Programmes in Which CBCS/Elective Course System Implemented

GOVERNMENT COLLEGE NEDUMANGAD

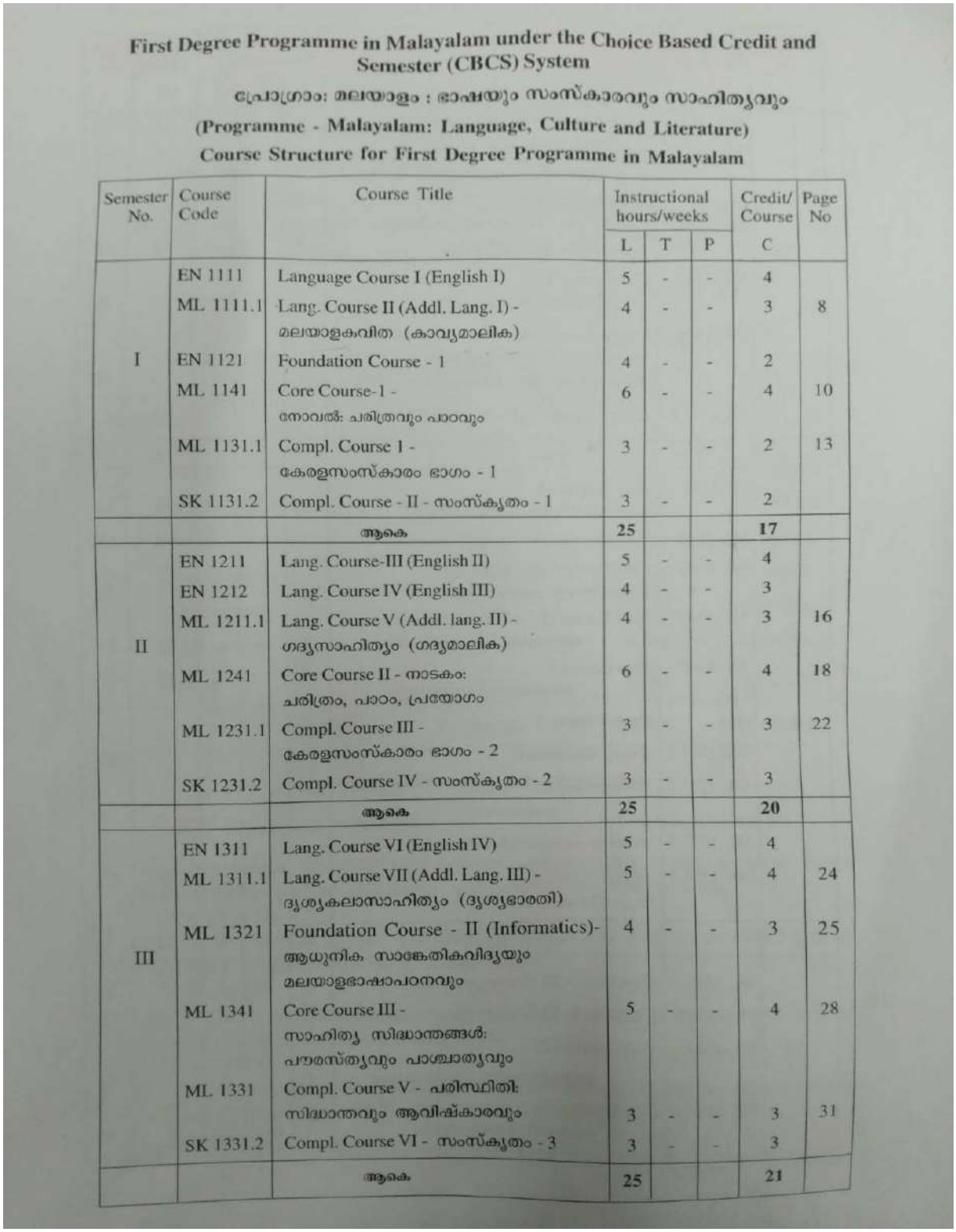
UNDER GOVERNMENT OF KERALA

NEDUMANGAD, THIRUVANANTHAPURAM, KERALA- 695541

Accredited by NAAC with 'B' Grade

PROGRAMS IN WHICH CHOICE BASED CREDIT SYSTEM (CBCS)/ ELECTIVE COURSE SYSTEM HAS BEEN IMPLEMENTED

1. BA MALAYALAM



First Degree Programme in Malayalam under the Choice Based Credit and Semester (CBCS) System

പ്രോഗ്രാം: മലയാളം : ഭാഷയും സംസ്കാരവും സാഹിത്യവും

(Programme - Malayalam: Language, Culture and Literature)

Course Structure for First Degree Programme in Malayalam

Semester No.	Course Code	Course Title	Instructional hours/weeks			Credit/ Course	Page No
			L	T	P	C	
I	EN 1111	Language Course I (English I)	5	-	-	4	
	ML 1111.1	Lang. Course II (Addl. Lang. I) - മലയാളകവിത (കാവ്യമാലിക)	4	-	-	3	8
	EN 1121	Foundation Course - 1	4	-	-	2	
	ML 1141	Core Course-1 - നോവൽ: ചരിത്രവും പാഠവും	6	-	-	4	10
	ML 1131.1	Compl. Course 1 - കേരളസംസ്കാരം ഭാഗം - 1	3	-	-	2	13
	SK 1131.2	Compl. Course - II - സംസ്കൃതം - 1	3	-	-	2	
		ആകെ	25			17	
II	EN 1211	Lang. Course-III (English II)	5	-	-	4	
	EN 1212	Lang. Course IV (English III)	4	-	-	3	
	ML 1211.1	Lang. Course V (Addl. lang. II) - ഗദ്യസാഹിത്യം (ഗദ്യമാലിക)	4	-	-	3	16
	ML 1241	Core Course II - നാടകം: ചരിത്രം, പാഠം, പ്രയോഗം	6	-	-	4	18
	ML 1231.1	Compl. Course III - കേരളസംസ്കാരം ഭാഗം - 2	3	-	-	3	22
	SK 1231.2	Compl. Course IV - സംസ്കൃതം - 2	3	-	-	3	
		ആകെ	25			20	
III	EN 1311	Lang. Course VI (English IV)	5	-	-	4	
	ML 1311.1	Lang. Course VII (Addl. Lang. III) - ദൃശ്യകലാസാഹിത്യം (ദൃശ്യഭാരതി)	5	-	-	4	24
	ML 1321	Foundation Course - II (Informatics)- ആധുനിക സാങ്കേതികവിദ്യയും മലയാളഭാഷാപഠനവും	4	-	-	3	25
	ML 1341	Core Course III - സാഹിത്യ സിദ്ധാന്തങ്ങൾ: പൗരസ്ത്യവും പാശ്ചാത്യവും	5	-	-	4	28
	ML 1331	Compl. Course V - പരിസ്ഥിതി: സിദ്ധാന്തവും ആവിഷ്കാരവും	3	-	-	3	31
	SK 1331.2	Compl. Course VI - സംസ്കൃതം - 3	3	-	-	3	
		ആകെ	25			21	

Semester No.	Course Code	Course Title	Instructional hours/weeks			Credit/ Course	Page No
			L	T	P	C	
IV	EN 1411	Lang. Course - VIII (English V)	5	-	-	4	
	ML 1411.1	Lang. Course IX (Addl. Lang. IV) ആശയവിനിമയം, സർഗ്ഗാത്മകരചന, ഭാഷാവബോധം	5	-	-	4	34
	ML 1441	Core Course - IV- മലയാള കവിത പൂർവ്വഘട്ടം (ഉദയഭാരതി)	5	-	-	4	36
	ML-1442	Core Course-V- മലയാളസാഹിത്യനിരൂപണം	4	-	-	3	39
	ML-1431	Compl. Course VII - ദലിതെഴുത്ത്, പെണ്ണെഴുത്ത്: സിദ്ധാന്തവും ആവിഷ്കാരവും	3	-	-	3	42
	SK 1431.2	Compl. Course VIII - സംസ്കൃതം - 4	3	-	-	3	
		ആകെ	**25**			**21**	
V	ML1541	Core Course VI - ഭാഷാശാസ്ത്രം, ഭാഷാചരിത്രം	4	-	-	4	46
	ML 1542	Core Course VII - ചെറുകഥാപഠനം	4	-	-	4	49
	ML 1543	Core Course VIII - വിവർത്തനം: സിദ്ധാന്തവും പ്രയോഗവും	3	-	-	2	52
	ML 1544	Core Course IX - ജീവചരിത്രം, ആത്മകഥ, യാത്രാനുഭവം	4	-	-	4	54
	ML 1545	Core Course X - തിരക്കഥയും സിനിമയും	4	-	-	4	56
		Open Course -1					
	ML 1551.1	കേരളീയകലകൾ/					60
	ML 1551.2	തിരക്കഥാരചന: തത്ത്വവും പ്രയോഗവും/					63
	ML 1551.3	മലയാള പത്രപ്രവർത്തനം					65
	ML 1551.4	ചലച്ചിത്രപഠനം.	3	-	-	2	67
		Project/Dissertation	3	-	-	-	
		ആകെ	**25**			**21**	
VI	ML 1641	Core Course XI - മാധ്യമലോകം	5	-	-	4	71
	ML 1642	Core Course XII - മലയാളവ്യാകരണം	5	-	-	4	74
	ML 1643	Core Course XIII - മലയാളകവിത - ഉത്തരഘട്ടം	5	-	-	4	76
	ML 1644	Core Course XIV - നാടോടി വിജ്ഞാനീയം	4	-	-	3	79

Semester No.	Course Code	Course Title	Instructional hours/weeks			Credit/ Course	Page No
			L	T	P	C	
		Open Course II (Elective)					
	ML 1651.1	താരതമ്യ സാഹിത്യം/					82
	ML 1651.2	ഭാഷാസാഹിത്യസംവാദങ്ങൾ/					83
VI	ML 1651.3	കേരളീയ കലകൾ/					86
	ML 1651.4	തിരക്കഥാ രചന: തത്ത്വവും പ്രയോഗവും/					89
	ML 1651.5	മലയാളപത്രപ്രവർത്തനം	3	-	-	2	91
	ML 1645	Project/Dissertation	3	-	-	4	
		ആകെ	**25**			**21**	

Summary

1.	Language Course (English)	-	5	-	24 hrs	19 credits
2.	Additional Language	-	4	-	18 hrs	14 credits
3.	Foundation courses	-	2	-	8 hrs	5 credits
4.	Complimentary courses	-	8	-	24 hrs	22 credits
5.	Core courses	-	13	-	64 hrs	52 credits
6.	Open course/ Elective	-	2	-	6 hrs	4 credits
7.	Project	-	1	-	6 hrs	4 credits
	Total:		**35 courses**		**150 hrs**	**120 credits**

എഴുത്തു പരീക്ഷയുടെ ചോദ്യമാതൃക

സമയം: 3 മണിക്കൂർ **ആകെ മാർക്ക്: 80**

1. ഒരു വാക്കിലോ വാക്യത്തിലോ ഉത്തരം എഴുതാനുള്ള പത്തു ചോദ്യം. എല്ലാ ചോദ്യത്തിനും ഉത്തരം എഴുതണം. ഓരോന്നിനും ഒരു മാർക്ക് വീതം.
   (10 x 1 = 10)
2. ഒരു ഖണ്ഡികയിൽ ഉത്തരം എഴുതാനുള്ള 12 ചോദ്യം. എട്ടു ചോദ്യത്തിന് ഉത്തരം എഴുതണം. ഓരോന്നിനും രണ്ടു മാർക്ക് വീതം.
   (8 x 2 = 16)
3. 120 വാക്കിൽ കവിയാതെ ഉത്തരം എഴുതാൻ 9 ചോദ്യം. 6 ചോദ്യത്തിന് ഉത്തരം എഴുതണം. ഓരോന്നിനും 4 മാർക്ക് വീതം
   (6 x 4 = 24)
4. മൂന്നു പുറത്തിൽ ഉത്തരം എഴുതാനുള്ള ഉപന്യാസമാതൃകയിലുള്ള ചോദ്യം 4. ഉത്തരം എഴുതേണ്ടത് രണ്ടെണ്ണത്തിന്. പതിനഞ്ച് മാർക്ക് വീതം.
   (2 x 15 = 30)

ആകെ - 80 മാർക്ക്

2. BA HISTORY

BA History (2013 Scheme)

SEM NO	COURSE NO	COURSE TITLES	INSTR: HRS	NO.OF CREDITS
I	EN 1111	Language Course I (English-1)	5	4
	M/H 1111	Language Course II (Addl. Language)	4	3
	EN 1121	Foundation Course I	4	2
	HY 1141	Core **I**-Methodology and Perspectives of Social Sciences	6	4
	HY 1131.1 (EC/IH/SG)	Complementary **I**-History of Modern India (1857-1900). For Economics, Islamic History and Sociology	3	2
	HY 1131.2 (EN/PL)	Complementary **II**- History of Modern World, (1789-1900), For English & Political Science	3	2
		Total	25	17
II	EN 1211	Language Course III (English II)	5	4
	EN1212	Language Course IV (English III)	4	3
	M/H 1211	Language Course V (Addl. Language II)	4	3
	HY 1241	Core **II**-Cultural Formation of the Pre-Modern World	6	4
	HY 1231.3 (EC/IH/SG)	Complementary **III**- History of Modern India (1901-1920), For Economics, Islamic History and Sociology	3	3
	HY 1231.4 (EN/PL)	Complementary **1V**- History of Modern World, (1901-1920),for English & Political Science	3	3
		Total	25	20
III	EN 1311	Language Course V1 (English)	5	4
	M/H 1311	Language Course VII (Addl. Language III)	5	4
	HY 1321	Foundation Course II- Informatics	4	3
	HY 1341	Core **111**-Evolution of the early Indian society &Culture	5	4
	HY 1331.5 (EC/IH/SG)	Complementary V-History of Modern India (1921-1947), For Economics, Islamic History and Sociology	3	3
	HY 1331.6 (EN/PL)	Complementary **V1**- History of Modern World, (1921-1945),For English & Political Science	3	3
		Total	25	21
IV	EN 1411	Language Course VIII (English V)	5	4
	M/H 1411	Language Course 1X (Addl. Language 1V)	5	4
	HY1441	Core **1V**- Medieval India: Socio-Cultural Processes.	5	4
	HY1442	Core **V**-History Modern World – Part 1	4	3
	HY 1431.7 (EC/IH/SG)	Complementary **VII**-History of Modern India (after1948), For Economics, Islamic History and Sociology	3	3
	HY 1431.8 (EN/PL)	Complementary **VIII**- History of Modern World, (after1946), For English & Political Science	3	3
		Total	25	21

	HY1541	Core **V1**-Major trends in Historical thoughts and writings	4	4
	HY1542	Core **V11**-Colonialism and Resistance movements in India	4	4
	HY1543	Core**V111**-History of Modern World – Part II	3	2
	HY1544	Core **1X**-History of Pre- Modern Kerala	4	4
	HY1545	Core **X**-Making of Indian Nation	4	2
		Open Courses-		
V	HY 1551.1	Empowerment of Women with special reference to India		
	HY 1551.2	An Introduction to Archaeology	3	2
	HY1551.3	History of Human Rights Movement.		
		Project/Dissertation		
		Historical Method-Mechanics Project Writing	3	0
		Study Tour		
		Total	25	20
V1	HY1641	Core **XI** - Making of Modern Kerala	5	4
	HY 1642	Core **XII** - Major trends in Indian Historical thought & writings	5	4
	HY1643	Core **XIII** - Contemporary India	5	4
	HY1644	Core **X1V** - Twentieth Century Revolutions	4	3
		Electives		
	HY1651.1	Historical Tourism	3	2
	HY1651.2	Heritage Studies		
	HY 1651.3	Contemporary World		
	HY1651.4	Empowerment of Women with special reference to India		
	HY1651.5	An Introduction to Archaeology		
	HY1651.6	History of Human Rights Movement.		
	HY1651.7	Environmental History of Modern India		
	HY1645	Project/Dissertation	3	4
		Total	25	21
		Grand Total	150	120

3. BSc MATHEMATICS

Board of Studies in Mathematics (UG)
UNIVERSITY OF KERALA

First Degree Programme in
MATHEMATICS
under Choice Based Credit and Semester System

REVISED SYLLABUS
2014 admission

Structure of Elective Courses

Sem	Course Code	Course title	Instr hrs per week	Credit
VI	MM 1661.1	Graph Theory	3	2
VI	MM 1661.2	Fuzzy Mathematics	3	2
VI	MM 1661.3	Mechanics	3	2

Structure of the Complementary Courses

Complementary Course in Mathematics for First Degree Programme in Physics

Course Code	Sem.	Title of Course	Contact hrs/week	No. of Credits
MM 1131.1	1	Differentiation and Analytic Geometry	4	3
MM 1231.1	2	Integration and Vectors	4	3
MM 1331.1	3	Theory of Eqs., Differential Eqs., and Theory of Matrices	5	4
MM 1431.1	4	Complex Analysis, Fourier Series and Transforms	5	4

Complementary Course in Mathematics for First Degree Programme in Chemistry

Course Code	Sem.	Title of Course	Contact hrs/week	No. of Credits
MM 1131.2	1	Differentiation and Matrices	4	3
MM 1231.2	2	Integration, Differential Eqs. and Analytic Geometry	4	3
MM 1331.2	3	Theory of Eqs.and Vector Analysis	5	4
MM 1431.2	4	Abstract Algebra and Linear Transformations	5	4

Board of Studies in Mathematics (UG)
UNIVERSITY OF KERALA

First Degree Programme in MATHEMATICS under Choice Based Credit and Semester System

SYLLABUS
for 2018 admission onwards

Structure of Core Courses

Sem	Course Code	Course title	Instr.hrs. per week	Credit
I	MM 1141	Methods of Mathematics	4	4
II	MM 1221	Foundations of Mathematics	4	3
III	MM 1341	Elementary Number Theory and Calculus – I	5	4
IV	MM 1441	Elementary Number Theory and Calculus – II	5	4
V	MM 1541	Real Analysis – I	5	4
	MM 1542	Complex Analysis – I	4	3
	MM 1543	Abstract Algebra – Group Theory	5	4
	MM 1544	Differential Equations	3	3
	MM 1545	Mathematics Software – LaTeX & SageMath (Practical Examination Only)	4	3
	MM 1551	Open Course	3	2
	——	Project preparation - From selecting the topic to presenting the final report	1	
VI	MM 1641	Real Analysis – II	5	4
	MM 1642	Complex Analysis – II	4	3
	MM 1643	Abstract Algebra – Ring Theory	4	3
	MM 1644	Linear Algebra	5	4
	MM 1645	Integral Transforms	4	3
	MM 1651	Elective Course	3	2
	MM 1646	Project		4

Structure of Open Courses

Sem	Course Code	Course title	Instr.hrs. per week	Credit
V	MM 1551.1	Operations Research	3	2
V	MM 1551.2	Business Mathematics	3	2
V	MM 1551.3	Basic Mathematics	3	2

Structure of Elective Courses

Sem	Course Code	Course title	Instr.hrs. per week	Credit
VI	MM 1661.1	Graph Theory	3	2
VI	MM 1661.2	Linear Programming with SageMath	3	2
VI	MM 1661.3	Numerical Analysis with SageMath	3	2
VI	MM 1661.4	Fuzzy Mathematics	3	2

Structure of the Complementary Courses

Complementary Course in Mathematics for First Degree Programme in Physics

Course Code	Sem.	Title of Course	Contact hrs/week	No. of Credits
MM 1131.1	1	Calculus with applications in Physics – I	4	3
MM 1231.1	2	Calculus with applications in Physics – II	4	3
MM 1331.1	3	Calculus and Linear Algebra	5	4
MM 1431.1	4	Complex Analysis, Special Functions and Probability Theory	5	4

Complementary Course in Mathematics for First Degree Programme in Chemistry

Course Code	Sem.	Title of Course	Contact hrs/week	No. of Credits
MM 1131.2	1	Calculus with applications in Chemistry – I	4	3
MM 1231.2	2	Calculus with applications in Chemistry – II	4	3
MM 1331.2	3	Linear Algebra, Probablity Theory & Numerical Methods	5	4
MM 1431.2	4	Differential Equations, Vector Calculus and Abstsract Algebra	5	4

Complementary Course in Mathematics for First Degree Programme in Geology

Course Code	Sem.	Title of Course	Contact hrs/week	No. of Credits
MM 1131.3	1	Algebra, Geometry and Trigonometry	4	3
MM 1231.3	2	Calculus and Linear Algebra	4	3
MM 1331.3	3	Complex Numbers, Algebra and Calculus	5	4
MM 1431.3	4	Basic Statistics and Differential Equations	5	4

Complementary Course in Mathematics for First Degree Programme in Statistics

Course Code	Sem.	Title of Course	Contact hrs/week	No. of Credits
MM 1131.4	1	Basic Calculus for Statistics	4	3
MM 1231.4	2	Advanced Differential and Integral Calculus	4	3
MM 1331.4	3	Fourier Series, Numerical Methods and ODE	5	4
MM 1431.4	4	Linear Algebra	5	4

Complementary Course in Mathematics for First Degree Programme in Economics

Course Code	Sem.	Title of Course	Contact hrs/week	No. of Credits
MM 1131.5	1	Mathematics for Economics I	3	2
MM 1231.5	2	Mathematics for Economics II	3	3
MM 1331.5	3	Mathematics for Economics III	3	3
MM 1431.5	4	Mathematics for Economics IV	3	3

4. B Com

Social Service/ Extension activities

General Structure for the First Degree Programme in Commerce

Sem No.	Courses	Instructional Hours Per Week	Credits	Duration (Hours) Uty Exam	Evaluation Internal	Evaluation End Semester Exam	Total credits
SEMESTER I	Language Course I (English I)	5	4	3	20%	80%	
	Language Course II (Additional Language I)	4	4	3	20%	80%	
	Foundation Course I	4	2	3	20%	80%	
	Core Course I	4	3	3	20%	80%	
	Core Course II	4	3	3	20%	80%	
	Complementary Course I	4	3	3	20%	80%	
SEMESTER II	Language Course III (English II)	5	4	3	20%	80%	20
							19
	Language Course IV (Additional Language II)	4	4	3	20%	80%	
	Foundation Course II	4	3	3	20%	80%	
	Core Course III	4	3	3	20%	80%	

5. MA HISTORY

SYLLABUS FOR M.A. HISTORY
SEMESTER PATTERN IN AFFILIATED COLLEGES
2014 ADMISSION ONWARDS

M.A. HISTORY COURSE STRUCTURE & MARK DISTRIBUTION

Semester	Paper Code	Title of the Paper	Distribution hrs/ Semester	Instructional hrs/ week		Dur ESA Hrs	Maximum marks		
				L	P		CA	ESA	Total
I	Hy 211	Historical Method - I	120	7		75	25	75	100
	Hy 212	Indian History - I	110	6		75	25	75	100
	Hy 213	Kerala History - I	110	6		75	25	75	100
	Hy 214	Electives	110	6		75	25	75	100
II	Hy 221	Historical Method - II	120	7		75	25	75	100
	Hy 222	Indian History - II	110	6		75	25	75	100
	Hy 223	Kerala History - II	110	6		75	25	75	100
	HY 224	Electives	110	6		75	25	75	100
III	Hy 231	Issues in Historiography	120	7		75	25	75	100
	Hy 232	Indian History - III	110	6		75	25	75	100
	Hy 233	Kerala History - III	110	6		75	25	75	100
	Hy 234	Electives	110	6		75	25	75	100
IV	Hy 241	Indian Historiography	120	7		75	25	75	100
	Hy 242	Indian History – IV	110	6		75	25	75	100
	Hy 243	Kerala History - IV	110	6		75	25	75	100
	Hy 244	Electives	110	6		75	25	75	100
		Project							100
		Viva-Voce							100

L: Lecture; P: Practical; CA: Continuous Assessment; ESA: End Semester Examination

6. MA MALAYALAM

എം.എ. മലയാളം സിലബസ് 2019
അഫിലിയേറ്റഡ് കോളേജുകളിലെ സെമസ്റ്റർ ഘടന
പേപ്പറുകൾ

സെമസ്റ്റർ - 1

ML 211 - പ്രാചീനസാഹിത്യം
ML 212 - മധ്യകാലസാഹിത്യം
ML 213 - കേരളസാഹിത്യ സംസ്കാരം
ML 214 - മലയാളവ്യാകരണം
ഗവേഷണരീതിശാസ്ത്രം

സെമസ്റ്റർ - 2

ML 221 - ആധുനികസാഹിത്യം - ഗദ്യം
ML 222 - ആധുനികസാഹിത്യം - പദ്യം
ML 223 - ഭാരതീയകാവ്യമീമാംസ
ML 224 - സാഹിത്യമീമാംസ - പാശ്ചാത്യം
ഗവേഷണരീതിശാസ്ത്രം

സെമസ്റ്റർ - 3

ML 231 - സമകാലികസാഹിത്യം - ഗദ്യം
ML 232 - സാഹിത്യചരിത്രവിജ്ഞാനീയം
ML 233 - Sanskrit Paper I Classical Sanskrit Literature, Poetry, Drama a nitions of Poetic types of Sanskrit
ML 234 - മലയാളവിമർശനം

സെമസ്റ്റർ - 4

ML 241 - സമകാലികസാഹിത്യം - പദ്യം
ML 242 - Sanskrit Paper II (Prose - Elementary Grammar, Composition Translation)
ML 243 - ആധുനികഭാഷാശാസ്ത്രം
ML 244 - ഐച്ഛികം
1. താരതമ്യസാഹിത്യം
2. നാടോടിവിജ്ഞാനീയം
3. വിവർത്തനം : തത്ത്വവും പ്രയോഗവും

(ഒരു കോളേജ് ഇതിൽ ഏതെങ്കിലും ഒരു വിഷയം സ്വീകരിക്കേണ്ടതാണ്)

ചോദ്യമാതൃക

നിർദ്ദേശം	ആകെ ചോദ്യം	എഴുതേണ്ടത്	മാർക്ക്	ആകെ മാർക്ക്
രണ്ടുപുറം	14	7	3	21
നാലപുറം	10	5	6	30
അഞ്ചുപുറം	6	3	8	24
ആകെ	30	15		75

7. M Com

M Com Syllabus

(from 2018 Admission onwards)

SEMESTER I

Code	Paper	Subject	Marks CA	ESA	Total
CO 211	Paper 1	Business Ethics and Corporate Governance	25	75	100
CO 212	Paper 2	Legal Framework for Business	25	75	100
CO 213	Paper 3	Research Methodology	25	75	100
CO 214	Paper 4	Planning and Development Administration	25	75	100
CO 215	Paper 5	Advanced Corporate Accounting and Reporting	25	75	100
		Total	**125**	**375**	**500**

SEMESTER II

Code	Paper	Subject	Marks CA	ESA	Total
CO 221	Paper 1	E -Business and Cyber Laws	25	75	100
CO 222	Paper 2	Strategic Management	25	75	100
CO 223	Paper 3	Quantitative Techniques and Financial Econometrics	25	75	100
CO 224	Paper 4	International Business	25	75	100
CO 225	Paper 5	Investment Management	25	75	100
		Total	**125**	**375**	**500**

Summer Internship

Elective - FINANCE

SEMESTER III

Code	Paper	Subject	Marks CA	ESA	Total
CO 231U	Paper 1	Income tax Planning and Management	25	75	100
CO 232F	Paper 2	Security Analysis and Portfolio Management	25	75	100
CO 233F	Paper 3	International Financial Management	25	75	100
CO 234F	Paper 4	Strategic Cost and Management Accounting	25	75	100
		Total	**100**	**300**	**400**

SEMESTER IV

Code	Paper	Subject	Marks CA	ESA	Total
CO241W	Paper 1	Goods and Service tax & Customs Duty -Law and Practice	25	75	100
CO 242F	Paper 2	Risk Management and Derivatives	25	75	100
CO 243F	Paper 3	Accounting Standards	25	75	100
CO 244S	Paper 4	Management Optimization Techniques	25	75	100
		Total	100	300	400
		Project Report			100
		Comprehensive Viva			100
		Grand Total			**2000**

Elective - INFORMATION TECHNOLOGY & E-BUSINESS

SEMESTER III

Code	Paper	Subject	Marks CA	ESA Written	ESA Practical	Total
CO 231 E	Paper 1	Office Automation	25	50	25	100
CO 232 E	Paper 2	Internet and Web Designing	25	50	25	100
CO 233 R	Paper 3	Management of Intellectual Property Rights	25	75	-	100
CO 234 E	Paper 4	Legal Frame work for Information Technology Based Business	25	75	-	100
		Total	**100**	**300**		**400**

SEMESTER IV

Code	Paper	Subject	Marks CA	ESA Written	ESA Practical	Total
CO 241 E	Paper 1	Database Management and Information Technology	25	50	25	100
CO 242 E	Paper 2	E -Banking and Business Models	25	75	-	100
CO 243 E	Paper 3	E- Commerce and Global Marketing	25	75	-	100
CO 244 S	Paper 4	Management Optimization Techniques	25	75	-	100
		Total	100	300		400
		Project Report				100
		Comprehensive Viva				100
		Grand Total				**2000**

Elective - INTERNATIONAL TRADE

SEMESTER III

Code	Paper	Subject	Marks CA	ESA	Total
CO 231 T	Paper 1	Foreign Language (Any one paper) CO 231.1 T Foreign Language : Arabic CO 231.2 T Foreign Language: French CO 231.3 T Foreign Language : German	25	75	100
CO 232 T	Paper 2	International Trade and Documentation	25	75	100
CO 233 R	Paper 3	Management of Intellectual Property Rights	25	75	100
CO 234 Y	Paper 4	FOREX Management	25	75	100
		Total	**100**	**300**	**400**

SEMESTER IV

Code	Paper	Subject	Marks CA	ESA	Total
CO 241 Z	Paper 1	Logistics and Supply Chain Management	25	75	100
CO 242 T	Paper 2	Strategic Management for MNCs	25	75	100
CO 243 T	Paper 3	Legal Framework for International Trade	25	75	100
CO 244 S	Paper 4	Management Optimization Techniques	25	75	100
		Total	**100**	**300**	**400**
		Project Report			100
		Comprehensive Viva			100
		Grand Total			**2000**

Elective - MARKETING

SEMESTER III

Code	Paper	Subject	Marks CA	ESA	Total
CO 231M	Paper 1	Agricultural and Rural Marketing	25	75	100
CO 232M	Paper 2	International Marketing	25	75	100
CO 233M	Paper 3	Marketing Research	25	75	100
CO 234M	Paper 4	Marketing Communication	25	75	100
		Total	**100**	**300**	**400**

SEMESTER IV

Code	Paper	Subject	Marks CA	ESA	Total
CO 241Z	Paper 1	Logistics and Supply Chain Management	25	75	100
CO 242M	Paper 2	Industrial Marketing	25	75	100
CO 243M	Paper 3	Services Marketing	25	75	100
CO 244S	Paper 4	Management Optimization Techniques	25	75	100
		Total	**100**	**300**	**400**
		Project Report			100
		Comprehensive Viva			100
		Grand Total			**2000**

Elective- BANKING AND INSURANCE

SEMESTER III

Code	Paper	Subject	Marks CA	ESA	Total
CO 231 U	Paper 1	Income Tax Planning and Management	25	75	100
CO 232 B	Paper 2	Modern Banking	25	75	100
CO 233 B	Paper 3	Insurance Law and Practice	25	75	100
CO 234 Y	Paper 4	FOREX Management	25	75	100
		Total	**100**	**300**	**400**

SEMESTER IV

Code	Paper	Subject	Marks CA	ESA	Total
CO 241W	Paper 1	Goods and Service tax & Customs Duty - Law and Practice	25	75	100
CO 242 B	Paper 2	Investment Banking and Financial Services	25	75	100
CO 243 B	Paper 3	Principles and Practices of Actuarial Science	25	75	100
CO 244 S	Paper 4	Management Optimization Techniques	25	75	100
		Total	**100**	**300**	**400**
		Project Report			100
		Comprehensive Viva			100
		Grand Total			**2000**

Subjects common for more than One Elective

SEMESTER NO	CODE	PAPER	SUBJECT	COMMON FOR THE FOLLOWING ELECTIVES
III	CO 231U	1	Income Tax Planning and Management	1. Finance 2. Banking &Insurance
III	CO 234Y	4	FOREX Management	1. International Trade 2. Banking & Insurance
III	CO 233R	3	Management of Intellectual Property Rights	1. International Trade 2. Information Technology and E Business
IV	CO 244S	4	Management Optimisation Techniques	1. Finance 2. Marketing 3. Banking and Insurance 4. Information Technology & E-Business 5. International Trade
IV	CO 241W	1	Goods and Service tax & Customs Duty- Law and Practice	1. Finance 2. Banking &Insurance
IV	CO 241Z	1	Logistics and Supply Chain Management	1. International Trade 2. Marketing

8. BA ECONOMICS

UNIVERSITY OF KERALA

Revised Scheme & Syllabus for

First Degree Programme in

B A ECONOMICS

(CBCS SYSTEM)

2015

Sem No.	Course Number	Course Title	Instrl.Hrs	Number of Credits
1	EN 1111	Languages Course I (English-II)	5	4
	1111	Languages Course II (Additional Languages)	4	3
	EN1121	Foundation Course I	4	2
	EC1141	Core I Methodology and Perspectives of Social Sciences	6	4
	1131	Complementary I	3	2
	1131	Complimentary II	3	2
		Total	**25**	**20**
II	EN1211	Languages Course III (English-II)	5	4
	1212	Languages Course IV (English-III)	4	3
	1211	Languages Course V (Additional Languages II)	4	3
	EC1241	Core II Micro Economics I	6	4
	1131	Complementary III	3	3
	1131	Complimentary IV	3	3
		Total	**25**	**20**
III	EN1311	Languages Course VI (English-IV)	5	4
	1311	Languages Course VII (Additional Languages III)	5	4
	EC 1321	Foundation Course II Informatics	4	3
	EC1341	Core III Micro Economics II	5	4
	1331	Complementary V	3	3
	1331	Complimentary VI	3	3
		Total	**25**	**21**
IV	EN1411	Languages Course VIII (English-V)	5	4
	1411	Languages Course IX (Additional Languages –IV)	5	4
	EC 1441	Core IV Basic Tools for Economics I	5	4
	EC1442	Core V Macro Economics I	4	3
	1431	Complementary VII	3	3
	1431	Complimentary VIII	3	3
		Total	**25**	**21**
V	EC1541	Core V Money and Modern Banking	4	4
	EC1542	Core VII Macro Economics II	4	4
	EC 1543	Core VIII Economics of Growth and Development	3	2

	EC1544	Core IX Indian Economy	4	4
	EC 1545	Core X Public Economics	4	4
	EC 1551	Open-I- Human Resource Management	3	2
		Project/Dissertation	3	-
		Total	**25**	**20**
VI	EC1641	Core XI Kerala Economy	5	4
	EC1642	Core XII- Financial Economics	5	4
	EC 1643	Core XIII Basic Tools for Economics-II	5	4
	EC1644	Core XIV International Economics	4	3
	EC 1661.1	Open II- Agricultural Economics/		
	1661.2	Industrial Economics/		
	1661.3	Mathematical Economics/		
	1661.4	Econometrics/		
	1661.5	Indian Economic History and Thoughts/		
	1661.6	Health Economics	4	2
	EC 1645	Project/Dissertation	3	4
		Total	**25**	**21**
		Grand Total	**150**	**120**

CORE I

EC.1141 METHODOLOGY AND PERSPECTIVES OF SOCIAL SCIENCE

Inst. Hours- 6 **Number of Credit-4**

Course Objective

The course intends to familiarize the students with the broad contours of Social Sciences, specifically Economics and its methodologies, tools and analysis procedures. The course also aims to create an enthusiasm among students about different schools of Economic thought and various aspects of social science research, methodology, concepts, tools and various issues.

