker: *Meridian* (Novel)
2. Mahaswetha Devi: *Draupadi* (Short Fiction)
3. Mayilamma: Chapter 13. “Protest: The First Year” (Pages 55 – 59) Jyothibai Pariyadathu *Mayilamma: The Life of a Tribal Eco-warrior*. Orient Blackswan, 2018.

## Recommended Reading

Butler, Judith. *Gender Trouble: Feminism and the Subversion of Identity*. New York: Routledge, 1990.

Cranny-Francis, Anne. Wendy Waring, Pam Stavropoulos, Joan Kirkby. *Gender Studies Terms and Debates*. Macmillan, 2017.

Delap, Lucy. *Feminisms: A Global History*. Penguin, 2020.

Foucault, Michel. *History of Sexuality*. Penguin Books: 1977

- Kolin, Philip C, ed. *American Playwrights since 1945: A Guide to Scholarship, Criticism, and Performance*. New York: Greenwood, 1989. Print.
- Leary, Lewis Gaston. *Articles on American Literature 1900-1950*. Durham, NC: Duke UP, 1954. Print.
- . *Articles on American Literature 1950-1967*. Durham, NC: Duke University Press, 1970. Print.
- Malkoff, Karl. *Crowell's Handbook of Contemporary American Poetry*. 1825. New York: Crowell, 1973. Print.
- Matthiessen, F. O. *American Renaissance: Art and Expression in the Age of Emerson and Whitman*. 1941. Oxford: Oxford UP, 1968. Print.
- Mish, Charles Carroll. *English Prose Fiction*. Charlottesville, Virginia: Bibliographical Society of the University of Virginia, 1952. Print.
- Perkins, David. *A History of Modern Poetry*. Cambridge, Massachusetts: Harvard UP, 1976-1987. 2 Vols. Print.
- Rich, Adrienne. "The Domestication of Motherhood." *Of Woman Born: Motherhood as Experience and Institution*. New York: Norton, 1976. Print.
- Ruland, Richard and Malcolm Bradbury. *From Puritanism to Postmodernism: A History of American Literature*. 1991. New York: Penguin, 1992. Print.
- Saunders, John. *The Tenth of December*. New York: Random House, 2013. Print.
- Spiller, Robert E, et al., eds. *Literary History of the United States*. 1948. London: Macmillan, 1974. Print.
- White, Barbara Anne. *American Women Writers: An Annotated Bibliography of Criticism*. New York: Garland, 1977.

## SEMESTER II

### Paper VIII – Critical Studies I<sup>1</sup> [7 hours/week]

#### Objectives<sup>2</sup>

The objectives of this paper are to:

- represent the important theoretical schools that have radically changed the perception of literature as a cultural phenomenon.

---

<sup>1</sup> It is proposed to offer the works of the major thinkers of the last and the present century in Europe and in our own country in a set of three papers (Critical Studies I in Semester II, Critical Studies II in Semester III, and Cultural Studies in Semester IV). The texts prescribed for detailed study are those texts that led to an epistemic shift in our thinking with reference to subject, language and knowledge.

<sup>2</sup> The objectives of these three papers are the same.

- familiarize the students with the basic premises of the foundational schools of modern thought, particularly on the construction of the subject, language, and socio-cultural formations.
- discuss the intellectual milieu in Europe that led to the emergence of theories of structuralism, post structuralism, psychoanalysis, Marxism and feminism
- familiarize the students with the primary conceptual apparatus of these systems of thought
- enable the students to analyze literary phenomena using the theoretical tools provided by the above schools.

### **Learning Outcomes**

At the end of the course it is expected that the students

- would sharpen their analytical and critical faculties drawing inspiration from the readings provided.
- gain an idea of the evolution of critical thinking in Europe and India in the 20<sup>th</sup> and 21<sup>st</sup> centuries.
- understand the function of language in the construction and analysis of literary and cultural phenomena.
- gain an insight into the interconnected nature of these major schools of thought leading to a shift from the paradigmatic to the syntagmatic.

### **Course Description**

#### **Module 1: Structuralism and Semiotics**

Saussure's concept of the synchronic study of language has radically changed the basic assumptions in the analysis and interpretation of language and literature. As a form of human science, structuralism can be perceived as a method of systematizing human experience in the study of linguistics, anthropology, sociology, psychology and literary studies. Structuralism views language as a system of signs that structures our perception of the world around us. For the structuralists, the visible world consists of surface phenomena whereas the world that is not visible consists of structures that underlie and organize the surface phenomena. The structuralist insights are useful especially in analysing literary conventions and popular culture.

Language as a system of signs – Ferdinand de Saussure – Noam Chomsky – Claude Levi-Strauss – Raman Jakobson – Vladimir Propp – Julien Greimas – Roland Barthes – Mikhail Bakhtin – Structuralist linguistics – Russian Formalism – Prague, Moscow and

Copenhagen schools of Linguistics – Structuralism in Anthropology – binary opposites – diachronic and synchronic reading – Semiotics – sign-code-confabulation – connotation / denotation – encoding / decoding – lexical modality – representation – semiosis – semiosphere – Semiotics of culture – metalanguage

### **Required Reading**

Saussure, Ferdinand de. “The Object of Study.” 1915. Trans. Roy Harris. *Literary Theory: An Anthology*. 1998. Ed. Julie Rivkin & Michael Ryan. 2nd ed. Massachusetts: Blackwell, 2004. 59-63. Print.

### **Supplementary Reading**

Barthes, Roland. “Myth Today.” *Mythologies*. 1957. Trans. Annette Lavers. New York: The Noonday P, 1991. 109-45. Print

### **Module II: Post structuralism**

Post structuralism emerged as a reaction against the structuralist’s orderly vision of language and human experience. Post structuralist theory has become instrumental in decentring the Western philosophical canon by viewing language as the conceptual framework that encases our experience. Derrida’s theory of deconstruction asserts that language is dynamic, ambiguous, and unstable, disseminating possible meanings. For post structuralism, language is the ground of being and the world is an infinite text, that is, an infinite chain of signifiers always in play.

Frederich Nietzsche – Martin Heidegger – Jacques Derrida – Jean Baudrillard – Jean-Francois Lyotard – Gilles Deleuze - Felix Guattari – Julia Kristeva – Hermeneutics – speech – phenomena – ‘metaphysics of presence’ – logos – logocentrism – bricolage – alterity – difference/différance – arche-writing – play – closure – theory of hierarchy – aporia – phenomenology

### **Required Reading**

Nietzsche, Friedrich. “On Truth and Lie in an Extra-Moral Sense.” *Oregonstate.edu*. Web. <[http://oregonstate.edu/instruct/phl201/modules/Philosophers/Nietzsche/Truth\\_and\\_Lie\\_in\\_an\\_Extra-Moral\\_Sense.htm](http://oregonstate.edu/instruct/phl201/modules/Philosophers/Nietzsche/Truth_and_Lie_in_an_Extra-Moral_Sense.htm)>

### **Supplementary Reading**

Derrida, Jacques. “The Written Being/The Being Written.” *Of Grammatology*. Trans. Gayatri Chakravorty Spivak. 1974. 40th Anniversary ed. Baltimore: Johns Hopkins UP, 2016. 19-24. Print.

### **Module III: Marxism**

Marxism focuses on the specific historical and material causes that affect all human events and productions. According to the Marxist theory, the key to understanding a society at any point in history is to focus primarily on the modes of production because all the ideologies and norms of society are constructed with the interests of one who controls the modes of production. Marxism views literature, like all cultural manifestations, as a product of the socio-economic and ideological conditions of the time and place in which it was written. For Marxism, attentions to the material conditions of life and a critical engagement with our attitude to those conditions are paramount.

Karl Marx – Antonio Gramsci – Walter Benjamin – Georg Lukacs – Louis Althusser – Slavoj Zizek – Terry Eagleton – *The Communist Manifesto* – class – base and superstructure – commodity fetishism – dialectical materialism – hegemony – ideology – interpellation – commodification – theory of production – bourgeois nationalism – bourgeois socialism – capitalist state – dictatorship of the proletariat – means of labor – means of production – mode of production – super-imperialism – surplus product – two-stage theory- wage slavery – conspicuous consumption – false consciousness – reflectionism – sign value – historical situation

#### **Required Reading**

Marx, Karl. “The Fetishism of Commodities and the Secret Thereof.” *Classical Sociology Theory*. Ed. Ian McIntosh. New York: New York UP, 1997. 68-71. Print.

—. “The German Ideology.” *Classical Sociology Theory*. Ed. Ian McIntosh. New York: New York UP, 1997. 26-38. Print.

#### **Supplementary Reading**

Benjamin, Walter, “The Work of Art in the Age of Mechanical Reproduction.” *Illuminations*. 1968. Ed. Hannah Arendt. Trans. Harry Zohn. New York: Schocken, 2007. 217-53. Print.

### **Module IV: Psychoanalysis**

One of the most significant insights of Freud which still governs classical psychoanalysis is the notion that human beings are motivated or driven by unconscious fears, desires, needs and conflicts. The existence of unconscious is central to all psychoanalytic theories and is conceived as a dynamic entity that engages humans at the deepest level of their being. Unconscious is ambiguous, seen as both the cause and effect of repression and can be accessed through dreams as well as the dynamics of language. For

the psychoanalysts sexual behaviour is a product of our culture and the origin of our sexual being lies in the nature of the affirmation or disruption of our sense of self that occurs in childhood.

Sigmund Freud – C.G. Jung – Jacques Lacan – Rene Girard – id, ego and superego – repression – condensation – displacement – fetishism – fixation – regression – archetypes – oral phase – phallic phase – the gaze – symbolic order – imaginary order – mirror stage – the real – name of the father – imago – reality principle – instinctual pleasure – jouissance – hysteria – neurosis – Oedipus complex – penis envy – Freudian slips

### **Required Reading**

Freud, Sigmund. “The Conscious and the Unconscious,” “The Ego and the Id,” “The Ego and the Super-Ego.” *Beyond the Pleasure Principle and Other Writings*. Trans. John Reddick. London: Penguin, 2003. 105-29. Print.

### **Supplementary Reading**

Lacan, Jacques. “The Insistence of the Letter in the Unconscious.” *Modern Criticism and Theory: A Reader*. 1988. 3rd ed. Ed. David Lodge and Nigel Wood. London: Routledge, 2013. 186-209. Print.

### **Module V: Feminism**

As a political and literary movement, Feminism poses new ways of asking and answering questions, challenging the conventional forms of discourse that exist within the mainstream of philosophy, culture and politics. The primary goal of Feminism is to liberate women from patriarchal oppression and attain the social, economic and political equality of the sexes. Feminist literary theory analyses how language, social power structures and institutions reflect patriarchal interests and the ways in which the thoughts marking the above have influenced women’s perception of themselves, The writings of feminists try to reveal the basic asymmetry between the terms “masculine” and “feminine” and argue against biological determination and socialization used by patriarchal forces in the construction of gender and sexuality.

Mary Wollstonecraft – Simone de Beauvoir – Betty Friedan – Helene Cixous – Shulamith Firestone – Germaine Greer – Judith Butler – Julia Kristeva – Luce Irigaray – Sandra Gilbert – Susan Gubar – Adrienne Rich – women’s suffrage – aphasia – transcendence – psychosomatic frigidity – liberal feminism – radical feminism – marxist feminism – new feminism – post feminism – Indian feminism – écriture féminine – gynocriticism – male gaze – objectification – phallogocentrism – phallogocentrism

## SEMESTER III

### Paper X – Critical Studies II [7 hours/week]

#### Course Description

##### Module I: Postmodernism

Postmodernism has derived its key ideas from post structuralist assumptions like multiple meanings and deconstructed centres. As a theory of history, society, culture, art, and literature, postmodernism questions the superiority of order and the unity of experience. Postmodernism rejects elitism, sophisticated formal experimentation and tragic sense of alienation predominant in the modernist writers. Theories of postmodernism critique grand narratives and promote the existence of little narratives in literary expressions. It celebrates fragmentation which obliterates the illusion of the text as ‘real’ and provides multiple interpretations and even parody.

Søren Kierkegaard – Friedrich Nietzsche – Jürgen Habermas – Martin Heidegger – Jacques Derrida – Michel Foucault – Jean-François Lyotard - Richard Rorty – Jean Baudrillard – Edmund Husserl – Martin Heidegger – Pierre Bourdieu – alterity – bricolage – constructivism – cyberpunk – hyperreality – pastiche – simulacra – virtual reality – black humor – intertextuality – metafiction – fabulation – historiographic metafiction – temporal distortion – magic realism – technoculture – paranoia – maximalism – minimalism – fragmentation

##### Required Reading

Habermas, Jürgen. “Modernity—An Incomplete Project.” *Postmodernism: A Reader*. Ed. Thomas Docherty. New York: Cambridge UP, 1993. 98-109. Print.

##### Supplementary Reading

Bauman, Zygmunt. “On Being Light and Liquid.” *Liquid Modernity*. Cambridge: Polity, 2000. 1-15. Print.

##### Module II: Cultural Materialism

Theories of Cultural Materialism along with New Historicism have shown new ways of reading and analysing literature, culture and history. As a critical method Cultural Materialism combines an attention to the historical context, theoretical method, political commitment and textual analysis. As an offshoot of Marxist criticism it bridges the gap between Marxism and Postmodernism. In Cultural Materialism, the word ‘culture’ includes all forms of culture, from the high to the low, and ‘materialism’ signifies the opposite of idealism. Cultural Materialists argue that the meanings of literary texts are not fixed by a

universal criterion: rather they are always in play and often subject to politically radical appropriations.

Raymond Williams – Marvin Harris – Eric Ross – John Cole – Allen W. Johnson – David H. Price - Stephen Sanderson – Stuart Hall – Angela McRobbie – Debbie Epstein – Chris Griffin – Frankfurt school – reductionism – dominant ideology – dissident readings – historical materialism – mode of reproduction – domestic economy – political economy – infrastructural determinism – epistemological principles of cultural materialism – ethnograph – containment

### **Required Reading**

Williams, Raymond. “Hegemony”, “Tradition, Institution, Formations”, “Dominant, Residual, Emergent”. *Marxism and Literature*. 1977. rpt. New York: Oxford UP, 2009. 108-27. Print.

### **Supplementary Reading**

Raghavendra, M. K. “Structure and Form in Indian Popular Film Narrative.” *Fingerprinting Popular Culture: The Mythic and the Iconic in Indian Cinema*. Ed. Vinay Lal and Ashis Nandy, New Delhi: Oxford UP, 2006. 24-50.

### **Module III: New Historicism**

New Historicism focuses on the historicity of literary texts and the textuality of history by analysing them in the context of power and ideology at a given time. New Historicist theory derives its basic assumptions from Foucauldian discourses on hegemonic institutional practices and individual subjectivities. This has led to an understanding that the production, categorization and analysis of texts are determined by forces of history, which in turn shape the cultural work itself. The New Historicist believes in the impossibility of objective analysis of history. The reading of a literary or cultural text is never definitive; it opens up ever new possibilities of interpretation.

Michel Foucault – Stephen Greenblatt – Fredric Jameson – Stephen Orgel – Clifford Geertz – Partha Chatterjee – Gyan Prakash – non discursive practices – apparatus – archaeology vs genealogy – historiography – arts of existence – discontinuity - episteme – non reductionism – circulation – panopticon – regimes of truth – textuality – anecdote

### **Required Reading**

Foucault, Michael. “The Unities of Discourse.” *The Archaeology of Knowledge and the Discourse on Language*. London & New York: Pantheon, 1972. 21-31. Print.

### Supplementary Reading

Chakrabarty, Dipesh. "Post Coloniality and the Artifice of History." *Representations* 37 (1992):1-26. *JSTOR*.Web. <[https://www.jstor.org/stable/2928652?seq=1#page\\_scan\\_tab\\_contents](https://www.jstor.org/stable/2928652?seq=1#page_scan_tab_contents)>.

### Module IV: Postcolonialism

Edward Said's *Orientalism* explores the culturally constructed distinction between the Orient and the Occident that paved the way for postcolonial theory. Postcolonialism attempts to understand the political, social, cultural and psychological operations of the colonialist and anticolonialist ideologies. Postcolonial theory goes on to analyse the ways in which a text reinforces or resists colonialism's oppressive ideology. Postcolonial theorists try to explore the double consciousness of the colonial subjects, divided between the culture of the colonizer and that of the indigenous community. They insist that the understanding of textual reflections of racism and ethnocentrism demands an attention to the cultural history and belief systems of the social group(s) being portrayed and discussed.

Aimé Césaire – Frantz Fanon – Kwame Nkrumah – Edward Saïd – Gayatri Chakravorty Spivak – Homi K. Bhabha – Dipesh Chakrabarty – Derek Gregory – Amar Acheraïou – Benedict Anderson – Partha Chatterjee – Michel de Certeau – Hubert Harrison – C. L. R. James – Salman Rushdie – Leopold Sedar Senghor – Robert Young – Ngũgĩ wa Thiong'o – Bill Ashcroft – Gareth Griffiths – Helen Tiffin – Ashis Nandy - colony and colonialism – settler – empire – orient and occident – centre/margin – marginality – decolonisation – nativism – anticolonialism – neo colonialism – eurocentricism – third world – ambivalence – diaspora – ethnicity – hybridity – mapping – mimicry – nation/nation-state – orientalism – negritude – other – subaltern – contact zone – essentialism – aboriginal – apartheid – black studies – counter discourse – dislocation – post colonial reading – world system theory

### Required Reading

Said, Edward W. "Introduction to Orientalism." *Orientalism*. 1978. New Delhi: Penguin, 2001. 1-28. Print.

### Supplementary Reading

Nandy, Ashis. "The Psychology of Colonialism: Sex, Age and Ideology in British India." Sections, I, II & III. *The Intimate Enemy: Loss and Recovery of Self Under Colonialism*. 1983. New Delhi: Oxford UP, 2010.1-7. Print. *Psychiatry* 45(1982): 197-219. *tandfonline.com*. 08 Oct. 2016. Web. <<http://www.tandfonline.com/doi/abs/10.1080/00332747.1982.11024151>>

## Module V: Nationalism & Post Nationalism

Nation as an imagined collective entity is often assumed as a sacred object. The nation can be conceived as an imagined political community created by the state which propagates certain common ideologies, beliefs and myths. The state creates its own tradition and myths to generate a ‘long historical continuity’ and a ‘common cultural past’ for the nation. Though most often, the cultural boundaries of nations overlap leading to conflicts and violence, the state’s aim is to construct a national unity and the state does this by positioning one group as the constitutive other of the normative group. Thus, a nation cannot exist without the ‘other’. It is the contradiction between the desire for homogeneity and diversity that is within the nation that makes the issue of nation and nationalism more problematic.

Talal Asad – Antoinette Burton – Partha Chatterjee – Bernard Cohn – Ernest Gellner – Stuart Hall – Eric Hobsbawm – Chandra Talpade Mohanty – Rajeswari Sunder Rajan – Dipesh Chakrabarty – Nationalism – post nationalism – sovereignty – citizenship – patriotism – myths – common cultural past – territory – immigrant identity – human rights – dalit studies – subaltern studies – minority ethnic community – re-emergence of extreme communal violence – gender ethnography

### Required Reading

Anderson, Benedict. Introduction. *Imagined Communities: Reflections on the Origin and Spread of Nationalism*. 1983. Rev. ed. London: Verso, 2003. 1-8. Print.

### Supplementary Reading

Chatterjee Partha. “Nationalism as a Problem in the History of Political Ideas.” 1986. *Nationalist Thought and the Colonial World: A Derivative Discourse*. London: Zed, 1993. 1- 35. Print.

### Reading List

Ashcroft, Bill, et al., eds. *The Post-Colonial Studies Reader*. London and New York: Routledge, 1995. Print.

Baudrillard, Jean. *Simulacra and Simulation*. 1981. Trans. Sheila Faria Glaser. Ann Arbor: U of Michigan P, 1994. Print.

—. *Jean Baudrillard: Selected Writings*. Ed. Mark Poster. 2nd ed. Stanford: Stanford UP, 2001. Print.

Bauman, Zygmunt. *Postmodern Ethics*. Oxford: Blackwell, 1993. Print.

Bhabha, Homi K. *The Location of Culture*. 1994. London: Routledge, 2004. Print.

## MEC 1332: Economic Growth and Development

**3 Hours**

**3 Credits**

### Course Outcome:

**CO1-** To enable students to understand the basic concepts of Economic Growth and Development

**CO2-** To examine the different tools for measuring economic growth and development.

**CO3-** To impart knowledge about theoretical framework of Growth and Development under different Schools of economic thought.

<b>MEC 1332: Tagging Course Outcomes</b>					
<b>Course Outcome</b>	<b>CO Statement</b>	<b>PSO</b>	<b>Cognitive Level</b>	<b>Knowledge Category</b>	<b>Assessment</b>
CO 1	By enabling the students to understand the concepts of growth and development, basic characteristics of LDCs, obstacles to grow and the Development Gaps	<b>PSO 1</b>	Evaluate	Procedural	An evaluation of the characteristics of LDCs
CO 2	By familiarizing students with the different tools used in measuring growth and development.	<b>PSO 1</b>	Analysis	Procedural	Assignment on analyzing the calculation of different development indices and a comparison between them.
CO 3	By imparting an understanding of the different growth models	<b>PSO 1</b>	Analysis	Procedural	An analysis of the applicability of the theories in the present world.

### COURSE STRUCTURE

**MODULE I : CONCEPTIONS OF DEVELOPMENT**

**(18 Hours)**

Meaning, Definition and Scope of Economic Growth and Development, Development Gap, Alternative Measures of Development, Comparing Development Trajectories across nations and within them.

**MODULE II : TOOLS FOR MEASURING DEVELOPMENT (15 Hours)**

Measurement of Poverty – absolute and relative; Head-Count Index and Poverty Gap Indices Sen’s Capabilities approach; Measurement of Income inequality – Kuznet’s inverted U Hypothesis, Lorenz Curve, Gini Coefficient, Physical Quality Life Index, Human Development Index, Happiness Index, Gender Development Index.

**MODULE III : GROWTH MODELS (20 Hours)**

Classical theories of Growth, Adam Smith, David Ricardo and Karl Marx; Neo-Classical Model of R.M. Solow; Neo-Keynesian Model of Joan Robinson, Harrod Domar Model; Endogenous Growth Models and evidence on the determinants of Growth.

**MODULE IV : THEORIES OF ECONOMIC GROWTH AND DEVELOPMENT (22 Hours)**

Rostow’s Stages of Growth, The Vicious Circle of Poverty, Nelson’s Low Level Equilibrium Trap, Lewis Theory of Unlimited Supply of Labour, Nurk’s Theory of Disguised Unemployment, Leibenstein’s Critical Minimum Effort Thesis. The Big Push Theory, Balanced and Unbalanced Growth, Dualistic Theories.

**References**

1. Debraj Ray, Development Economics, Oxford University Press, 2009.
2. Todaro and Smith, Economic Development, Pearson Education, New Delhi (recent edition)
3. Thirwall (2006), Growth and Development with Special Reference to Developing countries, Mcmillan, New Delhi.

# **SEMESTER - I**

## **Foundation Course I: CO 1121 – METHODOLOGY AND PERSPECTIVES OF BUSINESS EDUCATION**

No of institutional hours per week: 4

No of credits: 2

Aim of the course: To provide the methodology for pursuing the teaching learning process with a perspective of higher learning in business education.

Course objective:

1. To understand business and its role in society.
2. To understand entrepreneurship and its heuristics
3. To comprehend the business environment
4. To enable the students to undertake business activities
5. To provide a holistic, comprehensive and integrated perspective to business education

**Module 1:** Economic system and business- meaning of economic system- its functioning – different economic systems and their features- capitalism, socialism, communalism, mixed economies- division of labour- innovation- flow of goods and services, circular flow of income- different forms of business organizations- individual and organized business –family and corporate business. Business for profit, business not for profit and business for non- profit. Business entities – individual, partnerships, co- operatives, trusts , undivided families, joint stock companies- private- public, joint ventures and MNCs etc. –(basic concepts only) **(13 hrs)**

**Module 2:** Business and Economic Development- Meaning of economic growth and development- measures of economic development- Role of Business in economic development- company, industry and economy interrelationship- role of public and private sectors, new economic Policy- liberalization- privatization and globalization. Emergence of” managerialism”. (a brief study only) **(13 hrs)**

**Module 3:** Establishing business- steps in establishing a business- environmental analysis- legal , physical, financial, social, economic, technical etc.- idea generation- procedures and formalities- commencement of business – entrepreneur- individual, group entrepreneurs- intrapreneur- entrepreneurship. Mobilisation of financial resources for business – sources of funds- savings- factors affecting savings- loans and advances- equity and preference shares retained earnings and debt etc.- market for raising finance- money market and capital market- lending institutions- banks and non- banking institutions- payment to government – taxes, direct and indirect – state and national levels (a brief study only) **(20 hrs)**

**Module 4:** Trained man power for quality enhancement- role of trained manpower for quality at individual , family, organizational and national level- quality of life and quality of work life- the role of human resources management problems in small , medium and large organizations – use of technology in organization- (a brief study only) **(13 hrs)**

**Module 5:** Learning business information-Meaning of information – business information – methods and techniques of collecting and learning business information- observation, reading techniques – listening to lectures , note taking –seminars and workshops- student seminars –

individual and team presentations- conferences and symposiums- filed studies- case studies and project reports etc. (a brief study only) **(13 hrs)**

#### Books recommended

1. Keith Davis and William Frederic.C. Business and Society – management , Public policy , Ethics, International student Edition McGraw- Hill Book Co Newdelhi
2. Peter F.Drucker. Management- Task , Responsibilities, practices Allied publishers pvt Ltd, Mumbai
3. Peter f . Drucker The practice of management , Harper and Row Publishers Inc.NY.
4. N.D Kapoor Business Law Sulthan Chand & Sons
5. Francis Cherunilam Business Environment Text and Cases Himalaya Publishers
6. H.R Machiraju Indian Financial System Vikas Publications
7. P Suba Rao Essentials of HRM Himalaya publishers
8. Velasquez Business Ethics Eastern Economy edition
9. Nandan H Fundamentals of Entrepreneurship PHI, New Delhi
10. C.B.Gupta, business Organisations and management- Sultan Chand , 8<sup>th</sup> Edition 2013

## **Core Course I: CO 1141 – ENVIRONMENTAL STUDIES**

**No. of instructional hours per week: 4**

**No. of Credits: 4**

**Aim of the course:** To develop knowledge and understanding of the environment and enable the students to contribute towards maintaining and improving the quality of the environment.