MODULE I: Methodology of Social Science (25 Hours)

Social science Disciplines - Need for interdisciplinary approach - Objectivity and subjectivity in social Science - Limits to objectivity in social science.

MODULE II: Methodology and tools of Economics (30 Hours)

Economics as a social science –Subject matter and scope of Economics, Positive and Normative Economics, Economic theory and Economic laws, Role of assumptions in Economics, Method and Methodology - Deductive and inductive methodology, Economic Models The concept of equilibrium- Tools of Economic analysis- Graphs and diagrams.

MODULE III: Major Schools of Economic Thought (27 Hours)

Mercantilism and Physiocracy, Basic postulates of Classical economic thought, Marxian Economic Thought, Keynesianism and Monetarism.

MODULE IV: Research Methodology (30 Hours)

Meaning and objectives of research – Types of research - Steps in research Data - Primary and secondary Methods of data collection - Sampling Techniques – Schedules and questionnaires. Time series and cross sectional data, Economic variables. Undertaking a research study - Conceptualization of research issues, reviewing the literature, Hypothesis, analysis and presentation of data, writing a research report.

References

Module I:

- Blaug, M (1998): The Methodology of Economics, Cambridge Surveys of Economic Literature New York.
- Kaufmann, Felix (1958): Methodology of the Social Sciences, The Humanities Press, New York.
- Hunt, Elgin F (2008): Social Science and its Methods, Social Science and Introduction to the study of Society, Alyn and Bacon.
- Hunt, Elgin F and David C. Colander (2010): Social science-An introduction to the study of Society, 13 th ed, Pearson, New Delhi.
- Perry, John A and Erna K Perry (2010): Contemporary Society – An introduction to Social Science, 12 th ed, Pearson, New Delhi.
- Sayer, Andrew (1984): Method in Social Science a realist approach, Revised Second Edition, First published in 1984 by Hutchinson Second edition published in 1992 by Rout ledge.

Module II:

- Baumol, William J and Alan Blinder (2010): Economics: principles and Policy, 13 th Ed, South Western Cengage Learning, New Delhi.
- Boland, Lawrence A. (2000): The Methodology of Economic Model Building Methodology after Samuelson, Routledge, London and New York.
- Boland, Lawrence A. (2003):The Foundations of Economic Method: A Popperian Perspective Second Edition, Routledge, London and New York.
- Hausman, Daniel M. (1992): Essays on philosophy and Economic Methodology, Cambridge University Press.
- Lipsey, Crystal (1999): Principles of Economic Analysis, 9th Edition, Oxford University Press.
- Lipsey, Christopher, T S Ragan, Paul A Storer (2007) : Micro Economics, 13 th ed, Pearson.
- Mankiw,Gregory(2013) : Principles of Micro Economics, 6th ed, Cengage Learning India Private limited, Delhi.
- Samuelson, P (1948) : Foundations of Economic Analysis, Harvard University Press
- Samuelson P and Nordhaus (2002): Economics 7th ed, Tata McGraw-Hill.
- Wible, James R (1998):The Economics of science: Methodology and epistemology As if Economics really mattered, London and New York, First published 1998 by Routledge, London .This edition published in the Taylor & Francis e-Library, 2005.

Module III:

- Bruce, Stanley L. (1994): The Evolution of Economic Thought, 5th ed, the Dryden Press
- Blaugh, Mark (1990): Economic Theory in Retrospect,4thed,Cambridge University Press, New York.
- Eric Roll (1956): A History of Economic Thought, 3rd ed Prentice Hall, New Jersey.
- Ekelund, Robert B Jr. and Robert F.Herbert (1975): "A History of Economic Theory and Methods", Mc Graw Hill.
- Screpanti, Ernesto and Stefano Zmagni (2005): An outline of the History of Economic Thought, 2nd ed, Oxford University Press.
- Haney, Lewis H (1920): History of Economic Thought, Mc Milan, New York
- Hajela, T N (2015): History of Economic Thought, 18th ed, Ane Books, New Delhi.
- Hunt, E.K and Mark Lautzenheiser(2011): History of Economic Thought: A Critical Perspective, 3rd ed, Prentice Hall of India, New Delhi.

Module IV:

- Cooper, D. and Schindler P (2000): Business Research Methods, Tata McGraw Hill, New Delhi.
- Dasgupta,Manas (2007): Research Methodology in Economics: Problems and Issues, Deep & Deep Publications, New Delhi.
- Ethridge,Don (1995): Research methodology in Applied Economics: Organizing, Planning and Conducting Economic Research, IOWA State University Press.
- Krishna swami, O P and M Ranganathan (1993), Methodology of Research in Social Sciences, Himalaya Publishing House, New Delhi.
- Wilkinson and Bhandarkar(1990):Methodology and Techniques of Social Research, Himalaya Publishing House, New Delhi.
- Young, P.V (1984): Scientific Social Survey and Research, Prentice Hall of India Ltd, New Delhi.
- Kothari,C R(2010) : Research Methodology – Methods and Techniques, Rev edition, New Age Techno Press New Delhi
- Guthrie, Gerard (2010): Basic Research Methods- an entry to social science research, Sage publications, New Delhi.
- Goode,William J and Paul K Hatt (2006): Methods in Social Research, Surjeet publications, New Delhi.

CORE II

EC.1241 MICRO ECONOMICS-I

Inst. Hours – 6 **Number of Credit – 4**

Course Objective

The course intends to provide basic principles of Micro Economics.

MODULE I: INTRODUCTION (15 Hours)

Micro economics- Scope- Basic concepts in Micro Economics- Micro- Macro distinction- The basic economic problem and solution - PPC- Functions of an economic system-Capitalism- Socialism- Mixed economy- Role of price mechanism.

MODULE II: DEMAND AND SUPPLY ANALYSIS (30 Hours)

Demand function- Law of demand- Reasons for the downward slope of the demand - Exceptions to the law of demand- Changes in demand- Elasticity of demand: price elasticity- factors affecting price elasticity - methods of measurement - Income elasticity- Cross elasticity- Uses of the concept of elasticity of demand. Demand Forecasting- Short term and long term demand forecasting- Methods of forecasting

Supply- determinants- Law of supply- Changes in supply- Elasticity of supply and its uses. Market demand and Market supply- Market equilibrium.

MODULE II: CONSUMER BEHAVIOR (35 Hours)

Consumption- Utility analysis- Cardinal and ordinal approach- Marshallian utility analysis- Derivation of demand curve- Indifference curve and consumer equilibrium- Price effect, Income and substitution effects(Hicks and Slutsky)- Effect of change in price and income on consumer equilibrium(Price consumption curve and Income consumption curve)- Derivation of demand curve- Engel curve- Revealed Preference theory- Consumer surplus - Cardinal and Ordinal measurement.

MODULE IV: PRODUCTION AND COST ANALYSIS (32 Hours)

Production function- Production function with one variable input- Production function with two variable inputs (Iso-quants) – Iso-cost line- Producer's equilibrium- Laws of production: Law of Variable Proportions and Law of Returns to Scale-Economies of Scale- Cobb-Douglas Production function.

Different concepts of costs and their interrelations- Traditional theory of costs-Short run and long run cost curves- Opportunity costs-Empirical costs and Empirical Cost curves.

Reading List

Module I:

- Samuelson, P.A. and W.D. Nordaus (1998): Economics, Tata McGraw Hill, New Delhi.
- Robert. Y. Ahw (1976): Microeconomics: Theory and Application, John Wiley and Sons.
- Salvatore, D (2008): Microeconomics: Theory and Practice, Oxford University Press.
- Koutsoyiannis, A. (1990): Modern Microeconomics, Macmillan.
- Ahuja H. L (2012): Microeconomics: Theory and Applications, S. Chand, New Delhi.
- Besanko, Ronald R, Braeutigam, David A (2011): Microeconomics, 4th ed, Wiley India Edition.
- Mansfield, Edwin and Yohe,Gary (2010): Microeconomics 4th ed, Viva-Norton Indian Edition.
- Bernheim, Douglas B and Whinston, Michael D (2011): Microeconomics, Indian Edition, TMH.

- Maddala G S and Miller, Ellen(2004): Microeconomics: Theory and Applications, TMH.
- Landsburg,Steven E (2008): Pricing, Cengage Learning, IE.
- Chauhan S P S (2009): Microeconomics: Theory and Applications, PHI, New Delhi.

Module II:

- Koutsoyiannis, A. (1990): Modern Microeconomics, Macmillan.
- Pindyck, R.S and Rubinfield, D.L (2001): Micro Economics, Pearson Education.
- Salvatore, D (2008): Microeconomics: Theory and Practice, Oxford University Press.
- Schaum's Series, Outline of Microeconomics: McGrew Hills.
- Dwivedi, D.N(2002): Microeconomics: Theory and Applications, 2nd Ed.,Pearson, New Delhi
- Robert. Y. Ahw (1976): Microeconomics: Theory and Application, John Wiley and Sons.
- Varian, H.R. (2000): Intermediate Microeconomics: A Modern Approach, (5th ed), East West Press, New Delhi.
- Lipsey, R.G. and K.A. Chrystal (1999): Principles of Economics, (9th ed.), Oxford University Press.
- Besanko, Ronald R, Braeutigam, David A (2011): Microeconomics, 4th ed, Wiley India Edition.
- Mansfield, Edwin and Yohe,Gary (2010): Microeconomics 4th ed, Viva-Norton Indian Edition.
- Bernheim, Douglas B and Whinston, Michael D (2011): Microeconomics, Indian Edition, TMH.
- Maddala G S and Miller, Ellen(2004): Microeconomics: Theory and Applications, TMH.
- Landsburg, Steven E (2008): Pricing, Cengage Learning, IE.
- Chauhan S P S (2009): Microeconomics: Theory and Applications, PHI, New Delhi.

Module III:

- Koutsoyiannis, A. (1990): Modern Microeconomics, Macmillan.
- Pindyck, R.S and Rubinfield, D.L (2001): Micro Economics, Pearson Education.
- Dwivedi, D.N(2002): Microeconomics: Theory and Applications, 2nd ed, Pearson
- Salvatore, D (2008): Microeconomics: Theory and Practice, Oxford University Press.
- Varian, H.R. (2000): Intermediate Microeconomics: A Modern Approach, (5th ed), East West Press, New Delhi.
- Lipsey, R.G. and K.A. Chrystal (1999): Principles of Economics, (9th ed.), Oxford University Press.
- Besanko, Ronald R, Braeutigam, David A (2011): Microeconomics, 4th ed, Wiley India Edition.
- Mansfield, Edwin and Yohe,Gary (2010): Microeconomics 4th ed, Viva-Norton Indian Edition.
- Bernheim, Douglas B and Whinston, Michael D (2011): Microeconomics, Indian Edition, TMH.
- Maddala G S and Miller, Ellen(2004): Microeconomics: Theory and Applications, TMH.
- Landsburg,Steven E (2008): Pricing, Cengage Learning, IE.
- Chauhan S P S (2009): Microeconomics: Theory and Applications, PHI, New Delhi.

Module IV:

- Koutsoyiannis, A. (1990): Modern Microeconomics, Macmillan.
- Salvatore, D) 2008): Microeconomics: Theory and Practice, Oxford University Press.
- Da Costa(1980): Production, Cost and Distribution, McGraw Hill, New Delhi
- Schaum's Series, Outline of Microeconomics McGrew Hills.
- Besanko, Ronald R, Braeutigam, David A (2011): Microeconomics, 4th ed, Wiley India Edition.
- Mansfield, Edwin and Yohe,Gary (2010): Microeconomics 4th ed, Viva-Norton Indian Edition.
- Bernheim, Douglas B and Whinston, Michael D (2011): Microeconomics, Indian Edition, TMH
- Maddala G S and Miller, Ellen(2004): Microeconomics: Theory and Applications, TMH.
- Landsburg,Steven E (2008): Pricing, Cengage Learning, IE.
- Chauhan S P S (2009): Microeconomics: Theory and Applications, PHI, New Delhi.

Foundation Course II

EC.1321 Informatics

Inst.Hours- 4 **Number of Credit- 3**

Course Objective

To acquire basic informatics skills and attitudes relevant to the emerging knowledge society and also to equip the students to effectively utilize the digital knowledge resources for their chosen courses of study.

MODULE I: Philosophical foundations of computing (5 Hours)

Hardware – Parts of a computer - Input and output devices. Software – Philosophy of open software - operating systems

MODULE II: Creation and manipulation of documents (10Hours)

Word processor basics. New Blank document and toolbars. Manipulation of first document. Designing and redesigning the document. Working with graphs, pictures and video in documents. Records and mail merge.

MODULE: III: Data analysis (20 Hours)

Spread sheet basics. Excel environment. Entering data. Excel tool bars. Analysis of data using Spread sheets - Creation and manipulation of charts and graphs. Manipulation of data. Importing and exporting data from excel. Mathematical and statistical calculations, Excel functions. Applications in economics using simple examples.

MODULE IV: Preparation of presentations (10 Hours)

Introduction to presentation techniques. Working with texts, graphs, pictures, audio and video in slides. Adding animation in slides. Previewing the content.

MODULE: V: The internet and E-Commerce. **(15 Hours)**

Meaning and scope of the internet, Search techniques, search engines – browsers. INFLIB NET, NICNET etc. Online shopping and e-business / e-commerce (concepts) - Challenges with internet security – malware, phishing Computer virus, Antivirus software and privacy.

MODULE: VI: Social informatics **(12 Hours)**

Digital Divide, Methods to counter Digital Divide. Cyber crimes - Plagiarism, Software piracy, Cyber ethics, Cyber Laws. Computer – Ergonomics and health issues. Guidelines for proper usage of computers.

Note: 20 marks for this paper are from internal examination. Internal marks should be awarded based on practical examinations. Expected practical sessions for teaching – not less than 20 hours.

Reading List

Module 1:

- Peter Norton, Introduction to Computers, Mc Graw Hill, New Delhi.
- PK Sinha, Computer Fundamentals, BPB Publications
- Reema Thareja, Fundamentals of computers. Oxford.
- Anitha Goel, Computer Fundamentals, Pearson
- A Leon, Introduction to Computers, Vikas Publishing.

Module II:

- Peter Norton, Introduction to Computers, Mc Graw Hill, New Delhi.
- PK Sinha, Computer Fundamentals, BPB Publications
- A Leon, Introduction to Computers, Vikas Publishing.

Module III:

- Peter Norton, Introduction to Computers, Mc Graw Hill, New Delhi.
- PK Sinha, Computer Fundamentals, BPB Publications
- Reema Thareja, Fundamentals of Computers, Oxford.
- Ramez Elmasri and Shamkant B Navathe, Fundamentals of data base Systems, Pearson
- V Rajaraman, Fundamentals of Computers, PHI publications

Module IV:

- Peter Norton, Introduction to Computers, Mc Graw Hill, New Delhi.
- PK Sinha, Computer Fundamentals, BPB Publications
- Anitha Goel, Computer Fundamentals, Pearson
- Forouzan, Data Communications and Networking, Mc Graw Hill Pulications.
- Ramez Elmasri and Shamkant B Navathe, Fundamentals of data base Systems, - Pearson

Module V:

- PK Sinha, Computer Fundamentals, BPB Publications

- Reema Thareja, Fundamentals of Computers. Oxford.
- Anitha Goel, Pearson, Computer Fundamentals -
- Forouzan, Data Communications and Networking, Mc Graw Hill Pulications.
- Ramez Elmasri and Shamkant B Navathe, Fundamentals of data base Systems, Pearson

Module VI:

- Peter Norton, Introduction to Computers, Mc Graw Hill, New Delhi.
- PK Sinha, Computer Fundamentals, BPB Publications
- Forouzan, Data Communications and Networking, Mc Graw Hill Pulications..
- V Rajaraman, Fundamentals of Computers, PHI publications.

CORE III

EC.1341 MICROECONOMICS- II

Inst. Hours – 5 **Number of Credit – 4**

Course Objective

The course intends to provide a basic understanding of microeconomics.

MODULE I: MARKET STRUCTURES (27 Hours)

Market Structure- Perfect competition- Equilibrium of the firm and industry under perfect competition- Role of the time element- Monopoly- Price and output determination under monopoly- Price discrimination- Monopolistic competition- Price output determination and excess capacity under monopolistic competition-Oligopoly: features and types- Kinked demand curve theory.

MODULE II: FACTOR PRICING AND DISTRIBUTION (32 Hours)

Distribution - Marginal Productivity theory- Ricardian and Modern theories of rent- Quasi rent. Wages- Subsistence theory - Wage determination under perfect and imperfect competition - Wage differentials- Collective bargaining, Logic behind the backward bending supply curve of the labour. Theories of interest: Classical, Neoclassical and Keynesian theories. Theories of profit: Dynamic theory, Risk and Uncertainty theory, Innovation theory.

MODULE III: WELFARE ECONOMICS (15 Hours)

Definition- Criteria of social welfare- Bentham's criterion- Cardinalist criterion- Pareto optimality criterion- Compensation criterion: Kaldor-Hicks and Scitovsky.

MODULE IV: ECONOMICS OF UNCERTAINTY AND BASICS OF LINEAR PROGRAMMING (23 Hours)

Risk – Probability- Expected value-Variability- Decision making under risk- Preference towards risk- Methods of reducing risk- Diversification, Insurance- Expected utility theory. Linear Programming- Graphic Solution.

Reading List

Module: I

- Varian, H.R. (2000): Intermediate Microeconomics: A Modern Approach, (5th ed), East West Press, New Delhi.
- Pindyck, R.S and Rubin field, D.L (2001): Microeconomics, Pearson Education.
- Koutsoyiannis, A. (1990): Modern Microeconomics, Macmillan.
- Salvatore, D (2008): Microeconomics: Theory and Practice, Oxford University Press.

Module: II

- Koutsoyiannis, A. (1990): Modern Microeconomics, Macmillan.
- Salvatore, D (2008): Microeconomics: Theory and Practice, Oxford University Press.
- Da Costa (1980): Production, Price and Distribution, McGrew Hills Inc.
- Ahuja. H .L (2011): Microeconomics; theory and policy, S. Chand Publications.
- Dwivedi, D.N(2002): Microeconomics: Theory and Applications, 2nd ed., Pearson

Module: III

- Koutsoyiannis, A. (1990): Modern Microeconomics, Macmillan.
- Varian, H.R. (2000): Intermediate Microeconomics: A Modern Approach (5th ed), East West Press, New Delhi.
- Mishra: Welfare Economics, Raneda House Publications, New York.
- Pindyck, R.S and Rubin field, D.L (2001): Microeconomics, Pearson Education.
- Dwivedi, D.N (2002): Microeconomics: Theory and Applications, 2nd ed., Pearson.

Module: IV

- Pindyck, R.S and Rubinfield, D.L (2001): Micro Economics, Pearson Education.
- Varian, H.R. (2000), Intermediate Microeconomics: A Modern Approach (5th ed), East West Press, New Delhi.
- Kreps, David (1990): A course in Microeconomic Theory, Princeton University Press.
- Allen; R.G.D(1938): Mathematical Economics, McGraw Hills .Inc
- Schaum's Outline Series, Introduction to Mathematical Economics (2nd ed), McGraw Hills. Inc
- Gupta S. P- Linear Programming for management,
- Robert. Y. Ahw (1976): Microeconomics: Theory and Application, John Wiley and Sons.

CORE IV

EC.1441 BASIC TOOLS FOR ECONOMICS – I

Inst. Hours – 5 **Number of Credit – 4**

Course Objective

The objective of this course is to enable the students to understand economic concepts with the aid of mathematical tools and enable them to quantify the variables.

MODULE I: BASIC CONCEPTS **(25 Hours)**

Role of Mathematics in Economic Theory—Constant, Variable (Discrete and Continuous Variable), Coefficient, Slope. Algebraic Functions – Linear, Quadratic, Cubic, Exponential, Logarithmic functions. Economic functions. Equations – Linear, Quadratic and simultaneous Equations and their Solutions.

MODULE II: DIFFERENTIAL CALCULUS **(27 Hours)**

Limit and Continuity. Meaning of Differential Calculus—Rules of Differentiation – Partial and total differentiation – Maxima, Minima and Optimization. Economic applications of Differential calculus – Marginal Concepts – Marginal Cost – Marginal Utility, Marginal Revenue, Marginal Productivity, Elasticity of demand, Equilibrium Price and Quantity.

MODULE III: INTEGRAL CALCULUS **(20 Hours)**

Meaning - Rules of Integrals - Definite Integrals - Economic Applications of Integral Calculus - Total Cost, Total Revenue, Total Utility.

MODULE IV: MATRIX **(25 Hours)**

Meaning-Types-Addition, Substraction and Multiplication of Matrix. Properties of Determinants-Inverse of a Matrix-Simultaneous Equations-Cramer's Rule-Rank of a Matrix.

Reading List

Module I:

- Allen, R.J.D, Mathematical Analysis for Economics: Macmillan Press, London.
- Dowling, E. T: Introduction to Mathematical Economics, Schaum's Outline Series, McGraw Hill, New Delhi

Module II:

- Allen, R.J.D, Mathematical Analysis for Economics: Macmillan Press, London.
- Dowling, E. T: Introduction to Mathematical Economics, Schaum's Outline Series, McGraw Hill, New Delhi
- Chiang A.C: Fundamental Methods of Mathematical Economics, McGraw Hill, New Delhi.
- Mik Wisneiwski, Introductory Mathematical Methods in Economics, McGraw- Hill, New Delhi

Module III:

- Allen, R.J.D, Mathematical Analysis for Economics: Macmillan Press, London.
- Dowling, E.T., Introduction to Mathematical Economics, Schaum's Outline Series, McGraw Hill, New Delhi
- Mik Wisneiwski, Introductory Mathematical Methods in Economics, McGraw- Hill, New Delhi.

Module IV:

- Allen, R.J.D, Mathematical Analysis for Economics: Macmillan Press, London.
- Dowling, E.T: Introduction to Mathematical Economics, Schaum's Outline Series, McGraw Hill, New Delhi

- Taro Yamane, Mathematics for Economists: An Elementary Survey, Prentice Hall of India Pvt. Ltd., New Delhi.
- Mik Wisneiwski, Introductory Mathematical Methods in Economics, McGraw- Hill, New Delhi.

Additional Reading List

- Black. J. and J.F Bradley [1973]: Essential Mathematics for Economic, John Wiley and Sons, New Delhi.
- Agarwal D R [2001]: Mathematic for Economic, Vrinda Publication [P] Ltd, Delhi.
- Aggarwal, D M [2009]: Business Mathematics and Statics, Ane Books [P] Ltd, New Delhi.

Core V

EC.1442 MACRO ECONOMICS – I

Inst. Hours - 4 **Number of Credit – 3**

Course Objective

To enable the students to understand the theoretical framework and the working of an economy as a whole. The paper also gives an insight to the students about the basic concepts used in Macro economics and policy alternatives used in controlling the economy.

MODULE I: Fundamental Concepts (15 Hours)

Macro Economic Variables – Stock and Flow Variables – Exogenous and Endogenous Variables – Partial and General Equilibrium – Actual GNP and Potential GNP- Net Economic Welfare (NEW)- Macro Statics, Comparative static and dynamics.

MODULE II: National Income Accounting (20 Hours)

National Income Concepts and their relationship-Real and Nominal GNP-National Income at Current and Constant Prices-GNP Deflator-Methods of Measurement-Difficulties in the measurement of National Income-Limitations in the present system-Green Accounting-Social Accounting

MODULE III: Classical Macro Economic System (22 Hours)

Classical approach – Say's Law – Wage – Price Flexibility – Classical Dichotomy – Quantity Theory of Money (Fisher's Version) – Saving-Investment Equality – Classical Theory of Employment, Output and price level and interest – Keynesian objection to Classical Theory.

MODULE IV: Keynesian Macro Economic system (23 Hours)

Keynesian Macro Economic System – Principles of Effective Demand (ASF and ADF)- Simple Keynesian model of income determination and Keynesian Cross – Role of taxation and Government spending in the determination of National Income – Determination of National Income in the Open Economy.

Basic Reading List

Module I:

- Mukherjee, Sampat (2002): Modern Economic Theory, (4th ed): New Age International Publishers, Bangalore.

- Brown, William S (2004): Macroeconomics, Prentice Hall, New Jersey.
- Dwivedi ,D.N.(2005): Macro economics—Theory and Policy (2nd ed): Tata Mc Graw Hill
- Wykoff, Frank C. (1982): Macroeconomics: Theory, Policy and Evidence 2nd ed, Prentice Hall, NJ.
- Diulio, Eugene A (1990): Macroeconomic Theory, 2nd ed (Schaum's Outline Series), McGraw-Hill, NY.
- Edgmand, Michael R (1987): Macroeconomics: Theory and Policy, 3rd ed, Prentice Hall, NJ
- Gupta, G.S (2014): Macroeconomics Theory and Policy, 4th ed, TMH, New Delhi

Module II:

- Mankiw, Gregory (2011): Macroeconomics 7th ed: South Western Cengage Learning, USA
- Stone and Stone (1968): National Income and Expenditure, Bowes and Bowes.
- Ackley, Gardner (1978): Macroeconomics—Theory and Policy; MacMillan, New York
- Froyen, Richard.T (2008): Macro Economics 2nd ed: Dorling Kindersley, India.
- Joy.E.Hecht(2005): "National Environmental Accounting", Routledge
- Rangarajan, Narayan and R, Dholakia (2001): Principles of Macroeconomics, Tata McGraw Hill Education (India) Private Limited, New Delhi.
- Brown, William S (2004): Macroeconomics, Prentice Hall, New Jersey.
- Wykoff, Frank C. (1982): Macroeconomics: Theory, Policy and Evidence, 2nd ed, Prentice Hall, NJ.
- Gupta, G.S (2014): Macroeconomics Theory and Policy, 4th ed, TMH, New Delhi.
- Cherneff, Robert V. (1983): Macroeconomics: Theory and Policy, Prentice Hall, Ontario.
- Sikdar, Soumyen (2011): Principles of Macroeconomics, 2nd ed, OUP India
- Nattrass, Nicoli and VisakhVarma, G (2014): Macroeconomics Simplified: Understanding Keynesian and Neoclassical Macroeconomic Systems, Sage publications India, New Delhi.
- Diulio, Eugene A (1990): Macroeconomic Theory, 2nd ed (Schaum's Outline Series), McGraw-Hill, NY.
- Edgmand, Michael R (1987): Macroeconomics: Theory and Policy, 3rd ed, Prentice Hall, NJ

Module III:

- Dornbusch et al (2008): Macroeconomics 10th ed, Tata Mc Graw Hill, New Delhi
- Dwivedi, D.N. (2005): Macro economics—Theory and Policy 3rd ed, Tata Mc Graw Hill, New Delhi.
- Shapiro, Edward (1996): Macro Economic Analysis – Galgolia Publications, New Delhi.
- Froyen, Richard.T. (2008): Macro Economics 2nd ed, Dorling Kindersley, India.
- Rangarajan ,Narayan and R,Dholakia (2001): Principles of Macroeconomics, Tata McGraw Hill Education (India) Private Limited , New Delhi
- Brown, William S (2004): Macroeconomics, Prentice Hall, New Jersey.
- Wykoff, Frank C. (1982): Macroeconomics: Theory, Policy and Evidence, 2nd ed, Prentice Hall, NJ
- Gupta, G.S (2014): Macroeconomics Theory and Policy 4th ed, TMH,New Delhi

- Cherneff, Robert V. (1983): Macroeconomics: Theory and Policy, Prentice Hall, Ontario
- Sikdar, Soumyen (2011): Principles of Macroeconomics, 2nd ed, OUP India.
- Nattrass, Nicoli and VisakhVarma, G (2014): Macroeconomics Simplified: Understanding Keynesian and Neoclassical Macroeconomic Systems, Sage publications India, New Delhi.
- Diulio, Eugene A (1990): Macroeconomic Theory, 2nd ed (Schaum's Outline Series), McGraw-Hill, NY.
- Edgmand, Michael R (1987): Macroeconomics: Theory and Policy, 3rd ed, Prentice Hall, NJ.

Module IV:

- Froyen, Richard.T.(2008): Macroeconomics 2nd ed. Dorling Kindersley, India
- Dwivedi, D.N. (2005): Macro economics—Theory and Policy, 3rd ed. Tata Mc Graw Hill, New Delhi.
- Rangarajan, Narayan and R, Dholakia (2001): Principles of Macroeconomics, Tata McGraw Hill Education (India) Private Limited, New Delhi.
- Brown, William S. (2004): Macroeconomics, Prentice Hall, New Jersey, 2004
- Wykoff, Frank C. (1982): Macroeconomics: Theory, Policy and Evidence, 2nd ed, Prentice Hall, NJ, 1982.
- Gupta, G.S (2014): Macroeconomics Theory and Policy, 4th ed, TMH,New Delhi.
- Cherneff, Robert V. (1983): Macroeconomics: Theory and Policy, Prentice Hall, Ontario
- Sikdar, Soumyen (2011): Principles of Macroeconomics, 2nd ed, OUP India.
- Nattrass, Nicoli and VisakhVarma, G(2014): Macroeconomics Simplified: Understanding Keynesian and Neoclassical Macroeconomic Systems, Sage publications India, New Delhi
- Diulio, Eugene A (1990): Macroeconomic Theory, 2nd ed (Schaum's Outline Series), McGraw-Hill, NY.
- Edgmand, Michael R (1987): Macroeconomics: Theory and Policy, 3rd ed. Prentice Hall, NJ.

Additional reading List

Module I:

- Bernhard Felderer, ýStefan Homburg(1961) : Macro economics and New Macro economics, 2nd ed. Springer – Verlag, Germany.

Module II:

- Salah El Serafy(2013): Macroeconomics and the Environment: Essays on Green accounting, Edward Elgar Publishing, USA

Module III:

- Brain Snowden and Howard R Vane(ed.)(1977): A Macro Economics Reader, Routledge, London
- Robert J. Gordon(2011): Macroeconomics: Addison-Wesley

Module IV:

- Brain Snowden and Howard R Vane(ed)(1977): A Macro Economics Reader, Routledge, London.

➲ Branson W.A (1989): Macro Economic Theory and Policy, Harper and Row, New York.

Core VI

EC.1541 MONEY AND MODERN BANKING

Inst Hours- 4 **Number of Credits- 4**

Course Objective

The main objective of the course is to enable the students to know about the evolution and role of money in the economy. The paper also provides an insight into the innovative role of banks in the changing economic set up.

MODULE I: MONEY (22 Hours)

Concept of Money—Kinds, Functions and Significance – Monetary Standards: Metallic Standard, Gold Standard and Paper Standard—Value of money—Measurement of changes in the value of money—Demand for Money: The Classical Approach, Keynesian Approach, Monetarist approach—Supply of Money: Definitions—Determinants of Money Supply—High Powered Money and Money Multiplier—Indian Currency system.

MODULE II: COMMERCIAL BANKING (20 Hours)

Functions of Commercial Banks – Creation of Credit – Balance Sheet—Opening of an Account: Types of Accounts, Types of Deposits—Negotiable Instruments: Promissory Notes, Bills of Exchange, Demand Draft, Cheque, Payment and Collections of Cheques, Dishonouring, Crossing and Account payee—Bank Assets: NPA and its issues in Indian banking sector, concept and importance of SARFAESI ACT 2002.

MODULE III: INNOVATIVE FUNCTIONS BANKS (18 Hours)

Telephone Banking, Internet Banking, Mobile Banking—Types of Cards: Credit Cards, Debit Cards, Smart Cards, ATM Cards—Personal Identification Number (PIN)—Electronic Fund Transfer—Electronic Clearing Services, NEFT, RTGS, SWIFT and IFSC.

MODULE IV: RESRRVE BANK OF INDIA (12 Hours)

Reserve Bank of India and its functions—Credit policy instruments of RBI—Role of Non-Bank Financial Institutions— Co-operative Credit Structure—Banking sector reforms in India.

References

Module I:

➲ Ghosh and Ghosh, Fundamentals of Monetary Economics, Himalaya Publishing House
➲ RR Paul, Monetary Economics, Kalyani Publishers
➲ Maheswari and RR Paul (2003): Banking and Financial Services, Kalyani Publications
➲ Mithani, D.M. (2007): Money, Banking, International Trade and Public Finance, Himalaya Publishing House, New Delhi
➲ Sundaram & Varshney(2002): Banking Law; Theory and Practice,Sultan Chand Co.
➲ Gupta, Suraj B. (2009): Monetary Economics –Institutions, Theory and Policy, S.Chand & Company Ltd, New Delhi.

Module II:

- Natarajan and Parameswaran(2013): Indian Banking, S.Chand and Co
- Sachdev, Banking law and Practise, Lekshmi Narain Publications, Agra
- Sharma, B.R. & Nainta, R.P. (2006): Banking Law & Negotiable Instruments Act, Allahabad Law Agency, Faridabad.
- Varshney, Banking Law and Practise, Sulthan Chand and Sons education publishers, New Delhi

Module III:

- Jagroop Singh, Banking and Financial Markets, Kalyani Publishers, New Delhi
- Fernandez and Monsalvez (2013): Modern Bank Behaviour, Palgrave Macmillan
- KC Shekhar and Lekshmi Sekhar, Banking Theory and Practice, Vikas Publishing House Pvt Ltd.

Module IV:

- Santhanam, B (2010): Banking and Financial Systems, Margham Publishers
- ML Seth, Monetary Economics, Lekshmi Narain Agarwal, Agra
- ML Seth, Money, Banking, International Trade and Public Finance, Lekshmi Narain Agarwal, Agra
- Ghosh and Ghosh, Fundamentals of Monetary Economics, Himalaya Publishing House
- Gupta, Suraj B. (2009): Monetary Economics –Institutions, Theory and Policy, S.Chand & Company Ltd, New Delhi.