**Course objectives:**

1. To enable the students to acquire basic ideas about environment and emerging issues about environmental problems.
2. To give awareness about the need and importance of environmental protection

**Module I: Environmental studies** – meaning – scope – importance (4hrs)

**Module II: Ecology and Ecosystems, Biodiversity and its Conservation, and Natural resources** – meaning of ecology – structure and function of an ecosystem – producers – consumers – decomposers – energy flow in the ecosystem – ecological succession- food chain – food webs and ecological pyramids . Ecosystem – concept– types of ecosystems – structure and functions of forest ecosystem, grass land ecosystem- desert ecosystem, aquatic ecosystem. Biodiversity and its conservation- introduction- definition- genetic, species and ecosystem diversity- value of biodiversity – biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of diversity – threats to diversity – conservation of diversity in situ, ex-citu. Natural resources- features- air resources, forest resources, water resources, mineral resources, food resources- energy resources, land resources- over exploitation of natural resources- consequences- conservation of natural resources- role of an individual in conservation of natural resources (25 hrs)

**Module III: Industry and environment** - pollution – environmental pollution – soil pollution – air pollution – water pollution – thermal pollution – noise pollution – causes, effect and control measures – waste management – waste minimisation through cleaner technologies – reuse and recycling - solid waste management. (18hrs)

**Module IV: Social issues and environment** – Unsustainable to sustainable development – urban problems related to energy – water conservation – water harvesting – resettlement and rehabilitation of people – environment ethics – waste land reclamation – consumerism and waste products. (15 hrs)

**Module V: Human Population and environment** – population growth – variation among nations – population explosion – environment and human health – human rights – value education – Women and child welfare. (10hrs)

**Note:** :All students must visit a local area to document environmental issues and prepare a brief report on the same identifying issues involved and suggesting remedies. (This will part of the internal marks. i.e. for EVS the internal marks = attendance – 5 marks + test paper – 5 marks + field project – 10 marks)

### **Books recommended**

Misra. S.P and Pandey .S.N. *Essential Environmental Studies*, Ane Books India, New Delhi.  
Kiran B. Chokkas and others. *Understanding Environment*, Sage Publications New Delhi.  
Arumugam N. and Kumaresan V. *Environmental Studies*, Saras Publications, Kanyakumari.  
Benny Joseph. *Environmental Studies*, Tata McGraw-Hill Publishing Co.Ltd.,New Delhi.

## **Core Course II : CO 1142 - Functional Application of Management**

**No. of instructional hours per week : 4**

**No. of credits : 2**

Aim of the Course: To give an understanding on the functional application of management Course objectives: To familiarise the students with various aspects of organizational management .

**Module – 1: Introduction to Management** – Concepts, Significance, Management and administration. Management Process- Functions of management. **(Brief explanation to functions of management)**  
**(12hrs)**

**Module 2: Financial Management-** - Concept of finance- Functions of finance - Meaning, scope and objectives of financial management - Source of finance- short term and long term, Working capital- concepts and factors affecting working capital.  
**(15 Hrs)**

**Module 3: Operations management-** Meaning , scope, production function in an organisation- Routing, scheduling and dispatching, Material Management, Safety consideration and environmental aspects.  
**(15 Hrs)**

**Module 4: Marketing Management** –Marketing-Meaning, Definition, Concept , Importance, Marketing and selling . Marketing management - importance – major problems of marketing in India- Marketing mix ,Product, price, place and promotion.  
**(15 Hrs)**

**Module 5: Human Resource Management** – Meaning- Definition- Job analysis , job specification, Job description and job evaluation,- Recruitment , Selection, Training, Placement, Development and Compensation .  
**(Conceptual framework only) (15 Hrs)**

### **Books recommended:**

1. Tripathy Reddy, Principles of Management, Tata Mc Graw Hill Publishers, New Delhi.
2. L.M. Prasad, Principles of Management, Sultan Chand & sons, New Delhi.
3. M.Y. Khan and P.K. Jain, Financial management, Tata Mc Grawhill Publishers, New Delhi.
4. R.S. Goel, Operations management, Kalyani Publications, Ludhiana.
5. R. C. Agarwal, Marketing Management, Educational publishers, Agra.
6. Philip Kotler and Gary Armstrong, Principles of Marketing, PHI, New Delhi.
7. William. J .Stanton, Fundamentals of Marketing, McGraw-Hill, New York
8. Rajan Nair, Marketing Management, Sultan Chand & Sons, New Delhi.
9. C. B. Mamoria, Personnel Management, Sultan Chand&Sons, New Delhi.
10. I M. Pandey, Financial Management, Vikas Publishing House, New Delhi.

## SEMESTER - II

### Foundation Course II: CO 1221-INFORMATICS AND CYBER LAWS

No. of instructional hours per week : 4

No. of credits : 3

**Aim of the course:** To update and expand informatics skills and attitudes relevant to the emerging knowledge society and to equip the students to effectively utilise the digital knowledge resources for business studies.

**Course objectives:** 1. To review the basic concepts and fundamental knowledge in the field of informatics.

2. To create awareness about the nature of the emerging digital knowledge society and the impact of informatics on business decisions.

3. To create an awareness about the cyber world and cyber regulations.

**Module I: Overview of Informatics-** meaning, feature and importance - Computer networks & Internet, wireless technology, cellular wireless networks, introduction to mobile phone technology, Purchase of technology, license, guarantee, and warranty. New development in informatics (12hrs)

**Module II: Knowledge Skills for Higher Education-** Data, information and knowledge, knowledge management, Internet access methods –Dial-up, DSL, Cable, ISDN, Wi-Fi. Internet as a knowledge repository, academic search techniques, creating cyber presence. Academic websites, open access initiatives, opens access publishing models, Introduction to use of IT in teaching and learning - Educational software, Academic services – INFLIBNET, NICNET, BRNET. (15hrs)

**Module III: Social Informatics-** IT & Society– issues and concerns– digital divide, IT & development, IT for national integration, overview of IT application in medicine, healthcare, business, commerce, industry, defence, law, crime detection, publishing, communication, resource management, weather forecasting, education, film and media, IT in service of disabled, Futuristic IT – artificial intelligence, Virtual reality, bio computing. Health issues – guide lines for proper usage of computers, internet and mobile phones E-wastes and green computing, impact of IT on language & culture-localization issues (18hrs)

**Module IV: CYBER WORLD** - Cyber space, information overload, cyber ethics, cyber addictions, cybercrimes – categories – person, property, Government – types - stalking, harassment, threats, security & privacy issues, (12 hrs.)

**Module V: CYBER REGULATIONS** – Scope of cyber laws, - Provisions under IT Act 2000, cyber related Provisions under IPC (15 hrs.)

#### Books Recommended:

1. Ramesh Bangia. *Learning Computer Fundamentals*, Khanna Publishers, New Delhi.
2. Rajaraman, *Introduction to information Technology*, PHI, New Delhi.
3. Alexis Leon & Mathews Leon. *Fundamentals of Information Technology*, Vikas Publishing House, New Delhi.
4. Ramachandran et.al , *Informatics and Cyber laws*, Green Tech Books, Thiruvananthapuram
5. Barbara Wilson. *Information Technology: The Basics*, Thomson Learning.
6. George Beekman, Eugene Rathswohl. *Computer Confluence*, Pearson Education, New Delhi.
7. IT Act 2000,
8. Rohas Nagpal, IPR & Cyberspace – Indian Perspective

## **Core Course III: CO 1241 - BUSINESS COMMUNICATION AND OFFICE MANAGEMENT**

No. of instructional hours per week : 4

No. of credits : 3

**Aim of the course:** To explore the talents in business communication and enable the students to understand the appointment and role of a Company Secretary in business.

### **Course objectives:**

- 1.To develop communication skills among students relevant to various business situations
- 2.To impart knowledge on the management of Modern Offices.

**Module I: Communication**– meaning-definition-features-objectives -process - classification– principles of effective communication-communication skills – importance of communication in management-types of communication-barriers to communication-communication network. (12hrs)

**Module II: Oral communication**–meaning-merits and demerits –essentials –meetings and conferences –presentation skills –group communication – intra personal and inter personal communication-transactional analysis- –telephone conversation–interview –ethics of communication –exercises in oral communication. (15hrs)

**Module III: Written communication**– meaning- merits and demerits –objectives- essentials –importance-qualities of effective letters – business letters : essentials -structure–business enquiry –orders –execution of orders – reports: meaning-definition- importance-types - business report writing –preparation of resume –electronic media on communication – importance of media in communication. (15hrs)

**Module IV: Office Manager** –meaning & definition, functions, duties & qualities of office manager. Office: meaning & definition- nature of office work, importance & functions of office-meaning & definition of office management- Office layout. (15hrs)

**Module V: Record Keeping and Management** -meaning - definition - scope of record management- principles of record keeping - Filing: meaning- definition -different types of filing system. Indexing: meaning, definition - different types of indexing. (15hrs)

**Note: Oral and written communication exercises to be pursued in the learning process.**

Books Recommended:

- 1.Bhatia R.C., Business Communication. Ane Books Pvt.Ltd.,New Delhi.
- 2.Shalini Aggarwal. Essentials of Communication Skills, Ane Books Pvt.Ltd. New Delhi.
- 3.Asha Kaul.Effective Business Communication, PHI ,New Delhi.
- 4.Madhukar. R.K.Business Communication, Vikas Publishing House, New Delhi.
- 5.Francis Soundararaj.Speaking and Writing for Effective Business Communication, Macmillan india Ltd.,New Delhi.
- 6.Sadagopan.S. Management Information System, PHI, New Delhi.
- 7.Rajendra Paland Korlahalli J.S. Essentials of Business Communication Sultan Chand & Sons, New Delhi.
- 8.Goyal D.P.Management Information System, Macmillan India Ltd., New Delhi.
9. Chopra & Chopra, Office management -, Himalaya publications
10. Sharma & Gupta, Office Organisation & Management, Kalyani Publishers
11. Krishna Murty- s. Office Management ,Chand publications

## SEMESTER I

### Paper 1: CO 211- BUSINESS ETHICS AND CORPORATE GOVERNANCE

#### Objectives:

1. To convey basic understandings on the theories of Business Ethics
2. To provide a understanding on Corporate Governance practices and the provisions of the Companies Act relating to corporate governance

**Module 1: Business Ethics and Ethical Practices:** Ethics – Sources- Importance - factors influencing Business Ethics – Benchmarks on code of Ethics – Ethics Committees – Training Programmes – Ethical Decision Making – Ethics in Finance - Marketing and HR (15Hrs)

**Module 2: Organization Culture:** Features – Building and Maintaining Organization Culture – Organizational Socialization – Managing cultural Diversity – Work Ethics – Work Culture – Quality of Work Life – Work Life Balance – areas Improving Work Life Balance – Strategies of Work Life Balance (20Hrs)

**Module 3: Corporate Governance:** Importance – Objectives – Basic Ingredients of Corporate Governance – Principles - Theories – Phases of development of Corporate Governance in Global and Indian Perspectives – Code of Corporate Governance – Committees on Corporate Governance (Global and Indian) (15Hrs)

**Module 4: Corporate Social Responsibility :** CSR under Companies Act 2013 – Scope – Relevance – Importance – Areas of CSR – Arguments for and against CSR – Ackerman’s model of CSR – SEBI – Clause 49 of listing agreement – Evaluation of Corporate Governance of a Company – Methods – Shareholder Value – EOCE, PAT, EPS, TSR, MVA, EVA and HVA - Corporate Philanthropy – Corporate Citizenship – Social Audit (25 Hrs)

**Module 5: Corporate Image and Excellence** : Corporate image – building corporate image – Importance – Corporate Excellence – importance – Measures to achieve corporate excellence – New initiatives on corporate excellence - Role of Chairman – Qualifications – Power – Duties and Responsibilities – Board Committees – New Directions (15Hrs)

**References:**

1. Laura P Hartman, Perspectives in Business Ethics, Mc Graw Hill International
2. George A Steiner and John F Steiner, Business , Government and Society, Mc Graw Hill International
3. SK Chakraborty, Ethics in Management Vedantic Perspectives, Oxford University Press
4. Subhash Sharma, Management in New Age: Western Windows – Eastern Doors, New Age International Publishing , New Delhi
5. Prof (Col.) PS Bajaj, Dr. Raj Agarwal – Business Ethics an Indian Perspectives, Biztantra2006.

# SEMESTER-V

## ENVIRONMENTAL STUDIES AND PHYTOGEOGRAPHY

Course code: BO 1542 Number of Credits : 4

Number of contact hours : Lecture: 90 hrs; Practical: 36 hrs; Total: 126 hrs

Distribution of Hours	Theory	Practical
Environmental Studies	72 hrs	36 hrs
Disaster Management	09 hrs	00 hrs
Phytogeography	09 hrs	00 hrs
<b>Total</b>	<b>90 hrs</b>	<b>36 hrs</b>

**Aim of the course:** To inculcate environmental awareness among students for protecting the Nature.

### Objectives:

1. To create awareness about ecosystem and Natural resources.
2. To generate knowledge about importance of Biodiversity conservation
3. To understand the need to mitigate pollution and strategies for disaster management
4. To impart knowledge about phytogeographical regions

### MODULE-I

#### Natural resources and its conservation

12hrs

5. Natural Resources - Renewable and Non-renewable - Land & Soil, Water, Energy, Minerals, Food and agriculture, Forests, Plants & Wild life resources. Degradation of natural resources - Land degradation, degradation of water resources, Loss of flora and fauna; Causes – population explosion, over exploitation, deforestation, agriculture mismanagement, desertification, overgrazing, soil erosion, mining, urbanization and industrialization- change in land use, depletion of water resources.
6. Conservation of Natural resources and sustainable life styles.  
Land and soil- Afforestation, regeneration of wasteland  
Water - Rain water harvesting, ground water dams  
Energy - Promoting use of renewable resources-solar, tidal and wind; biodiesel, biofuels.  
Forests- Reforestation, Community forestry programmes

### MODULE- II

#### Ecosystems

22 hr

1. Ecosystems - Concept, definition, structure and function; components- biotic and abiotic; energy flow
2. Food chains -Food web & ecological Pyramids, biogeochemical cycles - Carbon and Phosphorous cycle
3. Ecological succession-Definition, primary and secondary succession, climax

## SEMESTER-V

concept, hydrosere and xerosere.