Additional Readings

- Centre for Financial Training (2009): Banking Systems, Cengage Learning
- Indian Institute of Banking and Finance (2012): Principles of Banking, Macmillan
- Choudhry, Moorad (2012): The Principles of Banking, Wiley
- Shelagh, Heffernan (2005): Modern Banking, Wiley
- Sinha, NK (2012): Money Banking and Finance, Magical Book Series
- Stephen C and Schoenholtz K (2010) : Money, Banking and Financial Markets, McGraw-Hill
- Sunanda Sen (2010): Managing Finances in Emerging Economies, Published in the Alternative Economic Survey, India "Two decades of neo-liberalism" Alternative Survey Group, Daanish Books, Delhi.
- Rangarajan, C (1998): Indian Economy – Essays on Money and Finance, UBS Publishers and Distributors, New Delhi.
- Rakesh Mohan (2014): Growth with Financial Stability, Oxford University Publishers, New Delhi.

CORE VII

EC.1542 MACRO ECONOMICS - II

Inst. Hours - 4 **Number of Credit – 3**

Course Objective

To enable the students to understand the theoretical framework and the working of an economy as a whole. The paper also gives an insight to the students about the basic concepts used in Macro economics and policy alternatives.

MODULE I: Components of Aggregate Demand in the Keynesian system (30 Hours)

Consumption Function – APC, MPC, APS and MPS- Short run and Long run - Keynesian Psychological Law of Consumption (Absolute Income Hypothesis) – Consumption function puzzle – Theories of consumption function – Life cycle, Permanent and Relative income hypothesis – Factors determining consumption(Objective and Subjective). Multiplier – static and dynamic-leakages of the multiplier. Saving function – Saving Paradox.

Investment - Gross, Net and Replacement Investment – Real and Financial Investment – Autonomous and Induced Investment – Inventory Investment- Determinants of Investment- Keynesian Investment Function - MEC and MEI- Accelerator – Dampeners on accelerator – Super multiplier.

MODULE II: Money, Prices and Interest Rate (20 Hours)

Money – Definition – Functions –Quantity Theory of Money – Cambridge Version – Liquidity Preference – Liquidity trap –Friedman's Restatement of the Quantity Theory – Monetarism — Pigou Effect – Real Balance Effect- Keynes effect - Interest rate – Real and Nominal - Fisher effect.

MODULE III: Inflation, Unemployment and Trade Cycle. (20 Hours)

Inflation: Meaning- Types – Headline and Core Inflation - Causes and effects – Inflationary and Deflationary Gap analysis – Stagflation – Phillip's Curve – Short run and Long run – Trade Cycle – Meaning and Phases – Theories of Trade Cycle- Hicks, Hawtrey and Hayek.

MODULE IV: Macro Economic Policy (15 Hours)

Macro Economic Policy – Objectives – Monetary and Fiscal Policy – Objectives and Instruments- Income Policy – IS and LM schedule for a two sector model- simultaneous equilibrium in goods and money market.

Basic Reading List

Module I:

- Mankiw, Gregory (2011): Principles of Macroeconomics, 6th ed. South Western Cengage Learning, USA
- Dwivedi, D.N. (2005): Macroeconomics—Theory and Policy, 3rd ed. Tata Mc Graw Hill.
- Shapiro, Edward (1996): Macro Economic Analysis – Galgolia Publications, New Delhi.
- Brown, William S. (2004): Macroeconomics, Prentice Hall, New Jersey.

- Wykoff, Frank C. (1982): Macroeconomics: Theory, Policy and Evidence 2nd ed, Prentice Hall, NJ
- Gupta, G.S (2014): Macroeconomics Theory and Policy 4th ed, TMH,New Delhi
- Cherneff, Robert V. (1983): Macroeconomics: Theory and Policy, Prentice Hall, Ontario
- Nattrass, Nicoli and VisakhVarma, G(2014): Macroeconomics Simplified: Understanding Keynesian and Neoclassical Macroeconomic Systems, Sage publications India, New Delhi
- Edgmand, Michael R (1987): Macroeconomics: Theory and Policy 3rd ed, Prentice Hall, NJ

Module II:

- Dwivedi, D.N.(2005): Macro Economics—Theory and Policy, 3rd ed. Tata Mc Graw Hill
- Mankiw, Gregory (2010): Macroeconomics, 6th ed. Worth Publishers NY.
- Shapiro, Edward (1996): Macro Economic Analysis – Galgolia Publications, New Delhi.
- Froyen, Richard.T. (2008): Macroeconomics, 2nd ed. Dorling Kindersley, India
- Nattrass, Nicoli and VisakhVarma, G (2014): Macroeconomics Simplified: Understanding Keynesian and Neoclassical Macroeconomic Systems, Sage publications India, New Delhi
- Brown, William S. (2004): Macroeconomics, Prentice Hall, New Jersey
- Wykoff, Frank C. (1982): Macroeconomics: Theory, Policy and Evidence, 2nd ed, Prentice Hall, NJ
- Gupta, G.S (2014): Macroeconomics Theory and Policy, 4th ed, TMH, New Delhi.
- Snowden, Brian and Howard R Vane (2005): Modern Macroeconomics, its origin development and current state, Edward Elgar Publishing, UK.
- Abel, Andrew and Ben S Bernanke (2007): Macroeconomics, Dorling Kindersley, New Delhi.
- Samuelson, P A and Nordhaus(2007) : Economics, Tata McGraw-Hill, New Delhi.

Module III:

- Dwivedi: D.N(2005): Macroeconomics-Theory and Policy, 3rd ed. Tata Mc Graw Hill.
- Mankiw, Gregory(2011): Principles of Macroeconomics, 7th ed. South Western Cengage Learning, USA.
- Nattrass, Nicoli and VisakhVarma, G (2014): Macroeconomics Simplified: Understanding Keynesian and Neoclassical Macroeconomic Systems, Sage publications India, New Delhi
- Edgmand, Michael R (1987): Macroeconomics: Theory and Policy, 3rd ed, Prentice Hall, NJ.
- William illiam S (2004): Macroeconomics, Prentice Hall, New Jersey, 2004.
- Frank, Frank C. (1982): Macroeconomics: Theory, Policy and Evidence, 2nd ed, Prentice Hall, NJ.
- Gupta, G.S (2014): Macroeconomics Theory and Policy, 4th ed, TMH,New Delhi, 2014.
- Cherneff , Robert V. (1983): Macroeconomics: Theory and Policy, Prentice Hall, Ontario.

Module IV:

- Dwivedi, D.N(2005) :Macroeconomics-Theory and Policy, 3rd ed. Tata Mc Graw Hill.
- Blanchard, Olivier(2010) : Macroeconomics, 5th ed. Pearson Education.
- Dornbusch, et al (1978): Macroeconomics, 11th ed. Tata Mc Graw Hill.

- Mankiw, Gregory (2010): Macroeconomics, 6th ed. Worth Publishers NY.
- Edgmand, Michael R (1987): Macroeconomics: Theory and Policy, 3rd ed, Prentice Hall, NJ.
- Nattrass, Nicoli and VisakhVarma, G(2014): Macroeconomics Simplified: Understanding Keynesian and Neoclassical Macroeconomic Systems, Sage publications India, New Delhi
- Brown, William S. (2004): Macroeconomics, Prentice Hall, New Jersey, 2004.
- Frank, Frank C. (1982): Macroeconomics: Theory, Policy and Evidence, 2nd ed, Prentice Hall, NJ.
- Gupta, G.S (2014): Macroeconomics Theory and Policy, 4th ed, TMH, New Delhi, 2014.
- Cherneff, Robert V. (1983): Macroeconomics: Theory and Policy, Prentice Hall, Ontario.

Additional Reading List

Module I:

- Errol. D'Souza(2008): Macroeconomics, Pearson Education
- Gupta, R.D and A.S. Rana (2004): Keynes and Post Keynesian Economics, Kalyani publishers, New Delhi.
- Branson W.A (1989): Macro Economic Theory and Policy, Harper and Row, New York.

Module II:

- Don Patinkin(1956): Money, Interest and Prices
- Ghosh, B.N.and Gosh, Rama(1996): Fundamentals of Monetary Economics, Himalaya Publishing house, New Delhi

Module III:

- Ghosh, B.N.and Gosh, Rama(1996): Fundamentals of Monetary Economics, Himalaya Publishing house, Mumbai

Module IV:

- Errol, D'Souza(2008): Macroeconomics, Pearson Education
- Branson, W.A (1989): Macro Economic Theory and Policy, Harper and Row, New York.

CORE VIII

EC.1543 ECONOMICS OF GROWTH AND DEVELOPMENT

Inst. Hours- 3 **Credit - 2**

Course Objective

To enable the students to understand the basic concepts of Development and Growth. It also intends to provide the theoretical framework for growth and development discourses under different schools of economic thought and a better insights and knowledge on issues and challenges on economic development.

MODULE I: Basic concepts of development (10 Hours)

Meaning, definitions and scope of Economic Growth and Development- Development gap- Development and under development- Basic characteristics of LDCs, Main obstacles to growth.

MODULE II: Tools for measuring Development (25 Hours)

Alternative measures of development and its limitations -Inequality and its measurements, Kuznets Inverted 'U' hypothesis, Lorenz Curve and Gini-coefficient- Physical Quality of Life Index, Human Development Index, Human Poverty Index, Happiness Index, Gender Development Index- Measurement of poverty – absolute and relative, Head-Count Index and Poverty Gap Indices- Sen's capabilities approach.

MODULE III: Theories of Economic Growth and Development (30 Hours)

Approaches to Development, Rostow's stages of growth, Nelson's Low level equilibrium trap, Lewis theory of unlimited supply of labour, Fei-Rannis model, Nurke's theory of disguised unemployment, Leibenstein's critical minimum effort thesis, The 'Big Push' theory, Balanced and unbalanced growth, Dualistic theories, Myrdal's theory of circular causation.

Classical theories of growth, Adam Smith, David Ricardo and Karl Marx- Neoclassical Model of Robert M. Solow-Neo Keynesian Model of Joan Robinson, Harrod-Domar model-concept of Endogenous growth.

References

Module I:

- Ghatak, Subrata (2003): Introduction to Development Economics, 4th ed, Routledge, London.
- Todaro,Michael P and Stephen C Smith(2014): Economic Development, Pearson, New Delhi
- Somasekhar, N T (2007): Development Economics, New Age International, New Delhi.
- Taneja, M L and Myer R M (2014): The economics of Development and Planning, Vishal Publishing, Punjab.
- Thirlwal, A P (2011): Growth and Development with special reference to developing Economies, Palgrave MacMillan, London.
- Hayami, Yujiro and Yoshihisa Godo (2014): Development Economics-from Poverty of nations to the wealth of Nations, Oxford University Press, New Delhi.
- Ray, Debraj (2014): Development Economics, Oxford University Press, New Delhi.
- Perkins, et al (2001): Economics of Development, W.W Norton Company, USA.

Module II:

- Hayami, Yujiro and Yoshihisa Godo (2014): Development Economics-from Poverty of Nations to the Wealth of Nations, Oxford University Press, New Delhi.
- Thirlwal,A P (2011): Growth and Development with special reference to developing Economies, Palgrave MacMillan, London.
- Taneja, M L and Myer R M (2014): The economics of Development and Planning, Vishal Publishing, Punjab.

- Ray, Debraj (2014): Development Economics, Oxford University Press, New Delhi.
- Somasekhar, N T (2007): Development Economics, New Age International, New Delhi.
- Ghatak, Subrata (2003): Introduction to Development Economics, 4th ed, Routledge, London.
- Behrman and Srinivasan T N (1955): Handbook of development economics, Vol3, Elsevier, Amsterdam.
- DasGupta, I (1993): An enquiry in a well-being and destitution, Clarendon press, Oxford.
- Higgins, B (1959): Economic Development, W.W. Norton, New York.
- Todaro,Michael P and Stephen C Smith(2014): Economic Development, Pearson, New Delhi
- Kindleberger, C.P (1977): Economic Development, 3rd ed, McGraw-Hill, New York
- Meier, G.M (1995): Leading Issues in Economic Development, Oxford University Press, and New Delhi.
- Perkins et al,(2001) 'Economics of development', W.W. Norton and company, U S A

Module III:

- Adelman, Irma (1961): Theories of Growth and Development, Stanford.
- Ghatak, Subrata (2003): Introduction to Development Economics, 4th ed, Routledge, London.
- Taneja, M, M L and Myer R M (2014): The economics of Development and Planning, Vishal Publishing, Punjab.
- Barro, Robert J and Xavier sala-i-Martin(2012):Economic Growth, Prentice Hall of India, New Delhi.
- Somasekhar, NT (2007): Development Economics, New Age International, New Delhi.
- Thirlwal,A P (2011): Growth and Development with special reference to developing Economies, Palgrave MacMillan, London.
- Jones, Charles I (2013): Introduction to Economic Growth, Viva Books, New Delhi.
- Ray, Debraj (2014): Development Economics, Oxford University Press, New Delhi.
- Gupta, K.R (2010): Economic Growth Models, Atlantic Publishers, New Delhi.
- Sen, Amartya(1974):Growth economics, Penguin Education, Harmondsworth, Middlesex, England.
- Kindleberger, C.P (1977): Economic Development,3rd ed, McGraw-Hill, New York
- Higgins, B (1959): Economic Development, W.W. Norton, New York.
- Todaro,Michael P and Stephen C Smith (2014): Economic Development, Pearson, New Delhi
- Meier, G.M (1995): Leading Issues in Economic Development, Oxford University Press, and New Delhi.
- Snowden, Brian and Howard R Vane(2005): Modern Macroeconomics, its origin development and current state, Edward Elgar Publishing, UK

CORE IX

EC.1544 INDIAN ECONOMY

Inst. Hours-4 **Number of Credit-4**

Course Objective

The purpose of this course on Indian Economy is to enable the students to have an understanding of the various issues of the Indian Economy, enabling them to comprehend and critically appraise current issues and problems of Indian economy. The focus of the syllabus is on the development of Indian Economy since Independence.

MODULE I: Demographic Features: An Overview (25 Hours)

Demographic Trend and Pattern since Independence-Changes in Major Demographic Indicators over the years (Literacy rate, Birth and Death Rates, Population growth rate, IMR, Child Mortality Rate) Changes in Rural –Urban Population - Urbanisation and its issues and Problems – Demographic Dividend in India and its issues and Challenges - National Population Policy 2000 - Salient features of Census 2011.

MODULE II: Economic Development Strategy since Independence (25 Hours)

Mixed Economic Framework - Key and Strategic Role of PSUs – Economic Crisis of 1990 – Macro Economic Reforms Implemented Since 1991-Structural Adjustment Programmes - Globalisation, Liberalisation and Privatisation – Fiscal and Financial Sector Reforms - Performance of Indian Economy before and after Economic Reforms -External Sector Reforms since 1991 - Trade and Currency Reforms, -Liberalisation of imports and exports - Second Generation Economic Reforms - Reforms from Product markets to Factor and Input Markets - Critical Assessment of Economic Reforms.

MODULE III: Agriculture, Industry and Service Sector (30 Hours)

Role of Agriculture in Indian Economy-Land Reforms-New Agricultural Strategy - Green Revolution — Need for Second Green Revolution - Agricultural Growth and Performance - New Agricultural Policy – Changes in Land use and Cropping Pattern-Agricultural Finance and Issues - Agriculture during Economic Reform Period - WTO and Indian Agriculture.

Industrial growth during pre reform and post reform period-Industrial Policy Resolution of 1956 and 1991 - Role of Micro, Small and Medium Scale Industries (MSMEs) in Indian Economy-Its problems and remedies- Relevance of MUDRA Bank - Role and Performance of Service sector in Indian Economy.

MODULE IV: Economic Planning and Development Issues (25 Hours)

Meaning and rationale of Planning-Basic Strategies, Objectives and Achievements of Planning in India-Strategies of 12th Plan, Inclusive Development -NITI Aayog -Concept of Poverty and Poverty Line-Trends and Pattern of Urban and Rural Poverty - Poverty alleviation Schemes-Structure and Growth of Employment-Trend and Pattern of Unemployment-Role of infrastructure-Both Physical and Social - Issues of Financing Infrastructure development in India - Energy, transport and communications.

References

Module I:

- Economic Survey 2014-15, Ministry of Finance, GOI, Chapter 9.
- Economic Survey 2012-13, Ministry of Finance, GOI Chapter-2. Seizing the Demographic Dividend.pp:26-55
- Asha A. Bhende, Tara Kanitkar (1978): Principles of population studies, Himalaya Publishing House, New Delhi.
- Uma Kapila (2013): Indian Economy since Independence, Academic Foundation, New Delhi.
- Aiyer, Shekar and Arora Mody (.2011): Demographic Dividend: Evidence from the Indian States.IMF Working Paper.
- Thirlwal, A.P (2011): Economics of Development, New York, Palgrave Macmillan.

Module II:

- Acharya, Shankar and Rakesh Mohan (2010) (ed), India's Economy – Performance and Challenges, Oxford University Press, New Delhi.
- Rakesh Mohan (2011): Growth with Financial Stability, Oxford University Press.
- Government of India, Economic Survey 2013-14, Chapter- 2.
- Dreze, Jean and AmartyaSen (2013): An Uncertain Glory – India and its Contradictions, Penguin Books.
- Alternative Economic Survey India, Two Decades of Neoliberalism, Alternative Survey Group, Daanish Books, New Delhi, 2010.
- Kanagasabapathi (2009)*:* Indian Models of Economy, Business and Management, Prentice Hall of India, New Delhi. pp.62 – 75.
- Conference Proceedings of 83rd Annual Conference of the Indian Economic Association (IEA) in Jammu in 2000 – Second Generation of Economic Reforms in India.

Module III:

- Alternative Economic Survey India , Two Decades of Neoliberalism, Alternative Survey Group, Daanish Books, New Delhi, 2010.
- Khan, H.R. (2011): Infrastructure Financing in India - Progress and Prospects, http://www.bis.org/review/r120117c.pdf
- The World Bank, Financing Infrastructure: Addressing Constraints and Challenges, 2006.
- Uma Kapila (2013) Indian Economy since Independence, Academic Foundation, New Delhi.
- Dutt, Ruddar and Sundaram (2014): Indian Economy, S Chand and Company, New Delhi.
- Mishra, J K and V K Puri (2014)*:* Indian Economy*:* The Development Experience, Himalaya Publishing House, Mumbai.

Module IV:

- Economic Survey 2013-14, Ministry of Finance, GOI. pp – 192 – 210.
- Alternative Economic Survey India , Two Decades of Neoliberalism, Alternative Survey Group, Daanish Books, New Delhi, 2010.
- Uma Kapila (2013): Indian Economy since Independence, Academic Foundation, New Delhi.

- Dutt, Ruddar and Sundaram (2014): Indian Economy, S Chand and Company, New Delhi.
- Mishra, J K and V K Puri (2014)*:* Indian Economy: The Development Experience*,* Himalaya Publishing House, Mumbai.
- Economic Survey 2014-15, Ministry of Finance, GOI.

Additional Readings

- INDIA 2014, Publication Division, New Delhi
- Tomlinson.B.R (2013): The Economy of Modern India-From 1860 to the 21st Century, Cambridge University Press, New Delhi.
- Mishra, R K and K Trivikraman (ed) (2013): The Global Financial Crisis: Challenges and Opportunities, Academic Foundation, New Delhi.
- Ahluwalia, I.J. and I.M.D. Little (ed) (1999): India's Economic Reforms and Development, (Essays in honour of Manmohan Singh), Oxford University Press, New Delhi.
- Krueger, Anne. O. (ed) (2002): Economic Policy Reforms and Indian Economy, Oxford University Press, New Delhi.
- Jalan, B. (1992):The Indian Economy – Problems and Prospects*,* Viking, New Delhi.
- Joshi, V. and I.M.D. Little (1999): India: Macro Economics and Political Economy, 1964-1991, Oxford University Press, New Delhi.
- Kaushik Basu (ed) (2004): India's Emerging Economy, Oxford University Press, New Delhi.
- 11th Five Year Plan(2008): Volume 1, 2 and 3, Planning Commission, published by Oxford University Press, New Delhi.
- 12th Five Year Plan(2013): Volume I,2 and 3,Planning Commission, published by Sage Publications, New Delhi
- Prakash, B A (2012): The Indian Economy since 1991: Economic Reforms and Performance, Pearson Education, New Delhi.
- Gopa Kumar, G (2011): Towards an Inclusive India – Role of Parliament in Social Change, Manak Publications Pvt. Ltd.New Delhi.
- Census Data, Accessible via URL- http://censusindia.gov.in/

Core X

EC.1545 PUBLIC ECONOMICS

Inst.Hours- 4 **Number of Credit – 4**

Course Objective

The course intends to provide basic information to students on the scope of Public Economics, significance of government and its functions, governmental finance and its economic impacts, and budgeting with special reference to India.

MODULE I: Introduction to Public finance (25 Hours)

Meaning and Scope-Classical, Keynesian and modern approach on Public economics-Public Finance and Private finance-Similarities and Dissimilarities-The principle of maximum social

Advantage- -The changing role of Government in modern economy-Market failure-Public goods. Externalities - Tragedy of commons, Free rider problem (concepts only) -Merit good, Social Good, Club good (concepts only).

MODULE II: Public Revenue and Public Expenditure (35 Hours)

Public revenue-Classification of public revenue-Sources of public revenue-Tax, Non-Tax sources-Canons of taxation, Principles of taxation-Direct tax-Merits and Demerits-Indirect tax-Merits and Demerits-VAT, MODE VAT, CENVAT, GST-Progressive, Proportional, Regressive, Digressive taxes-Merits and Demerits-Specific and Advalorem taxes-Merits and demerits—Incidence, Impact and Shifting-Theories of Incidence-Traditional Theories -Musgrave's theory of incidence- Effects of taxation- Laffer curve-Taxable capacity

Public expenditure-Types of public expenditure-Canons of public expenditure-Theories of public expenditure-Pure Theories of Public Expenditure-General theories-Wagner hypothesis, Peacock Wiseman hypothesis, Collin Clark hypothesis-Effects of Public expenditure- Reasons for growth in India's public expenditure.

MODULE III: Public Debt and Budgeting (25 Hours)

Public Debt- Meaning and objectives-Types-Sources of public debt-Internal and External Sources-Redemption of public debt- -Public debt and Deficit financing- Economic effects of Deficit financing-India's public debt.

Financial Administration-Budget- Concept, significance and characteristics-Classification of budget—Revenue and capital accounts - Budgetary deficits and its implications—-Techniques of budgeting-PPBS, ZBB-Budgetary procedure in India-Public account-Consolidated fund of India-Contingency fund of India.

MODULE IV: Fiscal Policy and Fiscal Federalism (25 Hours)

Meaning-Approaches of Classical and Keynesian economists on fiscal policy-Functions Instruments -Importance of fiscal policy.

Fiscal federalism-Definition-Planning commission and Finance commission-Functions-Horizontal and Vertical imbalance-Measures to correct Fiscal imbalances -Allocation of resources between Central and State Governments-Gadgil formula, Mukharjee formula-Sources of revenue of Central, State and local Governments in India .

References

Module I:

- Hindrick, Jean and Gareth D Myles (2006): Intermediate Public Economics, Prentice Hall of India
- Singh, S. K (2010): Public finance-Theory and Practice, 6th ed, S Chand, New Delhi.
- Andley and Sundaram (2006): Public Economics and Public Finance, Ratan Prakash, Agra.
- Kennedy, Maria John (2012): Public Finance, Prentice Hall of India.
- Hajela, T N(2010): Public Finance, 3rd ed, Ann's Books, New Delhi
- Agarwal, R.C (2007): Public Finance Theory and Practice, Leksmi Narayan Agarwal, Agra, India.
- Kriparani, et al (2000): Public Finance- Fiscal policy, S Chand, New Delhi.

Module II:

- Mithani, D M(1998): Modern Public Finance, 1st ed, Himalaya Publishing House, New Delhi.
- Lekhi, R K (2003): Public Finance, Kalyani Publications, New Delhi.
- Ghosh and Ghosh (2014): Public Finance, 2nd ed, Prentice Hall of India
- Hajela, T N(2010): Public Finance, 3rd ed, Ann's Books, New Delhi
- Kriparani, Kaveri,K, Sudha Naik, UK and Girija (2000): Public Finance- Fiscal policy, S Chand, New Delhi.

Module III:

- Tyagi, BP (1994): Public Finance, Jain Prakash Nath and Company Meerut.
- Kriparani, et al (2000): Public Finance- Fiscal policy, S Chand, New Delhi.
- Kennedy, Maria John (2012): Public Finance, Prentice Hall of India, New Delhi
- Agarwal, R.C (2007): Public Finance Theory and Practice, Leksmi Narayan Agarwal, Agra, India.
- Singh, S. K (2010): Public finance-Theory and Practice ,6th ed, S Chand, New Delhi

Module IV:

- Bhargava, R N(1967): The Theory and Working of Union Finances in India, Chaitanya Publications, New Delhi
- Soory, M M (2010): Finance Commissions and Fiscal Federalism in India, New Century Publications, New Delhi.
- Jaffy,V S (1999) (ed): Federal India Emerging Economic Issues, 1st ed, Indian Tax Institute
- Lekhi, R K (2003): Public Finance, Kalyani Publications, New Delhi.
- Tyagi, BP (1994): Public Finance, Jain Prakash Nath and Company Meerut.
- Kriparani, Kaveri,K, Sudha Naik,U K and Girija (2000): Public Finance- Fiscal policy, S Chand, New Delhi.

Additional Readings

- Musgrave and Musgrave(1976): Public Finance Theory and Practice, Mc Graw-HIll, Kogakhusa, Tokyo.
- Atkinson A B and J E Stiglitz (1980): Lectures on Public Economics, TATA Mc Graw Hills, New York.
- Om Prakash(2012):Public Economic Theory and Practice, Vishal Publishing Co, Jalandhar, India
- Dalton, Huge(1971):Principles of Public Finance, Rontledge and Hegan Paul Limited, London.
- Herber, B. P (1976): Modern Public Finance, Richard D Iruin, Homewood.
- Datt, Ruddar and K.P.M. Sundaram, (2001) Indian Economy, S. Chand & Company Limited, New Delhi
- Ganguly, S.(1999): Public Finance, The World Press Private Ltd. Calcutta.

OPEN I

EC.1551 HUMAN RESOURCE MANAGEMENT (HRM)

Inst.Hours - 3 **Number of Credit-2**

Course Objective

To enable the students to understand the significance of Human Resource in constituting economic growth. The course also teaches the basic principles of strategic human resource management and the various aspects of Human Resource Planning.

MODULE 1: Nature and Scope of HRM (14 Hours)

Meaning and Definitions – Objectives, Scope and Functions of HRM – Perspectives of Human Resource Management – Role of HRM in the Emerging Economic Scenario.

MODULE II: Human Resource Planning (HRP) and Development (20Hours)

Concept of Human capital – The economic principle of 'Labour theory of value'. Human Resource Development (HRD) - The trend of Working age population in India (compared to other countries) and future potential in global scenario. Distinction between HRD and HRM.

Meaning and Objectives of HRP - Need for HRP at Macro Level - Methods of Recruitment – Selection and Placement - Defining Training - Needs and Benefits of Training - Training Methods.

MODULE III: Controlling Human Resources (20 Hours)

Promotion – Transfer – Demotion – Separation. Concept and Meaning of Discipline – Disciplinary Action Procedure. Industrial Democracy–Workers' Participation in Management in India – Collective Bargaining in India.

References

Module I:

- Michel, U.P (2001): Human Resources Development and Human Relations, Himalaya Publishing House, Mumbai.
- Tripathi, P.C (2004): Human Resources Management, S.Chand & Sons, New Delhi.
- Duderja, V.D (2000): HRM and Development in New Millennium, Common Wealth Publishers, New Delhi.
- Pattanayak, B (2001): Human Resource Management, PHI, New Delhi.

Module II:

- Barotia, G.R (1999): Human Resource Management, Mangal Deep Publications, Jaipur
- Blaug, Mark (1970): Economics of Education – A Selected Annotated Bibliography, 2nd ed, Pergamon Press, NewYork
- Drucker, Peter F (1969): The age of Discounting, Part IV, Harper and Row, New York.
- Gupta, C.B (1997): Human Resource Management, Sultan Chand, New Delhi.
- Taneja,M, M L and Myer R M (2014): The economics of Development and Planning, Vishal Publishing, Punjab.
- Wendel, C. French (1997): Human Resource Development, All India Publishers, Chennai.

- Wanous, John P (1979): Organisational Entry: Recruitment, Selection and Socialisation of New Comers, Reading Mass: Addison – Wesley

Module III:

- Sarma, A.M (1998): Personnel and Human Resource Management, Himalaya Publishing House.
- Thakur, C.P and K.C. Sethi (ed.)(1973): Industrial Democracy : Some Issues and Experiences, Shri Ram Centre for Industrial Relations and Human Resources, New Delhi,
- Virmani, B.R(1978): Workers' Participation in Management: A New Perspective, Indian Journal of Industrial Relations, Vol.13,
- Monappa.A (1985): Industrial Relations, Tata McGraw Hill, New Delhi.
- Chakravarte, K.P (1993): Law of Industrial Employment and Management and Discipline, Allahabad.

CORE XI

EC.1641 KERALA ECONOMY

Inst Hours-5 **Number of Credit-4**

Course Objective

To understand the structural changes, sectoral aspects and features of the Kerala Economy since the formation of the state and enable the students to have a basic understanding of the emerging trends and issues of Kerala Economy .

MODULE I: Structure of Economy (15 Hours)

Kerala's development since the formation of the state-Features of the Economy- Kerala Model of Development-HDI Status -A Review of Economic Growth and Structural Change - Sector Wise contribution to GSDP

MODULE II: Demographic Features of Kerala (20 Hours)

Demographic Change(birth rate, death rate, infant mortality rate, sex ratio, age distribution)-Urbanisation, Migration and Immigration-Economic Impacts of Migration - Nature and Magnitude of Urban, Rural and Educated Unemployment - Trends in Urban and Rural Poverty in Kerala-Major poverty alleviation schemes in Kerala

MODULE III : Productive Sectors (25 Hours)

Agricultural development since 1956-Land reforms- Land Use Pattern and Cropping Pattern— Recent Trends in Agricultural Growth -Agricultural Credit and Indebtedness-Traditional and Modern Industries in Kerala, small scale industries and its prospects. Problems of Industrialization in Kerala – Status of Public sector industries in Kerala

MODULE IV: State Finance and Planning (25 Hours)

Fiscal Situation in Kerala-Sources of Revenue Receipts-Items of Capital and Revenue Expenditure-Revenue, Fiscal and Primary Deficits-Public Debt- Planning-Types of planning: democratic and totalitarian planning, long term and short term planning, centralised and decentralised planning-Features and Problems of Decentralized Planning in Kerala.

MODULE V: Service sector in Kerala (12 Hours)

Kerala Perspective Plan 2030 - its perspectives on Service sector-Role and importance-Education, Health and Tourism and IT Sector in Kerala.

MODULE VI: Industrial visit and Reporting

Students have to visit an industrial unit, study some of the economic aspects and submit a report.

Note: One of the criteria for assigning internal marks to this paper is the study report prepared by students (Not less than 5 pages). Assignments are not compulsory to this paper.

References

Module I:

- Oommen, M.A. (1993): Essays on Kerala Economy, Oxford & IBH.
- Planning Commission (2008): Kerala Development Report, Academic Foundation, New Delhi
- Ravi Raman,K (2010): Development, Democracy and the State : Critiquing the Kerala Model of Development, Routledge
- Govindan, Parayil (2000) (ed.): Kerala : The Development Experience – Reflections on Sustainability and Replicability, Zed Books, London
- Prakash, B.A (ed) (2004): Kerala's economic development: Performance and prospects in the post liberalization period, Sage Publications, New Delhi.
- Prakash, B.A (ed) (1999): Kerala's Economic Development: Issues and Problems, Sage Publication, New Delhi.
- State Planning Board , Economic Review, Various Years, Thiruvananthapuram
- Joseph Tharamangalam (2006): Kerala: The Paradoxes of Public Action and Development Hyderabad, India Orient Longman.

Module II:

- Zachariah, K.C. and S. Irudaya Rajan (2012):Kerala's Demographic Future: Issues and Policy Options, Academic Foundation, New Delhi
- Rajan, K(ed) (2009): Kerala Economy :Trends during the post reform period, serials publications, New Delhi.
- Zachariah K.C. and S. Irudaya Rajan (2012):Kerala's Gulf Connection *1998-2011:* Economic and Social Impacts of Migration, Orient Black swan, New Delhi
- Rajasenan, D. and Gerard De Groot (ed) (2005): Kerala Economy: Trajectories, Challenges and Implications, CUSAT, Kochi.

Module III:

- Harilal, *K.N.* & K.J. Joseph(2000): "Stagnation and revival of Kerala economy: An open economy perspective," Centre for Development Studies, Trivandrum Working Papers 305, Centre for Development Studies, Trivandrum, India.
- Rajan, K(ed)(2009): Kerala Economy :Trends during the post reform period, Serials Publications, New Delhi.

- Oommen, M.A. (1960): Financing of Small-Scale Industries in Kerala sponsored by the Banking Commission, Reserve Bank of India, Bombay.
- Oommen, M.A. (1999): Rethinking Development: Kerala's Development Experience (in two volumes), Concept, New Delhi.
- Oommen, M.A. (1979): Kerala Economy since Independence (ed.) Oxford & IBH, New Delhi.
- Oommen, M.A. (1975): A Study of Land Reforms in Kerala Oxford & IBH, New Delhi.
- Oommen, M.A. (1971): Small Industries in Indian Economic Growth: A Case Study of Kerala, Research Publications, New Delhi.
- State Planning Board, Economic Review, Various Years, Thiruvananthapuram
- Zachariah, K C et al (2003): Dynamics of Migration in Kerala, Orient Longman, India.

Module IV:

- Oommen, M.A. (2007) :A Decade of Decentralisation in Kerala: Issues, Options and Lessons. Har-Anand Publications Pvt. Ltd, New Delhi.
- Oommen, M.A. (1999): Rethinking Development: Kerala's Development Experience (in two volumes), Concept, New Delhi.
- George, K.K. K.K.Krishnakumar (2012): Trends in Kerala State Finances-1991-92 to 2012-13: A Study in the Backdrop of Economic Reforms in India Working Paper No.28 April 2012 Centre for Socio-economic & Environmental Studies, Kochi .
- State Planning Board, Economic Review, Various Years, , Thiruvananthapuram.

Module V:

- State Planning Board, Economic Review, Various Years, Thiruvananthapuram.
- Praveena Kodoth: Globalisation and higher education in Kerala: access, equity and quality Report of a Study sponsored by the Sri Ratan Tata Trust Centre for Development Studies, Trivandrum
- George, K K (2011): Higher Education in Kerala: How Inclusive is it to Scheduled Castes and Scheduled Tribes? Education Exclusion and Economic Growth Working Paper Series, Volume 1, Number 4, Centre for the Study of Social Exclusion and Inclusive Policy [CSSEIP] Cochin University of Science and Technology [CUSAT].
- Kerala State Planning Board (2014): Kerala Perspective Plan 2030, GOK Thiruvananthapuram
- Chandrasekhar, C. P. et al (2001) :Issues in School Education in Contemporary Kerala, A paper prepared for UNICEF, New Delhi.
- Jean Drez & Amartya Sen (1997):India: Economic Development and Social Opportunities, OUP, New Delhi.
- UGC (2003): Higher Education in India: Issues, Concerns and New Dimensions, UGC, New Delhi.
- Tara S. Nair (2010): Health and Education – A Policy Critique, Published in the Alternative Economic Survey, India "Two decades of neo-liberalism" Alternative Survey Group, Daanish Books, Delhi.
- Ved Prakash (2007): Trends in Growth and Financing of Higher Education in India, EPW, 42 (31):3249-58, 4-10th August.
- Human Development Report (2005) Prepared for the Government of Kerala by Centre for Development Studies Thiruvananthapuram.