4. Plant adaptations- Morphological, anatomical & physiological adaptations of – Hydrophytes, Xerophytes, Halophytes, Epiphytes, Parasites
5. Introduction- types, characteristic features, structure and functions of the following ecosystems.
6. Forest ecosystem, 2. Grassland ecosystem, 3. Desert ecosystem, 4. Aquatic ecosystems- Ponds, Streams, Rivers, Oceans, Estuaries (brief account only)

### MODULE-III

#### Biodiversity and its conservation

18hrs

1. Introduction, Definition- genetic, species and ecosystem diversity; biodiversity index (Shannon index)
2. Hot-spots of biodiversity; India as mega-diversity nation.
3. Threats to biodiversity: land use changes & habitat destruction, poaching of wild life- hunting & export, Overuse of pesticides, invasive species.
4. IUCN, Red data Book; Extinct and Threatened species- endangered & Rare; Endemic species of Western Ghats.
5. Conservation of biodiversity: In-situ (National parks and Wild life sanctuaries) and Ex-situ conservation (botanical gardens); Biosphere Reserves & World Heritage Sites in India-Ramsar sites, Chilka lake.
6. Global initiatives in biodiversity conservation- Stockholm Conference, Montreal Protocol, Convention on Biological diversity Regional initiatives- Chipko movement, National Biodiversity Authority (NBA), Access and Benefit sharing (ABS), A brief account on conservation efforts in Kerala- Kerala State Biodiversity Board (KSBB), People Biodiversity Register.

### MODULE-IV

#### Environmental pollution

20hrs

1. Definition, causes, effects and control measures of – 1. Air pollution, 2. Water pollution, 3. Soil pollution, 4. Marine pollution, 5. Noise pollution, 6. Thermal pollution.
2. Solid Waste Management- waste minimization, Recycling and Reuse, Consuming environment friendly products. E-waste management.
3. Environmental Legislations - Environment protection Act (1986); Air [prevention and control of pollution] Act (1981; Amended 1987); Water [prevention and control of pollution] Act (1974; Amended 1988); Wildlife Protection Act (1972); Forest conservation Act (1980). (Scope and relevance only)
4. Environmental Organisations –UNEP, IPCC, WWF, Central Pollution Control Board

### MODULE-V

#### Disaster management

09hrs

1. Introduction, Definition and terminologies; scope and concept of disaster management.
2. Natural and Environmental disasters-a brief description of the following disasters-

## SEMESTER-V

earth quake, flood, coastal disasters, landslides, tsunami(role of mangroves in controlling tsunami disaster), cyclone, dam collapse, nuclear disaster, chemical disaster, biological disaster.

3. Environmental Issues - Global warming and sea level rise, Acid rain, Ozone layer depletion- causes and effects.
4. Disaster management – four phases – mitigation, preparedness, responses, recovery. Emergency procedures and warning systems, application of GIS (brief account only).

## MODULE-VI

### Phytogeography

9 hrs

1. Concept & definition, species distribution- continental drift, continuous and discontinuous distribution.
2. Vegetation in India – Forests- tropical, temperate, sholas, sub alpine, alpine, mangroves & Grass lands.
3. Phytogeographical regions of India - Western and eastern Himalayas, Desert, Western Ghats, Deccan Peninsula, Gangetic Plain, North East India, Coasts & Islands

### Practical

36hrs

1. Visit a local polluted site and report major pollutants.
2. Visit a mangrove vegetation and report diversity
3. Study of ecological and anatomical modifications of Xerophytes, Hydrophytes,
4. Halophytes, Epiphytes and Parasites.
5. Observation and study of different ecosystems mentioned in the syllabus.
6. Phytogeographical regions of India- Photos/Diagrams

## REFERENCE

1. Abbassi, T. & Abbassi, S. A. (2010). Remote sensing, GIS and Wetland management, Discovery Publishing House, Pvt. Ltd.
2. Ahluwalia VK and Sunitha Malhotra, (2009). Environmental science, Ane Books Pvt.Ltd.
3. Ambasht R.S. (2008) Text book of Plant Ecology, Students and Friends &Co. Varanashi.
4. Anji Reddi M. (2000). Remote sensing and Geographic Information System. B.S. Publications, Hyderabad.
5. Aravind Kumar (2009). Pollution and Biodiversity, Biosocial aspects, , Daya Publishing House
6. Asthana D.K and Meera Asthana, (2006). A Text Book of Environmental Studies, S. Chand & Company Ltd. New Delhi.
7. Chandoco.S Weaver and Clements (1949) Plant Ecology, McGraw Hill Publications, New York.
8. Chang Kang – Tsung (2007). Introduction to GIS. Tata McGraw Hill Education.
9. Chapman J.L. (2006). Ecology-Principles and Application. Cambridge UniversityPress India Pvt. Ltd
10. Chrisman and Nicholas (1997). Exploring GIS, John Wiley and Sons.

# SEMESTER-IV

## PLANT PHYSIOLOGY, PLANT ECOLOGY, HORTICULTURE AND PLANT BIOTECHNOLOGY

Course Code : 1431, Number of credits : 3

Number of contact hours: 54 hrs (Lecture); 36 hrs (Practical) Total-90 hrs

Distribution of Hours	Theory	Practical
Plant Physiology	30hrs	15hrs
Plant Ecology	08hrs	13hrs
Horticulture	06hrs	02hrs
Plant Biotechnology	10hrs	06hrs
<b>Total</b>	<b>54 hrs</b>	<b>36 hrs</b>

**Aim of the course:** To create awareness about physiological aspects of growth & metabolism along with knowledge about Ecology, horticulture and Biotechnology

### Objectives:

- ✎ To understand physiology of absorption, photosynthesis and respiration.
- ✎ To study ecosystem and ecological modifications
- ✎ To generate awareness about horticultural techniques.
- ✎ To familiarize plant tissue culture techniques

### MODULE-I

#### Plant Physiology

10 hrs

1. General introduction :physiological processes, their significance and applications.
2. Water relations of plants: Importance of water to plant life.
  - a. Absorption of water- organs of absorption, root and root hair. Physical aspects of absorption- imbibition, diffusion and osmosis. Plant cell as an osmotic system; water potential and osmotic potential. Plasmolysis and its significance, practical applications. Mechanism of water absorption – active and passive absorption, root pressure. Pathway of water across root cells.
  - b. Ascent of sap- vital and physical theories.
  - c. Loss of water from plants: transpiration - cuticular, lenticular and stomatal mechanism - theories – starch sugar hypothesis, potassium - ion theory. Significance of transpiration - guttation, anti - transpirants, factors affecting transpiration.
3. Mineral nutrition: macro and micro elements, role of essential elements and their deficiency symptoms. Mechanism of mineral absorption (a) passive absorption- ion exchange and Donnan equilibrium (b) active absorption- carrier concept.

## SEMESTER-IV

### MODULE-II

10 hrs

1. Photosynthesis: Introduction, significance and general equation. Photosynthetic apparatus, structure and function of chloroplast, quantasomes - solar spectrum and its importance - Fluorescence and Two pigment systems- raw material for photosynthesis- Mechanism of photosynthesis- Light reaction - cyclic and non cyclic photophosphorylation. Hill reaction - Dark reaction: Calvin cycle. Comparative study of C<sub>3</sub>, C<sub>4</sub>, and CAM plants. Photorespiration
2. Factors affecting photosynthesis - Law of limiting factors.

### MODULE-III

10 hrs

1. Respiration: Introduction, definition and significance and general equation. Respiratory substances, types of respiration- aerobic and anaerobic. Aerobic respiration - glycolysis, Krebs's cycle, terminal oxidation. Anaerobic respiration – fermentation: alcoholic and lactic acid fermentation. Energy relation of respiration
2. R .Q and its significance – Factors affecting respiration.
3. Translocation of solutes: Path way of movement, phloem transport, mechanism of transport - Munch hypothesis, protoplasmic streaming theory - activated diffusion hypothesis, electro osmotic theory.
4. Growth: Phases of growth - vegetative and reproductive growth - growth curve – plant growth regulators - Auxins, Gibberellins, Cytokinins, Ethylene, Abscisic acid – synthetic plant hormones - practical applications. Senescence and abscission. Photoperiodism.

### Practical

15 hrs

1. Water potential of onion peel / *Rhoeo* peel by plasmolytic method
2. Papaya petiole osmoscope.
3. Determination of water absorption and transpiration ratio.
4. Measurement of rate of transpiration using Ganong's potometer or Farmer's potometer.
5. Evolution of oxygen during photosynthesis.
6. Evolution of CO<sub>2</sub> during respiration.
7. Ganong's respirometer and measurement of R.Q.
8. Alcoholic fermentation using Kuhne's fermentation vessel.
9. Measurement of growth using Arc auxanometer.

### MODULE-IV

#### Plant Ecology

8 hrs

1. Definition-Scope and relevance to society and human environment. Need for public awareness
2. Ecosystems-Concept of an ecosystem- structure and function of an ecosystem-
3. Biotic and abiotic components- Energy flow in an ecosystem.
4. Ecological succession-Definition- primary, secondary- hydrosere.
5. Food chains -Food web & ecological Pyramids.
6. Introduction- types, characteristic features, structure and functions of the following ecosystems.

**Semester III**  
**Foundation Course II**  
**Experimental Zoology, Instrumentation**  
**Biostatistics and Bioinformatics**  
**Course Code: ZO. 1341**

**No. of Credits - 3**

**Total hours 54**

**Aim of the course**

To introduce the methodology and perspectives of Science in general so as to enable the students to systematically pursue Zoology in relation to other disciplines that come under the different branches of science.

**Objectives of the course**

- To learn the fundamental characteristics of science as a human enterprise
- To understand how science works
- To study to apply scientific methods independently

**Module. I**

**Nature and scope of Zoology:**

**7 Hrs.**

Branches of Zoology, Opportunities to a Zoologist, Institutes of Zoological and Scientific importance in India- Location, major achievements and present activities (academic and scientific) [Zoological Survey of India. Central Marine Fisheries Research Institute, Central Institute of Fisheries Technology, Rajiv Gandhi Centre for Biotechnology, Bioinformatics Centre and Library, Indian Institute of Science. Stem Cell Institute, National Institute of Immunology, Centre for Cellular & Molecular Biology, Centre for DNA Fingerprinting and Diagnostics, Central Drug Research- Institute].

**Module - II**

## **Instrumentation (Principle Working and Application)**

**12 hrs**

### **Methods in Biological Science and Solutions**

**Microscopes:** Types of microscopes- Dissection microscope, Light microscope, Dark field microscope,. Fluorescent microscope, Phase contrast microscope, Electron microscope (SEM, TEM); Microtome (Different Types),.Embedding, sectioning and staining techniques of light microscopy.

Photometry: Colorimetry and Spectrophotometry, Autoradiography: Principle, mechanism, and significance; Centrifugation: Principle and applications; Chromatography: Principle and uses.

### **Module - III**

#### **Biostatistics and Experimental Science.**

**16hrs**

Introduction to Biostatistics: Variable and-attribute; Population vs. Sample; Census vs. Sample survey; Arrangement of data; Frequency distribution.

Graphical presentation of data: Line diagram; Bar diagram; .Pie chart; Histogram. Measures of central tendency: Arithmetic mean; Mode; Median.

Measures of dispersion: Variance; Standard deviation; Standard error of mean; Standard score. Testing of hypothesis and goodness of fit: Null hypothesis, Level of significance, Probability, Normal distribution, Error of inference, Student's t-test, Chi-square test.

### **BIOINFORMATICS**

#### **Module IV**

**4 hrs**

**Overview of Information Technology:** features of the modern Personal Computer and Peripherals computer networks and Internet. Introduction to Operating System. DOS/Windows. Linux. Purchase of technology, license. guarantee. warranty.

#### **Module V**

**7hrs**

Definition, Nature & Scope of Bioinformatics - Contrast between Bioinformatics and Computational Biology; Key Bio-sequences in Molecular Biology - DNA, RNA and Aminoacid sequences. Popular Databases in Bioinformatics – NCBI, DDJB, PDB, OMIM; BLAST & FASTA sequence file formats, Approach of Comparative Biology based on sequence comparison - The basic idea of sequence comparison (algorithms not required) - idea of scoring matrices

## **Module VI**

**8 hrs**

The Blast search engine - important features - Idea of Multiple sequence alignment -Proteomics: Basic ideas of Protein Structure prediction- Concept of Homology Modeling- Idea of Molecular Phylogenetics - 'advantages and computational procedure (only description of use of a package such as Phylip). Basic concepts of computer Aided. Drug .Discovery. General description of drug discovery pipeline concept of Personalized medicine;

Bioinformatics tools: (i)Molecular Visualization Software - Rasmol (Basic features only) - (ii) ORF finding (iii) gene finding, (iii) BLAST (iv) Hydrophobicity Prediction (v) Single Nucleotide Polymorphism (SNP) prediction using GENSNIIP.

Central Drug Research Institute

**NB: Assignments/ Seminar** - Topics related to syllabus can be given to students as assignment/- seminar.

## **References**

- Aggarwal, S.K. (2008) Foundation course in Biology. Ane Books India, New Delhi.
- Arora PN and PK Malhotra (19%) BiosuniSties. Himalaya Publishing House.
- Arthur. M. Lesk (2000) Introduction to Bioinformatics, Oxford publishers.
- Bajpai, P. K. (2008) Biological instrumentation and methodology. S. Chand and Company Ltd.

**Semester IV**  
**Zoology Core course III**  
**ECOLOGY, HABITAT DESTRUCTION & DISASTER MANAGEMENT**  
**Course code – ZO 1441**

**No. of credits - 3**

**Total hours 54**

**Course Outcomes**

- Students get basic knowledge on ecosystem, food chain, food web and energy flow.
- Students acquire general awareness on pollution and their impacts.
- Imparts basic knowledge on ecosystems and their functioning.
- Students learn about various types of anthropogenic pressures on ecosystem, related degradation and management measures.
- Students get awareness of toxicants, their impacts on human health and environment and remedial measures.
- Create awareness about disasters, prevention and mitigation measures.

**ECOLOGY**

**4 hrs**

**Module I**

**Components of ecosystem:** Environmental factors - abiotic factors, light, temperature, soil, air; biotic factors- autotrophs, phagotrophs and saprotrophs; ecosystem interaction and relationship between biotic and abiotic factors, the cybernetic nature and the stability of the system. Pond as an ecosystem (self study)

**Module II**

**5 hrs**

**Biogeochemical cycles:** Basic types of biogeochemical cycles - gaseous cycle-carbon and nitrogen cycles, mention sedimentary cycles (P and S), recycling pathways and recycle index.

**Limiting Factors-** basic concepts- Leibig's law of minimum, Shelford's law of tolerance, combined concept of limiting factors, Light and temperature as limiting factors.

### **Module III**

**8 hrs**

**Habitat Ecology:** Biosphere classification- lithosphere, hydrosphere and atmosphere physical features, fauna and their adaptations of aquatic, terrestrial and marine habitats (self study).

**Population ecology:** Properties of population- density, natality, mortality, age distribution, biotic potential, environmental resistance and carrying capacity, population growth forms, J and S shaped curves, emigration, immigration and migration, population fluctuation. **Community ecology:** Definition and characters, species diversity; stratification; dominance; ecotone and edge effect; ecological indicators; community periodicity, succession.

### **Module IV**

**5hrs**

**Anthropogenic impact on ecosystem:** Ionizing radiation and radioisotopes, ionizing radiation and human health, radiation accidents and other exposures, disposal of radioactive wastes, pesticides like DDT, endosulfan, furadan, insect repellants , e-wastes. Monitoring of pollutants - physical, chemical and biological.

### **Module V**

**3 hrs**

**Wild life conservation and management:** Significance, causes of extinction, concepts of threatened species, red data book, IUCN, WWF, CITES, Green Environment and Green peace; protected areas, biosphere reserves, national parks and sanctuaries in India, forests in India, desertification, deforestation, carbon trading; importance of mangroves in coastal ecosystems-conservation and management.

### **Module VII**

**9 hrs**

**Environmental biotechnology:** Biotechnological methods of pollution detection, biotechnological methods in pollution management, bioremediation, biotechnology and biodegradation, genetically engineered microbes in bio-treatment of waste, eco-friendly bioproducts for environmental health, bio-piracy, bio-pesticides and bio-fertilizers, organic farming and its merits. Green chemistry - designing a Green synthesis, basic principles of Green chemistry.

## **Module VIII**

**5 hrs**

### **Environment Movements**

Environment and health - Environment and development: Environmental Movements (Chipko, Narmada Bachao Andolan). environmental movements in Kerala (Madhav Gadgil/Kasturi Rangan Reports. Ramsar sites Wetland Reclamations and localized anti-reclamation movements) Kerala state Biodiversity Board, Biodiversity Register.

## **DISASTER MANAGEMENT**

### **Module IX**

**8 hrs**

#### **Disruption in Ecosystem**

Natural-flood, Draught, Earth quake, Cyclone, Tsunamis, Volcanic eruption. Anthropogenic influence on erosion, climate change and pollution. Mining activities Monoclonal plantations, genetically modified plants and their impact in ecosystem. Impact of Developmental projects such as construction of dams, Hydroelectric projects Thermal power station.

### **Module X**

**7 hrs**

Disaster Management – Meaning and Definition: Definitions of Disaster, Hazard, Risks. Vulnerability, and Resilience and their relationship: Classification of disasters- Human induced and Natural; Cause of Disasters; Impact of disasters. Factors affecting Vulnerability – Economic, Political, Environmental and Social Counselling.

#### **Assignment/Seminar**

Global warming, Green House Effect, Ozone depletion Climate change, Kyoto protocol

## **Reference**

**Zoology Core course VII**  
**Immunology and Microbiology**  
**Course code – ZO 1543**

**No. of credits - 4**

**Total hours 72**

**Course Outcomes**

- Students understand the scope and importance of clinical immunology.
- Students understand the principles and mechanisms of immunology.
- Learn the malfunctioning and disorders of the immune system
- Students acquire knowledge on immunodeficiency diseases.
- Transplantation and mechanism of Graft retention and rejection are learned.
- Students get a brief history of microbiology.
- Students develop a broad understanding of the positive as well as negative aspects of microbes.
- Economic importance (applied aspects) of microbes in industry can be studied.

**Immunology**

**42hrs**

**Module I**

**2hrs**

**Introduction, history, development and scope.**

**Module II**

**3hrs**

**Immunity:** definition, classification of immunity. Innate (non-specific) - species, racial and individual IM with examples, acquired (specific) - active IM (natural and artificial) with examples, passive IM (natural and artificial) examples.

**Module III**

**7hrs**

**Immune system:** organs and tissues of the immune system. Primary (central) - thymus, bone marrow, bursa of Fabricius, secondary (peripheral)- spleen, lymph nodes, MALT etc. Cells lymphocytes - T cells and B cells - formation, development and maturation; plasma cells and null cells - natural killer cells, lymphokine - activated killer cells;

phagocytes / macrophages; antigen presenting cells - macrophages, B-lymphocytes, dendrite cells, Langerhans cells; follicular dendrite cells, neutrophils, eosinophils, basophils, mast cells. Mitogens - mention only

#### **Module IV**

**16hrs**

**Antigens** (immunogens) (Ag): definition, complete antigens, haptens, antigenic determinants or epitopes; antibodies (Immoglobulins) - definition, general structure of Ig, Ig determinants, physico-chemical properties of Ig, classes of Ig- G, M, A, D, E; mention abnormal Igs; antigen - antibody reactions- mechanism (mention zone phenomenon), precipitation reactions, agglutination reactions, complement fixation, neutralization, opsonisation (brief accounts only) Complement system: definition, general features, major histocompatibility complex (MHC) (brief account only). Immune response- definition, types of immune responses- humoral immune response (antigen mediated immunity - AMI) and cellular immune response (cell mediated immunity - CMI) in detail, induction of CMI, mention cytokines, define immunological memory, immunological tolerance and immune suppression

#### **Module V**

**14hrs**

**Hyper sensitivity / allergy:** definitions, classification- types I, II and III (Brief accounts only); immuno deficiency diseases (ID)- definition, primary IDs, disorders of immune mechanism (humoral, cellular and combined IDs), disorders of complements, disorders of phagocytosis, mention one example each, secondary IDs - mention example, an account of Acquired Immune Deficiency Syndrome (AIDS); Auto immunity-definition, mechanism, mention AI diseases; transplantation immunity-definition, classification of transplants, graft versus host reactions;graft rejection, mechanism of graft rejection, factors affecting graft survival; Immunisation and vaccination- definitions, vaccines; types of immunization- active immunization- killed and live attenuated vaccines, microbial extracts, vaccine conjugates, toxoids, recombined vaccines, DNA vaccines;

passive immunization- pooled nonnal human Igs, specific Igs (hyper antisera); combined immunization

**Microbiology** **30hrs**

**Module VI** **14hrs**

**Introduction:** history, development and scope Importance of microbes in various ways beneficial, harmful, ecological and others. Classification of microbes/ particles: broad classification- viruses- different groups, examples; mention viroids and prions, *Mycoplasmas*, *Rickettsiae* and *Chlamydiae*; Bacteria: 1. Archaea - significance of extreme life forms(Methanoarchaea , extreme halophiles and thermophiles); Eubacteria (=Bacteria) Major groups of Eubacteria: Bergey’s system of classification; modern methods classification of Eubacteria (outline only with familiar examples)- Nonphotosynthetic proteobacteria:- (Fennentative Rods and Vibrios) ex. *Vihrio*, *Pasteurella* (oxidative rods and cocci) eg. *Pseudomonas*, *Azotobacter*, *Rhizohium*; Chemo-lithotrophic bacteria:- eg. nitrifying, sulphur and iron bacteria; Firmicutes (eg. *Staphylococcus*) and Actinobacteria (Coryneform bacteria); Phototrophic bacteria (Cyanobacteria); Algae-( details not expected) Protista- different groups-examples: *Plasmodium*, *Giardia*; Fungi- Mention different groups - example *Candida*. Structure of a bacteriophage and a typical bacterium

**Module VII** **4hrs**

**Applied microbiology:** various fields: emphasis on environmental, agricultural, medical, biotechnological, industrial and strategic fields

**Module VIII** **12hrs**

**Symbiotic and Pathogenic Microbes:** microbes with other microbes, microbes with plants, microbes with animals; microbe - human host interactions, normal human microbiota of various organs-mention any 3 examples, pathogenic microbes - mention any 3 examples, microbial toxins - mention any 2 examples. Microbial diseases in man

**Practical IV - Developmental Biology , Ecology, Ethology, Evolution and  
Zoogeography  
Course Code — ZO1646**

**No. of credits - 3**

**Developmental Biology and Experimental Embryology**

**[Any six]**

1. Study of different types of eggs-Amphioxus, frog, chick, human based on models/charts {Any three]
2. Study of blastula- Amphioxus, frog- slide / model [Any one]
3. Study of gastrula Amphioxus/frog-yolk plug stage - slide / model. [Any one]
4. Mounting, sketch and label of 24hrs/48hrs chick blastoderm.[Any one]
5. Study of placenta(model/specimen) - any two types.
6. Stained preparation of grass hopper sperm (demonstration)
7. Mount few eggs of Culex from the egg raft and record the life cycle of Mosquito
8. Mount the egg of yellow crazy ant (an alien invasive ant) *Anoplolepis* and describe the type of egg.

**Ecology ( 1-14 Compulsory)**

1. Estimation of dissolved oxygen of water sample.
2. Estimation of CO<sub>2</sub> in water sample.
3. Primary productivity using dark and light bottle
4. Turbidity using Secchi disc
5. Estimation of hardness of three different water samples.
6. Extraction of soil organisms- Berlese funnel, Baerman's funnel [Any one]
7. Construction of food web .
8. Study of ecological adaptations - any three
9. Study of marine. plankton - any three
- 10.Measurement of pH of different water samples using pH meter pH paper and indicator solution.

**Ethology**

11. Pheromones for pest management

11(a) Mango fruit fly trap (*Dacus dorsalis*) by Methyl eugenol

11(b) Melon fly trap (*Bactrocera cucurbitae*) by cue lure trap

### **Environment Movements**

12. Photo of Rachel Carlson, Sunderlal Bahuguna, Medha Patkar. (Photo of Eminent persons, Identify and comment on their contributions)

### **Evolution**

13. Photo of Darwin and Lamarck - Identify the scientist and mention the contribution.

### **Zoogeography**

14. Study different zoogeographical realms with fauna.

**Semester V**  
**Zoology Open Course I**  
**Public Health and Hygiene**  
**Course Code - Z01551.1**

**No. of credits - 2**

**Total hours 54**

**Aim of the course**

To make the student aware of the essentials of public health and sanitation thereby warding off diseases and uplifting the living standards of the community

**Objectives of the course**

- To learn the principles of nutrition and dietetics
- To understand the ill effects of modern lifestyle
- To study the advantages of personal hygiene and sanitation.

**Module I**

**6hrs**

Introduction: Scope and importance of the study; balanced diet, diet control for diabetics; cholesterol etc., concept of energy, calories, daily food intake as per occupation, pregnancy and lactation. Dietary requirements of infants; pre-school, children, school children, adults and geriatric care. Malnutrition and over nutrition - obesity and weight control; defects of modern food habits – fast food, soft drinks, ice-creams and broiler chicken

**Module II**

**4hrs**

Adulteration of food: food hygiene - hygiene of milk, meat, fish. eggs, fruits and vegetables, common food adulterants - harmful effects and their detection, food additives, fortification of food; Food Adulteration Act and its stringent implementation

**Module III**

**18hrs**

Health Hazards: Health dynamicity - definition, factors influencing health. health as medium of socio-economic development. Diseases - Common food borne and water born be diseases (gastroenteritis, jaundice,-cholera; salmonellosis, travellers' diarrhoea and *Escherichia coli* infection, typhoid) – mode of transmission, causative agents, symptoms,

prevention and control. Sexually mode. of transmission, (STD) causative agents, symptoms, prevention and control. Sexually transmitted infections - AIDS, genital herpes, hepatitis B, syphilis, gonorrhoea - causative agents, symptoms, modes of transmission and prevention.

Dengue, chikunguniya, Weil's disease (general methods of mosquito control and the need; to prevent mosquito breeding in and around our homes).

Life style habits - excessive usage of T.V., computer, mobile phones. two wheelers, and their impacts on health. Lack of physical exercise and its deleterious effects on the body and mind.

#### **Module IV**

**6hrs**

Health Education: Definition, objectives, principles and methods of health education, ill effects of smoking, alcoholism and drug abuse (emphasis should be given to pan masala. amphetamines, hashish,. opium, brown sugar, pethedine). Population control and family welfare, use of contraceptives. .Blood donation -basics. of ABO, blood grouping including Rh factor. Genetic incompatibility and consanguineous marriages.

#### **Module V**

**12hrs**

Mental Health: Definition by WHO and necessity of mental well being. major depressive disorders, substance abuse, schizophrenia, obsessive compulsive disorders, domestic violence. causes for lost years of healthy life, strategies for prevention and possible interventions, childhood mental disorders and illnesses, gulf widow syndrome, stress reduction and management (importance of yoga)

#### **Module VI**

**8hrs**

Hygiene: Definition, personal hygiene - body odour, oral hygiene; grooming, feminine hygiene sleep hygiene, hand washing, toiletry. Social hygiene - clean living movements, occupational hygiene, food and cooking hygiene medical hygiene, excessive hygiene.

NB:-**Assignments/ Seminar** - Topics-related to syllabus- can he given to students as assignment/seminar.

**Semester VI**  
**Zoology Elective Subject – I**  
**Economic Zoology – Vermiculture and Apiculture**  
**Course Code – ZO1651.1**

**No. of credit - 2**

**Total hours 54**

**Aim of the course**

To promote self employment and self reliance among educated youth

**Objectives of the course**

- To learn the basic procedure and methodology of vermiculture
- To learn the scope and methodology of apiculture.

**Vermiculture**

**24hrs**

**Module I**

**6 hrs**

Introduction: definition and scope of vermiculture. Nature and species of earthworms: habit categories - epigeic, endogeic and anecic, indigenous and exotic species (*Eudrillus eugeniae*/*Eisenia foetida*/*Perionyx excavatus*/*Lampito mouritii*). identification of the above four species based on morphological characters.