- Health policy Kerala (2013: Health & Family Welfare Department, Government of Kerala.
- Kerala Perspective Plan 2030, Kerala State Planning Board, Thiruvananthapuram 2015,

Core XII

EC.1642 FINANCIAL ECONOMICS

Inst Hours- 5 **Number of Credit - 4**

Course Objective

The course intends to familiarize the students with the basic concepts in financial economics and develop comprehensive knowledge on the role of finance in the operation of an economy. It also enables them to know the operation of the Indian Financial System and activities in the financial markets.

MODULE I: Introduction to Financial system and Financial Markets (25 Hours)

Financial system-Structure-Functions- Financial markets- Financial Instruments-Role of Financial system-Financial system and Economic development.

Money market-Meaning-Functions-Instruments of money market-Call loans, Collateral loans, Promissory notes, Bills of Exchange, Treasury Bills, Gilt edged securities, Certificate of Deposits', Commercial papers, REPOS-Components of money market-Call money market, Collateral loan market, Acceptance market, Bill market-Institutions of money market-Acceptance houses, Discount houses, Central bank, Commercial bank-Features of Indian money market-DFHI and RBI in Indian Money market.

MODULE II: Capital Market (30 Hours)

Capital market- Meaning – Functions-Structure-Primary and Secondary markets-Primary market (New issue market)-Functions of NIM- Intermediaries in NIM (merchant bankers, underwriters, registrar and share transfer agents, bankers to an issue, stock broker) Instruments of Capital market- -Preference shares, Differed shares, Equities Ordinary shares-Bonds and debentures, Government promissory notes, Public sector bonds-Initial Public Offer-Methods of floatation of shares –Dematerialization of Shares- Depository-Functioning of depository.

Secondary Market- Nature and functions of stock exchanges -Settlement and trading in stock exchange- Players in stock exchanges-Speculators-Bulls, Bears, Lame duck, Stag- Kerb trading, Insider trading- Listing of securities

MODULE III: Security Market Analysis (20 Hours)

Risk-Return on risk-types of risk-Security Evaluation-Fundamental Analysis, Technical Analysis -Fundamental Analysis- Constant growth Model, P/E Ratio-Technical Analysis-Dow Theory, Dow-Jones Index, Elliot Wave Theory-Derivatives-Options, Futures/Forwards, Swaps-Construction of Stock market indices.

MODULE I V: Indian Financial System (25 Hours)

Structure of Indian Financial System-Organization and management of Indian Stock Exchanges-SEBI - OTCEI, BSE-BOLT, SENSEX-NSE-NEAT,NIFTY, ISE -Depositories in India-NSDL, CSDL- Development financial institutions -Pension and Provident Funds, National Pension system and PFRDA (Pension Funds Regulatory and Development Authority) Mutual funds-

Venture capital funds- NBFIS, Chit Funds-Credit rating agencies in India-CRISIL, ICRI, CARE -International credit rating agency- Sand P-Financial sector reforms-Narasimham Committee report.

References

Module I:

- Keith, P Ibeam (2005): Finance and Financial Markets, 2nd ed, Palgrave Mc Milan.
- Bhole, L M (1999): Financial Institutions and Markets, TATA Mc Graw Hill Co Ltd, New Delhi
- Gupta, S B (2007): Monetary Economics Institutions Theory and Policy, Chand and Co Ltd
- Smith, P F (1978): Money and Financial Intermediation: The Theory and Structure of the Financial System, Prentice Hall, New Delhi
- Khan, N Y (1996): Indian Financial system, TATA Mc Graw Hill Co Ltd, New Delhi
- Bharathi V Pathak(2003):Indian Financial system, Pierson Education, New Delhi
- Preethi Singh (2009) : Dynamics of Indian Financial system, markets, institutions and services, Annes Books Pvt Ltd, New Delhi

Module II:

- Guru Swamy, S (2009): Financial Markets and Institutions, 3rd ed, Vijay Nicole Imprints Pvt Ltd,Chennai, TATA Mc Graw Hills Co Ltd, New Delhi.
- Guru Swamy,S(2006):Capital Markets, 2nd ed, Vijay Nicole Imprints Pvt Ltd, Chennai, TATA McGraw Hills Co Ltd, New Delhi.
- Faboozi, J Frank, Modiglani Franco(2008):Capital Markets-Institution and Instruments, 4th ed, Pearson Education, New Delhi (PHI).
- Avadhani, V A (1993): Investments and Securities markets in India, Himalaya Publishing House, Mumbai.

Module III:

- Kevin, S (2008): Security Analysis and Portfolio Management, 2nd ed, Prentice Hall of India.
- Avadhani, V A (2008): Security analysis and Portfolio Management, Himalaya Publishing House
- Sasidharan, K, Mathews K Alex (2013): Security analysis and Portfolio Management, Tata McGraw Hills Co Ltd, New Delhi
- Bharathi V Pathak(2003): Indian Financial system, Pierson Education, New Delhi

Module IV:

- Guru Swamy,S(2009): Financial Markets and Institutions, 3rd ed, Vijay Nicole Imprints Pvt Ltd,Chennai, TATA Mc Graw Hills Co Ltd, New Delhi.
- Machi raju, M R (1999):Indian Financial System, Vikas Publishing House, New Delhi.
- Rajesh S Kothari (2010): Financial Services in India, Concepts and Applications, Sage Publications.
- Gupta, SB (2007): Monetary Economics Institutions Theory and Policy, Chand and Co Ltd
- Khan, N Y (1996): Indian Financial system, TATA Mc Graw Hill Co Ltd, New Delhi.

➲ Bhole, L M (1999): Financial Institutions and Markets, TATA Mc Graw Hill Co Ltd, New Delhi.

Additional Readings

➲ Faboozi, J Frank, Modiglani Franco, Ferry G Michael: Foundations of Financial Markets and Institutions, 4th ed, Pierson Education, New Delhi (PHI).

➲ Maria William Cornett and Saunders Anthony (2010): Financial Markets and Institutions, 4th ed, Mc Graw Hills.

➲ Chandra P (1997): Financial Markets, 4th ed, TATA Mc Graw Hill.

➲ Prasad KM (2001):Developments in India's Financial System, Sarup and Son's, New Delhi

➲ RBI Reports.

CORE XIII

EC.1643 BASIC TOOLS FOR ECONOMICS II

Inst. Hours: 5 **Number of credit: 4**

Course Objective

The course is intended to familiarize the students with statistical tools and techniques and enable them to apply these tools in economics.

MODULE I: **Correlation and Regression** **(30 Hours)**

Correlation-Types-Simple, Partial and Multiple correlation-Simple correlation analysis-Scatter diagram-Karl Pearson's coefficient of correlation-Spearman's rank correlation- probable error- uses and importance of correlation.

Regression - Simple linear regression-Method of Least Squares-Lines of regression-Regression coefficient-Relation between regression and correlation coefficients-Uses of regression in economics.

MODULE II: **Index Numbers** **(20 Hours)**

Definition – Construction of index numbers – Simple and Weighted index numbers - Problems in the construction of index numbers – Tests of index numbers – CPI – WPI – Deflating – Base shifting – Splicing – Uses of Index numbers.

MODULE III: **Probability** **(25 Hours)**

Set theory – Types of Sets – Basic set operations. Probability- Elements of probability theory (sample space, events) –Approaches to the definition of Probability: Classical definition, Relative frequency definition and Axiomatic approach – Addition rule – multiplication rule – Conditional Probability – Bayes' Theorem.

MODULE IV: Random variable and Theoretical distributions **(22 Hours)**

Random variable – Discrete and Continuous – Expectations and Variance of random variables. Probability distribution – Discrete distribution: Binomial distribution – Continuous distribution: Normal distribution.

Basic Reading List

Module I:

1. Yule and Kendall, An Introduction to the Theory of Statistics, Charles Gtiffin and Company, London
2. Croxton, F.E. and Cowden, D.J. Applied General Statistics, Prentice- Hall of India, New delhi.
3. Gupta S. and V.K. Kapoor, Fundamentals of Applied Statistics, S.Chand and Sons, New Delhi.
4. Gupta, S.P, Statistical Methods, Sulthan Chand and Sons, New Delhi.
5. Monga, G.S. Mathematics and Statistics for Economics, Vikas Publishing, New Delhi

Module II:

1. Yule and Kendall, An Introduction to the Theory of Statistics, Charles Gtiffin and Company, London
2. Croxton , F.E. and Cowden, D.J. Applied General Statistics, Prentice- Hall of India, New Delhi.
3. Gupta S. and V.K. Kapoor , Fundamentals of Applied Statistics, S.Chand and Sons, New Delhi.
4. Gupta, S.P, Statistical Chand and Sons, New Methods, Sulthan Delhi
5. Monga, G.S. Mathematics and Statistics for Economics, Vikas Publishing, New Delhi

Module III:

1. Gupta, S.P, Statistical Methods, Sulthan Chand and Sons, New Delhi.
2. Gupta S. and V.K. Kapoor, Fundamentals of Applied Statistics, S.Chand and Sons, New Delhi.
3. Monga, G.S. Mathematics and Statistics for Economics, Vikas Publishing, New Delhi
4. Goon, Gupta and Dasgupta, Fundamentals of Statistics, Volume I & II

Module IV:

1. Gupta, S.P, Statistical Methods, Sulthan Chand and Sons, New Delhi.
2. Monga, G.S. Mathematics and Statistics for Economics, Vikas Publishing, New Delhi
3. Goon, Gupta and Dasgupta, Fundamentals of Statistics, Volume I & II

Additional Reading List

1. Goon, Gupta and Dasgupta, Basic Statistics.
2. N.G. Das, Statistical Method
3. Aggarwal, D.M.(2009), Business mathematics and Statistics, Ane Books(P) Ltd, New Delhi.
4. Oakshott(1998), Essential Quantitative Methods, Palgrave Macmillan, New York.
5. Yule and Kendall, An Introduction to the Theory of Statistics.

Core XIV

EC.1644 INTERNATIONAL ECONOMICS

Inst.Hours – 4 **Number of Credits – 3**

Course Objective

To understand the basic concepts and theories of international trade and enable the students to have a basic understanding of the emerging trends ,issues and polices in the field of international Economic system .

MODULE I: THEORIES OF INTERNATIONAL TRADE (23 Hours)

International Economics - subject matter-basis of trade – Mercantilism and Physiocrats - Classical theory: Absolute and Comparative Advantage theories - Terms of trade- offer curve – community indifference curve – opportunity cost (concepts only).

The Heckscher-Ohlin theory- Leontief Paradox – gains from trade – static and dynamic gains- trade as an engine of growth, foreign trade multiplier

MODULE II: BALANCE OF PAYMENTS (20 Hours)

Balance of Payments – Components – accounting framework – disequilibrium – causes – measures to correct disequilibrium – automatic and deliberate measures – Devaluation – Effects of devaluation -Marshall –Lerner condition – J Curve effect – Absorption approach – FDI ,FII and MNC.

MODULE III: FOREIGN EXCHANGE (25 Hours)

Exchange rate determination – mint parity theory – purchasing power parity theory – BOP theory- Exchange rate systems – fixed and flexible exchange rates , Managed floating system– nominal, real and effective exchange rate- forward rate- spot rate-– Foreign exchange risks – hedging and speculation - IMF and International liquidity management.

MODULE IV: THEORY OF COMMERCIAL POLICY (22 Hours)

Commercial policy – free trade vs protection – tariff barriers - impact of tariff- optimum tariff- Non tariff barriers- Quantitative Restrictions.

Economic Integrations – rationale and objectives – forms of integrations – Free Trade Area – Customs Union- Common Market – Economic Union – Economic Integration - EU – Regionalism Vs Multilateralism – WTO and its objectives.

References

Module I:

- Soderstein, B O and Geffry Reed (2006): International Economics, Palgrave Mc Milan.
- Apple yard, Dennis R (2014): International Economics, 5th ed, TMH,New Delhi
- Salvatore, Dominic(2012): International Economics', John Wiley and Sons
- Chacholides, Miltiades(2012): International Economics, 5th ed, TMH,New Delhi
- Carbugh, Robert J(2008): International Economics ,11th ed, Cengage Learning.
- Barbara Ingham (2004):International Economics, Prentice Hall, New York

- Cherunilam, Francis (2012): International Economics, Tata McGraw Hill, New Delhi.
- Mannur, H G(2014): International Economics, Vikas publishing House, New Delhi
- Lindert, Peter H (1995): International Economics, Richard Irwin, New Delhi
- Sawyer, W Charles and Richard L Sprinkle (2013): International Economics, PHI, Delhi
- Rana, K C and K N Verma (2014): International Economics, Vishal publishing, Delhi.
- Gerber, James (2014) : International Economics, 6th ed,Pearson Education.

Module II:

- Soderstein, B O and Geffry Reed (2006): International Economics, Palgrave Mc Milan.
- Apple yard, Dennis R (2014): International Economics, 5th ed, TMH,New Delhi.
- Chacholides, Miltiades(2012): International Economics, 5th ed, TMH,New Delhi.
- Carbugh, Robert J(2008): International Economics, 11th ed, Cengage Learning.
- Barbara Ingham (2004):International Economics, Prentice Hall, New York.
- Salvatore, Dominic(2012): International Economics, John Wiley and Sons.
- Cherunilam, Francis (2012): International Economics, Tata McGraw Hill, New Delhi.
- Mannur, H G(2014): International Economics, Vikas publishing House, New Delhi.
- Lindert, Peter H (1995): International Economics, Richard Irwin, New Delhi.
- Sawyer, W Charles and Richard L Sprinkle (2013): International Economics, PHI, Delhi
- Rana, K C and K N Verma (2014): International Economics, Vishal publishing, Delhi.
- Gerber, James (2014) : International Economics, 6th ed,Pearson Education.

Module III:

- Soderstein, B O and Geffry Reed (2006): International Economics, Palgrave Mc Milan.
- Apple yard, Dennis R (2014): International Economics, 5th ed, TMH, New Delhi.
- Chacholides, Miltiades(2012): International Economics, 5th ed, TMH, New Delhi.
- Carbugh, Robert J(2008): International Economics,11th ed, Cengage Learning.
- Barbara Ingham (2004):International Economics, Prentice Hall, New York.
- Salvatore, Dominic(2012): International Economics, John Wiley and Sons.
- Cherunilam, Francis (2012): International Economics, Tata McGraw Hill, New Delhi.
- Mannur, H G(2014): International Economics, Vikas publishing House, New Delhi.
- Lindert, Peter H (1995): International economics, Richard Irwin, New Delhi.
- Sawyer, W Charles and Richard L Sprinkle (2013): International Economics, PHI, Delhi.
- Rana, K C and K N Verma (2014): International Economics, Vishal publishing, Delhi.
- Gerber, James (2014) : International Economics, 6th ed,Pearson Education.

Module IV:

- Soderstein, B O and Geffry Reed (2006): International Economics, Palgrave Mc Milan.
- Apple yard, Dennis R (2014): International Economics, 5th ed, TMH,New Delhi.
- Chacholides, Miltiades(2012): International Economics, 5th ed, TMH,New Delhi.
- Carbugh, Robert J(2008): International Economics,11th Ed, Cengage Learning.
- Barbara Ingham (2004):International Economics, Prentice Hall, New York.
- Salvatore, Dominic(2012): International Economics, John Wiley and Sons.
- Cherunilam, Francis (2012): International Economics, Tata McGraw Hill, New Delhi.

- Mannur, H G(2014): International Economics, Vikas publishing House, New Delhi.
- Lindert, Peter H (1995): International economics, Richard Irwin, New Delhi.
- Sawyer, W Charles and Richard L Sprinkle (2013): International Economics, PHI, Delhi.
- Rana, K C and K N Verma (2014): International Economics, Vishal publishing, Delhi.
- Gerber, James (2014) : International Economics, 6th ed,Pearson Education.

OPEN II ELECTIVE

EC.1661.1 AGRICULTURAL ECONOMICS

Inst. Hours - 3 **Number of Credit- 2**

Course Objective

The aim of this course is to provide a detailed treatment of issues in agricultural economics. Its aim is to familiarize students with policy issues that are relevant to Indian agricultural economics and enable them to analyze the issues, using economic concepts.

MODULE I: Introduction (15 hours)

Nature and scope of agriculture—Role of agriculture in economic development—Interdependence between agriculture and industry—Different Systems of Farming—Farm budgeting and cost concepts—Sustainable Agriculture and Food Security

MODULE II: Models of Agricultural Development (12 hours)

Lewis Theory of Unlimited Supplies of Labour—Mellor's Model of Agricultural Development—Boserup Model of Agricultural Development–Cobweb Theorem

MODULE III : Development Problems of Indian Agriculture (27 Hours)

Agricultural Credit: Cooperative credit system—NABARD—Role of Commercial Banks—Non Agricultural Rural credit institutions—Unorganized credit system

Agricultural Marketing: Marketing and state policy—Agriculture Warehousing

Agricultural Pricing: Objectives of agricultural price policy—Food security in India—Food Security Act 2013 and public distribution system. Climate change and Indian agriculture

Organic farming in India-Status and prospects, Impact of WTO on Indian agriculture

Basic Reading List:

Module I:

- Norten and Allwnding: (Year) The Introduction to Economic and Agricultural Development, McGraw Hill Co. Publication. New Delhi.
- Sadhu A.N. & Singh Amarjit (1966): Fundamentals of Agricultural Economics, Himalaya Pub. House, Delhi.
- Soni, R.N.: Leading Issues in Agricultural Economics, Sohan Lal Nagin Chand and Co., Jalandhar.

Module II:

- Soni, R.N.: Leading Issues in Agricultural Economics, Sohan Lal Nagin Chand and Co., Jalandhar.
- Sadhu A.N. & Singh Amarjit (1966): Fundamentals of Agricultural Economics, Himalaya Pub. House, Delhi.

Module III:

- Misra S.K. & V.K.Puri (2007): Indian Economy – Himalaya Publication House, Mumbai.
- Datt R. & K.P.M. Sundharm (2007): Indian Economy, S. Chand & Co. Ltd.New Delhi
- Rao G.S.L.H.V. Prasada, Rao G.G.S.N., Rao V.U.M. (2010): Climate Change and Agriculture over India (2010), PHI. New Delhi.
- Narayanan, S (2005): Organic Farming in India: Relevance, Problems and Constraints (Occasional Paper – 38), Department of Economic Analysis and Research, National Bank for Agriculture and Rural Development, Mumbai.
- Prasad, C.S. (2006): Sixty years of Indian Agriculture, New Delhi.

OPEN II ELECTIVE

EC.1661.2 INDUSTRIAL ECONOMICS

Inst.Hours - 3 **Number of Credit-2**

Course Objective

This course presents various aspects of industrial structure and location. It also provides an introduction to current theory in Industrial economics and discusses the role of policy in the context of competition, industrial policies and regulation.

MODULEI: BASIC CONCEPTS (10 hours)

Nature and Scope of Industrial Economics - Basic Concepts- Plant, Firm, Cartel, Industry, Industrial Productivity, Market Structure.

MODULE II: INDUSTRIAL LOCATION (14 hours)

Industrial Location – General determinant- Theories of Webber and Sergeant Florence – Industrial locational trends in India-Industrial Clustering – Regional growth – Measures of regional imbalance and backwardness

MODULE III: INDIAN INDUSTRIAL GROWTH AND PATTERN (30 hours)

Industrial growth in India - Pattern and Phase, Importance of Industrial Growth for agriculture, employment, tertiary sector and foreign exchange-Industrial Policy resolution – 1956, 1985 and 1991-Role of PSEs Small and Medium scale enterprises-Cottage Industries – Industrial backwardness – Climate change and Indian Industry-Disinvestment process in India-Policy Towards reviewing industry - EPZ, SEZ, Techno parks, FDI, FPI.

Basic Reading List:

Module I

- Barthwal,R R (2010): Industrial Economics, New Age International (P) Limited, New Delhi, 2010.
- Penrose, E (1959): The theory of growth of the Firm, Blackwell, Oxford.

Module II

- Ahluwalia(1985): Industrial Growth in India, Oxford University Press, New Delhi.
- Barthwal,R R (2010): Industrial Economics, New Age International (P) Limited, New Delhi, 2010.
- Kuchal, S.C. (1980): Industrial Economy of India Chaitanya.

Module III

- Ahluwalia(1985): Industrial growth in India, Oxford University Press, New Delhi.
- Umakapila(2003) : Understanding the problems of Indian Economy, Academic Foundation
- Agarwal, A N (1995): Indian Economy Problems of development and planning Vishwas publication.
- Parikh, J.K. & Parikh, K. (2002): Climate change: India's perceptions, positions, policies and Possibilities, Climate Change and Development, OECD.

OPEN II ELECTIVE

EC.1661.3 MATHEMATICAL ECONOMICS

Inst. Hours- 3 **Credit – 2**

Course Objective

The aim of the course is to provide a comprehensive introduction to basic mathematical techniques employed in Economic Theory

MODULE I: Introduction to Mathematical Economics (15 Hours)

Nature and Scope of Mathematical Economics-Economic model-Ingredients of a Mathematical model-Functions-Optimization-Maxima and minima-Lagrange multiplier Method

MODULE II: Theory of Value (15 Hours)

Cardinal and Ordinal Utility-Mathematical derivation of consumer's equilibrium-Consumer' surplus-Slutsky Theorem-Income and substitution effect-Method of demand forecasting.

MODULE III : Theory of Production (24 Hours)

Production function—Adding- up theorem—Cobb-Douglas—Derivation of cost function from a production function—Marginal analysis—Equilibrium of a firm—Perfect market equilibrium—Monopoly equilibrium—Discriminating Monopoly—Producer's surplus.

Basic Reading List

Module I:

1. Dowling, Introduction to Mathematical Economics, Schaums Series.
2. Mehta and Madani, Mathematical Economics, S. Chand, New Delhi.
3. Bose,D, An Introduction to Mathematical Economics, HPH, Mumbai

Module II:

1. Dowling, Introduction to Mathematical Economics, Schaums Series.
2. Mehta and Madani, Mathematical Economics, S. Chand, New Delhi.
3. Bose,D, An Introduction to Mathematical Economics, HPH, Mumbai
4. Mik Wisneiwski, Introductory Mathematical Methods in Economics, McGraw- Hill, New Delhi

Module III:

1. Dowling, Introduction to Mathematical Economics, Schaums Series.
2. Mehta and Madani, Mathematical Economics, S. Chand, New Delhi.
3. Bose,D, An Introduction to Mathematical Economics, HPH, Mumbai, Delhi

OPEN II ELECTIVE

EC.1661.4 INTRODUCTORY ECONOMETRICS

Inst.Hours- 3 **Credit - 2**

Course Objective

Econometrics intends to integrate economic theory, statistics, mathematics and the real-world data. It is a useful tool that allows estimating the magnitude and strength of the relationships that exist between various sets of variables. Econometrics has much practical application in modern world, not only as an academic endeavour, but also in the government and private sectors.

This course introduces students to simple and multiple regression methods for analyzing data in economics and related disciplines. The objective of the course is for the student to learn how to conduct and to critique empirical studies in economics and related fields. Although the emphasis of the course is on empirical applications, a treatment of traditional econometrics will also be made.

The course covers the foundations of econometrics. This course provides a comprehensive introduction to basic econometric concepts and techniques. It covers estimation and diagnostic testing of simple and multiple regression models.

MODULE I: Introduction

Nature and Scope of Econometrics—Methodology of Econometrics **(5 Hours)**

MODULE II: Simple Linear Regression Model: Two Variable Cases (14 Hours)

Estimation of model by method of ordinary least squares—Properties of estimators—Gauss Markov theorem—Goodness of fit—Tests of hypotheses— Forecasting

MODULE III : Multiple Linear Regression Model (20 Hours)

Least Square Estimation -R^2 and adjusted R^2-Partial regression coefficients-Testing of hypotheses-Functional forms of regression models-Qualitative (dummy) independent variables – Forecasting

MODULE IV: Violations of Classical Assumptions (15 Hours)

Violations of classical assumptions: Consequences, Detection and Remedies-Multicollinearity-Heteroscedasticity-Serial Correlation

Assignments

In addition to assignments from the modules, areas like Random Variables and Probability distribution, Testing of hypotheses, Confidence interval etc may be given as assignments to enable the student to strengthen his/her statistical base.

Basic Reading List

Module I:

1. D.N.Gujarati and D.C.Porter (2009): Essentials of Econometrics Chapter 1, McGraw Hill, 4th ed, International Edition.
2. GMK Madnani (2008): Introduction to Econometrics: Principles and Applications, Chapter 1. Oxford&IBH Publishing Co, 8th ed.

Module II:

1. D.N.Gujarati and D.C.Porter (2009): Essentials of Econometrics, Chapter 2 & 3 McGraw Hill, 4th ed, International Edition.
2. Christopher Dougherty (2007): Introduction to Econometrics, Chapter 2 Oxford University Press, 3rd ed, Indian Edition.
3. Webster, Allen (2013): Introductory Regression Analysis: with Computer Application for Business and Economics, Chapter 2 & 3 Routledge.

Module III:

1. D.N.Gujarati and D.C.Porter (2009): Essentials of Econometrics, Chapter 4 McGraw Hill, 4th ed, International Edition.
2. Christopher Dougherty (2007): Introduction to Econometrics, Chapter 3 and 5 Oxford University Press, 3rd ed, Indian Edition.
3. Webster, Allen (2013): Introductory Regression Analysis: with Computer Application for Business and Economics, Chapter 4 Routledge.

Module IV:

1. D.N.Gujarati and D.C.Porter (2009): Essentials of Econometrics, Chapter 10 McGraw Hill, 4th ed, International Edition.
2. Christopher Dougherty (2007): Introduction to Econometrics, Chapter 3, 7 and 12 Oxford University Press, 3rd ed, Indian Edition.
3. Webster, Allen (2013) Introductory Regression Analysis: with Computer Application for Business and Economics, Chapter 4, 7 & 8 Routledge.

Additional Reading List

1. Jan Kmenta (2008): Elements of Econometrics, Indian Reprint, Khosla Publishing House, 2nd ed.
2. Greene, Willam H. (2013): Econometric Analysis, Pearson, 5th ed.
3. Robert. S.Pindiyck and Daniel Rubinfield (1998): Econometric Models and Economic Forecasts, MacGraw Hill, .
4. Stock, J.H. and M.W. Watson (2003): Introduction to Econometrics, Addison-Wesley, 1st ed.

OPEN II ELECTIVE

EC. 1661.5 INDIAN ECONOMIC HISTORY AND THOUGHTS

Inst. Hours-3 **Number of Credit-2**

Course Objective

The objective of this course is to make students aware of the economic history of India and to provide a historical perspective on the evolution and process of transformation of Indian economy in the pre-British and British periods. This paper intends to familiarise the students on the great contribution of our national leaders and Indian economists who critically perceived the direction of Indian economy under foreign rule. The focus of the syllabus is to inform students on the share and contribution of Indian economy in the world, economic exploitation of the British and the native thinking on the path of economic development of India.

MODULE I: The Pre-British Indian Economy – India in the World (15 Hours)

Share of Indian Economy in the World GDP before 1700 and comparing the share of different countries — Terms of Trade—Contribution of Agriculture – Industry and Trade- Centres and Higher Education system in Ancient India – The economic system in India in the Pre-British Period – Its salient features.

MODULE II: Indian Economy under British Rule (15 Hours)

Indian economy after 1700 – The nature and intensity of economic exploitation of India under British Rule – the declining share of India in the World GDP – Decline of Indian agriculture-Industry – Trade – Appearance of Poverty and Famines - Farmers' indebtedness.

MODULE III: Economic Thoughts I (10 Hours)

Kautilya's Arthasastra - Economic Thoughts of Dadabhai Naoroji – Mahadev Govind Ranade (M.G.Ranade) -Romesh Chandra Dutt (R.C. Dutt) - B.R. Ambedkar - J.C.Kumarappa – Amartya Sen

MODULE IV: Economic Thoughts II (15 Hours)

Economic thoughts of Gandhi – Decentralised Planning concept of Gandhi – Gandhian Economics - Economic Perspectives of Nehru- Compare and contrast Economic Perspectives of Nehru and Gandhi – Integral Humanism and its relevance today.

References

Module I:

- Maddison, Angus (2003): The World Economy – A Millennial Perspective, 1st Indian ed. Overseas Press (India) Private Limited, New Delhi
- Kanagasabapathi, P (2009): Indian Models of Economy, Business and Management Prentice Hall of India, New Delhi.
- MadhusudananPillai, K.N. (2014): Indian Education: Genesis, Growth, Development and Decline, Vivekananda Kendra Prakashan Trust, Chennai.
- Romesh Dutt(1906): The Economic History of India – Under Early British Rule, Vol.1 & Vol. II, ed, Great Britain.

Module II:

- Maddison, Angus (2003): The World Economy – A Millennial Perspective, 1st Indian ed. Overseas Press (India) Private Limited, New Delhi
- Kanagasabapathi,P (2009): Indian Models of Economy, Business and Management Prentice Hall of India, New Delhi.
- Dadabhai Naoroji (1966): Poverty and Un-British Rule in India, 2nd ed; Ministry of Information and Broadcasting, Govt. of India, New Delhi.
- Dharamapal (1995): The Beautiful Tree, 2nd ed, Keerthi Publishing House Pvt. Ltd, and AVP Printers and Publishers Pvt. Limited, Coimbatore.
- Bhattacharyya, Dhires (1989): A Concise History of Indian Economy, Prentice Hall of India Ltd. (PHI), New Delhi.

Module III:

- AmartyaSen, Choice, Welfare and Measurement
- AmartyaSen, On Economic Inequality
- AmartyaSen, On Ethics and Economics
- The Indian Economic Journal (Journal of the Indian Economic Association), Special Issue, "Dr.B.R.Ambedkar's Economic and Social Thoughts and their Contemporary Relevance". December, 2013.
- Dasgupta, Ajit K. (1993): A History of Indian Economic Thought, Routledge, London.
- Rangarajan, L.N.(2001):Kautilya – The Arthasastra, Penguin Books India Pvt. Limited, New Delhi
- Singh, V.B. (1975): From Naoroji to Nehru – Six Essays in Indian Economic Thought, The Macmillan Company of India Limited, New Delhi.

Module IV:

- Singh, V.B. (1975): From Naoroji to Nehru – Six Essays in Indian Economic Thought, The Macmillan Company of India Limited, New Delhi.
- Devendra Swarup (1992): Deendayal Upadhyaya's Integral Humanism: Documents, Interpretation, Comparisons, Deendayal Research Institute, New Delhi.
- Sudhakar Raje (ed.)(1972): Pandit Deendayal Upadhyaya: A Profile,
- Ajit K.Dasgupta, Gandhi's Economic Thought, Routledge, London. Year.

- Balbir S.Shihag (2014): Kautlia: The True Founder of Economics, Vitasta Publishing Pvt Ltd.
- Panchamukhi, V.R.: An Integrated Paradigm for Development: Whither development Process in the Asian Countries? CMDR Monograph Series No. – 13. Centre for Multi-disciplinary Development Research (CMDR) Dharwad, Karnataka.

Additional Readings

- Swadeshi – The Nation - Building Philosophy, Vivekananda Kendra Prakashan Trust, Chennai.
- M.K.Gandhi, Hind Swarajya (2011): "Indian Home Rule", (Text of the first edition of 1910 published under the title Published by the Centre for Policy Studies, Chennai.
- Maddison, Angus (1971): Class Structure and Economic Growth – India and Pakistan since the Muguls, George Allen and Unwin Ltd.
- Dreze, Jean &AmartyaSen(2013): An Uncertain Glory – India and its Contradictions, Penguin Books
- Raghavan, V.P.(2009):History of Economic Thought, Kunal Books, New Delhi,
- Lokanathan,V(2013): A History of Economic Thought, S.Chand& Company Ltd, New Delhi,
- AmartyaSen (2000): Development as Freedom, Oxford University Press.
- M.K.Gandhi: An Autobiography OR the Story of My Experiments with Truth, Navajivan Publishing House, Ahmadabad. Reprint, 2011.
- Jitendra Kumar Bajaj and M.D. Srinivas (2001) Timeless India – Resurgent India, Centre for Policy Studies, Chennai.
- Jitendra Kumar Bajaj and M.D. Srinivas (2001): Food for all, Centre for Policy Studies, Chennai.
- Mukherji, Radha Kumud (1969): Ancient Indian Education, Motilal Banarsidas Delhi.
- Basham, A.L (2001): The Wonder that was India, Rupa& Co., New Delhi.
- Schumacher, E.F (1993): Small is Beautiful – A Study of Economics as if Mattered, Vintage London.
- Pulapre Balakrishnan (2010): Economic Growth in India: History and Prospect, Oxford University press, New Delhi.

OPEN II ELECTIVE

EC.1661.6 HEALTH ECONOMICS

Inst. Hours - 3 **Number of Credit-2**

Course Objective

The course intends to develop an understanding of the relevance of economic concepts to the health care sector and describes the system of health care financing and evaluation in the health care sector. It also imparts an understanding of the role of information in the health care system.

MODULE I: INTRODUCTION TO HEALTH ECONOMICS. (15 Hours)

Relevance of Health Economics-Features of economic analysis in health care-How health care is different-Presence and extent of uncertainty, insurance, information-Role of equity and need.

Birth rate-Death rate-Infant mortality rate-Maternal mortality rate-Morbidity-Quality of adjusted life year (QALY)

MODULE II: DEMAND FOR HEALTH CARE (15 Hours)

Utility, indifference curves and demand curves for health care- demand curve for the society – adding up of the individual demands – insurance and demand – role of quality in the demand for care – time costs and travel costs.

Production function of health, role of medicine – role of education – cost minimization and output maximization.

MODULE III: ECONOMIC EVALUATION OF HEALTH CARE SYSTEM. (12 Hours)

Meaning of economic evaluation – importance of economic evaluation – types of economic evaluations- cost of illness studies – cost- benefit analysis – cost effectiveness analysis.

MODULE IV: INFORMATION IN HEALTH CARE (13 Hours)

Asymmetric information – application of the principle of lemons – principal agent relationship – adverse selection – supplier induced demand – consumer information and quality – moral hazard – existence of monophony and monopoly rent in health care – price discrimination.

References

- Wonderling, David, Reinhold Gruen and Nick Black (2007): Introduction to Health Economics, Berkshire, Open University Press.
- Rushby, Julia Fox- and John Cairns (Ed) (2006): Economic Evaluation. Delhi, Tata McGraw-Hill.
- Neun, Santerre (1996): Health Economics Theories, Insight and Industry Studies, Health Economics' (3rd ed), (Published by Irwin 1996. Charles E Phelps, Addison Wesley).