**Module II**

**10 hrs**

Methodology of vermicomposting: step by step methodology - containers for culturing, raw materials required, preparation of bed, environmental pre-requisites, feeding, harvesting and storage of vermicompost. Advantages of composting, precautions to be taken to prevent attack by pests and pathogens:

**Module III**

**8 hrs**

Vermi compost profile and applied aspects: physical, chemical and biological parameters of vermicast, vermin enrichment, economic uses of vermiculture (biofertilizer, waste disposal, vermiwash, poultry feed, vermi-remediation etc.

**Apiculture**

**30 hrs**

**Module IV****8 hrs**

Introduction and Scope: Definition and significance of the study. Caste system and Social behavior; common. species of honeybees used, organization of bee colony, social life and adaptations of honeybees.

**Module V****12 hrs**

Bee keeping methods and equipments: indigenous methods, extraction appliances, extraction of honey from the comb and processing. management and maintenance of an apiary, bee pastures

**Module VI****10 hrs**

Diseases and economics: diseases (bacterial, fungal, protozoan, acarine, brood diseases, preventive and curative measures. Use of honey, bees wax, bee venom, nutrient profile of honey, marketing strategies.

**NB:Assignments/ Seminar** - Topics 'related to syllabus, can be given to students as assignment/ seminar.

**References**

1. Cherian & Ramachandran Bee keeping in-South Indian Govt. Press, Madras.
2. Gupta, K.C. Romance of bee keeping. Khadi Paristhan, Calicut.
3. Mary Appelhof. Worms eat my Garbage.
4. Mishra R.C. Perspectives in Indian Apiculture
5. Sathe, T.V. Vermiculture and Organic farming.

**Semester III**  
**Zoology Complementary Course III**  
**Functional Zoology**

**Course Code - ZO1331**

**Total hours 54**

**No. of credits - 3**

**Aim of the course**

To familiarize students on the physiology of their own body and urge them to take precautionary measures to safeguard their health.

**Objectives of the course**

- To study the structure and function of each system in the human body.
- To study the etiology of common physiological disorders, syndromes and diseases.

**Module I**

**4 hrs**

Nutrition: Types of nutrition - autotrophy and heterotrophy. Outline classification of food components. Brief mention of malnutrition disorders. Vitamins - physiological role and disorders (deficiency diseases).

**Module H**

**6 Hrs**

Respiration: Respiratory pigments and their functions with special emphasis on haemoglobin transport of oxygen and carbon dioxide.

Respiratory • disturbances - brief mention of Apnoea, Dyspnoea, Hypoxia, Hypo and Hypercapnia. Asphyxia and Carbon monoxide poisoning. Physiological effects of smoking.

**Module III**

**8 hrs**

**UNIVERSITY OF KERALA**  
**B. A ISLAMIC HISTORY**  
**FIRST DEGREE PROGRAMME UNDER CBCSS**  
**(Semester II)**

**IH. 1241**

**LIFE AND TIMES OF PROPHET  
MUHAMMAD**

**Core Course II**  
**hrs/week**

**4 Credits : 6**

**1. Aims of the Course:-**

The Course Aims to familiarize students in the geography of Arabia, its climate, flora and fauna and its population. It also throws light Days of Jahiliyah and the life of Prophet Muhammad.

**2. Objectives of the course:-**

- a. To introduce an awareness among the students in the geography of Arabia, its climate, flora and fauna. It also gives an idea of the tribal system, Bedouin life and socio- religious condition of Jahiliyah period.
- b. To give an idea to the students of the early life of the Prophet, the days of the prophet hood, the opposition of the Quraysh and the migration
- c. To provide information regarding the eventful life of Prophet Muhammad after migration to Madinah such as the defensive wars, the new administrative system, the religious teachings and the ideal society formed by the Prophet.

**3. Syllabus:-**

**Module I-Arabia -An introduction**

Geographical divisions of Arabia-Flora and fauna-Climatic conditions-Bedouin life -tribal system-Jahiliyah period -Ayyam Al Arab -Kaba-

**Module II- Prophet Muhammad at Makkah**

Birth of Prophet Muhammad- Parents-Early life-Harb al Fijar- Hilf al Fudul-Marriage-Khadijah-Commencement of the mission- Early followers-Opposition - Migration to Abyssinia-Year of Sorrow- Isra and Miraj-Visit to Taif- Pledges of Aqaba-The Hijrah to Madinah

**Module III- Prophet at Madinah**

Socio religious condition of Madinah-Major tribes-Ansars and Muhajirs-Masjid Nabawi-The Madinah Charter- Prophet as the Ruler of Madinah-Battles of Badr,Uhud and Khandaq-The Treaty of Hudaibiyah-

Victory of Makkah-Farewell pilgrimage and the Last Sermon of Arafah-Death of Prophet-Prophet as a Reformer and Statesman.

#### **Module 1V- Teachings of Prophet Muhammad**

Religious teachings-concept of God-articles of Faith-Five Pillars of Islam-Moral teachings-honesty and Trustworthiness-Equality and social Justice-Status of Women-Importance of education.

#### **4. Books Recommended:-**

- a. Ameer Ali, S. (1953) The Spirit of Islam, London.
- b. Ameer Ali, S. (1990) Early Islam, Edinburgh.
- c. Ameer Ali, S. (1990) The History of the Saracens.
- d. Azam, A. R. (1964) The Eternal Message of Muhammad, London.
- e. Cambridge History of Islam, (Relevant Chapters).
- f. Encyclopaedia of Islam, (n.d.) Relevant Chapters.
- g. Gibb, H. A. R. (1962) Studies on the civilization of Islam (ed) Boston.
- h. Haykal, M.H. (n .d.) Hayat Muhammad, English Tr. By Ismail Raji al Faruqi.
- i. Hitti, P. K. (1949) The Arabs: A short History, Princeton.
- j. Hitti, P.K. (1953) The Arabs: Short History, London.
- k. Hourani, Habib (n.d.) History of the Arabs.
- l. Hussaini, S.A.Q. (n.d.) Arab Administration.
- m. Lewis, B. (1960) The Arabs in History, London.
- n. Lewis, Bernard (n. d.) Islam and the World.
- o. Maududi, S. A. A. (1979) SeeratSawrar-i-Alam, Lahore.
- p. Nadvi, Abdul Hassan Ali (1978) Nabi-Rehmat, Karachi.
- q. Nadvi, Abdul Hassan Ali (1987) Islam and the World, Karachi.
- r. Nicholson, R. A. (1962) A Literary History of the Arabs, Cambridge.
- s. Numani, Shibli (1971) Sirat al-Nabi, DarulMusannifin, Azamgarh.
- t. Sarwar, Hafiz Ghulam Muhammad (1969) The Holy Prophet, Sh. Ashraf, Lahore.
- u. Siddiqi, Abdul Hameed (1969) The life of Muhammad, Lahore.
- v. Siddiqi, Dr. Y. Mazhar (1987) Organization of Government under the Prophet, Delhi.
- w. Siddiqi, Naeem (1975) Muhsin-i-Insaniat, Lahore.
- x. Siddiqui, Mazharuddin (n.d.) Development of Islamic State and Society.

**UNIVERSITY OF KERALA**  
**B. A ISLAMIC HISTORY**  
**FIRST DEGREE PROGRAMME UNDER**  
**CBCSS (Semester II)**

**IH. 1231**

**FOUNDATIONS OF ISLAMIC  
CULTURE**

**Compl.Course III**  
**hrs/week**

**3 Credits : 3**

**1. Aims of the Course:-**

**The course aims to give a deep insight to the students in the fundamental principles of Islam. It also enables the student that Islam means peace and it is a way of life and meant for the salvation in the hereafter. It helps to realise the prevalent prejudices against Islam from the minds of the students.**

**2. Objectives of the course:-**

- a. To introduce an awareness among the students about the general principles of Islam, its beliefs and practices, the concept of God and the importance of the Oneness of God.
- b. To give an idea about the position of women envisaged by Islam. It also aims to throw light on their rights and responsibilities, role in the family and social life .
- c. To familiarise the significance Islamic Economic system, concept of wealth, role of money, Islamic ethics on the accumulation and distribution of wealth .
- d. To pick up the students of the exact nature of political administration suggested by Islam.

**3. Syllabus:**

**Module I:-**

Meaning of Islam- Sources of Islam- Articles of Faith- Tawhid and Shirk- Five Pillars of Islam

**Module II:-**

Status of Women in Islam- Polygamy and Divorce- dignity and dress code-

**Module III:-**

# FIRST DEGREE PROGRAMME UNDER CBCSS (Semester III)

IH. 1331

ISLAMIC CULTURE AND  
CIVILIZATION

Compl.Course V  
hrs/week

3 Credits : 3

## 1. Aims of the Course:-

**The course aims to bring forth the intellectual contribution of medieval islam and to help the students to realize that the 'Dark Age' of middle ages is confined to the European part of the world only.**

## 2. Objectives of the Course:-

- a. Introduce Muslim Culture and learning in the middle ages.
- b. Familiarize the contributions of the Muslims to the development of medical sciences.
- c. Evaluate their achievements in the fields of mathematics and Astronomy.
- d. Appreciate the progress in history and philosophy.

## 3. Syllabus:-

### Module I- Fundamentals of Islam

Meaning of Islam- Tawhid and Risalat- Unity of God and Mankind- Obligatory duties- Status of women in islam- Socio-economic and religious rights.

### Module II- Islamic Political Thought

Sovereignty of Allah- Man as Vicegerent of God- election of rulers- Nature of Democracy in Islam- Equilibrium between individualism and collectivism-

### Module III- Economic Thought in Islam

Ownership of wealth – distribution of wealth- primary and secondary right to weatth- prohibition of Riba- Permitted and prohibited in Islam- Economic Ethics

### Module IV- Intellectual and Cultural Contributions

Medicine- Al Razi and Ibn Sina- Alchemy- Jabir Ibn Hayyan- Mathematics and Astronomy- Umar Khyyam and Al Khwarizmi- Algebra and Algorithm- Philosophy- Al Kindi, Al Farabi, Ibn Rushd- Historiography- Al Tabari, Al Masudi, Ibn Khaldun

## 4. Books Recommended:-

- a. Maududi, S.A.A -Towards Understanding Islam

Expansion of the empire into Central Asia-Sind and Spain-Sulayman.

**Map:Umayyah Empire under Walid1**

**Module III- Reinstatement of Khilafath.**

UmarII-His Religious policy-Administation-Character and achievements-  
Hisham-MarwanII-Decline of the Empire.

**Module IV- Polity and Society under Umayyads**

Central Administration-Provincial administration-Military and Revenue  
administration-social life-Kharijites-Mawalis-Dhimmis-Economic condition-  
Educational developments-Art and architecture.

**4. Books Recommended:**

- a. Cambridge History of Islam.
- b. Din,A.A, The Umayyah Caliphate, London,1971.
- c. Habib Hourani,, History of The Arabs.
- d. Hitti ,Philip, K- History of The Arabs,London, 1953.
- e. Hitti ,Philip, K -The Arabs:Short History,London,1953.
- f. Lewis. B ,The Arabs in History,Newyork,1960.
- g. Mazarul- ul- Haq. History of Islam.
- h. S.W. Muir. The Caliphate ,Its Rise,Decline and Fall,Beirut:1961.
- i. T.W Arnold,The Caliphate.
- j. Ameer Ali. The Spirit of Islam,London.

**UNIVERSITY OF KERALA**

**B. A ISLAMIC HISTORY**

**FIRST DEGREE PROGRAMME UNDER  
CBCSS (Semester IV)**

**IH. 1442**

**THE ABBASIYA CALIPHATE**

**Core Course V  
hrs/week**

**3 Credits : 4**

**1. Aim and objectives of the course:-**

**The course aims to familiarize the students the great Muslim  
Civilization developed under the auspices of the Abbasids.**

**2. Objectives:-**

1. To impart an idea regarding the origin of the Abbasids

2. To understand highlight intellectual contributions of the Abbasids
3. To know the administrative setups.
4. Understanding about Bagdad and its changing faces.
5. To understand the different ruling strategies and different petty dynasties.

### **3. Syllabus:-**

#### **Module I-Origin and Development of the Abbasids**

The Abbasiyah propaganda- Abul Abbas Al-Saffah- Al-Mansur, - foundation of Bagdad and his reforms- Al Mahadi- Harun-al-Rashid-Rise and fall of Barmakids, - Al-Ameen, civil war, Al Ma'mun- BaithulHikma-Al Muthasim, change of capital- Al Wathiq and Al Muthawakkil- their policies.

#### **Module II-History of Later Abbasiyahs(840-1258)-**

Al-Muntasir, Al- Mustain , Al-Mutazz , Al-Muqtadir, Al- Mustazhir, Al Nasir , Al-Mustasim, last caliph , Invasion of Hulagu- Sack of Baghdad-collapse of Abbasiyah Caliphate.

#### **UNITIII -Intellectual Contributions**

Development in Medicine, Philosophy, Astronomy, Astrology, Mathematics, History, Geography, Alchemy, Theology and Historiography- Hellenism-Development of art and architecture, painting, Calligraphy, Music, education - fiqh, Sihah al sittah- Four school of thought- Baith-al Hikma- age of translations, Indian, Persian and Greek influence Mutazilia, .

#### **UNIT IV- Development of Society and Polity**

Abbasid society and administration - Central, Provincial, Judicial, financial, military, postal, Persinisation of Abbasiyah court, Islamization of the empire, status of women, family life, Socio-economic life, agriculture ,trade and commerce, the conquest of Arabic, Bagdad- the hub world culture.