Module I:

- Sherman, Folland, Allen C Goodman and Miron Stano (2012):The Economics of Health and Health Care, Pearson Prentice Hall.
- Neun, Santerre (1996): Health Economics Theories, Insight and Industry Studies, Health Economics' (3rd ed), (Published by Irwin 1996. Charles E Phelps, Addison Wesley).

Module II:

- Phelps, Charles E(2002) : health economics , Addison Wesley
- Sherman Folland, Allen C Goodman and Miron Stano (2012): The Economics of Health and Health Care, Pearson Prentice Hall.

Module III:

- Henderson, James W (2010) :Health Economics and Policy, Thomson South Western (3rd ed.)

Module IV:

➲ Sherman Folland, Allen C Goodman and Miron Stano (2012): The Economics of Health and Health Care, Pearson Prentice Hall.

EC 1645 PROJECT WORK

No of Credits - 4 **Total Hours - 6**

(SemV 3hrs & SemVI 3hrs)

Guidelines

1) Students should (Group wise/ Single) strictly present the topic before the faculty for approving their project proposal. This should be carried out in the 5th semester.

2) One day orientation class on research methodology by an eminent resource person should be arranged for developing exposure in research work among students before starting the project work.

3) A pre submission seminar should be undertaken at the 6th semester for reviewing the nature and quality of the project work.

Specification of the Project Work

1. The Project Work may be on any economic problem relevant to the study of Economics.
2. It should be based on either primary or secondary source of data.
3. It should be a typed one of 40-60 pages (spiral bind)
4. The Project Work shall contain the following items.

A. Introduction and Review of literature.

B. Methodology

C. Analysis

D. Conclusion & Suggestion if any

E. Bibliography

5. The Project Assignment may be given in the 5th semester and report should be submitted at the end of 6th semester.
6. An acknowledgment, declaration certificate of the supervising teacher etc should also be attached.

Evaluation Indicators

	Project Report Indicators	**Score**	**Weightage**
1.	Introduction and Review of literature		10%
2.	Methodology		20%
3.	Analysis		40%
4.	Conclusion & Suggestion		20%
5.	Bibliography		10%

Complementary I

EC .1131 FOUNDATIONS OF ECONOMIC THEORY

Inst. Hours – 3 **Number of credit - 2**

Course Objective

The main objective is to provide a basic understanding of economic concepts and theories.

MODULE I: INTRODUCTION TO ECONOMICS

Nature and Scope of Economics—Definitions: Wealth, Welfare, Scarcity and Growth definition—Basic Economic Problem—Micro and Macro Economics—Positive and Normative Economics—Significance of the study of Economics.

MODULE II: CONSUMER BEHAVIOUR

Consumption—The Concept of Utility—Cardinal Utility and Ordinal Utility—The Law of Diminishing Marginal utility—Consumer's Surplus—Demand and Supply and their determinants—Law of demand and law of supply—Changes in demand and supply.

MODULE III: THEORY OF PRODUCTION

Factors of production—Production function—Short run and Long run—Economies of scale—Concepts of cost, total cost, average cost, marginal cost, opportunity cost—Concepts of revenue: total revenue, average revenue and marginal revenue—Breakeven point.

MODULE IV: MARKET STRUCTURES

Market structures–Perfect competition, Monopoly, Monopolistic competition and oligopoly (Features only)—Factor pricing: wages, interest, rent and profit—Marginal Productivity theory of distribution.

References

- Samuelson. P.A. Nordhaus (2009), Economics, Tata McGraw Hill.
- Dewett, K.K. (Recent edition): Modern Economic Theory, S. Chand & Co., Delhi.
- Salvatore, D: (Year) Microeconomics: Theory and Practice, OUP.
- Dwivedi, D.N(2005), Microeconomics: Theory and Applications, 2nd ed. Pearson.
- Agarwal, H.S (2009) Micro-Economic Theory, ANE Books.

Complementary III

EC.1231 MONEY AND BANKING

Inst Hours-3 **Number of credit -3**

Course Objective

The course provides basic understanding about the nature and significance of money and banking in the functioning of an economy.

MODULE I: MONEY

Concept of money—Nature of money—Kinds of money—Functions of money

MODULE II: VALUE OF MONEY

Value of money—Fisher's equation of exchange—Index number—Type of index number, Consumer price index, Whole sale price index, Share market indices—Construction of index number and its limitations

MODULE III: INFLATION

Inflation—Type of inflation—Causes and effects of inflation—Measures to control inflation— Deflation—Concept of trade cycle.

MODULE IV: BANKING

Banking system : Commercial banks—Functions of commercial banks—Central bank and its functions—Indian banking system—Public sector bank—Private sector bank –Scheduled bank and non scheduled banks—Reserve bank of India—Functions of Reserve Bank of India—Credit policy instruments—Banking Sector Reforms in India

References

- Hajela N (2001): Money and Banking Theory, Indian Ane Books Pvt Ltd-
- Dewett, KK: (Year) Modern Economic Theory - Publishers.
- Baye, M.R and D. W. Jansen(1996): Money, Banking and Financial Markets, AITBS.
- Jadhay, N (2006): Monetary Policy, financial stability and central banking in India, Macmillan.

Complementary V

EC. 1331 PUBLIC FINANCE AND TRADE

Inst. Hours-3 **Number of credit-3**

Course Objective

The course inculcates the students about the significance of public finance in the context of increasing role of Government. It also provides the basic theoretical framework of budgetary mechanism in India, State activities and various aspects of International Trade.

MODULE I: PUBLIC FINANCE

Public Finance and Private Finance-Public revenue-Sources of revenue of government-Taxable source and Non Taxable source-Principles of Tax-Indian Tax System-Central and State Taxes.

MODULE II: PUBLIC EXPENDITURE

Public expenditure—Principles of public expenditure—Growth of public expenditure—Public expenditure in India.

MODULE III: PUBLIC DEBT

Public debt-Classification of public debt-Methods of debt redemption-India's public debt.

MODULE IV: INTERNATIONAL TRADE

International Trade—Internal trade and external trade—Ricardian theory of international trade-Balance of Trade and balance of payment—India's balance of Trade and payment—Globalization—WTO and the impact in India.

References

- Hajela,T N (2009):Public finance (3rd ed), Ane Book Pvt.Ltd
- Hajela, TN (2009) International Trade, Ane Books Pvt.Ltd-
- R.Dutt and S.P.M. Sundaram, Indian Economy, latest Edition**.**
- Kennedy, Maria John (2013)**:** Public Finance, PHI, Delhi.

Complementary VII

EC.1431 INDIAN ECONOMY SINCE INDEPENDENCE

Inst. Hours- 3 **Number of Credit – 3**

Course Objective

The general objective of the course is to provide basic understanding of the Indian Economy. More specifically it familiarises the students about the various concepts of National Income and create awareness about the significance of agriculture, industry and service sector in the economy.

MODULE I: Basic Features

Features of Indian Economy-Major demographic features: birth and death rate, sex ratio and age composition-Special features of 2011 census-Concept of poverty and poverty line-Human Development Index and India.

MODULE II: National Income

Meaning of national income—Aggregate concepts of national income estimation—Methods and difficulties in the measurement of national income—Green Accounting.

MODULE III: Agriculture, Industry & Service Sector

Role of agriculture in Indian economy— Green Revolution—Major issues in agriculture—Role of Industries in Indian economy—Industrial Policy of 1991—Importance of small scale industries and its problems—Significance of service sector in Indian economy.

References

- Uma Kapila (2013): Indian Economy since Independence, Academic Foundation, New Delhi.
- Prakash, B A (2012): The Indian Economy since 1991: Economic Reforms and Performance, Pearson Education, New Delhi.
- Dhingra, C (2004): Indian Economic Problems, S Chand & Company.
- Dutt, Ruddar and Sundaram: Indian Economy, S Chand and Company, New Delhi.
- Mishra J K and V K Puri (Year): Indian Economy: The Development Experience, Himalaya Publishing House, Mumbai.

I. General Structure for the Career related first degree Programme in Physics & Computer Applications

Sem. No.	Course title	Instructional hours/week		Credit	Uty.Exam duration	Evaluation		Total credit
		L	P			Internal	Uty. exam	
I	EN1111.3 English Lang I	5		3	3 hours	20%	80%	
	ML/HN1111.3 Addl Lang I	5		3	,,			
	PC1121 Foun Course (Core) I	3		3	,,			16
	Core Course (Lab)		2	-	-			
	PC1171 Voc Course I	3	2	3	3 hours			
	MM1131.6 Compl. Course I	5		4	,,			
II	EN1211.3 Eng Lang. II	5		3	3 hours			
	ML/HN1211.3 Addl Lang. II	5		3	,,			
	PC1221 Foun Course(Voc) II	3		2	,,	,,	,,	21
	PC1241 Core Course I	5		4	,,			
	PC1242 CoreCourse II (LabI)		2	3	,,			
	MM1231.6 Compl. Course II	5		4	,,			
	PC1271 Voc.Course II(Lab)		2	3	,,			
III	EN1311.3 Eng Lang. III	5		3	3 hours			16
	PC1341 Core Course III	3	4	3	,,			
	PC1371 Voc.Course III	3	-	3	,,	,,	,,	
	PC1372 Voc.Course IV	3	2	3	,,			
	MM1331.6 Compl. Course III	5		4	3 hours			
IV	EN1411.3 Eng Lang. IV	5		3	3 hours			
	PC1441 Core Course IV	3		3	,,			
	PC1442 Core Course V	3		3	,,			26
	PC1443Core. Course VI	-	2	4	,,	,,	,,	
	(Lab II & Proj) PC1471 Voc. Course V	3	-	3	3 hours			
	PC1472 Voc. Course VI	2	-	2	,,			
	PC1473Voc.Course VII (Lab)	-	2	4	,,			
	MM1431.6 Compl. Course IV	5		4	,,			
V	PC1541 Core Course VII	4	-	3	3 hours			
	PC1542 Core Course VIII	4	4	3	,,			
	PC1571 Voc. Course VIII	3	-	3	,,	,,	,,	16
	PC1572 Voc. Course IX -Lab	-	7	4	,,			
	PC1551 Open Course I(Voc)	3		2	3 hours			

Sem. No.	Course title	Instructional hours/week		Credit	Uty.Exam duration	Evaluation		Total credit
		L	P			Internal	Uty. exam	
VI	PC1641 Core Course IX	3	-	3	3 hours			
	PC1642 Core Course X	3	-	3	,,			
	PC1643 Core (lab III) XI		2	3	,,	,,	,,	25
	PC1644 Core (Lab IV) XII		2	3	,,			
	PC1661 Elective (Core)	3		2	,,			
	PC1671 Voc. Course XI	4		4	,,			
	PC1672 Voc. Course XII	4		3	,,			
	PC1673 Project (Voc)		4	4				

II. Course structure: (a). Core Courses (theory)

SEM	TITLE OF PAPER	Number of hours per week	Number of credits	Total hours/ semester	UE Dura-tion
1	PC 1121- Mechanics, Thermodynamics & Properties of matter (Foundation Course)	3	3	54	3 hrs
2	PC1241- Environmental Studies	5	4	54	3
3	PC1341– Electrodynamics	3	3	54	3
4	PC1441-Classical Mechanics & Theory of Relativity.	3	3	54	3
	PC1442- Optics	3	3	54	3
5	PC1541– Electronics	4	3	72	3
	PC1542–Atomic & Nuclear Physics	4	3	72	3
	PC1641-Solid State Physics	3	3	54	3
6	PC1642– Statistical Mechanics & Quantum Mechanics	3	3	54	3
	PC1661– Elective course	3	2	54	3

(b). COURSE STRUCTURE FOR PRACTICALS AND PROJECT WORK FOR THE CORE COURSE:

Sem	Title of Paper	Duration of Exam	Number of credits	Allotted hours	
				Per week	Per year
2	PC1242- mechanics, properties of matter, measurements and acoustics	3	3	S1—2 S2—2	144
4	PC1443– Electricity, Heat & magnetism	3	4	S3—4 S4—2	144
6	PC1643- Optics & Electronics	3	3	S5—2 S6—2	144
6	PC1644 – Digital electronics & computer science	3	3	S5—2 S6—2	144

III. Course structure:(a). Vocational Courses (theory)

SEM	TITLE OF PAPER	Number of hours per week	Number of credits	Total hours/ semester	UE Dura-tion
1	PC 1171- Introduction to IT	3	3	54	3 hrs
2	PC1221- Introduction to Programming	3	2	54	3
3	PC1371–Operating Systems	3	3	54	3
	PC1372- Data Structures	3	3	54	3
4	PC1471- Software Engineering	3	3	54	3
	PC1472- Object Oriented Programming	2	2	36	3
5	PC1571– Database Management Systems	3	3	54	3
	PC1551-Open Course	3	2	54	3
	PC1671- Introduction To Information Security	4	4	72	3
6	PC1672– Computer Networks	4	3	72	3

(b). COURSE STRUCTURE FOR PRACTICALS AND PROJECT WORK FOR THE VOCATIONAL COURSE:

Sem	Title of Paper	Duration of Exam	Number of credits	Allotted hours	
				Per week	Per year
2	PC1271- Programming Lab – I	3	3	S1—2 S2—2	144
4	PC1473– Programming Lab – II	3	4	S3—2 S4—2	216
5	PC1572- Programming Lab III	3	4	S5—7	252
6	PC1673 – Major Project & Viva	3	4	S6—4	144

IV. Complementary course (Mathematics)

Seme-ster	Title of the course	No. of hours/ week	No. of credits	Total hours per sem.	UE duration
1	MM1131.6- Complex numbers, differentiation & theory of equations	5	4	90	3
2	MM1231.6- Analytic geometry, integration, diff. equations & matrices	5	4	90	3
3	MM1331.6- Vector differentiation, coordinate systems, abstract algebra and Fourier transforms	5	4	90	3
4	MM1431.6- Linear transformations, vector integration & complex analysis	5	4	90	3

PC1121: MECHANICS ,THERMODYNAMICS & PROPERTIES OF MATTER

(54 hours – 3 credits)

Unit 1- Dynamics of Rigid Bodies (13 hrs) (Book: 2, Chapter 8)

Equations of motion for rotating rigid bodies-angular momentum and M.I-Theorems on M.I- calculation of M.I of bodies of regular shapes- uniform rod, ring, disc, annular ring, solid cylinder, hollow cylinder and solid sphere-KE of rotating and rolling bodies-torque-Determination of M.I of a fly wheel (theory, experiment and applications).Motion of a body rolling down an inclined plane.

Unit 2-: Thermodynamics (18 hrs) (Book 3)

Thermodynamic systems, Thermodynamic equilibrium, Zeroth Law, concept of heat,First law of Thermodynamics, differential form ,Second law of thermodynamics- Clausius and Kelvin statements-Carnot engine-Carnot's theorem, Thermodynamic scale of temperature, Principle refrigerator. Working and efficiency of Otto engine and Diesel engine. Clausius-Clepeyron Equation, application, effect of pressure on boiling point, melting point, calculation of latent heat.

Preliminary ideas, definition of entropy, Entropy and adiabatic, change of entropy in carnot's cycle, change of entropy in any reversible, irreversible cycle, Clausius inequality, entropy and available energy,. Entropy, probability and disorder.Nernst heat theorem and third law of thermodynamics.Temperature entropy diagram, T-S diagram for carnot's cycle.

Unit 3-Elasticity (4hrs) Book 1&2 (Ref)

Modulus of elasticity & relation(revision)-bending of beams-bending moment –centrally loaded-uniformly loaded-experimental determination of Y using bending of beams(uniform) Static torsion-theory & experiment-I section girders

Unit 4-Fluid Mechanics (13 hrs) Book 1&2 (Ref) (Book: 2, Chapter 16)

Surface tension-surface energy-expression for excess pressure on a curved liquid surface-excess pressure inside a spherical drop, determination of surface tension by Quincke's method, Newmann's triangle, -measurement of ST by capillary rise method, variation of surface tension with temperature.

Streamline and turbulent flow-equation of continuity-Euler equation- Bernoulli's theorem-application-venturimeter, Torricelli's theorem

Unit 5: Transference of heat (6 hrs) chapter 8 Ref 3

Thermal conductivity - determination by Lee's Disc method for bad conductor radial flow of heat, cylindrical flow ,thermal conductivity of rubber, Wiedmann-Franz law.Radiation of heat, Stefan's law, determination of Stefan's constant, solar constant,determination of solar temperature

Books for Study

1 Mechanics- Hans H.S and Puri. S.P ,THM: Second Edition)

2 Mechanics- J.C. Upadhyaya (Ramaprasad)

3 Heat and Thermodynamics- Brijlal & Subrahmanyam (S. Chand &Co)

Books for reference

1.	Properties of matter	D.S.Mathur
2.	Properties of matter	Brijlal and Subrahmanyam
3.	Statistical mechanics	Sinha (TMH)

PC1241: ENVIRONMENTAL STUDIES (50 hours – 4 credits)

Unit 1 : Multidisciplinary nature of environmental studies (2 lectures)

Definition, scope and importance, need for public awareness.

Unit 2 : Natural Resources : Renewable and non-renewable resources (8 lectures)

Natural resources and associated problems.

a) Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.

b) Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food resources : World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.

f) Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Unit 3 : Ecosystems (6 lectures)

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystems :-
    a. Forest ecosystem
    b. Grassland ecosystem
    c. Desert ecosystem
    d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 4 : Biodiversity and its conservation (8 lectures)

- Introduction – Definition : genetic, species and ecosystem diversity.
- Biogeographical classification of India
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, National and local levels.
- Inida as a mega-diversity nation
- Hot-sports of biodiversity.

- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Unit 5 : Environmental Pollution (8 lectures)

Definition

- Cause, effects and control measures of :-
  a. Air pollution
  b. Water pollution
  c. Soil pollution
  d. Marine pollution
  e. Noise pollution
  f. Thermal pollution
  g. 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.
- Diaster management : floods, earthquake, cyclone and landslides.

Unit 6 : Social Issues and the Environment (7 lectures)

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rahabilitation of people; its problems and concerns. Case Studies
- Environmental ethics : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation.
- Public awareness.

Unit 7 : Human Population and the Environment (6 lectures)

- Population growth, variation among nations.
- Population explosion – Family Welfare Programme. VII
- Environment and human health.
- Human Rights.
- Value Education.

- HIV/AIDS.
- Women and Child Welfare.
- Role of Information Technology in Environment and human health.
- Case Studies.

Unit 8 : Field work (Field work Equal to 5 lecture hours)

- Visit to a local area to document environmental assets river/ forest/grassland/hill/mountain
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc.

REFERENCES

a) Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.

b) Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad –380 013, India, Email:mapin@icenet.net (R)

c) Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p

d) Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)

e) Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p

f) De A.K., Environmental Chemistry, Wiley Eastern Ltd.

g) Down to Earth, Centre for Science and Environment (R)

h) Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p

i) Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)

j) Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.

k) Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.

l) Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.

m) Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)

n) Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)

o) Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p

p) Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.

q) Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut

r) Survey of the Environment, The Hindu (M)

s) Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science

t) Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)

u) Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)

v) Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

(M) Magazine

(R) Reference

(TB) Textbook

PC1341-ELECTRODYNAMICS (54 hours -3 credits)

Unit 1-Electrostatic Field (10hrs)

Electric field*: Introduction*, Coulomb's Law*, Electric field*, continuous charge distribution*Divergence and curl of electrostatic fields; Field lines, flux and Gauss' law,the divergence of E, applications of gauss's law, the Curl of E Electric potential: Introduction to potential, Comments on potential, Poisson's and Laplace's equations, Potential of a localized charge distribution, electrostatic boundary Work and energy in Electrostatics: The work done to move a charge, The energy of a point charge distribution, The energy of a continuous charge distribution.

Unit 2-Electrostatic fields in matter (10 hrs)

Polarization: Dielectrics, induced dipoles, Polarization, The field of a polarized object: Bound charges, Physical interpretation of bound charges, and the field inside a dielectric. Electric displacement: Gauss's law in the presence of dielectrics, Boundary conditions

Unit 3-Magnetostatics (8hrs)

Introduction*, The Biot-Savart law*, Ampere's force law*, Magnetic torque, Magnetic flux and gauss's law for magnetic fields, Magnetic vector potential, Magnetic intensity and Ampere's circuital law, Magnetic materials.

Unit 4-Electromagnetic Induction (8hrs)

Electromotive force: Ohm's law Electromagnetic induction: Faraday's law, the induced electric field Maxwell's Equations: Electrodynamics before Maxwell, How Maxwell fixed Ampere's law, Maxwell's equations, Magnetic charge, Maxwell's equations in matter, Boundary conditions

Unit 5-Electromagnetic waves (8hrs)

Waves in one dimension: The wave equation Electromagnetic waves in vacuum: Thewave equation for E and B, Monochromatic plane waves, Energy and momentum in electromagnetic waves

Unit 6-Alternating current (6 hrs)

AC through series LCR (acceptor circuit) and parallel LCR circuit (rejecter circuit)- Qfactor, Power in AC-power factor -AC bridges Maxwell's L/C bridge and Owens's bridge.

Unit 7-Circuit Theory (4 hrs)

Ideal voltage and current sources- Thevenin's and Norton's theorems, Maximum power transfer theorem, h parameters applied to two port networks* Revision topics

Books fo r study

1. Electrodynamics - David J Griffith (PHI rd edition)
2. Electromagnetic theory fundamentals- Bhag Guru and Huseyin Hizirogulu (Cambridge University Press 2nd edition)
3. Electricity and Magnetism – J.H. Fewkes & John Yarwood (University tutorial press

Reference Books

1. Elecricity and Magnetism-Murugesan (S.Chand & Co.)
2. Elecricity and Magnetism – E.M. Purcell, Berkley Physics course, Vol.2 (MGH)
3. Elecricity and Magnetism -_K.K.Tiwari (S.Chand & Co.)

4. Electricity and Magnetism- D.C.Tayal (Himalaya Publishin Co)
5. Electricity and Magnetism_ - Muneer H. Nayfeh & Norton K. Bressel (John Wiley & Sons)
6. Classical Electrodynamics- Walter Greiner (Springer International Edition)
7. Electromagnetic waves and radiating systems-Jordan & Balmain (PHI)
8. Electromagnetics B.B.Laud (Wiley Eastern Ltd.2nd edition)
9. Introduction to electrodynamics-Reitz &Milford (Addison Wesley)

TOPICS FOR DISCUSSION IN TUTORIAL SESSION/ASSIGNMENTS (SAMPLE)

1. Comment on how electrostatic energy is stored in a field
2. Discuss the electrostatic properties of conductors
3. What is meant by electrostatic shielding? In what way it help us?
4. Discuss the peculiarities of electric displacement D and electric field E. How they are incorporated in Maxwell's Equations
5. Discuss the properties of linear dielectrics. What differentiates a dielectric to be linear or not
6. Discuss applications of Ampere's circuital law
7. Compare electrostatics and magnetostatic
8. Why magnetic forces cannot do work
9. Discuss about cyclotron motion & cycloid motion
10. Discuss whether there existed any stand-off between ohm's law and Newton's second law
11. A battery has an emf. Can this emf. is a 'force' ? How will you interpret electromotive force?
12. Discuss the role of motional emf in power generation
13. Discuss the orthogonality of E, B and propagation vector k
14. A wave function can have a sinusoidal representation. Solve the wave equation for this function and discuss the various terms related to a wave such as amplitude,frequency, phase, wave number, frequency etc.
15. Complex representation of wave function has g o o d advantage. Why? Discuss the linearity of wave function. (Use complex notation)
16. Discuss AC through LC, LR and CR circuits
17. Show that sharpness of resonance is equal to Q- factor
18. What is a choke coil? Discuss the advantage of using a choke coil instead of a resistor.

PC 1441 -CLASSICAL MECHANICS & THEORY OF RELATIVITY (54 hrs 3 credits)

Unit 1 -Oscillations (14 hrs.) (Book: 1,Chapter 9)

Simple harmonic motion – Energy of harmonic oscillators-simple pendulum-mass on a spring-oscillation of two particles connected by a spring- compound bar pendulum-interchangeability of suspension and oscillation-four points collinear with C.G about which the time period is the same-conditions for maximum and minimum periods-Determination of g using symmetric bar pendulum. Damped harmonic Oscillator, power dissipation, quality factor.

Unit 2- Motion in central force field (10 hrs): Book 3; Chapter 5 & Book 4; Ch. 4

Equivalent one body problem-motion in central force field-general features of motion-motion in an inverse-square law force field-equation of the orbit-Kepler's laws of planetary motion and their deduction.

Unit 3 - Lagrangian Dynamics (10 hrs): Book 4; Chapter 2

Constraints - generalized coordinates - principle of virtual work - D' Alembert's principle, Lagrange's equation from D' Alembert's principle , - applications of Lagrange's equation in simple pendulum, Atwood's machine and compound pendulum (comparison of Lagrangian approach with Newtonian approach).

Unit 4 - Special theory of relativity (20 hrs): Book 2; Chapter 11 & 12

Inertial frames of reference-Galilean transformation-non-inertial frames - reference frame with translational acceleration-uniformly rotating frame fictitious forces-centrifugal forces and coriolis forces. Origin and significance of special theory of relativity – search for universal frame of reference – Michelson-Morley experiment – postulates of special theory of relativity – consequences – Lorentz transformation equations – kinematical consequences of Lorentz Transformation – length contraction – time dilation – twin paradox - space like and time like intervals – variation of mass with velocity – mass energy equivalence – transformation of relativistic momentum and energy –tachyons.

Books for study :

1. Mechanics- J.C. Upadhyaya (Ramaprasad)
2 Mechanics – H.S.Hans and S.P.Puri (Tata-McGraw Hill).
3 Introduction to classical mechanics – R.G.Thakwale and P.S.Puranik (Tata- McGraw Hill).
4. Classical Mechanics – J C Upadhyaya (Himalaya Publishing House)

Books for reference:

1. Classical Mechanics – Goldstein.
2. Classical Mechanics- Vimal Kumar Jain (Ane Books Pvt Ltd)
3. Modern Physics – (Schaum's outlines)
4. Classical Mechanics - Systems of Particles & Hamiltonian Dynamics – Walter Greiner.
5. Concepts of Modern physics-Arther Bieser (Tata-McGraw Hill).
6. Classical Mechanics – N.C Rana and P.S.Joag
7. Basic Relativity – Richard A.Mould, Springler, Ane Books India Pvt Ltd

PC1442- OPTICS (54 hours -3 Credits)

Unit 1. Interference of light (12 hrs) (Book 1: Chapter 14 & 15 and Book 3: chapter 12 & 13)

The principle of superposition - coherent sources – Double slit interference (theory of interference fringes and band width)- interference in thin films –reflected and transmitted system, fringes of equal inclination- fringes of equal thickness - wedge shaped films- testing of optical flatness - Newton's rings (reflected system)-refractive index of a liquid - Michelson interferometer –determination of wavelength

Unit 2. Diffraction (12 hrs) (Book 1: Chapter 17, 18 & 19 and Book 3: Chapter 16 & 17)

Fresnel diffraction: - Half-period zones - explanation of rectilinear propagation of light diffraction at a circular aperture– diffraction at a straight edge-zone plate. Fraunhofer diffraction: - Diffraction at a single slit, double slits – planetransmission grating - Rayleigh's criterion for resolution - resolving power of a telescope, microscope, prism and diffraction grating.

Unit 3. Polarisation (12 hrs) (Book 1: Chapter 20 and Book 3: chapter 19)

Plane polarized light - polarization by reflection – Brewster's law - pile of plates - Malus law - Double refraction - Huygens explanation for double refraction in uniaxial crystals - Nicol prism - Nicol prism as a

polarizer and analyzer – Theory of production and analysis of plane, circularly and elliptically polarized light - quarter and half wave plates.

Unit 4. Dispersion (4 hrs) (Book 2: Chapter 11)

Normal dispersion - Elementary theory of dispersion - Cauchy's and Hartmann dispersion formula - anomalous dispersion - Wood's experiment for anomalous dispersion of sodium vapour.

Unit 5. Fiber Optics (6 hrs) (Book 1: Chapter 24 and Book 3: chapter 24)

Introduction, optical fiber, the numerical aperture, coherent bundle, pulse dispersion in step index fiber, graded index fiber, single mode fiber, multimode fiber, fiber optic sensors-examples -fiber optic communication (qualitative), Advantages of fiber optic communication system.

Unit 7. Laser: (8 hrs)(Book 2: Ch. 12, Book 1: Ch. 23, Book 3: chapter 23 and Book 4: Ch. 6)

Basic principle of laser operation , Einstein's coefficients-light propagation through medium and condition for light amplification, population inversion by pumping - optical resonators (qualitative) Q factor, various laser systems –Ruby laser - He-NE laser, (working principle only) -characteristics of laser beams -spatial coherence -Temporal coherence.

Books of Study

1.	Text Book of Optics	N. Subramaniam & Brijlal, M.N.Avadhanulu,23rd edition (2006)
2.	Optics and spectroscopy	R.Murugesan.
3.	Optics	Ajoy Ghatak
4.	Lasers: Principles, Types and applications	K.R.Nambiar

References

5.	Optics	P.Vivekanandan
6.	Fundamentals of Optics	Jenkins and White
7.	Modern Classical Optics	Geoffrey Brooker.
8.	Principles of Optics	B.K.Mathur
9.	Fundamentals of Optics	Khanna and Gulati
10.	Lasers &Non-Linear Optics	B.B.Laud
11.	Electronic Communications	Dennis Roddy & John Coolen

Topics for assignments/discussion in the tutorial session (sample)

1. Michelson's interferometer-Standardization of metre.
2. Diffraction at a rectangular aperture.
3. Optical activity-Fresnel's theory of optical rotation.
4. Constant deviation spectrometer.
5. Laurent's half shade polarimeter.
6. Harmonic generation.
7. Laser applications.
8. Study of Fraunhofer lines using spectrometer.
9. Study of absorption spectra of KMnO4.
10. Determination of refractive index of liquid by Newton's rings method.
11. Comparison of radii of curvature by Newton's rings method.

PC 1541 - ELECTRONICS (72 hours -3 Credits)

Unit 1. Diode Circuits: (10 hours); [Ref. 1: Chapter. 2, Ref. 2: Chapter 17, Ref. 3: Chapter 9]

PN junction - PN junction under forward and reverse biased conditions – *rms* value and peak inverse voltage – diode characteristics - ac and dc resistances - half wave and full wave rectifiers (average dc value of current, ripple factor and efficiency) - different types of filters (shunt capacitor, LC and CLC) - breakdown mechanism in diodes - Zener diode - voltage regulator.

Unit 2. Transistor: (14 hours); [Ref. 1: Chapter 4, Ref. 2: Chapter 18]

Theory of BJT operation - CB, CE and CC characteristics - alpha and beta and gamma - relation between transistor currents - biasing circuits (CE configuration) - stability factors - selection of operating point - ac and dc load lines - collector feed back; base resistor and potential divider methods - small signal BJT amplifiers - input and output resistances - graphical analysis of the small signal CE amplifier (frequency response, band width and gain in dB) - effect of Q point on AC operation.

Unit 3. Large signal (power) amplifiers: (10 hours); [Ref. 2: Chapter. 22]

Amplifier classes and efficiency - class A operation - transformer coupled class A amplifier - class B amplifier - push pull amplifier - basic ideas of class AB and class C operation - multi stage amplifiers - frequency responses - distortion in amplifiers.

Unit 4. Feed back & Oscillator circuits: (8 hours); [Ref. 1: Chapter. 6, Ref. 2: Chapter. 25]

Feed back principles – negative feed back – emitter follower – advantages of negative feed back - positive feed back - principle of sinusoidal feed back oscillation - Barkhausen criterion for oscillations - RC phase shift, Hartley.

Unit 5. Modulation: (6 hours); [Ref. 1: Chapter. 14]

Fundamentals of modulation - AM, FM and PM - frequency spectrum of AM - power in AM - modulated class C amplifier - linear demodulation of AM signal - frequency spectrum for FM - super heterodyne AM receivers.

Unit 6. Operational amplifiers (IC741): (12 hours); [Ref. 1: Chapter. 7, Ref. 4: Chapter. 16]

Introduction – Schematic symbol and pin configuration - circuit configuration and block diagram representation – ideal OP amp. - equivalent circuit – CMRR – dual input, balanced output differential amplifier - voltage gain, input and output resistances – differential mode and common mode – virtual ground principle – parameters of OP amp. - inverting amplifier - non inverting amplifier - differential amplifier - summing and subtractor amplifiers.

Unit 7. Digital electronics(12hrs)

Binary no system, binary addition & substraction. Logic gates AND, OR NOR,NOT, NAND, XOR, Realization of other logic gates using NAND,NOR, Boolean laws, De Morgan's theorem.

Half adder, full adder, controlled inverter, binary adder- subtractor, flip flop- SK flip flop, JK flip flop, Master Slave, D & T flip flop.

Books for study:

1. Basic Electronics- Santiram Kal
2. Basic electronics- B. L. Theraja
3. Principles of electronics- V. K. Mehta
4. A first course in Electronics- Anwar A. Khan, Kanchan K. Dey

Books for references:

5. Electronic Devices and Circuits- Theodore F.Bogart,Jr. –Universal book stall
6. Electronic devices and Circuit theory- Robert Boylestad & Louis Nashelski-Vth edition PHI
7. Electronic fundamentals & applications- John D Ryder-Prentice Hall of India Pvt. Ltd.
8. Electronic Communications- Dennis Roddy, John Coolen, Fourth edition.

Topics for assignments/discussion in the tutorial session (sample)

1. Electronic projects using flip flops
2. Electronic projects using logic gates
3. Electronic projects using IC 741 OP amp.
4. Electronic projects using timer 555
5. Electronic projects using IC 311
6. Constant voltage power supplies
7. Constant current sources
8. Oscillators of different frequencies
9. Low range frequency generators
10. High range frequency generators
11. Voltage regulated dc power supplies with variable output
12. Voltage regulated dual power supplies with variable output
13. Instrument for the measurement of capacitance
14. Instrument for the measurement of dielectric constant of a liquid/ solid
15. Effect of temperature on electronic components

PC1542- ATOMIC AND NUCLEAR PHYSICS (72 hrs -3 Credits)

Unit 1- Vector Atom Model: (10hrs)

Introduction- Various quantum numbers associated with vector atom model-, L.S and j.j couplings – application of spatial quantization- Pauli's exclusion principle – magnetic dipole moment of electron due to orbital and spin motion - Stern and Gerlach experiment-Spin-Orbit coupling.

Unit 2- Atomic Spectra (12 hrs)

Optical spectra-Spectral terms and notations - selection rules - Zeeman effect - Larmor's theorem – quantum mechanical explanation of normal Zeeman effect. Anomalous Zeeman effect –Paschen-Back effect-Stark effect.

Unit 3- Molecular spectra (15 hrs)

Characterisation of electromagnetic radiation, the quantization of energy, regions of the spectrum,Rotational spectra of diatomic molecules-rotational energy levels-selection rules-rotational spectrum-isotope effect- bond length and atomic mass. The intensities of spectral lines, Diatomic vibrational spectra-vibrational energy levels-selection rule- vibrational transitions-Vibrating diatomic molecule as a harmonic oscillator,The anharmonic oscillator, diatomic vibrating rotator.

Unit 4 - Introduction to the nucleus (10 hrs)

Constituents of nuclei-nuclear charge-binding energy-angular momentum of the nucleus-magnetic moment-nuclear quadrupole moment-nuclear stability-models of nuclear structure-The liquid drop model-shell model-collective model., Nuclear forces, characteristics, Meson theory of nuclear forces

Unit 5 – Radioactivity (10 hrs)

Alpha, beta and gamma rays, rate of decay, half life and mean life-units of radioactivity-conservation laws in radioactive series-decay series-radioactive equilibrium-secular and transient equilibrium-radioactive dating-range of alpha particles-Geiger-Nuttal law-alpha decay-Gamow's theory-alpha particle disintegration energy-beta ray spectra-magnetic spectrograph-origin of line and continuous spectrum-neutrino theory of beta decay-gamma decay.

Unit 6 – Nuclear fission and fusion (10 hrs)

Nuclear fission-energy released in fission-Bohr and Wheeler's theory-chain reaction- multiplication factor-critical size-atom bomb-nuclear reactors-breeder reactors-uses of nuclear reactors. Nuclear fusion-sources of stellar energy-thermonuclear reactions-hydrogen bomb- controlled thermonuclear reactions-magnetic bottle.

Unit 7 - Elementary Particles (5 hrs) (Book 4)

Fundamental interactions in nature-classification of elementary particles-conservation laws-lepton conservation-baryon conservation-strangeness-isospin-hyper charge-resonance particles- The quark model-Fied bosons, the standard model and beyond.

Books for Study:

1. Modern Physics- G.Aruldas and P.Rajagopal, PHI, New Delhi, 2005.
2. Modern Physics by R.Murugesan, S.Chand & Co., Reprint, 2008.
3. Atomic and Nuclear Physics- N.Subramaniam & Brijlal, S.Chand & Co.
4. Concepts of Modern Physics by A. Beiser, Tata McGraw-Hill, New Delhi, 6th edition.

Books for Reference:

1. Atomic Physics - J.B.Rajam, S.Chand & Co.
2. Fundamentals of Molecular Spectroscopy - Banwell (TMH)
4. Spectroscopy- Walker & Straw, Chapman & Hill.
5. Molecular Spectroscopy- G.Aruldas.

Topics for assignments/discussion in the tutorial session (sample)

1. Bohr model of atom and correspondence principle.
2. Molecular bond and electron sharing.
3. Width of spectral lines.
4. Spectroscopic techniques.
5. X-ray diffraction for identification of samples

PC1641- SOLID STATE PHYSICS – (54 hrs -3 Credits)

Unit I- Crystal Structures and inter-atomic forces (25 hrs) (Book 1: Chapter 1&3)

Introduction-crystalline state-basic definitions-Fourteen Bravais lattices and seven crystal systems-elements of symmetry-nomenclature of crystal directions and crystal planes-Miller indices-examples of simple crystal structures-amorphous solids and liquids-interatomic forces-types of bonding. generation and absorption of X-rays-Bragg's law-scattering from an atom-scattering from a crystal-reciprocal lattice and X-ray diffraction-diffraction condition and Bragg's law-experimental techniques-neutron diffraction-electron diffraction.

Unit 2 – Conduction in metals and Free electron model (8 hrs) (Book 1: Chapter 5)

Introduction-conduction electrons-free electron gas-electrical conductivity-electrical resistivity versus temperature-heat capacity of conduction electrons-Fermi surface- electrical conductivity-effects of the Fermi surface-thermal conductivity in metals-Hall effect (Book 2, ch.10 & Book 3, ch.9)-failure of free electron model.

Unit 3- Thermal properties of Solids (3 hrs)(book 2 chapter 5)

Classical specific heats, Quantum theory of heat capacity- Average thermal energy of a harmonic oscillator, Einstein theory of specific heats, phonon density of states, Debey model of lattice specific heat. Energy bands in solids

Unit 4- Optical, Magnetic and Dielectric properties of Material (6 hrs)
(Book 1 chapter 8, 9, chapter 15)

Introduction- dielectric constant and polarisability–sources of polarazability- electronic, ionic and dipolar polarizability, piezoelectricity Introduction- review of magnetic formulas and its susceptibility- classification of materials-Langevin diamagnetism- paramagnetism –classical and quantum theory.Comparison of ferro ferri and antiferro magnetism

Unit 5-Superconductivity (8 hrs) (Book 1: Chapter 10)

Introduction- Zero resistance-perfect diamagnetism or The Meissner effect-The critical field-electrodynamics of superconductors-Theory of superconductivity-tunneling and the Josephson effect-miscellaneous topics (intermediate state, Type I & II superconductors).

Books for Study:

1. Elementary Solid State Physics – Principles and Applications, M.A.Omar.
2. Elements of Solid state Physics-J.P.Srivastava
3. Solid State Physics – Structure and Properties of Materials, M.A.Wahab, 2nd edition, Narossa Publishing House.

Books for Reference :

1. Introduction to Solid State Physics, Kittel, Wiley & Sons, 7th edition.
2. Concepts of Modern Physics by Beiser, Tata McGraw Hill, 5th Edition, 1997.
3. Fundamentals of Solid State Physics, Saxena-Gupta-Saxena, 9th edition (2004-05), Pragathi Prakasan, Meerut.
4. Fundamentals of Physics, 6th Edition, by D.Halliday, R.Resnick and J.Walker, Wiley. NY, 2001.
5. Physics, 4th Edition, Vols I, II & II Extended by D.Halliday, R.Resnick and K.S.Krane, Wiley, NY. 1994.
6. The Feynman Lectures on Physics, VoIs. I, II, and III, by R. P. Feynman, RB Leighton and M Sands, Narosa, New Delhi, 1998.
7. Introductory Solid State Physics by H.P.Myers, Viva books, New Delhi, 1998

Topics for assignments/discussion in the tutorial session (sample)

1. Crystal imperfections-point, line and surface imperfections
2. Types of colour centers.
3. Liquid crystals.

4. Amorphous semiconductors.
5. Polymers.
6. Biological Applications.
7. Enzyme study.
8. Carcinogenic activity.

Books for Study

1. Modern Physics by R. Murugesan, S. chand & Co., Reprint, 2008.
2. Modern Physics – G. Aruldas and P. R. Rajagopal, PHI, New Delhi, 2005
3. Nuclear Physics – D. C. Tayal, Himalaya Publishing House, 4th edition.

References

1. Concepts of Modern Physics by A. Beiser, Tata McGraw-Hill, New Delhi, 6th edition.
2. Atomic and Nuclear Physics – N. Subramaniam and Brijlal, S. Chand & Co.
3. Nuclear Physics – S. N. Ghoshal, S. Chand & Co.
4. "Nuclear Physics" – Kaplan (Narosa)
5. Atomic Physics – J. B. Rajam, S. Chand & Co.

Topics for assignments /discussion in the tutorial session (sample)

1. Fusion reactors.
2. History of the Universe (elementary particle).
3. Linear accelerator.
4. Ionization chamber and Wilson cloud chamber.
5. Solid state detectors and proportional counter.

PC1642- STATISTICAL PHYSICS AND QUANTUM MECHANICS (54 hrs- 3 credits)

Unit 1 –: Statistical Physics (20 hrs) (Book 1)

Statistical probability, Macro& Microstates, Phase space, Statistical ensemble , Postulate of equal probability, Entropy and thermodynamic probability, Statistical ensembles, microcanonical ensemble, canonical ensemble, Grand canonical ensembles.Maxwell Boltzmann distribution, Velocity distribution.Indistinguishability of identical particles, Bose Einstein and Fermi Dirac distribution functions, comparison of three statistics, Application of BE & FD statistics, Bose- Einstein condensation.

Unit 2 – The Emergence of Quantum Mechanics (14 hrs) Book 2; Chapter 1

Black body radiation-photoelectric effect-The Compton effect-wave properties of matter and electron diffraction-The Bohr atom -The Rutherford planetary model-The Bohr postulates-The correspondence principle.

Unit 3 – The Wave Function (20 hrs) Book 3; Chapter 1 & Book 4

The Schrödinger equation-The statistical interpretation-probability normalization- momentum-The uncertainty principle. Stationary states-infinite square well- The harmonic oscillator-free particle-The Delta-Function potential

Books for study.

1. Thermal and Statistical Mechanics- S.K. Roy (NewAge International)

2. Concepts of Modern Physics – Arthur Beiser (TMH)
3. Quantum Physics (3/e) - Stephen Gasiorowicz, John Wiley and Sons (2003).
4. Introduction to Quantum Mechanics – D.J.Griffiths, PHI (1995).
5. Quantum Mechanics – G. Aruldhas, PHI.
6. Heat thermodynamics and statistical physics- Brijlal &Subrahmanyam (S.Chand & co)

Books for Reference

1. Quantum Mechanics: An Introduction (4/e), W.Greiner, Springler (2001)
2. Schaum's Outline of Theory and Problems of Quantum Mechanics, Y. Peleg, R.Pnini, E.Zaarur, Schaum's outline series, MGH (ISBN 0070540187)
3. A Text book of Quantum Mechanics, P.M.Mathews and S.Venkatesan, TMH.
4. A text book of Quantum Mechanics, Ghatak and Lokanathan.
5. Principles of Quantum Mechanics (2/e), R.Shankar, ISBN 0-306- 44790-8, Plenum Press.
6. Elements of Statistical Mechanics- Kamal Singh & S. P. Singh (S. Chand &Co)
7. Thermal Physics, Statistical Physics and Solid state Physics – C. J. Babu (Calicut University Press)
8. Statistical mechanics – Sinha (TMH)

PC1661.1. ASTRONOMY AND ASTROPHYSICS (54 hours -3 credits)

UNIT I-Introduction 4 hrs (Book 2, Chapter 1, P 1 – 6)

Astronomy and Astrophysics, Importance of Astronomy, Methods of Astronomy and Astrophysics**,** The Scientific Methods, Scope of Astronomy

UNIT II - Astronomy **15 hrs (Book 1, Chapter 4, 5, P 65-70, 78-101)**

Birth of the Universe, Ancient astronomy, Medieval Astronomy, Renaissance Astronomy, Modern Astronomy

UNIT III-The Objects in the Sky 15 hrs ((Book 1, Chapter 6, P 102-127)

The Microwave background radiation, The Sun, The Stars, Neutron Stars and Black holes, Supernovae, Galaxies

UNIT IV -The Solar System 15 hrs (Book 1, Chapter 7, P 128-154)

Sun and Planets, Formation of the Planets, Comets, Planets and Satellites, Asteroids, Meteorites

UNIT V -Earth in Space 5hrs (Book 1, Chapter 8, P 155-162)

Motion of the Earth, The Calendar, The Seasons

Books for Study

1. Planet Earth, Cesare Emiliani , (Cambridge University Press, 1995)
2. Astrophysics - K. D. Abhayankar (University Press,2001)

Books for reference

1. Fundamentals of Geophysics William Lowrie(Cambridge University Press, 1997)
2. Modern Physics- R. Murugeshan, Kiruthika Sivaprasath (2007), S.Chand & Company Ltd.

3. Introduction to Astrophysics – Baidyanadh Basu
4. Modern Trends in Physics Vol I , C. J. Babu
5. Space Science –Louise K. Harra& Keith O.Mason(Imperial College Press, London, 2004)

PC 1661.2 GENERAL METEOROLOGY(54 hours -3 Credit)

Unit 1(20 hrs)

Introduction to Meteorology-The atmosphere-Solar energy-Global Circulation – Climatology-Tropical weather-Global climate system. Atmospheric composition-primary gases-Greenhouse gases-reactive gas species-aerosols- Temporal and spatial variation of atmosphere. Mass of atmosphere-total pressure and vapour pressure. Standard Atmosphere-Vertical Structure of earth's atmosphere-Troposphere, Stratosphere, Above Stratosphere,The Energy Balance- Black body radiation -Radiation laws-The atmosphere and solar radiation –Reflection, Scattering, absorption and Transmission. The Greenhouse effect Earth's surface and solar energy-the steady state systems

Unit 2(20 hrs)

Atmospheric temperatures-daily temperature changes –day time heating-Night time cooling-Factors influencing the vertical distribution of temperature-horizontal distribution of temperature-Moisture in the atmosphere-changes of states-Hydrological cycle-ralative humidity-evaporation and transpiration-precipitation-regional variation in precipitation –water balance –inter annual variation in the climate-El-Nino and La-Nina.

Unit 3 (6 hrs)

Concepts of equilibrium, atmospheric equilibrium, adiabatic process of temperature changes, adiabatic lapse rate, atmospheric stability and lapse rate, atmospheric equilibrium in saturated air.

Unit 4 (8 hrs)

Theory of global warming-Evidence for global warming. Changes in Temperature record.Changing levels of atmospheric carbon dioxide- Rising sea levels-The other contributions to global warming-Theory of ozone depletion-Ozone chemistry-CFC and ozone hole.

References:

1. Atmosphere, weather and climate (8e), Roger G Barry and Richard J Chorley 2.Climatology: D S Lal
3. Global Warming: A complete Guide John Houghton ,
4. Atmospheric Science: An Introductory Survey, John M Wallace & Peter V Hobbs 5.Physical Meteorology, H.G.Houghton,
6. Atmosphere weather and climate K.Siddhartha, Kisalaya Publications

PC1661.3. SPACE SCIENCE (54 hrs -3 credits)

Universe (12 hrs)

Large Scale Structure of the Universe: Astronomy and Cosmology, Our Galaxy, Galaxy types, Radio sources, Quasars, Structures on the largest scale, Coordinates and catalogues of astronomical objects, Expansion of the Universe

Ref; Introduction to Cosmology- J. V. Narlikar (1993), Cambridge University Press, Art. 1.1 to 1.8 (Pages 1 to 26)

The evolution of Stars (9 hrs)

Introduction, Classification of Stars: The Harvard classification, Hertzsprung -Russel diagram, Stellar evolution, White dwarfs, Electrons in a white dwarf star, Chandrasekhar limit, Neutron stars, Black holes, Supernova explosion, Photon diffusion time, Gravitational potential energy of a star, Internal temperature of a star, Internal pressure of a star.

Ref; Modern Physics- R. Murugeshan, Kiruthika Sivaprasath, S.Chand & Company Ltd. (2007), Art. 78.1 to 78.15(Pages 963 to 976)

The active Sun (10 hrs)

Introduction, Sunspots and Solar storms, Sunspots and Solar activity, Cosmic rays of Solar origin, The Solar wind, Solar corona and the origin of the solar wind, Disturbed Solar wind.

Ref; Earth's Proximal Space- Chanchal Uberoi (2000), Universities Press (India) Limited, Art. 3.1 to 3.6 (Pages 36 to 55)

The earth's Atmosphere (15 hrs)

Introduction, Nomenclature and temperature profile, Temperature distribution in the troposphere, Temperature of stratosphere, temperature of mesosphere and thermosphere, Temperature variability, The pressure profile, Scale height, Density variation. The Ionosphere: Effect on scale height, Ionospheric electric fields, Ionization profile, Layer of charge, Ionospheric hydrogen and Helium.

Ref; Introduction to Space Science- Robert C. Haymes (1971) John Wiley & Sons Art. 3.1 to 3.9 and 3.12 to 3.17 (Pages 54 to 65 and 69 to 78)

Magnetosphere (8 hrs)

Introduction, The magnetic field of Earth, Earth's variable magnetic field, Solar activity and Earth's magnetic weather, solar wind interaction, The Chapman-Ferraro closed magnetosphere, Dungey's open magnetosphere, Structure of the magnetosphere: Magneto tail and Plasma sheet, Plasma sphere, Earth's radiation belts.

Ref; Earth's Proximal Space- Chanchal Uberoi (2000), Universities Press(India) Limited, Art. 4.1 to 4.6 and 4.8 to 4.8.3 (Pages 56 to 67 and 71 to 74)

Books for Study

1. Introduction to Space Science – Robert C Hymes (1971), John Wiley & Sons Inc.
2. Earth's Proximal Space- Chanchal Uberoi (2000), Universities Press (India)
3. Introduction to Cosmology- J. V. Narlikar (1993), Cambridge University Press
4. Modern Physics- R. Murugeshan, Kiruthika Sivaprasath (2007), S.Chand & Company Ltd.

Books for reference

1. Space Physics and Space Astronomy – Michael D Pappagiannis (1972), Gordon and Breach Science Publishers Ltd.
2. Introductory Course on Space Science and Earth's environment-Degaonkar (Gujarat University, 1978)
3. Introduction to Ionosphere and magnetosphere- Ratcliffe (CUP, 1972)
4. The Physics of Atmospheres-Houghton (Cambridge University Press)
5. Introduction to Ionospheric Physics-Henry Rishbeth & Owen K. Garriot (Academic Press, 1969)
6. Space Science –Louise K. Harra& Keith O. Mason(Imperial College Press, London, 2004)

7. Introduction to Space Physics- Kivelson and Russel
8. Introduction to Astrophysics – Baidyanadh Basu
9. Astrophysics - K. D. Abhayankar (University Press)

PC1661.4. PHOTONICS (54 hours -3 credits)

Unit 1: (7 hrs)

Photons in semiconductors-semiconductors-energy band and charge carriers-semi conducting materials-electron and hole concentrations-generation, recombination and injection-junctions-hetero junctions-quantum wells and super lattices.

Unit 2: (6 hrs)

Semiconductor photon sources-light emitting diodes-injection-electroluminescence- LED characteristics-internal photon flux-output photon flux and efficiency-responsivity- spectral distribution-materials-response time-device structures.

Unit 3: (8 hrs)

Semiconductor laser amplifiers-gain-amplifier band width-optical pumping-electrical current pumping-hetero structures-semiconductor injection lasers-amplification-feedback and oscillators-resonator losses-gain condition-internal photon flux-output photon flux and efficiency-spectral distribution-spatial distribution-single frequency operation-quantum well lasers (qualitative).

Unit 4: (8 hrs)

Semiconductor photon detectors-The external photo effect-photo electron emission-The internal photo effect-semiconductor photo detection-quantum efficiency-responsivity- devices with gain-response time-photoconductors- photo diodes-PIN photo diodes-heterostructure photo diode- Schotky barrier photodiodes-array detectors-avalanche photodiodes-gain and responsivity- response time.

Unit 5: (8 hrs)

Electro optic, Pockels and Kerr effects- electro optic modulators and switches-scanners-directional couplers-spatial light modulators-electro optics of liquid crystals-wave retarders and modulators-spatial light modulators.

Unit 6: (7 hrs)

Non linear optics-second order and third order optical non linearity-intensity dependent refractive index-optical Kerr effect-self focusing.

Unit 7: (10 hrs)

Photonic switching and computing-opto mechanical, electro optic, acousto optic and magneto optic switches-all optical switches- bistable systems-principle of optical bistability- bistable optical devices- optical inter connectors-optical computing-digital optical computing-analog optical processing.

Book of Study

1. Fundamentals of Photonics: BFA Saleh and M.C.Teich, John Wiley & Sons, Inc.

Reference books

1. Semiconductor optoelectronic devices: Pallab Bhattacharya, Printice Hall of India.
2. Optics and Photonics- An introduction: F. Graham Smith and Terry A.King, John Wiley & Sons, Inc.
3. Lasers and Non linear Optics: B.B.Laud, New Age International Pvt Ltd.

PC1661.5 NANOSCIENCE ANTECHNOLOGY (54 hours.5.)

Unit 1 Introduction to Nanoscience and Nanotechnology (10 Hours)

Nanoscience and nanotechnology- Definition-Historical development, scope and applications

[Book 1, Chapter 1].

Comparison of bulk and nanomaterials-, classification of nanostructured materials: one, two and three dimensional confinement, size and dimensionality effects - size effects,conduction electronsand dimensionality, Fermi gas and density of states, Potential wells,Partial confinement,Properties dependent on density of states,excitons.

[Book 2 Chapter 9.1, 9.3, 9.4]

Unit 2 Properties of nanomaterials and scaling laws (6 Hours)

Introduction, size dependent properties, Properties of nanomaterials-chemical reactivity, solubility, melting points, electronic energy levels, electrical conductivity, Super-paramagnetism, Electron confinement, Integrated optics, Optical properties, Mechanical properties, Thermodynamic properties, scaling laws.

[Book 1 Chapter 3.1 to 3.4]

Unit 3 Synthesis and characterisation (16 Hours)

Synthesis of nanoscale materials and structures, Zero Dimensional materials-Inert gas condensation, Inert gas expansion, Sonochemical processing, Sol-gel deposition, Molecular self assembly, 1D and 2D- Foil beating, Electro-deposition, PVD, CVD, 3D- Rapid solidification, Equiangle extrusion, Milling and Mechanical alloying, Micromachining,Consolidation of nanoclusters and milled powders, Methods for nanoprofiling.

[Book 3 chapter 8.1]

Electron microscopy, Scanning probe microscopy, Optical microscopy, XRD

[Book 4,Chapter 2.1 to 2.4, 2.6]

IR and Raman Spectroscopy, Photoemission and X-ray spectroscopy

[Book 2 Chapter 3.4]

Unit 4 Carbon nanostructures (10 Hours)

Carbon nanostructures-carbon molecules, carbon clusters, Fullerene-structure of C-60 andits crystal-larger and smaller fullerenes-other bucky balls. Carbon nanotubes-fabrication-structure-electrical properties-vibrational properties-mechanicalproperties. Applicationsof carbon nano tubes-Field Emission and shielding-computers-fuel cells-chemical sensors-catalysis-mechanical reinforcement.

[Book 2, Chapter 5]

Unit 5 Nanomachines and nanodevices (12 Hours)

Resonant Tunneling diode, quantum cascade lasers, single electron transistors- operating principles and applications.

[Book 5, Chapter 9.1 to 9.4]

Books for study

1 Nanotechnology, An Introduction to synthesis, Properties and Applications of Nanomaterials, Thomas Varghese and KM Balakrishna, Atlantic Publishers and Distributors (P) Ltd, New Delhi

2 Introduction to Nanotechnology, Charles P. Poole Jr and Frank J Ovens, Wiley Interscience, USA

3 Nanomaterials, Nanotechnologies and design, Michael F Ashby, Paulo J Ferreira and Daniel L Schodek, Elsevier Publishers, UK

4 Nano, The Essentials, T. Pradeep, Tata Mc Graw Hill, New Delhi

5 Nanotechnology and Nanoelectronics, W.R. Fahrner, Springer, Newyork.

References

1 Encyclopedia of Nanoscience and Nanotechnology, H.S.Nalwa (Ed),American Scientific Publishers, Los Angels

2 Nanotubes and Nanowires, C.N.R. Rao and Govindraj, RSC Publishing

3 Nanotehnology, An Introduction, Jeremy J Ramsden, Elsevier Publishers,UK

4 Nanotechnology, Mick Wilson, Kamali Kannagara, Geoff Smith, MichelleSimmons and Burkhard Raguse, Overseas Press, New Delhi

PC1661.6. COMPUTER HARDWARE & NETWORKING (54 hrs -3 credits)

Unit 1. (3 hrs)

P.C. Architecture Functional block diagram of a computer. Processors Introduction to Microprocessor. CISC, RISC processors

Type of Processors and their specification.(Intel: Celeron, Pentium family- PII, PIII, PIV, dual core, core 2duo - AMD-K5,K6 series)

Unit 2 (10 hrs)

Motherboards:Motherboard components

Types, Form factor, Different components of Motherboard (BIOS, CMOS, BICMOS, RAM, CMOS Battery, I/O slots, I/O connectors), Riser architecture, Main Memory

(SIMM, DIMM, RIMM), extended/expanded/cache memories. Chipsets (Intel &AMD)-ROM, DRAM, SDRAM, CDRAM, RDRAM, WRAM. Bus standards:Types of Buses (PC, ISA, MCA, AGP, PCI, USB, IEEE FireWire). Add on Cards Different latest Add on Cards (TV Tuner Card, DVR card, Video Capture, Internal Modem, Sound Card)

Unit 3 (9 hrs)

Drivers:

1. Floppy Disk Drive- Floppy Drive Components(overview only)
2. Hard Disk Drive (HDD)

Types, Capacity, Hard Disk Components (Media, Read/Write Head, Spindle Motor Head Actuator), Connector, Jumper setting, trouble shooting in HDD. Hard Disk Controller (HDC) – Block diagram, Working, Interfacing (IDE, SCSI, ATA and SATA series)

Configuration of HDD- Installation, Formatting, File Format (FAT, NTFS). Pen drive, i-pods

3. Optical Disk Drive

Types (ROM, R/W, DVD ROM, DVD R/W), Capacity, Difference between CD & DVD (capacity, format)-trouble shooting.

Unit 4 (5 hrs)

Peripherals

Keyboard and Mouse- operation

Types of VDU (CRT, LCD, and TFT), Resolution, and Dot pitch Printers – Types (dot matrix, inkjet, laser) Scanner- operation.

Power conditioning Device:SMPS- Block diagram, operation

UPS- Types (online, off line, Hybrid)-trouble shooting in all these devices.

Unit 5 (4 hrs)

Viruses & Vaccines

Virus- Introduction, infection methods,Types of viruses, Different symptoms of virus attack, precautions. Vaccine- Method of vaccine, Different types of Antivirus used in PC, Firewalls

Unit 6 (7 hrs)

NETWORKING ESSENTIALS Introduction Need for networking Network Topology OSI Model Types of networks (LAN, WAN, MAN) Protocols, LAN Protocols-Classification, Examples, Ethernet networking WAN Protocols- PPP, X .25, PPTP, L2TP, ISDN

Unit 7 (8 hrs)

LAN Connectivity Devices- NIC, Repeater, Hub, Switch, Bridge.Internet Connectivity Device- Routers, Gateways, CSU/DSU TCP/IP Protocol SuiteWhat is TCP/IP, Importance, OSI vs TCP/IP

Unit 8 (6 hrs)

IP Addressing

Overview, Address classes, Network ID, Host ID and Subnet Mask, Addressing guidelines, Reserved IP Address, Subnetting and Supernetting(overview)

Unit 9 (2 hrs)

Emerging Technologies, Wireless Technology - Bluetooth, WAP Mobile Technology- GSM, CDMA, GPRS

Books for Study:

1. D. Balasubramanian, "Computer Installation & Servicing", Tata McGraw Hill.
2. Rom Gilster, Black book, "PC Upgrading and Repairing", Dream tech, New Delhi.
3. Street Smart, James Pyler, "PC Upgrading and Repairing", Wiley Publishing, Inc.
4. Stephen.J.Bigelow,"Bigelow's Troubleshooting, Maintenance & Repairing PCs", Tata McGraw Hill
5. Craig Zacker, "The Complete Reference- Networking", Tata McGraw Hill
6. Douglowe, "Networking All in One Desk Reference"-3Edn, Wiley India Pvt Ltd.

References:

1. Mark Minasi, "The Complete PC Upgrade & Maintenance Guide" BPB Publication
2. C.A. Schmidt, "The Complete Computer Upgrade & Repair Book", Dreamtech
3. Craig Zacker, John Rourke, "The Complete Reference- PC Hardware" Tata McGraw Hill
4. Scott Mueller, "Upgrading & Repairing PC's", Pearson Education
5. Vishnu Priya Sing & Meenakshi Singh, "Computer Hardware Course", Computech
6. Manahar Lotia, Pradeep Nair, Payal Lotia, "Modern Computer Hardware Course", BPB Publication.
7. Richard Mc Mohan, "Introduction to Networking", Tata McGraw Hill.

InternetResources:

www.edugrid.ac.in/webfolder/cou rses/cn/cn_resourses.htm www.howstuffwork.com www.e-tutes.com www.learnthat.com www.intel.com, www.amd.com., http://en.wikipedia.org

PRACTICALS

PC1242- MECHANICS, PROPERTIES OF MATTER, HEAT AND ACOUSTICS
(Minimum 16 experiments to be done)

1. Simple pendulum-Study of variation of period with length, mass and amplitude.
2. Spring mass system-spring constant
3. Fly Wheel - Moment of Inertia
4. Compound Bar Pendulum – Symmetric
5. Compound Bar Pendulum – Asymmetric
6. Uniform Bending—Y—Pin and Microscope
7. Uniform bending—Y- optic lever method
8. Non-uniform bending-Y-Optic lever& telescope
9. Non- Uniform bending –Y pin &microscope method
10. Young's Modulus- Cantilever-Angle between tangents.
11. Young's Modulus- Cantilever-Pin & Microscope
12. Rigidity modulus –Static torsion
13. Torsion pendulum-Rigidity modulus
14. Kater's pendulum-Acceleration due to gravity
14. Melde's string——Frequency of fork
15. Viscosity of a liquid——Stoke's method
16. Viscosity-Continuous flow method using constant pressure head.
17. Viscosity-Variable pressure head arrangement
18. Surface tension-Capillary rise
19. Surface Tension –Quincke's Method
20. Sonometer-frequency of A.C
21. Kundt's tube-determination of velocity of sound.
22. Comparison of least counts of measuring instruments.
23. Evaluation of errors in simple experiments.

References

1. Yarwood and Wittle; Experimental Physics for Students, Chapman & Hall Publishers.
2. An advanced course in practical physics, Chathopadhyaya, Rakshit and Saha, New central agency, Kolkata.
3. A text book of practical physics, S.Viswanathan & Co., Chennai.
4. Advanced Practical Physics, B.L.Worsnop and H.T.Flint, Khosla Publishers, Delhi.

PC1443- HEAT, ELECTRICITY AND MAGNETISM

(Minimum 16 experiments to be done)

1. Phase transition-determination of M.P of wax.
2. Determination of thermal conductivity of rubber
3. Lee's disc-determination of thermal conductivity of a bad conductor.
4. Potentiometer-Resistivity.
5. Potentiometer-Calibration of ammeter
6. Potentiometer –Reduction factor of T.G
7. Potentiometer –Calibration of low range voltmeter
8. Potentiometer – Calibration of high range voltmeter
9. Thermoemf-measurement of emf using digital multimeter.
10. Carey Foster's bridge-Resistivity
11. Carey Foster's bridge-Temperature coefficient of resistance.
12. Mirror galvanometer-figure of merit.
13. BG- Absolute capacity of a condenser
14. Conversion of galvanometer into ammeter and calibration using digital Multimeter
15. Conversion of galvanometer into voltmeter and calibration using digital Voltmeter.
16. Circular coil-dipole moment
17. Study of network theorems-Thevenin's & Norton's theorems and maximum power transfer theorem.
18. Circular coil-Study of earth's magnetic field using compass box.
19. Absolute determination of m and Bh using box type and Searle's type vibration magnetometers.
20. Searle's vibration magnetometer-comparison of magnetic moments.

References

1. Yarwood and Wittle; Experimental Physics for Students, Chapman & Hall Publishers.
2. An advanced course in practical physics, Chathopadhyaya, Rakshit and Saha, New central agency, Kolkata.
3. A text book of practical physics, S.Viswanathan & Co., Chennai.
4. Advanced Practical Physics, B.L.Worsnop and H.T.Flint, Khosla Publishers, Delhi.

PC 1643 OPTICS AND BASIC ELECTRONICS

1. Spectrometer-A, D and n of a solid prism.
2. Spectrometer –Dispersive power and Cauchy's constants
3. Spectrometer Grating—Normal incidence- N & wavelength
4. Spectrometer-i-d curve
5. Spectrometer- Hollow prism
6. Liquid lens-refractive index of liquid and lens
7. Newton's Rings—Reflected system
8. Air wedge-diameter of a wire
9. Spectrometer – small angled prism
11. Spectrometer –Grating Minimum deviation

12. Standardisation of meter using He-Ne Laser
13. PN junction Diode (Ge & Si) characteristics To draw the characteristic curves of a PN junction diode and to determine its ac and dc forward resistances.
14. Full wave (centre tapped) rectifier To construct a full wave rectifier using junction diode and to calculate the ripple factor with and without shunt filter (10 readings for RL 100 to 5000).
15. Full wave (centre tapped) rectifier To construct a full wave rectifier using junction diode and to study effect of L, C, and LC filters on the ripple factor (for different RL).
16. Bridge rectifier To construct a bridge rectifier using junction diodes and to calculate the ripple factor with and without shunt filter (10 readings for RL 100 to 5000).
17. Bridge rectifier- Dual power supply To construct a dual power supply using bridge rectifier and measure the output voltages for different pair of identical load resistors.
18. Zener diode characteristics To draw the I-V characteristic of a Zener diode and to find the break down voltage and the dynamic resistance of the diode.
19. Zener diode as a voltage regulator To construct a voltage regulator using Zener diode and to study the output voltage variation (i) for different RL and (ii) for different input voltage with same RL.
20. Transistor characteristics-CE To draw the characteristic curves of a transistor in the CE configuration and determine the current gain, input impedance and output impedance.
21. Transistor characteristics-CB To draw the characteristic curves of a transistor in the CB configuration and determine the current gain, input impedance and output impedance.
22. Single stage CE amplifier- To construct a single stage CE transistor amplifier and study its frequency response

PC1644—ELECTRONICS AND COMPUTER SCIENCE
(Minimum 15 experiments to be done – 5 from computer science)

1. OP amp. IC741- Inverting amplifier To construct an inverting amplifier using IC741 and determine its voltage gain.
2. OP amp. IC741- Non inverting amplifier To construct a non inverting amplifier using IC741 and determine its voltage gain.
3. Phase shift oscillator To construct a phase shift oscillator using transistor and measure the frequency of the output waveform.
4. Logic gates- OR and AND To verify the truth tables of OR and AND gates using IC
5. Logic gate- NOT, NAND To verify the truth tables of NOT gate using IC
6. Transistorised Multivibrator- Astable
7. Astable Multivibrator using IC 555
8. SR Flipflop using 7400/7410 9.Schimdt trigger using IC 7414
10. Analogue to Digital convertor
11. Study of LCR Circuit
12. Adder and Subtractor using Basic gates

COMPUTER SCIENCE

1. Program to find the roots of a quadratic equation (both real and imaginary root)
2. Program to sort a given list containing the name of students and their total marks and print the rank list.
3. Programs to plot the functions Sin x, Tan x and e^{-x} .
4. Program to find the product of two n×n matrices.

5. Program to find the dot product and cross product of vectors
6. Program to simulate the trajectory of the projectile thrown (a) horizontally and (b)at an angle.
7. Program to study the motion of a spherical body in a viscous fluid.
8. Program to study the motion of a body under a central force field.
9. Program to fit a straight line through the given set of data points using least square fitting algorithm.
10. Program to integrate a given function using Simpson's rule.
11. Program to integrate a given function using Trapezoidal rule.
12. Program to find the solution of differential equation by RK2 method.