#### **4. Books Recommended:-**

- |                        |                                   |
|------------------------|-----------------------------------|
| a. Philip.K.Hitti      | - History of the Arabs            |
| b. Ameer Ali.S         | - A short History of the Saracens |
| c. Ameer Ali.S         | - Spirit of Islam                 |
| d. Holt P.M and others | - The Cambridge History of Islam  |
| e. Mahmud.S.F          | - A Short History of Islam        |
| f. KhudaBakhsh         | - Arab Civilization               |
| g. MorisLombrd         | - The Golden Age of Islam         |

- h. Ibrahim Kunju. A.P: Mappila Muslims of Kerala
- i. Ibrahim Kunju. A.P: Mysore – Kerala Relations in the 18<sup>th</sup> Century
- j. Ibrahim Kunju. A.P: Studies in medieval Kerala History
- k. IslamikavinhanaKosam Vol. 8
- l. Kareem. C.K: Kerala Muslim Directory
- m. Kurup.K.K.N: Ali Rajas of Cannanore
- n. Mohammad Koya S.M: Mappila Muslims of Malabar
- o. Mohammed Kunhi P.K: Muslimkalum Kerala Samskravum
- p. Nambiar O.K: Kunjalis -The Admirals of Calicut
- q. Rolland E.Miller: Mappial Muslims of Kerala
- r. Sayed Mohammad: Kerala Muslim Charithram
- s. Sayed Mohammed: Kerala Muslim Directory
- t. SayedMoideenSha: Islam In Kerala
- u. ShaikZaynudeen: TuhfathulMujahideen
- v. Stephen Federick Dale: The Mappilas of Malabar
- w. William Logan: Malabar Manual
- x. Abdul Salim.A, Gopinathan Nair P.R: Educational Empowerment in India.
- y. Muhammad.U: Educational Empowerment of Kerala Muslims: A Socio-Historical Perceptive

## **UNIVERSITY OF KERALA**

### **B. A ISLAMIC HISTORY**

#### **FIRST DEGREE PROGRAMME UNDER CBCSS (Semester VI)**

#### **IH. 1644 CONTEMPORARY DEBATES ON ISLAM**

**1. Aim of the course:-**

The course intends to provide the students with basic historical overview of the intellectual discourses in Islam which focus on the scholastic debates pertaining theological, political, cultural and gender issues from medieval to modern period. The intellectual debates ended up in the emergence of different sects and groups in Islam.

**2.Objective of the course:-**

- a. To familiarise the context of the emergence different sects and movements in Islam
- b. To give a brief idea about revivalist- Reformist movements in Islam
- c. To enable the students to follow the discussions on human rights and gender issues in Islam
- d. To have an overall view on the discourses in Islam

**3. Syllabus:-**

**Module I- Beginning of sects and trends in Islam**

Fundamentals of islam- Political Thought in Islam- principles of Islamic Political Theory-Sovereignty of God- nature ,purpose and functions of the Islamic State- Islamic Economics- Difference between Islamic and Modern Economics- Economic philosophy- Ownership of Wealth –means of ownership- Environmental Vision of Islam- Islamic approach towards pollution-air, water, noise-Against deforestation

**Module II -Revivalism and Reformism in Islam**

Ibn Taymiyya and Muhammed bin Abdul Wahab as two pioneers of Islamic revival- Jamal al- Din al Afghani, Muhammad Abdu, Rashid Rida as pioneers of Islamic reform- Hasan al- Banna, Mawdudi, SayyidQutb and Khumeini as political theoreticians of modern day Islam

**Module III -Human Rights in Islam**

Human Rights: Its meaning and significance- The genesis of human rights in Islam- Madeena Charter and the farewell sermon of the prophet- Basic human rights: Life, Property, Progeny, Faith and the rights of non Muslims. Declaration of Human Rights 1948- The Cairo Declaration of Human Rights

**Module IV- Gender Justice in Islam**

Status of women in early Islam- the representation of women in the Qur'an - the debates on gender justice in Islam- The Contemporary

# **SEMESTER I**

## **PAPER I-BC 211 TOOLS AND TECHNIQUES IN BIOCHEMISTRY**

### **Unit 1. Technology Fundamentals**

General scheme for purification of biocomponents Methods of studying cells and organelles and sub cellular fractionation and marker enzymes. Methods for lysis of plant, animal and microbial cells. Ultra filtration freeze drying and fractional precipitation.

Ultra centrifugation – Velocity and buoyant density determination, density gradient centrifugation, molecular weight determination.

### **Unit 2. Chromatography**

Basic principles and applications of ion-exchange, gel filtration, partition, affinity, HPLC and reverse phase chromatography, gas chromatography, TLC, paper chromatography, chromatofocussing.

Electrophoresis – basic technique- polyacrylamide / starch/agrose gel electrophoresis, use of SDS/urea, iso electrophoresis, capillary electrophoresis, pulse, field, gel electrophoresis, Blotting techniques, western, eastern and southern

### **Unit 3. Analytical Techniques**

Principles and application of tracer technique – Radiation dosimetry, radio diagnosis of diseases, autoradiography, Cerenkov radiation, Liquid scintillation counter, re-counters.

Principles and biophysical methods used for the analysis of biopolymer structure. X-ray diffraction, UV, ORD, CD, visible, NMR, ESR spectroscopy. Atomic absorption and plasma emission spectroscopy.

Photometry & Spectrophotometry – Outline and fundamental principles of fluorescence & phosphorescence, absorption, transmission of light, Beer – Lamberts law, Colorimeter, Spectrophotometer, flame photometry.

Laser – principle, application in Medicine and Biological Sciences.

### **Unit 4. Research Methodology**

Scientific research and writing . Important and need for research ethics and scientific research. Formulation of hypothesis. Type and characteristic designing a research work. Scientific writing. Characteristic logical format for writing thesis and papers. Essential features of abstract. Introduction. Review of literature. Materials and methods and discussion. Effective illustration, Tables and figures, reference style, Harvard and Vancouver system.

**PAPER X - BC 234**  
**METHODS IN RESEARCH**

**Unit I : Introduction to Intellectual Property**

IPR policy of Government of India, Indian & International Patent laws, Types of patents. Indian Patent Act 1970; Recent Amendments; Protection of New GMOs; Financial assistance for patenting-introduction to existing schemes. Procedure for patent application, International harmonization of patent laws, Patenting of life forms - plant, animals, microbes, gene, process and products,

**Unit II : Research methodology and Scientific Writing :**

Goals of research – Types of research – Important and need for research ethics and scientific research. Formulation of hypothesis. Characteristic designing a research work - experimental design. Characteristic logical format for writing thesis and papers- Essential features of abstract, Introduction, Review of literature, Materials and methods, results and discussion, Effective illustration, Tables and figures, reference style- Harward and Vancavour system. When and where to publish? Ethical issues related to publishing, Plagiarism and Self-Plagiarism. Citation and Acknowledgement, ISBN & ISSN. Peer review. Impact factor and H- index of journals. Presentation tools : oral and poster, Microsoft Power Point and PDF slides.

**Unit III : Biostatistics**

Introduction to Biostatistics. Concept of sampling and sampling methods. Classification and tabulation of data. Diagrammatic and graphical representation of data. Measure of central tendencies- Mean, median, mode, geometric mean and harmonic mean. Variance- Coefficient of variation. Statistics of Dispersion- range, quartile deviation, mean deviation, standard deviation and standard error. Concepts of moments, skewness and kurtosis; Simple correlation and regression; Correlation analysis-scatter diagram, Karl Pearson's coefficient of correlation and Spearman's rank correlation. Software packages for statistical analysis - MS-Excel. Probability and law of probability; Probability distributions (binomial, poisson and normal); Tests of statistical significance (t –Test, chi-square test); Analysis of variance- one way and two way ANOVA (Notice:- The

Part B: 11-22	8 out of 12; Short Answer	16
Part C: 23-31	6 out of 9; Short Essay	24
Part D: 32-35	2 out of 4; Essay	30
		Total = 80-80 marks

SYLLABUS FOR B.Sc. CHEMISTRY PROGRAMME  
Semester – I Core Course - 1 Course Code– CH1141 Credit-4

Inorganic Chemistry I

Lecture -Tutorial-Lab: 2-0-2

36hrs.

### Aim of the Course

The course builds on the plus-two level introductory chemistry and familiarizes theoretical aspects of atomic structure and periodicity. Subsequently, it delves into the principles of acids, bases and nonaqueous solvents. The course will be highlighting the chemistry of hydrogen as well as s-block elements. The course also introduces the students an idea about environmental chemistry and different types of pollution.

### Course objectives

The course helps to learn the students to understand the structure of atom, periodicity and non-aqueous solvents. Upon course completion, the student will be able to appreciate how the inner structure of elements dictates the chemical properties of elements and also understand how the elements are arranged in the periodic table and the properties and application of s -block elements, hydrogen and their compounds.

### Course outline

#### Module I- Atomic Structure and Periodicity

6 hrs.

Introduction to the structure of atom - Dual nature of electron - de Broglie equation - matter waves and electromagnetic waves - experimental verification of de Broglie relation - Heisenberg's uncertainty principle - expression and significance. Wave mechanical concept of the atom - Schrodinger equation (Derivation not required) -. Quantum numbers - Pauli's exclusion Principle - Aufbau Principle – Hund's rule - Electronic configuration of atoms - classification of elements into s, p, d, f blocks - electronegativity-Pauling's scale, Mulliken and Allred - Rochow scale-(Including numerical problems)

#### Module II-Hydrogen

6hrs

Position of hydrogen in the periodic table. - Similarities and difference in properties compared with alkali metals and halogens- Atomic and physical properties of hydrogen; Preparation of hydrogen- Reactions of hydrogen. Nascent, atomic and active hydrogen- Ortho and para hydrogen -Deuterium and tritium –Uses of hydrogen- Hydrogen as next generation fuel-Hydrides- Types of hydrides, properties; water; Hydrogen bond-types-consequences of hydrogen bond. Hydrates; Hardness of water- types- different methods water softening. Heavy water- preparation and properties.

#### Module III-S-Block Elements

9hrs

General characteristics, atomic and ionic radii, ionisation enthalpy, electropositive character, formation of univalent positive ions, hydration of ions, reducing properties, Electrode potentials, characteristic flame colouration, lattice enthalpy, chemical properties, , comparison of lithium with other members of the family, resemblance of lithium and magnesium, uses of alkali metals, properties of alkali metals and their uses, compounds of elements of group 1 – comparative study-oxides, hydroxides, halides, carbonates and bicarbonates General characteristics of group II-atomic and ionic radii, ionisation enthalpy, reducing properties, electrode

potentials, characteristic flame colouration, chemical properties, gradation in properties, comparison of beryllium with other members of the family, Uses of alkaline earth metals, Compounds of alkaline earth metals-Beryllium oxide, beryllium chloride, calcium oxide, calcium hydroxide, calcium cyanamide- preparation and properties. comparison of solubility products of hydroxides and sulphates, Portland cement.

#### Module IV -Acids, Bases and Non Aqueous Solvents

6hrs

Lowery-bronsted and Lewis concepts of acids and bases-introduction to SHAB principle. General properties- classification- self ionization and levelling effect- reaction in non-aqueous solvents - protic and aprotic non aqueous solvents- examples- solutions of metals in liquid ammonia- self ionization of liquid ammonia- liquid SO<sub>2</sub>, liquid HF, alkali metals in liquid ammonia

#### Module V - Environmental Chemistry – Air, Water and Soil Pollution

9 hrs.

Air pollution - ozone layer depletion, ozone hole, protection of ozone umbrella –Air pollution caused by fire works, harmful effects of fireworks, acid rain, green house effect, smog –Classic and photochemical Smog- management of air pollution.

Water pollution: Causes- Heat, industrial waste, sewage water, detergents, agricultural pollutants - treatment of industrial waste water-Activated charcoal, Synthetic resin, reverse osmosis and electro dialysis - Quality of drinking water - Indian standard and W H O standard - Dissolved oxygen - BOD, COD.

Soil pollution - Pesticides, Fertilizers, Industrial waste, plastics - Control of pollution

#### References

1. T.F.Gieryn, Cultural boundaries of science Univ. Chicago Press 1999.
2. The Golem : What everyone should know about science. H.Collins and T.Pinch. Cambridge Univ Press 1993
3. Alexis Leon & Mathews Leon, Computers Today, Leon Vikas
4. SotiSivendraChanthra Contemporary Science Teaching,
5. ManasChanda, "Atomicstructure and Chemical Bonding including Molecular spectroscopy"
6. E.S. Gilreath "Fundamental concepts of Inorganic Chemistry"
7. Puri, Sharma and Kalia "Inorganic Chemistry"
8. Madan "Inorganic Chemistry".
9. Manku , "Theoretical principles of Inorganic Chemistry" -
10. M. C. Dey and J. Selbin "Theoretical Inorganic Chemistry".
11. F A Cotton and G. Wilkinson "Basic Inorganic Chemistry".
12. S. K. Banerji, "Environmental Chemistry".
13. A. K. De "Environmental Chemistry - An introduction"
14. B. K. Sharma "Air Pollution".
15. V. K. Ahluwalia "Environmental Chemistry"
16. G.W. vanLoon and S. J. Duffy "Environmental Chemistry: A global perspective"
17. Puri, Sharma and Kalia "Inorganic Chemistry"

19. Which do you expect to have more metallic character, Lead (Pb) or Tin (Sn)
20. What is a Match Head of match stick made of?
21. Explain why graphite conducts electricity whereas diamond doesn't.
22. Is the reactivity of group I metals increasing or decreasing down the group? Explain why?  $2 \times 8 = 16$

#### Section C

Each question carries 4 marks (Short essay type) Answer any six questions

23. Explain the colour of firecrackers.
  
24. What is the difference between covalent and ionic bonding?
25. What are periods and groups in the periodic table? What is periodicity?
26. What are adulterants.
27. How is Thomson's model of the atom different from Dalton's model of atom?
28. What's the difference between an oxidation number and an ionic charge?
29. Explain the health hazards associated with drinking soft drinks?
30. How can metallic character change across a period?
31. Describe clearly the link between increasing effective nuclear charge across a period and the changes in van der Waals radius.