References:

1. Basic electronics and linear circuits; N.N. Bhargava, D.C. Kulshreshtha, S.C. Gupta
2. OP- Amps and linear integrated circuits; Ramakant A. Gayakwad
3. Basic electronics; Santiram Kal
4. Basic electronics; B. L. Theraja
5. Principles of electronics; V. K. Mehta
6. A first course in Electronics; Anwar A. Khan, Kanchan K. Dey

VOCATIONAL COURSES

Career Related First Degree Programme in BSc Physics and Computer Applications (PCA)

Scheme and Syllabus

SCHEME

Division of Marks (Lab Examination)

(Computer Science)

1. First program should be sufficiently simple **25 marks**
   (Logic – 10 marks, Successful compilation – 10 marks, Result – 5 marks)
2. Second program should be based on advanced concepts **30 marks**
   (Logic – 15 marks, Successful compilation – 10 marks, result – 5 marks)
3. Viva Voce **15 marks**
4. Lab Record **10 marks**

Total Marks **80 marks**

Sem	Course code	Course	No. of hrs/week	No. of credits	Hrs/ Sem.	CE	ESE
1	PC1171	Introduction to IT	3	3	54	20%	80%
2	PC1221	Introduction to Programming	3	2	54	"	"
2	PC1271	Programming Lab – I	S1- 2 S2 - 2	3	S1-36 S2-36	"	"
3	PC1371	Operating Systems	3	3	54	"	"
3	PC1372	Data Structures	3	3	54	"	"
4	PC1471	Software Engineering	3	3	54	"	"
4	PC1472	Object Oriented Programming	2	2	36	"	"
4	PC1473	Programming Lab – II	S3-2 S4-2	4	S3-36 S4-36	"	"
5	PC1571	Database Management Systems	3	3	54	"	"
5	PC1551	OPEN COURSE	3	2	54	"	"
	1551.1	Internet Technology					
	1551.2	Linux Environment					
	1551.3	Business Informatics					
5	PC1572	Programming Lab III	7	4	136	"	"
6	PC1671	Introduction To Information	4	4	72	"	"
		Security					
6	PC1672	Computer Networks	4	3	72	"	"
6	PC1673	Major Project & Viva	4	4	72	"	"

PC 1171 INTRODUCTION TO IT

1. AIM:

To create overall generic awareness about scope of the field of IT and to impart basic personal computing skills.

To create background knowledge for the various courses in the programme.

2. OBJECTIVES:

To introduce the basic terminology in the field of IT

To impart functional knowledge about PC hardware, operations and concepts To impart functional knowledge in the use of GUI Operating System

To impart functional knowledge in a standard office package (word processor, spread sheet and presentation softwares and popular utilities

To impart functional knowledge about networks and internet.

To give an overview of computer application in various fields and an overall generic awareness about the scope of the field of IT

3. SYLLABUS

Module–I:Computer characteristics: Speed, storage, accuracy, diligence; Digital signals, Binary System, ASCII; Historic Evolution of Computers; Classification of computers: Microcomputer, Minicomputer, mainframes, Supercomputers; Personal computers: Desktop, Laptops, Palmtop, Tablet PC; Hardware & Software; Von Neumann model.

Module–II: Hardware: CPU, Memory, Input devices, output devices. Memory units: RAM (SDRAM, DDR RAM, RDRAM etc. feature wise comparison only); ROM-different types: Flash memory; Auxiliary storage: Magnetic devices, Optical Devices; Floppy, Hard disk, Memory stick, CD, DVD, CD-Writer; Input devices - keyboard, mouse, scanner, speech input devices, digital camera, Touch screen, Joystick, Optical readers, bar code reader; Output devices: Display device, size and resolution; CRT, LCD; Printers: Dot-matrix, Inkjet, Laser; Plotters, Sound cards & speaker.

Module-III: Software- System software, Application software; concepts of files and folders, Introduction to Operating systems, Different types of operating systems: single user, multitasking, time-sharing multi-user; Booting, POST; Basic features of two GUI operating systems: Windows & Linux (Basic desk top management); Programming Languages, Compiler, Interpreter, Databases; Application softwares: Generic Features of Word processors, Spreadsheets and Presentation softwares; Generic Introduction to Latex for scientific typesetting; Utilities and their use; Computer Viruses & Protection, Free software, open source.

Module–IV: Computer Networks- Connecting computers, Requirements for a network: Server, Workstation, switch, router, network operating systems; Internet: brief history, World Wide Web, Websites, URL, browsers, search engines, search tips; Internet connections: ISP, Dial-up, cable modem, WLL, DSL, leased line; email, email software features (send receive, filter, attach, forward, copy, blind copy); characteristics of web-based systems, Web pages, introduction to HTML.

NB:- Activities and assignments are not meant for End_Semester_Examination

Activities & Assignments: *Applications of Computers in various fields: office automation, education, entertainment, medicine, commerce, governance, resource management, law and order, communications, science and technology, defence; Historic evolution of IT; Pioneers in IT; Debates in IT : Computer Creativity, Digital Divide, IT Policy, IT and Development etc; IT in India (major initiatives, key institutions, statistics), IT in Kerala (major initiatives, key institutions, statistics); Careers in IT.*

4. REFERENCES

4.1 Core

E. Balaguruswamy, *Fundamentals of Computers*, McGraw hill, 2014

4.2 Additional

Dennis P Curtain, *Information Technology: The Breaking wave*, McGrawhill, 2014
Peter Norton, *Introduction to Computers*, McGrawhill, Seventh edition

4.3 Internet resources:

- www.fgcu.edu/support/office2000
- www.openoffice.org *Open Office Official web site*
- www.microsoft.com/office *MS Office web site*
- www.lgta.org *Office on-line lessons*
- www.learnthenet.com *Web Primer*
- www.computer.org/history/timeline
- www.computerhistory.org
- http://computer.howstuffworks.com
- ohttp://vmoc.museophile.org *Computer History*
- www.dell.com *Dell Computers*
- www.intel.com *Intel*
- www.ibm.com *IBM*
- www.keralaitmission.org *Kerala Govt. IT Dept*.
- www.technopark.org

PC1221 INTRODUCTION TO PROGRAMMING

1. AIM:

To Expose students to algorithmic thinking and problem solving and impart moderate skills in programming in a industry-standard programming language

2. OBJECTIVES:

To expose students to algorithmic thinking and algorithmic representations To introduce students to basic data types and control structures in C.

To introduce students to structured programming concepts

To introduce students to standard library functions in C language

3. SYLLABUS

Module–I: Introduction to programming: Algorithm & Flow charts: Definitions, Symbols used to draw flowcharts, Examples, Editor, Program Writing – Structure of the Program, top-down design, Source code, Object code, Executable file, Extensions of different files, Program Compilation, Running of a Program; Header file concept. Variables and Constants, Rules for naming the Variables/Identifiers; Basic data types of C, int, char, float, double; storage capacity – range of all the data types; Storage classes;

Module-II: Basic Elements: Operators and Expressions: Assignment Operator, Arithmetic Operator and Arithmetic expression, Relational Operator and Relational exp., Logical Operator and how it is used in condition, Expression Evaluation (Precedence of Operators); simple I/O statements, Control structures, if, if else, switch-case, for, while, do-while, break, continue. Arrays, Defining simple arrays, Multi-dimensional arrays, declaration, initialization and processing;

Module-III: Functions & Pointers: concept of modular programming, Library, User defined functions, declaration, definition & scope, recursion, Pointers: The & and * Operators, pointer declaration, assignment and arithmetic, visualizing pointers, call by value, call by reference, dynamic memory allocation.

Module–IV: Advanced features: Array & pointer relationship, pointer to arrays, array of pointers. Strings: String handling functions; Structures and unions; File handling: text and binary files, file operations, Library functions for file handling, Modes of files.

Activities and assignments: *Pre-processor directives: #include, #define, macros with arguments, the operators # and ##, conditional compilations, multiple file programming; creating header files, program verification, algorithm efficiency analysis; int86 functions and graphic functions.*

4. REFERENCES

4.1 Core

Ashok N. Kamthene, *Programming in C*, Pearson Education, Second edition

4.2 Additional

E.Balaguruswamy, *Programming in ANSI C*, McGrawhill, Sixth Edition

NB:- Activities and assignments are not meant for End_Semester_Examination

PC1271PROGRAMMING LAB – I

1. AIM:

To provide an opportunity for hands-on practice of basic features of DOS, Windows, software tools(word processor, spread sheet, presentation s/w) and algorithmic thinking and problem solving in a industry standard programming language

2. OBJECTIVES:

After the completion of this course, the student should be able to:

Create, Save, Copy, Delete, Organise various types of files and manage the desk top in general

Use a standard word processing package Exploiting popular features

Use a standard spread-sheet processing package Exploiting popular features Use a standard presentation package Exploiting popular features

Also, this course will provide hands-on practice in the following topics, under a variety of programming situations with a focus on writing, debugging and analyzing structured programs: basic data types in C. basic control structures in C. arrays, structures and files standard library functions in C language solving moderately complex problems involving the above and requiring selection of appropriate data structures and efficient algorithms

3. SYLLABUS

1. Familiarization of important DOS/Windows/Linux features
2. Practice on basic features of word processor, spread sheet and presentation software.

Part A

The C laboratory work will consist of 15-20 Experiments

1. Testing out and interpreting a variety of simple programs to demonstrate the syntax and use of the following features of the language: basic data types, operators and control structures.

Part II

2. 1-D Arrays: A variety of programs to declare, initialise, read, print and process 1-D arrays of various basic data types. Processing to include, selection, sum, counting, selective sum, selective counting, reversing etc.
3. Pointers: A large number of trivial programs involving all possible data types to familiarize the syntax of pointers in a variety of situations and to draw memory diagrams based on the observations.
4. Structures: A variety of programs to declare, initialise, read, print and process structures made up of a variety of data types and structures.
5. 2-D Arrays: A variety of programs to declare, initialise, read, print and process 2-D arrays of various basic data types. Processing to include, selection, sum, counting, selective sum, selective counting, reversing etc.
6. Array of Structures and Structure of Arrays: Programs to demonstrate declaration and processing of structure of arrays and array of structures.
7. Pointers to Arrays: A number of programs to demonstrate handling of 1-D and 2-D arrays using pointers and to draw memory diagrams based on the observations.
8. Pointers to Structures: A number of programs to demonstrate use of pointers to structures and to draw memory diagrams based on the observations.
9. Functions –I: Simple Examples of declaring and using functions of the following categories (i) no argument, no return, (ii) argument, no return, (iii) no argument, return, (iv) argument, return, all pass by value
10. Functions –II: Declaring and using functions with pass by reference, Passing and Returning structures, Recursive functions.
11. Files: Simple Example involving use of multiple files: declaring, opening, closing, reading from and writing to text files.
12. Files: Example involving use of multiple files: declaring, opening, closing, reading from and writing to binary files.
13. Library functions: A variety of Examples demonstrating (i) string processing functions (ii) a variety of selected library functions
14. Debugging programs involving syntactic and/or logical errors

16-20: Developing programming solutions to problems including program design, algorithm development and data structure selection.

4. REFERENCES

4.1 Core

Deitel & Deital, *C: How to Program*, Pearson Education Alan R Feuer, *The C Puzzle Book*, Pearson Education Yashvant Kanetkar, *Test Your C Skills*, BPB Publications, 3rd Edition

4.2 Internet resources:

- www.cprogramming.com
- www.programmersheaven.com o comp.lang.c*newsgroup*
- www.cplusplus.com
- cwx.prenhall.com/bookbind/pubbooks/deitel
- www.fgcu.edu/support/office2000
- www.openoffice.org Open Office Official web site
- www.microsoft.com/office MS Office web site
- www.lgta.org Office on-line lessons
- www.learnthenet.com Web Primer

PC 1371 OPERATING SYSTEMS

1. AIM:

To introduce students to basic functions and the theoretical underpinnings of modern operating systems

2. OBJECTIVES:

To introduce students to:

Fundamental concepts of systems software Functions of operating systems as a resource manager Strategies for constrained resource allocation Strategies for process scheduling Memory and I/O Management techniques Salient features of popular operating systems.

3. SYLLABUS

Module I:Introduction to operating system: Operating system as the main component of system software; OS as a resource manager, Structure of OS- shell, utilities, resource management routines, kernel, evolution of OS, multiprogramming, time sharing, real-time systems, parallel systems, distributed systems, OS functions, Characteristics of modern OS; **Process Management:** Process description and control: process control block, Process states: operations on processes; concurrent process; threads; processes and threads; symmetric multiprocessing; micro Kernels. CPU Scheduling: Schedulers, Scheduling methodology, CPU Scheduling algorithms, performance comparison.

Module II: Process synchronization- independent and concurrent processes, critical section, mutual Exclusion, Petersons solution, semaphore, classical synchronization problem-bounded buffer and reader/ writer problem. Concept of inter-process communication. **Deadlock**- deadlock and starvation, conditions for deadlock, resource allocation problem, methods for handling deadlock-deadlock prevention, deadlock avoidance- Bankers algorithm, deadlock detection, deadlock recovery.

Module III: Memory Management & Protection: Concept of memory, address binding, Logical address, physical address, swapping, contiguous allocation- fixed partition, variable partition, fragmentation. Non-contiguous allocation– paging, segmentation. Virtual memory- demand paging, page fault, replacement algorithms, thrashing. Protection and security – mechanisms and policies, threats, accidental data loss, protection mechanisms, user authentication, attacks from inside, virus, antivirus.

Module IV:I/O & File Management I/O management – I/O hardware, application I/O interface, kernel I/ O subsystem. Disk I/O, disk scheduling, RAID, disk cache. File management- file concept, access methods, directory structure, file system structure & implementation, directory implementation, allocation methods, free space management.

Assignments and activities: *case study of popular Operating Systems- MS DOS, UNIX, Windows 2000, Windows NT, Linux, Sun OS, Solaris. Process management –Windows, Linux, Solaris. Concurrency management - Windows, Linux, Solaris. Memory management - Windows, Linux, Solaris.*

NB:- Activities and assignments are not meant for End_Semester_Examination

4. REFERENCES

4.1 Core

Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, *Operating System Principles*

4.2 Additional

Achyut S Godbole, *Operating systems*, McGRawhill, Third Edition

4.3 Internet resources:

- www.aw.com/cs_supplements/nutt3/index.html
- www.aw.com/cs_supplements/nutt/index.html
- cwx.prenhall.com/bookbind/pubbooks/tanenbaum2/
- www.gnu.org,
- www.linux.org,
- www.linuxcentral.com

PC1372 DATA STRUCTURES

1. AIM:

To introduce students to various data structures and their features and applicability.

2. OBJECTIVES:

By the end of the course, students should be:

Able to write well-structured programs in C

Be familiar with data structures like array, structures, lists, stacks, queues, trees and graphs

Able to implement the above data structures in C/C++

Able to appreciate various searching and sorting strategies

Able to select appropriate data structures for solving a given problem

3. SYLLABUS

Module–I: Review of Arrays, Structures, pointer to structures, passing structures as arguments to functions. Linked Lists: Concept of static versus dynamic data structures, implementation of linked lists using pointers, operations on linked lists: insertion, deletion and traversing. Doubly linked lists and circular linked lists, applications of linked lists.

Module- II: Stacks and Queues: FIFO and LIFO data structures – stacks using (i) pointers and (ii) arrays. Queues using (i) pointers and (ii) arrays, applications, polish notation.

Module-III: Trees: Concept of linear versus non-linear data structures, various types of trees – binary, binary search trees. Creating a binary search tree, traversing a binary tree (in-order, pre-order and post-order), operations on a tree –insertion, deletion and processing, expression trees, implementation using pointers, applications.

Module–IV: Searching: sequential searching, binary searching, Hashing – linear hashing, hash functions, hash table searching, Sorting: exchange sort, selection sort and insertion sort, Graphs, graph traversal- depth-first and breadth-first traversal of graphs, applications.

Assignments and Activities: *Multi-way search trees, B-trees, Huffman trees, case-studies.*

NB:- Activities and assignments are not meant for End_Semester_Examination

4. REFERENCES

4.1 Core

A.K.Sharma, *Data Structures Using C*, Pearson, Second edition, 2011

4.2 Additional

Nair A.S., Makhalekshmi,*Data Structures in C*, PHI, Third edition 2011.

4.3 Internet resources:

- www.keralauniversity.edu/csbos
- http://warrior-101.tripod.com/dstut/dstut.html: Tutorial on data structures.
- http://crasseux.com/books/ctutorial/Data-structures.html

PC1471 SOFTWARE ENGINEERING

1. AIM:

To enable the students to have a thorough understanding of the activities in development projects using (a) Structured Analysis and Design and (b) Object Oriented Analysis and Design

2. OBJECTIVES:

At the end of the course, the students should be able to :

Appreciate the importance of having a process for software development.

Understand the various activities undertaken for a software development project following the Function oriented Design & Object oriented design

Understand the issues in code design and development

Test software developed using SSAD and OOAD methodologies.

Have in depth knowledge about the different OOAD Themes and compare them with SSAD

3. SYLLABUS:

Module 1: Introduction : Characteristics of Software, Product and Process, Need for Software Process, Characteristics of a Software Process, Software Development Process models, Software Development Life Cycle Model: Waterfall Model, Prototyping, iterative development, Spiral Model, time-boxing model; Comparison of different Life Cycle Models, Software Project Management, Project Estimation Techniques, Software Requirements Analysis and Definition: Software Requirements, Overview of SA/SD Methodology, Requirements Specification: Need for SRS, Characteristics of an SRS, Components of an SRS, Specification Languages, Structure of a Requirements document. Functional Specification with Use cases, developing use cases, Structured Analysis, Matrics, quality metrics, Planning a project, effort estimation, COCOMO model, quality plan, risk management-assessment, control.

Module II: Function oriented design: Problem partitioning, abstraction, modularity, Top-down and Bottom-up Strategies, coupling, cohesion, design notations-structure charts, structured design, Data Flow Diagrams, Developing the DFD Model of a system, Entity Relationship Diagram, Developing ERD of a system, Decision Trees, Decision Tables, Structured English, first-level factoring, factoring input, output and transform branches, transaction analysis, verification.

Module III: Object-oriented design: Object-oriented design concepts, Comparison between Algorithmic Decomposition and Object Oriented Decomposition Unified Modelling Language, Object Oriented Design using UML, Class Diagram, Sequence Diagram, Collaboration Diagram; detailed design, PDL, algorithm design, state modelling of classes, design walkthroughs, critical design review, consistency checkers, other UML diagrams.

Module IV: Coding and testing: common coding errors, structured programming, coding standards, incremental coding process, test driven development, source code control and build, refactoring, verification-code inspections, static analysis, unit testing, combining different techniques. Testing- error, fault and failure, test oracles, test cases, Black Box Testing, Equivalence Class Partitioning, Boundary Value Analysis, Cause Effect Graphing, White Box Testing- control flow based and data-flow based testing, test plan, test case specifications, defect logging and tracking, Comparison of Different Techniques.

Activities and Assignments*: Preparing various documents, case studies, preparing test plans, UML diagrams, Metrics for various development phases, Agile Programming Methodologies, extreme Programming, Formal Methods, CASE Tools.*

NB:- Activities and assignments are not meant for End_Semester_Examination

4. REFERENCES:

4.1 Core

Rajib Mall, *Fundamentals of Software Engineering,* Second Edition, PHI

4.2 Additional

PankajJalote**,** *An Integrated Approach to Software Engineering***,** Narosa

Waman S Jawadekar, *Software Engineering*, McGraw hill, 2013

Journals and Magazines: (*i***)** Software Development, CMP Media. (ii) Software Quality Professional, ASQ.

4. Internet Resources:

- http://courses.cs.vt.edu/csonline/SE/Lessons/
- http://www.omg.org/gettingstarted/what_is_uml.htm
- http://www-106.ibm.com/developerworks/java/library/co-design5.html
- http://www-106.ibm.com/developerworks/java/library/j-jmod0508/
- www.rspa.com
- http://www.math-cs.gordon.edu/local/courses/cs211/ATM

PC1472 OBJECT ORIENTED PROGRAMMING

1. AIM:

To introduce the student to the basic concepts of object orientation and impart skills in an industry standard object oriented language

2. OBJECTIVES:

On the completion of this course, the student will be able to

Understand the concepts of classes and object

Define classes for a given situation and instantiate objects for specific problem solving

Reuse available classes after modifications if possible Possess skill in object oriented thought process

3. SYLLABUS

Module–I: Concept of Object orientation – why related data and methods should be kept as a single unit – comparison with procedural and structured programming – Classes and objects – data abstraction, encapsulation, inheritance, polymorphism, dynamic binding, message passing. Advantages of object orientation – reusability, maintenance, security, comfort in programming. Input and output streams in C++; Basic data types and declarations.

Module–II: Classes and objects in C++, access modifiers, static members, friend functions, Constructors and Destructors, polymorphism, Operator Overloading and type conversion, anonymous objects

Module-III: Inheritance- parent and child classes, private, public and protected inheritance, Multiple inheritance and multi-level inheritance, Virtual base classes. C++ and memory models – new and delete operators, Heap, dynamic objects.

Module–IV: Binding & Polymorphism: Early binding, Late Binding, Pointers to derived class objects, virtual functions, Pure virtual functions, abstract classes, object slicing, exception handling in C++: try, throw and catch.

Assignments and activities: *Evolution of OOP – history of C and C++, Review of features of C++ common with C and also minor variations; study of File stream classes in C++. Templates – class and function templates, Templates versus macros, String objects in C++, Standard Template Library in C++ - containers, associative containers Name spaces.*

4. REFERENCES

4.1 Core

Ashok N. Kamthane, *Object oriented Programming with ANSI & Turbo C++,* Pearson

4.2 Additional

H M Deitel and P J Deitel, *C++: how to program*, Pearson Education

Robert Lafore, *Object Oriented Programming in Turbo C++*, Galgotia Publications

NB:- Activities and assignments are not meant for End_Semester_Examination

PC1473 PROGRAMMING LAB – II

1. AIM:

To provide an opportunity for hands-on practice of object oriented programming and problem solving in a industry-standard programming language and also hands-on practice in various user-defined static and dynamic data structures.

2. OBJECTIVES:

This course will provide hands-on practice in a the following topics, under a variety of programming situations with a focus on writing, debugging and analyzing object oriented programs: basic data types and control structures in C++. managing classes and objects in a variety of situations solving moderately complex problems involving the above and requiring selection of appropriate structures and algorithms

3. SYLLABUS

The laboratory work will consist of 15 20 experiments, only by using class concept

Part A

1. Testing out and interpreting a variety of simple programs to demonstrate the syntax and use of the following features of the language: basic data types, operators and control structures.
2. Solving a problem using (i) structures and (ii) classes and comparison between the two (the problem logic and details should be kept minimal and simple to enable focus on the contrast between the two methods, for example declaring result of a set of students defining the name and total marks in the program itself).
3. Class definitions and usage involving variety of constructors and destructors

Part B

4. Programs involving various kinds of inheritances,
5. Programs involving operator overloading and type conversions
6. Programs involving virtual base classes, friend functions
7. Program to demonstrate early and late binding
8. Program to allocate memory dynamically
9. Program involving class and function templates
10. Programs to demonstrate(i) string processing (ii) file streams (iii) a variety of selected library functions
11. exception handling
12. Handling of 2-D arrays using pointers
13. Debugging programs involving syntactic and/or logical errors

4. REFERENCES

Deitel&Deital, *C++: How to Program*, Pearson Education

PC1571 DATABASE MANAGEMENT SYSTEMS

1. AIM:

To introduce basic concepts of data bases, and related techniques and tools

2. OBJECTIVES:

Be aware of basic concepts of data bases and data base management systems Be aware of concepts of relational data bases.

Know to normalize relational data bases

Skilled in using relational algebra and relational calculus Develop skills to write database queries

3. SYLLABUS

Module–I: Introduction: evolution of data base systems, overview of database management systems, Relational data model, mathematical definition, candidate, primary and foreign keys, set operations on relations, insertion, deletion and update operations, attribute domains.

Module-II: Relational algebra and relational calculus, Introduction to SQL, Table creation, selection, projection and join using SQL

Module-III: Functional Dependencies – Inference axioms, normalization, 1NF, 2NF, 3NF and Boyce-Codd Normal forms, Lossless and lossy decompositions.

Module-IV: The E-R Model, Entities and attributes, 1-1 and many-1, many-many relationships. Security – Physical and Logical, Design and maintenance issues, integrity.

Assignments and activities: *Study of features of MS Access, Open Office Base, Oracle, mySQL, emerging areas.*

4. REFERENCES

4.1 Core

Ramon A. Mata-toledo and Pauline K. Cushman, *Fundamentals of Relational Data Bases*, Schaum Outlines, Tata McGraw Hill

4.2 Additional

Atul Kahate, *Introduction to Data Base Management Systems*, Pearson Education

4.3 Internet resources:

- www.pearson.co.in/AtulKahate,
- www.edugrid.ac.in/webfolder/courses/dbms/dbms_indEX.htm

NB:- Activities and assignments are not meant for End_Semester_Examination

PC1551 OPEN COURSE

PC 1551.1 INTERNET TECHNOLOGY

1. AIM:

Give an introduction about the components of internet, its working and the way in which web pages are designed.

2. OBJECTIVE:

At the end of this course, the students will be able to

Discuss various components of internet

Explain different devices used for networking Explain the working principle of Internet

Design web pages using HTML

3. SYLLABUS:

MODULE I- Introduction to Computer Networks- Advantages of Networks, Goals of Networks, Types of Networks- LAN,MAN,WAN, Internet , Public Networks, LAN topologies- Bus, Star, Ring, Mesh.

MODULE II- Networking Devices- Interconnecting Issues, Connectivity Devices, Hubs, Switch, Bridges, Routers.

MODULE III- Introduction to Internet -Meaning of Internet, WWW- History, Working of Internet, Browsing, Searching the Web, Internet protocols- TCP/IP Protocol suite, UDP, IP addresses, IP Versions – IPV4, IPV6, Services of the Internet- FTP, HTTP, Email.

MODULE IV- HTML- Understanding HTML, Text tags; Graphics, Video and Sound Tags; Link and Anchor Tags; Table Tags; Frame Tags; Miscellaneous tags (layers, image maps etc);

4. REFERENCES

4.1 Core

Douglas E Comer, *Computer Networks and Internets*, 4/e, Pearson Education

4.2 Additional

Andrew S. Tanenbaum, *Computer Networks*, 4/e, Pearson Education

PC 1551.2 LINUX ENVIRONMENT

4.1 AIM:

To familiarize with Linux working environment

4.2 OBJECTIVES:

Introduction to Operating Systems

Introduction to linux

Introduction to OpenOffice.org

3. SYLLABUS

Module I- Operating Systems- Necessity of OS, Types of OS-Batch Systems, Time Sharing Systems, Real time Systems, Basic Structure of An OS- Kernel, Shell, File System, OS as a Resource Manager, General principles of Resource Management

Module II- Introduction to Linux**-** History and Features of Linux, Various flavours of Linux, Linux Kernel and Shell, Graphical Desktops- GNOME, KDE, Linux File System and Directories, Linux commands bc, cal, cat, cd, chgrp, chmod, clear, cmp, cp, kill, rm, rmdir, tty, wc, who, grep, write, telnet, whois, mv, find, ps, mkdir, more, date, mount, show, mount etc. Pipeline and redirection concepts, using floppy and cd- rom in linux

Module III-Open Office.org-Open Office Writer-Parts of the OpenOffice.org Window, Editing and Writing a Writer document, spell checker, autocorrect, Thesaurus, create table, table formatting, finding items in a document, header and footer, create and modify page numbers, adding graphics, borders and colors

Module IV- Open Office.org-Open Office Calc- Entering data in a spreadsheet, spreadsheet math, columns, lookup functions, charting data, Open Office Impress- Create a new presentation , insert, copy and delete slides, formatting text, bulleted and numbered lists, adding clipart, pictures, charts and spreadsheets, slide settings and transitions, animating slides, previewing and running a slideshow

Assignments and Activities: *Packages in Linux, Case study of open source softwares, comparison of Linux with Windows*

4. REFERENCES

4.3 Core

Pramod Chandra P Bhat, *An Introduction to Operating Systems: Concepts and Practice,* 2/e PHI,2007

4.4 Additional

Richard Peterson, *Linux Programming: A Beginners Guide*,DreamTech

NB:- Activities and assignments are not meant for End_Semester_Examination

PC1551.3 BUSINESS INFORMATICS

1. AIM:

To create an awareness about role of IT in business and to introduce concepts and techniques of e-commerce

2. OBJECTIVES:

By the end of this course, the student should be able to:

Have an awareness about role of IT in business

Have knowledge of basic concepts of e-commerce

Be aware of different types of e-commerce web sites and different modes of payments

Be aware of security and legal issues in e-commerce

3. SYLLABUS

Module–I: History of e-commerce, definition, classification- B2B, B2C, C2C, G2C, B2G sites, ecommerce in education, financial, auction, news, entertainment sectors, Doing e-Commerce.

Module–II: Electronic payment systems – relevance of currencies, credit cards, debit cards, smart cards, e-credit accounts, e-money, security concerns in e commerce, authenticity, privacy, integrity, non-repudiation, encryption, secret key cryptography, public key cryptography, digital signatures, firewalls

Module–III: Mass marketing, segmentation, one-to-one marketing, personalization and behavioural marketing, web advertising, online advertising methods, advertising strategies and promotions, special advertising and implementation topics.

Module IV-Mobile Commerce: attributes and benefits, Mobile Devices, Computing software, Wireless Telecommunication devices, Mobile finance applications, Web 2.0 Revolution, social media and industry disruptors, Virtual communities, Online social networking: Basics and examples, Web 3.0 and Web 4.0, Civil law, intellectual property law, common law and EC legal issues

Assignments and Activities*: Case study of two internationally successful e-commerce web sites and two Kerala-based e-commerce web sites; IT act (India) and e-commerce.*

4. REFERENCES

4.1 Core

Erfan Turban et.al., *Electronic Commerce–A Managerial Perspective*, Pearson Education

4.2 Additional

R Kalokota, Andrew V. Winston, *Electronic Commerce – a Manger's guide*, Pearson

NB:- Activities and assignments are not meant for End_Semester_Examination

4.3 Internet resources:

- www.ecommercetimes.com,
- www.online-commerce.com,
- www.rsa.com,
- www.ntsecurity.com
- www.easystorecreator.com/ecommercetutorial.asp

PC1572- PROGRAMMING LAB III

1. Visual Tools

Part A (30 hrs)

A list of Exercises, covering the basic aspects of VB, shall be prepared by the faculty in charge.

The list should provide guided and structured learning facility such that students can do case studies/ Projects using VB.

Ex:- Using KEYPRESS EVENT restrict only numeric values into textbox.
Calculator Program.
Simple word processing Program.

Part B (42hrs)

Candidates should do and record a case study of substantial standard. Questions based on the case study shall be included in the viva-voce

2. DBMS

Part A(52 Hrs)

- Students should do and records assignments based on SQL given by the faculty in charge.
- Questions for the internal lab test should be based on this part and of comparable standard.

Part B (20Hrs)

- Students should do and record a case study of substantial standard.

PC1671 INTRODUCTION TO INFORMATION SECURITY

1. AIM:

To introduce internetworking and the issues and methods of information security over internetworks.

2. OBJECTIVES:

On completion of this course student shall:

Be aware of principles and protocols of internetworks understand the basic issues in information security understand the concept of ciphers and cryptography. To impart an idea on various ciphers understand the concept of digital signatures and e-mail security policies to impart an idea on malicious softwares and remedies.

3. SYLLABUS

Module I: Information Security: Network security, Confidentiality, integrity, authentication, security policy, basic network security terminology, cryptography, symmetric encryption, substitution ciphers, transposition ciphers, steganography, Block ciphers, modes of operation, Data Encryption Standard, Public key cryptography, applications, strength and weakness, RSA algorithm, key distribution (concepts only).

Module II: Authentication, authentication methods, message digest, digital signatures, digital signature algorithm, DSS, E-mail security: Pretty Good Privacy, working of PGP, S/MIME, MIME, IP Security, Architecture, IPSec: strengths and benefits, IPv4, IPv6, ESP protocol, Web Security: Secure Socket layer, SSL session and connection.

Module III: Malicious Software, viruses, working of anti-virus software, worms, Trojans, spyware, firewall, characteristics of firewall, packet filters, application level gateways, firewall architecture, trusted systems.

Module IV: Security and Law:- Regulations in India. Information Technology Act 2000/2008.Cyber Crime and the IT Act 2000/2008.Indian Contract Act 1872, Indian Penal Code, Indian Copyright Act, Consumer Protection Act. Future Trends – The Law of Convergence.

Assignments and activities: *AES, Blowfish algorithms, Kerberos, Comparison of PGP and S/MIME, study of common malicious software, antiviruses.*

4. REFERENCES

4.1 Core

Brijendra Singh, *Cryptography & Network Security*, PHI.

Pachghare, V.K., *Cryptography and Information Security,* PHI.

NB:- Activities and assignments are not meant for End_Semester_Examination

PC1672 COMPUTER NETWORKS

1. AIM:

To introduce computer networks and through knowledge of data communication networks, their structures, techniques as well as some common standards.

2. OBJECTIVES:

On completion of this course student shall:

Be aware of evolution of development of networks understand the basic transmission technologies and characteristics understand the use of layer architecture for networking systems understand the main design issues of transport protocols and the mechanism to control traffic flow and congestion.

3. SYLLABUS

Module I Introduction to networks – Data Communication – Data flow simplex, Half duplex, Full duplex- Type of Connection – Point–to-Point, multi-drop. Bandwidth- bit rate, baud rate. Transmission media – Copper wires, fiber optics, Radio transmission, microwave, Satellite. switching-circuit, packet, message.

Module II Protocols – standards- Layering, packets, Layered PDUs, ISO-OSI model, TCP/IP model – Comparison. Framing- bit oriented, byte oriented, Error correction – detection – parity, hamming code, CRC. Flow control, error control- Piggybacking, pipelining, Protocols- Noise less and noisy channels – stop &wait, Stop &wait ARQ, Sliding window.

Module III Access control - pure- slotted ALOHA, CSMA, CSMA/CD. LAN Standards – Ethernet, Token bus, Token ring. Interfacing devices – bridge, hub, switch, router, gateway.

Module IV Internetworking- datagrams, fragmentation – routing-Distance vector routing, Link state routing. Concepts of congestion control-leaky bucket algorithm. Process to Process delivery -TCP, UDP, Application Layer -DNS, Remote login, file transfer protocol(FTP).

Assignments and activities: *Practical networking- networking in LINUX, Peer–to-peer networking, Measurement and packet analysis, blue tooth, emerging topics*

4. REFERENCES

4.1 Core

Brijendra Singh, *Data Communication and Computer Networks*, 2/e, PHI

4.2 Additional

Behrouz A Forouzan, *Data Communication & Computer networks*, 4thed, MGH

Achyut S Godbole, *Data communications and networks*, McGrawHill, Second

4.3 Internet resources:

- www.netbook.cs.purdue.edu, www.labbook.cs.purdue.edu,
- www.edugrid.ac.in/webfolder/courses/cn/cn_indEX.htm

NB:- Activities and assignments are not meant for End_Semester_Examination

PC1673 MAJOR PROJECT & VIVA

1. AIM:

To expose student to industry-standard project practices, through a real-life project work under time and deliverable constraints, applying the knowledge acquired through various courses.