$4 \times 6 =$

#### Section D

Each question carries 15 marks (essay type) Answer any two questions.

32.
  - a. Explain about the pH changes of aqueous solutions of elements in the third period as the period is crossed.
  - b. Explain how these changes are directly related to the changes in effective nuclear charge across the period.
  - c. Describe the metallic character of elements in a period.
  
33.
  - a. Explain the role of some chemicals in household items. (7.5 marks)
  - b. Write a short note on food adulteration. (7.5 marks)
  
34.
  - a. Write a short note on the uses and hazards of fertilisers. (10 marks)
  - b. Draw the structure of carbon and sodium containing nucleons. (5 marks)
  
35.
  - a. Compare the structure of substances, methane, water, carbon dioxide and iodine, with ethane and silicon (10 marks)
  - b. Compare the bonding structures of diamond – graphite. (5 marks)

Module -I Environmental Components:	9 hrs
Structure and composition of the, Atmosphere, hydrosphere, biosphere and Lithosphere – composition of atmosphere	
Module -II Water pollution:	9 hrs
Sources, its effect and control; Sampling and measurement of water quality and their analysis, water quality standards, BOD and COD Hard water – soft water Eutrophication and restoration of lakes.	
Module -III Air Pollution:	9 hrs
Types and sources of air pollution, Common Air Pollutants - Effects of air pollution; Smog – ozone layer depletion – green house effect – acid rain	
Module -IV Soil Pollution:	9 hrs
Sources, types, effects and control of: Land pollution, Marine pollution, Thermal Pollution and Radioactive pollution. Waste separation, storage and disposal ; Waste Reduction, Recycling and Recovery of materials. Plastics and their misuses.	
Module -V Major environmental disasters	9 hrs
Major environmental disasters - - mercury poisoning in Minamata, Japan ,Itaitai disease due to cadmium poisoning in Japan - Love Canal toxic waste site, Seveso disaster chemical plant explosion - Bhopal disaster - Chernobyl incident,	
Module -VI Major environmental laws:	9 hrs
Environment (Protection Act) – The Air (Prevention and control of pollution) Act – The water (Prevention and control of pollution) Act – The wild life protection Act – Forest conservation Act – The Ozone Depleting Substances (Regulation and Control) Rules – The Plastic Waste (Management and Handling) Rules - Rio declaration- Montreal protocol, Kyoto protocol Introduction to Green chemistry (elementary ideas only)	

#### Reference

1. S. K. Banerji, "Environmental Chemistry".
2. K. De "Environmental Chemistry - An introduction"
3. B. K. Sharma "Air Pollution".
4. V. K. Ahluwalia "Environmental Chemistry"
5. G.W. vanLoon and S. J. Duffy "Environmental Chemistry: A global perspective"
6. S.K.Mohanty, Environment and Pollution Laws, Universal Law Publishing Co. Pvt Ltd

SYLLABUS FOR COMPLEMENTARY COURSE COURSE  
Theoretical Chemistry (Common for  
Botany/Zoology/Microbiology)  
(For Students of Botany Majors)  
SEMESTER 1 Complementary Course 1 Course Code-CH1131 .3 Credit-2

L-T-P 2-0-2 36 Hours

Module I – Atomic Structure

(9 hrs)

Atomic spectrum of hydrogen - different series, Rydberg equation, Bohr theory – postulates – statement of Bohr energy equation – derivation of spectral frequency from Bohr equation. Schrodinger wave equation (mention only, no derivation), concept of orbitals, the four quantum numbers and their significances. Orbitalwise electron configuration, energy sequence rule – Pauli's principle, Hund's rule, Stability of filled and half filled orbitals.

Module II – Chemical Bonding

(9 hrs)

Energetics of bond formation – Born-Haber cycle. Hybridisation and structure of molecules –  $sp^2$ ,  $sp^3$ ,  $sp^2$ ,  $sp^3$ ,  $dsp^2$ ,  $dsp^3$ ,  $sp^2d$  and  $sp^3d$  hybridisation with examples. Explanation of bond angle in water and ammonia. VSEPR theory with regular and irregular geometry –. Hydrogen bond – inter and intra molecular – its consequences on boiling point – volatility and solubility. Partial covalent character of the ionic bond – Fajan's Rules. A brief review of molecular orbital approach

– LCAO method – bond order, bond distance and stability of  $O_2^{2+}$ ,  $O_2^{2-}$ ,  $NO$ ,  $NO^+$

Module III – Analytical Principles

(9 hrs)

Principles of volumetric analysis – primary standard – standard solutions normality and molarity, theory of acid-base titrations, permanganometric and dichrometric titrations, iodometry and complexometric titrations. Theory of acid-base indicator – redox indicators. Beer- Lambert law- Principles of colorimetry – Estimation of Iron and phosphate.

Module IV – Environmental Chemistry

(9 hrs)

Nature of environmental threats and role of chemistry. Green house effect, ozone layer and its depletion.. Water pollution: Various factors affecting purity of water, sewage water, industrial waste, agricultural pollution such as pesticides, fertilizers, detergents, treatment of industrial waste water using activated charcoal, synthetic resins, reverse osmosis, electro dialysis.-Dissolved oxygen-BOD,COD

References

1. Atomic structure and chemical bonding with introduction to molecular spectroscopy – Manas Chanda
2. Concise Inorganic Chemistry – J.D. Lee
3. Environmental Chemistry A. K. De

**M.Sc. PROGRAMME IN BRANCH III CHEMISTRY**

(Revised syllabus Under Semester System w.e.f. 2016 Admissions)

**SEMESTER I****CH 211 INORGANIC CHEMISTRY I****Total 90 h****Unit I Coordination chemistry-I: Theories of metal complexes 18 h**

Types of ligands and complexes. Isomerism: Structural, geometrical and optical isomerism. Crystal field theory: Splitting of d orbitals in octahedral, tetragonal, square planar, tetrahedral, trigonal bipyramidal and square pyramidal fields. Jahn-Teller theorem, evidence for JT effect, static and dynamic JT effect. Crystal field stabilization energy (CFSE) and its calculations. Octahedral Site Stabilization Energy. Factors affecting the splitting parameter. Spectrochemical series. Evidence of covalency in Metal-Ligand bond, introduction to Ligand field theory. Molecular orbital theory. Sigma and pi bondings in complexes. MO diagrams of octahedral and tetrahedral complexes with and without pi bonds. Experimental evidence of pi bond on the stability of sigma bond. Nephelauxetic effect.

**Unit II Analytical principles 18 h**

Evaluation of analytical data: Accuracy and precision. Standard deviation, variance and coefficient of variation. Student 't' test, 'Q' test, and 'F' test. Confidence limits. Errors: Classification, distribution, propagation, causes and minimization of errors. Significant figures and computation rules. Correlation analysis: Scatter diagram. Correlation coefficient, r. Calculation of r by the method of least squares. Volumetric methods: Classification of reactions in volumetry. Theories of indicators. Acid-base, redox, adsorption, metallochromic indicators. Complexometric titrations: Titration using EDTA-direct and back titration methods. Precipitation titrations. Redox titrations. Titrations in non-aqueous solvents. Organic reagents used in gravimetry: Oxine, dimethylglyoxime and cupferron. Principle and instrumentation of TG, DTA and DSC. Factors affecting TG and DTA curves. Applications of TG DTA and DSC in the study of metal complexes.

**Unit III Molecular symmetry****18 h**

Symmetry and Character table: Symmetry elements and symmetry operation. Matrix representation of symmetry operations. Character of a matrix. Conditions for a set of elements to form a group. Point groups. Multiplication of operations. Group multiplication table. Similarity transformation and classification of symmetry operation, Matrix representation of point group. Reducible and Irreducible representations. The Great Orthogonality theorem. Rules derived from GOT (proof not required). Setting up of character table of  $C_{2v}$ ,  $C_{3v}$  and  $C_{2h}$  groups. Direct product representations. Reduction formula, reduction of reducible representation to IRs. Transformation properties of atomic orbitals. Hybridisation: identification of atomic orbitals taking part in hybridisation of triangular planar, square planar, trigonal bipyramidal, square pyramidal and tetrahedral molecules. Molecular symmetry and optical activity.

**Unit IV Isopoly and heteropoly acids, Noble gases, interhalogens****18 h**

Preparation, properties and structure of isopoly acids of Mo, W and V and Heteropoly acids of Mo and W. Preparation and properties of Xenon fluorides and Krypton compounds ( $KrCl_4$ ,  $KrF_4$ ,  $KrF_2$ ,  $KrBr_6$ ,  $Kr_2Cr_2O_7$ ,  $KrCrO_4$  &  $KrO_2$ ), structure of  $XeF_2$  (MO theory only). Preparation, bonding and uses of inter halogen compounds. Properties and structure of aluminosilicates and zeolites, shape selectivity. Preparation, properties and applications of silicones.

**Unit V Chemistry of Natural Environmental Processes****18 h**

The chemistry of processes in atmosphere; Composition of the atmosphere. Automobile pollutants and the catalytic converter. Photochemical smog. Chemistry of the stratosphere. Catalytic destruction of ozone. Depletion of the ozone layer. Hazards of common air pollutants on the human health. The Chemistry of processes in hydrosphere; The hydrologic cycle. Cycling and purification. The unique properties of water. Acid base properties.  $CO_2$  in water. Alkalinity.  $O_2$  consuming waste. DO, BOD and COD. The chemistry of processes in Lithosphere; Redox status in soil. pE, pH predominance diagrams for redox sensitive elements. Acidity in soil materials. Acid neutralization capacity and the quantification of the soil acidity. Ion speciation in soil solution. Cation exchange capacity and exchange phase composition.

**CH 242 (b) - ORGANIC CHEMISTRY-IV****Unit I Organometallic chemistry****18 h**

Preparation of organo Mg, Al, Li, Cu, Zn, Cr, Fe, Ce and sulphur stabilised compounds. Grignard reagents in organic synthesis. Alkylation, oxirane addition, carbon dioxide addition, carbonyl addition, enone addition (1,2- and 1,4-additions), reduction, conjugate addition and enolisation reactions. Selectivity in Grignard reactions. Reactions of organo Li reagents, Li exchange reaction, its use in the preparation of RLi compounds, addition to C=O, COOH and CONR<sub>2</sub>, Li dialkylcuprates (Gilman reagent)-preparation and reaction with alkyl halides, aryl halides and enones. AlkynylCu(1) reagents, Glaser coupling. Dialkylcadmium compounds- preparation and reaction with acyl halides. Benzenetricarbonyl chromium- preparation and reaction with carbanions. Tebbe's reagent, Silane carbanion and its reactions.

**Unit II Molecular recognition and supramolecular chemistry****18 h**

Introduction to supramolecular chemistry. One-pot reactions. The concepts of molecular recognition, host, guest and receptor systems. Forces involved in molecular recognition. Hydrogen bonding, ionic bonding,  $\pi$ -stacking, Van der Waals and hydrophobic interactions. Introduction to molecular receptors. Tweezers, cryptands and carcerands. Cycophanes, cyclodextrins and calixarenes- typical examples. Non-covalent interactions in biopolymer structure organization. Role of self-organization and self-association in living systems. Importance of molecular recognition in DNA and protein structure, their function and protein biosynthesis. Supramolecular systems like Organic zeolite, Clathrate hydrates of gases, Helicates, Nanotubes, liquid crystals, nanotechnology and other industrial applications of supramolecular chemistry.

**Unit III Medicinal chemistry****18 h**

Combinatorial organic synthesis, introduction, methodology, automation, solid supported and solution phase synthesis, study of targeted or focused libraries and small molecule libraries, Application- drug discovery.

Drug design and development-Discovery of a drug, a lead compound. Development of drug-

Pharmacophore identification, modification of structure, structure-activity relationship, structure modification to increase potency. The Hammett equation, Taft equation and lipophilicity. Computer assisted drug design. Receptors and drug action. Natural products and drug development. Different classes of drugs with examples. Synthesis of paracetamol, phenobarbital, diazepam, sulphamethoxazole, benzylpenicillin, chloramphenicol.

#### **Unit IV Chemistry of biopolymers and polymers**

**18 h**

Peptide bond formation methods. SPPS, Mechanism, Amino and carboxy protection in SPPS. Synthesis of tripeptides, A, G, C, T, U, adenosine, ADP and ATP. Automated polypeptide and oligonucleotide synthesis. Structure organization of proteins and polynucleotides. Protein sequencing by Edman's method. Protein denaturation. Structure of polysaccharides including starch, cellulose, glycogen and chitin. Synthesis of stereoregular polymers. Ziegler-Natta catalyst. Polymers in organic synthesis- supports, reagents and catalysts. Biodegradable polymers.

#### **Unit V Green chemistry**

**18 h**

Twelve principles of green chemistry. Green chemical strategies for sustainable development- Reaction mass balance, atom economy evaluation for chemical reaction efficiency, green solvents, reaction media- Synthesis under water, solventless, fluorous and ionic liquid media. Synthesis using scavenger resins, catalysis and biocatalysis. Green computation. Green processes-. Microwave synthesis- fundamentals of microwave synthesis- Two Principal Mechanisms for Interaction with matter- The Microwave Effect with examples - Single-Mode and Multimode Microwave cavities. Microwave technology- Techniques and applications. Sonochemical synthesis. Applications of sonication in the synthesis of organic compounds

#### **References**

1. M. B. Smith, "March's advanced organic chemistry." 7<sup>th</sup> Edition, Wiley, 2013.
2. D. Hellwinkel, "Systematic nomenclature of organic chemistry," Springer, 2001. D. 1994.
3. M. B. Smith, "Organic synthesis," 3<sup>rd</sup> Edition Academic Press, 2011.
4. R.K. Bansal, "Synthetic approaches in organic chemistry," Narosa, 2001.
5. R.J. Simmonds, "Chemistry of biomolecules," Royal Society of Chemistry, 1992.
6. J. J. Li, "Name reactions," Springer-Verlag, 2006.