2. OBJECTIVES:

To provide an opportunity to apply the knowledge gained through various courses in solving a real life problem

To provide an opportunity to practice different phases of software/system development life cycle

To introduce the student to a professional environment and/or style typical of a global IT industry

To provide an opportunity for structured team work and project management To provide an opportunity for effective, real-life, technical documentation

To provide an opportunity to practice time, resource and person management.

3. PROJECT GUIDELINES

Group Size – Maximum 3

No. of records – No. of group members + 1 (Department copy) Certificate should include the names of all members

The minimal phases for the project are: Project search, finalization and allocation, Investigation of system requirements, Data and Process Modelling, System Design, Program design, Program coding and unit testing, System integration, System implementation and acceptance testing.

3.1 Planning the Project: The Major Project is an involved Exercise which has to be planned well in advance. The topic should be chosen in Semester 4 itself and the case study of Course CS1302 should as far as possible, be based on the project topic, though on Exceptional cases, for valid reasons, the project guide may waive this condition. Related reading, training and discussions should start from semester 5 itself.

3.2 Selection of project work: Project work could be of 3 types:

a) Developing solution for a real-life problem: In this case, a requirement for developing a computer based solution already Exists and the different stages of system development life cycle is to be implemented successfully. Examples are Accounting Software Package for a particular organization, Computerisation of administrative functions of an organization, Web Based Commerce, etc. The scope for creativity and Exploration in such projects is limited, but if done meticulously, valuable Experience in the industrial context can be gained.

(b) Innovative Product development: These are projects where a clear-cut requirement for developing a computer based solution may not be Existing, but a possible utility for the same is conceived by the proposer. An Example is a Malayalam Language Editor with Spell Checker, Computer Music Software for Indian Music, Heat Engines Simulation Software for eLearning, Digital Water Marking Software,

(c) Research level project: These are projects which involve research and development and may not be as structured and clear cut as in the above case. Examples are Malayalam Character Recognition, Neural Net Based Speech Recogniser, Biometric Systems, Machine Translation System etc. These projects provide more challenging opportunities to students, but at EX level is a difficult choice. If any student identifies proper support in terms of guidance, technology and references from External organizations and also the supervisors are convinced of the ability of the student(s) to take up the project, it shall be permitted. The methodology and reporting of such projects could be markedly different from type (a) and is left to the proposer/external supervisor of the projects.

3.3 Selection of Team: To meet the stated objectives, it is imperative that Major Project is done through a team effort**.** Though it would be ideal to select the team members at random (drawing lots) and this should be strongly recommended, due to practical considerations, students may also be given the choice of forming themselves into teams with 3 to 5 members (teams less than 3 members may be permitted in Exceptional cases, for valid reasons). A gender mix should also be strongly suggested. A team leader shall be elected through drawing lots. Teams shall maintain team meeting minutes and ensure that every team member has tasks assigned in writing. Team meeting minutes shall form a part of the Project Report. Even if students are doing projects as groups, each one must independently take up different modules of the work and must submit the reports also independently (though, in such cases, some common materials is permissible). Evaluation will also be done independently.

3.4 Selection of Tools: No restrictions shall be placed on the students in the choice of platforms/tools/ languages to be utilized for their project work, though open source is strongly recommended, wherever possible. No value shall be placed on the use of tools in the evaluation of the project.

3.5 Selection of Organisation & Guide: No restrictions shall be placed on the students in the choice of organization where project work may be done, in terms of locality, type (public/private) etc. It is the duty of the Head of Institute/Principal of College to ensure that the Aim, Objectives and full project guidelines are communicated to the external organization. The guide should ideally be a post-graduate with minimum 2 years of work experience.

Students may also choose to do project in the college/institute (or partially in the college/institute and partially in an external organization), especially product-based work, but in such cases the supervisors must ensure that (i) industry practices are followed (ii) the students undertake a planned visit to an IT industry with

international operations to make up for the loss of experience and (iii) the services of an external guide with industry experience is obtained.

3.6 Project Management: Head of Institute/Principal of College should publish a list of students, projects topics, internal guide and external organization (if any) and teams agreed, before the end of semester 5. Changes in this list may be permitted for valid reasons and shall be considered favourably by Head of Institute/ Principal of College any time before commencement of the project. Any request for change after commencement should considered by a committee of 3 teachers and their recommendation shall be accepted by Head of Institute/Principal of College.

Gantt-chart of proposed activities and a draft statement of project deliverables (which may subsequently be altered if justified) should be prepared before the commencement of the project. The actual completion of each phase should be noted on the chart in the course of the project work. Students should submit a fortnightly report of progress which could be indication of percentage of completion marked on the orginal Gantt-chart, with any notes attached. Students should ideally keep a daily activity log sheet. Team meetings should be documented in the format given at the end. Changes in the submitted documents are possible, as project development is essentially an evolutionary process. The project guide must ensure that changes are necessary due to the knowledge gained in succeeding phases of the project. The date of completion of a phase should be brought forward if the changes made are deemed to be errors and not due to additional knowledge gained from a succeeding phase.

3.7 Documentation:

The following are the major guidelines: The final outer dimensions of the report shall be 21 cm X 30 cm. The colour of the flap cover shall be light green. Only hard binding should be done, with title of the thesis and the words "<BRIEF TITLE> BSc (CS) Project Report 200…" displayed on the spine in 20 point, Bold, Times New Roman, as in example below. In case the title is too long, a shorter version of it may be used (Like "Image Pro" instead of "Image Pro – An Interactive Image Processing package"). It is highly recommended that Latex be used for documentation.

- The text of the report should be set in 12 pt, Times New Roman, Single Spaced.
- Headings should be set as follows: CHAPTER HEADINGS 20 pt, Times New Roman, Bold, All Caps, Centered.

WEB BASED BILLING SOFTWARE: BSC(CS) PROJECT 2009

1. SECTION HEADINGS 12 pt, Times New Roman, Bold, All Caps, Left Adjusted. 1.1 Section Sub-headings 12 pt, Times New Roman, Bold, Left Adjusted.

Titles of Figures, Tables etc are done in 12 point, times New Roman, Italics, Centered.

<PROJECT TITLE>

<STUDENT'S NAME>

<COLLEGE NAME>

PROJECT REPORT

Submitted in partial fulfilment of the

Requirements for the award of

Bsc (computer science) degree of

University of kerala

2014

Some general guidelines on documentation stylistics are:

- Double quotes and single quotes (“”, ‘’) should be used only when essential. In most cases words put in quotes are better highlighted by setting them in italics. Eg: This process is known as “morphing”. This process is known as *morphing*.
- Page numbers shall be set at right hand top corner, paragraph indent shall be set as 3.
- Only single space need be left above a section or sub-section heading and no space may be left after them.
- Certificate should be in the format: “Certified that this report titled..... is a bonafide record of the project work done by Sri/Kum..... under our supervision and guidance, towards partial fulfillment of the requirements for the award of the Degree of BSC (Computer Science) of the University of Kerala” with dated signatures of Internal; Guide, external guide and also Head of Institute/ College.
- If the project is done in an external organization, another certificates on the letterhead of the organization is required: “Certified that his report titled ..... is a bonafide record of the project work done by Sri/Kum..... under any supervision and guidance, at the ..... Department of..... (Organization) towards partial fulfilment of the requirements for the award of the Degree of BSC (Computer Science) of the University of Kerala”.
- References shall be IEEE format (see any IEEE magazine or transaction). Take care in use of italics and punctuation. While doing the project, keep note of all books you refer, in the correct format, and include them in alphabetical order in your reference list. Eg: A book is cited as: Kartalopoulos, S V Understanding Neural Networks and Fuzzy Logic, BPB Publishers, 1996, pp. 21-27. (pp.21-27 indicates that pages 21-27 have been referred. If the whole book is being referred, this may be omitted. If a single page is referred, say 7, it may be cited as p.7 Report writing is NOT a hasty activity done after finishing the project.

Students must try to develop the report along with the work, so as to give it flesh and blood. Drafts should be read, modified, spell checked and grammar checked at least thrice during the course of the project and before a final printout is taken, the same may be got approved from the internal guide. The students should send two interim reports to internal guides. This will also help the students in their report writing.

The Gantt chart, fortnightly progress reports, and team meeting minutes mentioned in section 3.5 should appear as appendix to the project report. Regarding the body of the report, as an indicative Example, the following is given (though students should not attempt to fit every kind of project report into this format):

- Organizational overview (of the client organization, where applicable)
- Description of the present system
- Limitations of the present system
- The Proposed system- Its advantages and features
- Context diagram of the proposed system.
- Top level DFD of the proposed system with at least one additional level of Expansion
- Structure Chart of the System
- System flowchart
- Menu Tree
- Program List

- Files or tables (for DBMS projects) list. Class names to be entered for each file in OO systems.
- List of fields or attributes (for DBMS projects) in each file or table.
- Program – File table that shows the files/tables used by each program and the files are read, written to, updated, queried or reports were produced from them.
- Reports List with column headings and summary information for each report.
- System Coding and variable/file/table naming conventions
- System controls and standards
- Screen layouts for each data entry screen.
- Report formats for each report.

Program documentation is suggested on the following lines:

- Program id
- Program level run chart
- Program function Explanation
- Data entry screen (reproduced from system documentation).
- Report layout (reproduced from system documentations)
- Program level pseudo code or flowchart.
- Decision tables, decision trees, with English Explanation where necessary.
- Program listing
- Test data & Results

3.8 Methodology:

Wherever applicable, object oriented approach should be used for software development. The project report should generally contain details of the following steps *(though students should not attempt to fit every kind of project into this format):*

(a) Analysis

- Study of existing systems and its drawbacks (general)
- Understanding the functionalities of the system (detailed)
- Preparation of requirement
- Conduct of Feasibility study
- Identification of relevant Objects
- Abstraction of each object (attributed and methods)
- Relationship between objects

(b) Design

- Design of each subsystems
- Design of each classes
- Design of communications between objects
- Design of Algorithms for problem solving
- User interface Design
- Any other steps if necessary

(c) Coding and Impletion

(d) Testing

(e) Security, Backup and Recovery Mechanisms

(f) On line help and User Manuals

(g) Upgradability Possibilities

3.9 Project IPR & Utilisation: The intellectual property rights in all project work done by the students shall vest with the University of Kerala, except in cases where some external organizations seek undertaking from students to concede IPR in all work done in their organization or under their guidance. Where possible, students should attempt to obtain at least a joint IPR for the University. In cases where project works are of public utility, students shall be asked to publish their work including source code and documentation, in so far as their rights are clear.

4. REFERENCES

4.1 Core

S A Kelkar, *Software Project Management*, Prentice Hall of India

W Alan Randolph, Barry Z. Posner, *Effective project planning and management*, PHI

4.2 Additional

Greg Mandanis, *Software Project Management Kit for Dummies*, IDG Books Joel Henry, *Software Project management*

Frederic P B, Mythical Man-month, *Essays on Software Engineering*, Addison Wesley

David Lamport, *Latex: A document Preparation System*, 2/e, Pearson Education

COMPLEMENTARY COURSE

COMPLEMENTARY COURSE (MATHEMATICS) MATHEMATICS-I

(COMPLEX NUMBERS, DIFFERENTIATION AND THEORY OF EQUATIONS) CODE: MM 1131.6 INSTRUCTIONAL HOURS PER WEEK: 5

No. of Credits: 4

Overview of the course:

The auxiliary course intended for students of Physics and computer applications students lays emphsis on the application of mathematical methods.The first module gives an intoduction to complex numbers.The next two modules on Calculus links the topic to the real world and the student's own experience as the authors of the text put it. Doing as many of the indicated exercises from the text should prove valuable in understanding the applications of the theory. Applications of the subject on the lines of those in Physics as given in the text could be obtained from the net. The fourth module covers theory of equations.

Module 1: Complex Numbers

- Review of basic results: Introduction to complex numbers, representation of complex numbers, the Argand diagram, De Moivre's theorem, evaluation of roots of complex numbers, finding nth roots of unity, its properties,
- Expansion of trigonometric functions of multiples of angles, expansion of powers of trigonometric functions, separation into real and imaginary parts

Module 2: Differentiation with applications I

- Functions and graphs of functions with examples . Interpretations of slope. The graph showing direct and inverse proportional variation. Mathematical models (functions as models). Parametric equations. Cycloid.

Exercise set 1.8; Questions 31 - 34.

- Instantaneous velocity and the slope of a curve. Limits. Infinite limits and vertical asymptotes. Limits at infinity and horizontal asymptotes. Some basic limits. Indeterminate forms of the type 0/0.

Exercise set 2.1; Questions 27 and 28.

- Continuity. Slopes and rates of change. Rates of change in applications. Derivative. Exercise set 3.1; Questions 1, 2 and 16.
- Techniques of differentiation. Higher derivatives. Implicit differentiation. Related rates. Local linear approximation. Differentials. Examples 1 - 6.

Exercise set 3.8; Questions 53 - 55.

- Rectilinear motion. Speeding up and slowing down. Analysing the position versus time curve. Free fall motion.

Examples 1 - 7. Exercise set 4.4; Questions 8, 9, 30 - 32.

- Absolute maxima and minima. Applied maximum anmd minimimum problems.

Exercise set 4.6; Questions 47 and 48.

- Statement of Rolle's Theorem and Mean Value Theorem. The velocity interpretation of Mean Value Theorem. Statement of theorems 4.1.2 and 4.83 (consequences of the Mean Value Theorem).

- Inverse functions. Continuity and differentiability of inverse functions. Graphing inverse functions. exponential and logarithmic functions. Derivatives of logarithmic functions and logarithmic differentiation. Derivatives of the exponential function. Graphs and applications involving logarithmic and exponential functions.

Exercise set 7.4; Question 50.

- L' Hospital's Rule for finding the limits (without proof) of indeterminate forms of the type 0/0 and 1/1. Analysing the growth of exponential functions using L'Hospital's Rule. Indeterminate forms of type 0 ·1 and 1-1 and their evaluation by converting them to 0/0 or 1/1 types. Indeterminate forms of type 00, 10 and 11.
- Definitions of hyperbolic functions. Graphs of hyperbolic functions. Hyperbolic identities. Why they are called hyperbolic functions. Derivatives of hyperbolic functions. Inverse hyperbolic functions. Logarithmic forms of inverse hyperbolic functions. Derivatives of inverse hyperbolic functions.

Module 3: Differentiation with applications II

- Power series and their convergence. Results about the region of convergence of a power series(without proof). Radius of convergence.Functions defined by a power series. Results about term by term differentiation and integration of power series (without proof). Taylor's theorem with derivative form of remainder (without proof) and its use in approximating functions by polynomials. Taylor series and Maclaurin's series and representation of functions by Taylor series. Taylor series of basic functions and the regions where these series converge to the respective functions. Binomial series as a Taylor series and its convergence. Obtaining Taylor series representation of other functions by differentiaion, integration, substitution etc.
- Functions of two variables. Graphs of functions of two variables. Equations of surfaces such as sphere, cylinder, cone, paraboloid, ellipsoid, hyperboloid etc. Partial derivatives and chain rule (various forms). Euler's theorem for homogeneous functions. Jacobians.

Exercise set 14.3; Questions 47 and 48. Exercise set 14.4; Question 50.

Exercise set 14.5; Question 42.

- Local maxima and minima of functions of two variables. Use of partial derivatives in locating local maxima and minima. Lagrange method for finding maximum/minimum values of functions subject to one constraint.

Exercise set 14.9; Question 20.

Module 4: Theory of equations

- Polynomial equations and fundamental theorem of algebra (without proof). Applications of the fundamental theorem to equations having one or more complex roots, rational roots or multiple roots.
- Relations between roots and coefficients of a polynomial equation and computation of symmetric functions of roots. Finding equations whose roots are functions of the roots of a given equation. Reciprocal equation and method of finding its roots.
- Analytical methods for solving polynomial equations of order up to four-quadratic formula, Cardano's method for solving cubic equations), Ferrari's method (for quartic equations). Remarks about the insolvability of equations of degree five or more. Finding the nature of roots without solving-Des Cartes' rule of signs.

Module 1: 18 hours; Module 2: 24 hours; Module 3: 24 hours; Module 4: 24 hours

Texts:

1. Howard Anton, Irl Bivens, Sephen Davis, Calculus. Seventh Edition, John Wiley & Sons inc
2. Barnard and Child, Higher Algebra, Macmillan.
3. S K Mapa, Higher Algebra (Classical), Sarat Book Dirtibutors, Kolkata. References:

1. James Stewart, Essential Calculus, Thompson Publications, 2007.
2. Thomas and Finney, Calculus and Analytic Geometry, Ninth Edition, Addison-Wesley.
3. Peter V. O' Neil, Advanced Engineering Mathematics, Thompson Publications, 2007

CODE: MM 1231.6 INSTRUCTIONAL HOURS PER WEEK: 5

NO. OF CREDITS: 4 MATHEMATICS-II

(ANALYTIC GEOMETRY, INTEGRATION, DIFFERENTIAL EQUATIONS AND MATRICES)

Overview of the course:

The complementary course in the second semester continues in laying emphasis on applications of integral calculus and differential equations to problems in Physics. Module 1 consists of a review of basic integration techniques and the applications of integration. It also covers multiple integrals. Module 2 deals with differential equations, while Module 3 covers matrix theory.

Module 1: Analytic Geometry

- Geometric definition of a conic-the focus, directrix and eccentricity of a conic. Classification of conics into ellise, parabola and hyperbola based on the value of eccentricity. Sketch of the graphs of conics. Reflection properties of conic sections.

Exercise set 11.4; Questions 39 - 43.

- Equations of the conics in standard positions. Equations of the conics which are translated from standard positions vertically or horizontally. Parametric representation of conics in standard form. Condition for a given straight line to be a tangent to a conic. Equation of the tangent and normal to a conic at a point.
- Asymptotes of a hyperbola. Equation of the asymptotes. Rectangular hyperbola and its parameric representation. Equation of tangent and normal to a rectangular hyperbola at a given point.
- Rotation of co-ordinate axes. Equation connecting the co-ordinates in the original and rotated axes. Elimination of the cross product term in a general second degree equation by suitable rotation. Identifying conics in non-standard positions represented by general second degree equation by suitable rotation of axes. The discriminant of a general second degree equation and its invariance under rotation of co-ordinate axes. The conditions on the discriminant for the general second degree equation to represent a conic, a pair of straight lines or a circle.

Module 2: Integration with applications

- Indefinite integrals (Review only), integral curves, integration from the view point of differential equations, direction fields

Exercise set 5.2; Questions 43 and 44

- (Review only) Definite integral and Fundamental Theorem of Calculus.
- Rectilinear motion: finding position and velocity by integration. Uniformly accelerated motion. The free-fall model. integrating rates of change. Displacement in rectilinear motion. Distance travelled in rectilinear

motion. Analysing the velocity versus time curve. Average value of a continuous function. Average velocity revisited.

Exercise set 5.7; Questions 3, 4, 5, 6, 29 and 55

- Review of integration techniques.
- Use of definite integrals in finding area under curves, area between two curves, volume of revolution, arc length and surface area of a solid of revolution.
- The idea of approximating the volume under a bounded surface in 3-space by volumes of boxes, leading to the definition of double integrals of functions of two variables over bounded regions. Evaluation of double integrals by iterated integrals. Evaluation by changing to polar co-ordinates and by suitably changing order of integration in the iterated integral. Applications to finding the volume of solids under bounded surfaces.

Module 3: Differential Equations

- Review of basic concepts about differential equations and their solutions. Method of solving special types of first order ODEs such as variable separable, exact, homogeneous, and linear. Finding the family of curves orthogonal to a given family.
- Second order linear differential equations. Nature of the general solution of homogeneous and non-homogeneous linear ODEs. Extension to higher order ODEs.• Second order linear homogeneous ODEs with constant coefficients. The characteristic equation and its use in finding the general solution. Extension of the results to higher order ODEs.
- Second order linear non-homogeneous ODEs with constant coefficients. General solution as the sum of complementary function and particular integral. Second order linear differential operator and its properties.The inverse operator and its properties. Operator method for finding the particular integral of simple functions. Extension of the results to higher order equations. Cauchy and Legendre equations and their solutions by reducing to equations with constant coefficients by suitable change of variable.

Module 4: Theory of Matrices

- (Review only) basic concepts about matrices. Operations involving matrices, different types of matrices. Representation of a system of linear equation in matrix form. Inverse of a matrix, Cramer's rule.
- The rows and columns of a matrix as elements of Rn for suitable n. Rank of a matrix as the maximum number of linearly independent rows/columns. Elementary row operations. Invariance of rank under elementary row operations. The echelon form and its uniqueness. Finding the rank of a matrix by reducing to echelon form.
- Homogeneous and non-homogeneous system of linear equations. Results about the existence and nature of solution of a system of equations in terms of the ranks of the matrices involved.
- The eigen value problem. Method of finding the eigen values and eigen vectors of a matrix. Basic properties of eigen values and eigen vectors. Eigen values and eigen vectors of a symmetric matrix.
- Diagonalisable matrices. Advantages of diagonalisable matrices in computing matrix powers and solving system of equations. The result that a square matrix of order n is diagonalisabe (i) if and only if it has n linearly independent eigen vectors (ii) if it has n distinct eigen values. Method of diagonalising a matrix. Diagonalisation of real symmetric matrices. Similar matrices. Module 1: 22 hours; Module 2: 23 hours; Module 3: 22 hours; Module 4: 23 hours Text for Module 2: Howard Anton, et al, Calculus. Seventh Edition, JohnWiley

  Text for Module 4: David C. Lay, Linear Algebra, Thompson Publications,2007.

References:

1. James Stewart, Essential Calculus, Thompson Publications, 2007.
2. Thomas and Finney, Calculus and Analytic Geometry, Ninth Edition, Addison-Wesley.
3. Peter V. O' Neil, Advanced Engineering Mathematics, Thompson Publications, 2007
4. Michael D. Greenberg, Advanced Engineering Mathematics, Pearson Education, 2002.
5. George F Simmons, Differential equations with applications and historical notes, Tata McGraw Hill, 2003

Distribution of instructional hours:

Module 1: 24 hours; Module 2: 24 hours; Module 3: 24 hours; Module 4: 18 hours

CODE: MM 1331.6 INSTRUCTIONAL HOURS PER WEEK: 5NO. OF CREDITS: 4
MATHEMATICS-III (VECTOR DIFFERENTIATION, COORDINATE SYSTEMS, ABSTRACT ALGEBRA AND FOURIER SERIES AND TRANSFORMS)

Module 1: Vector Differentiation

- (Review only) Vectors in 3-space. Addition of two vectors, multiplication of a vector by a scalar and basic properties of these operations. Representation in Cartesian coordinates using standard basis. Dot,cross and triple product of vectors, their significance and properties.• Vector function of a single variable and representation in terms of standard basis. Limit of a vector function and evaluation of limit in Cartesian representation. Continuous vector functions and the idea that such functions represent oriented space curves. Examples.
- Derivative of a vector function and its geometric significance. Derivative in terms of Cartesian components. Tangent vector to a curve, smooth and piecewise smooth curves. Applications to finding the length and curvature of space curves, velocity and acceleration of motion along a curve etc.
- Scalar field and level surfaces. The gradient vector of a scalar field (Cartesian form) at a point and its geometric significance. Gradient as an operator and its properties. Directional derivative of a scalar field and its significance. Use of gradient vector in computing directional derivative.
- Vector fields and their Cartesian representation. Sketching of simple vector fields in the plane. The curl and divergence of a vector field(Cartesian form) and their physical significance. The curl and divergence as operators, their properties. Irrotational and solenoidal vector fields. Various combinations of gradient, curl and divergence operators.

Module 2: Coordinate systems

- Conic sections in polar coordinates. Eccentricity of an ellipse as a measure of flatness. Polar equations of conics. Sketching conics in polar coordinates. Kepler's Laws. Example 4 of section 11.6.
- Triple integrals over bounded regions in three space. Evaluation by iterated integrals. Cylindrical coordinates and spherical coordinates and their relation to Cartesian coordinates. Use of cylindrical and spherical co-ordinates in evaluating triple integrals. Applications of triple integrals to finding volumes of solid objects.
- Spherical co-ordinates, polar co-ordinates, cylindrical co-ordinates, relation to cartesian co-ordinates, application of integration, integration in spherical co-ordinates.

Module 3: Abstract algebra

- Groups–definition and examples, elementary properties, finite groups and subgroups, cyclic groups, elementary properties, symmetry of plane figures • Rings and fields– definition and examples,

- Vector spaces, definition and examples, elementary properties, linear dependence and independence, basis and dimension.

Module 4: Fourier Series and transforms

- Periodic functions, trigonometric series, Fourier series, evaluation of Fourier coefficients for functions defined in (-1,+1), Fourier series for odd and even functions, half range series, Fourier series for odd and even functions, Fourier series of functions defined in (-L,+L).
- Fourier integrals and Fourier transforms.

  Text for Modules 1 and 2: Howard Anton, et al, Calculus. Seventh Edition, John Wiley Text for Module 3: J B Fraleigh, A First Course in Abstract Algebra, Narosa Publications Text for Module 4: Kreyzig, Advanced Engineering Mathematics, 8th edition, John Wiley.

References:

1. James Stewart, Essential Calculus, Thompson Publications, 2007.
2. Thomas and Finney, Calculus and Analytic Geometry, Ninth Edition, Addison-Wesley.
3. D A R Wallace, Groups, Rings and Fields, Springer

Distribution of instructional hours:

Module 1: 27 hours; Module 2: 27 hours; Module 3: 18 hours; Module 4: 18hours

CODE: MM 1431.6 INSTRUCTIONAL HOURS PER WEEK: 5 No. OF CREDITS: 4 MATHEMATICS –IV (LINEAR TRANSFORMATIONS, VECTOR INTEGRATION AND COMPLEX ANALYSIS.)

Module 1: Linear Transformations

- Linear transformations from Rn into Rm. Matrix of a linear transformation relative to a given pair of bases and linear transformation defined by a matrix. Characterisation of linear transformations from Rn into Rm.
- Linear transformations from Rn into Rn and matix of suchtranformations. Matrix representation of simple tranformations such as rotation, reflection, projection etc. on the plane. Relation between matricesof a given transformation relative to two different bases. Method of choosing a suitable basis in which the matrix of a given transformation has the particularly simple form of a diagonal matrix.

Module 2: Vector Integration

- The method of computing the work done by a force field in moving a particle along a curve leading to the definition of line integral of a vector field along a smooth curve. Scalar representation of line integral. Evaluation as a definite integral. Properties. Line integral over piecewise smooth curves. Green's theorem in the plane (without proof) for a region bounded by a simple closed piecewise smooth curve.
- Oriented surfaces. The idea of flux of a vetor field over a surface in 3-space. The surface integral of a vector field over a bounded oriented surface. Evaluation by reducing to a double integral. Use of cylindric al and spherical co-ordinates in computing surface integral over cylindrical and spherical surfaces.
- Stokes' theorem (without proof) for an open surface with boundary a piecwise smooth closed curve. Gauss' divergence theorem (without proof). Verification of the theorems in simple cases and their use in computing line integrals or surface integrals which are difficult to evaluate directly. Physical intrepretation of divergence and curl in terms of the velocity field of a fluid flow.

- Conservative fields and potential functions. Relation of conservative vector fields to their irrotational nature and the path- independence of line integrals in the field (without proof). Significance of these results in the case of conservative force fields such as gravitational, magnetic and electric fields. Method of finding the potential function of a conservative field.

Module 3: Complex Analysis -I

1. Complex Functions

- (Review only) Basic concepts about complex numbers. Real and imaginary parts, modulus of a complex number. Algebra of complex numbers, complex plane, modulus and argument of a complex number, n-th roots of a complex number.
- Sets of points in the complex plane, circle, open disc, closed disc, closed set open set, connected set and limit point of a set.
- Complex functions. The real and imaginary parts of a complex function. Functions as mapping between two complex planes. Polynomial and rational functions. Definition of elementary functions exp(z),sinz,cosz etc by defining their real and imaginary parts in terms of known real functions. Definition of logz as the inverse of exponential function and its multivalued nature. Principal branch of logarithm. Rational and complex powers of a complex number and their multi-valuedness.

2. Complex differentiation

- The limit of a complex function. Limit in terms of real and imaginary parts of the function. Basic properties of limits. Derivative of a complex function. The Cauchy-Riemann equations and the necessary and sufficient conditions for differentiability. Analytic functions. Analyticity of theelementary functions.
- Harmonic functions of two variables. The result that the real and imaginary parts of an analytic function are harmonic. Method of constructingan analytic function with a given harmonic function as real or imaginary part.

Module 4: Complex Analysis -II

Complex Integration

- Curves in the complex plane. Smooth and piecewise smooth curves. Integral of a complex function along a curve. Evaluation of line integrals by reducing to definite integral.
- Cauchy's theorem (without proof) and its implications.Conditions for independence of path in simply connected domains. Fundamental theorem showing connection between line integral of a function and its and anti-derivative (without proof). Cauchy's integral formula for derivatives and its use in computing line integrals over simple closed curves.

Text for Modules 3 and 4: Kreyzig, Advanced Engineering Mathematics, 8th edition, John Wiley. References:

1. James Stewart, Essential Calculus, Thompson Publications, 2007.
2. Thomas and Finney, Calculus and Analytic Geometry, Ninth Edition, Addison-Wesley.
3. Peter V. O' Neil, Advanced Engineering Mathematics, Thompson Publications, 2007
4. Michael D. Greenberg, Advanced Engineering Mathematics, Pearson Education, 2002.

Distribution of instructional hours:

Module 1: 18 hours; Module 2: 27 hours; Module 3: 27 hours; Module 4: 18 hours.

UNIVERSITY OF KERALA

COURSE STRUCTURE AND SYLLABI

FOR

CAREER-RELATED FIRST DEGREE

PROGRAMME IN

PHYSICS AND COMPUTER

APPLICATIONS

UNDER

CHOICE BASED CREDIT & SEMESTER- SYSTEM (CBCS)

(2015 admission onwards)

kup 302(2)/2015-'16

UNIVERSITY OF KERALA

M. A. ECONOMICS PROGRAMME
(Semester System)

REVISED SYLLABUS

(With effect from 2018 Admission Onwards)

2018

Syllabus for M.A. Economics Programme (Semester System) Offered in Affiliated Colleges.

(with effect from 2018 Admission Onwards)

Course Structure and Distribution of Marks

Semester	Paper Code	Title of the paper	Distribution of Instructional hours (Lecture) per semester	Instructional hours (Lecture) per week	Duration of ESA (Hrs.)	Maximum Marks		
						CA	ESA	Total
I	EC 211	Micro Economics I	120	7	3	25	75	100
	EC 212	Economics of Growth and Development	110	6	3	25	75	100
	EC 213	Indian Economic Policy I	110	6	3	25	75	100
	EC 214	Quantitative Methods for Economics	110	6	3	25	75	100
II	EC 221	Micro Economics II	120	7	3	25	75	100
	EC 222	Economics of Social Sector and Environment	110	6	3	25	75	100
	EC 223	Indian Economic Policy II	110	6	3	25	75	100
	EC 224	Econometrics and Research Methodology	110	6	3	25	75	100
III	EC 231	Macro Economics -I	120	7	3	25	75	100
	EC 232	International Economics I	110	6	3	25	75	100
	EC 233	Public Economics	110	6	3	25	75	100
		Optional I	110	6	3	25	75	100
IV	EC 241	Macro Economics -II	120	7	3	25	75	100
	EC 242	International Economics II	110	6	3	25	75	100
	EC 243	Financial Securities Market Analysis	110#	6	3	25	75	100
		Optional II	110	6	3	25	100	100
	EC 244	Dissertation	-	-	-	-	-	100
		Viva-Voce	-	-	-	-	-	100
		Total	**1800**		**-**	**-**	**-**	**1800**

Out of 110 hours, 5 hours for practical session.

CA : Continuous Assessment. **ESA : End Semester Assessment**

OPTIONAL PAPERS

(One paper each in Semester III and Semester IV)

Semester	Paper Code	Title
III	EC 201	Agricultural Economics
	EC 202	Economics of Insurance
	EC 203	Labour Economics
	EC 204	Law and Economics
	EC 205	Mathematical Economics
	EC 206	Urban Planning
IV	EC 207	Advanced Econometrics
	EC 208	Demography
	EC 209	Economics of Infrastructure
	EC 2010	Industrial Economics
	EC 2011	Welfare Economics
	EC 2012	Women and Development

Scheme of Assessment

Continuous Assessment (C A): 25 marks

For the Papers other than the Paper "EC 243: Financial Securities Market Analysis"

Components	Marks
Attendance	5
Assignment	5
Seminar	5
Test Paper (average of the marks in two test papers)	10
Total	**25**

For the Paper "EC 243: Financial Securities Market Analysis"

Components	Marks
Attendance	5
Assignment	5
For attending 5 hours of practical work on online trade	5
Test Paper (average of the marks in two test papers)	10
Total	**25**

End Semester Assessment (ESA): 75 marks

This will be through a three hour written examination consisting of 10 very short answer questions (with no choices), each carrying 1 mark, 7 short answer questions to be chosen out of 10 questions, each carrying 5 marks, and 3 descriptive questions to be chosen out of five questions, each carrying 10 marks.

CORE PAPERS IN FIRST SEMESTER

EC 211: MICRO ECONOMICS – I

(Hours per semester: 120
Hours per week: 7)

Objectives

The purpose of the course is to provide an understanding of the principles of economics in application to individual decision makers, both consumers and firms. This course equips the students themselves with the various aspects of the conventional as well as the recent developments in microeconomic theory.

Course Contents

Module I: Recent Developments in Demand Theory (16 hours)

Pragmatic approach to demand analysis - constant elasticity demand function - distributed lag models (Nerlov's stock adjustment principle, Houthakker's and Tylors dynamic model) - linear expenditure system.

Module II: Production & Cost Analysis (24 hours)

Production function - homogenous and non-homogenous production functions - technical progress and production function - capital deepening, labor deepening and neutral technical progress - exogenous and endogenous technical progress - empirical production functions - Cobb-Douglas and Constant Elasticity Substitution production function - production function of a multi product firm.

Modern theories of cost - short run and long run - engineering cost curves - short run and long run - analysis of economies of scale - real and pecuniary economies of scale.

Module III: Imperfect Market Structures (32 hours)

Monopoly - monopoly power - social cost of monopoly - price discrimination - international price discrimination and dumping – inter-temporal price discrimination and peak load pricing - two-part tariff - tying and bundling - public policies towards monopolies - antitrust laws, regulations, public ownership - monopoly welfare loss.

Monopolistic competition- Chamberlin's (large group) model - equilibrium with new firm entering the industry; with price competition; with price competition and free entry- excess capacity – mark up over marginal cost - debate over advertizing.

Oligopoly- Non-collusive oligopoly - Cournot's duopoly, Bertrand duopoly, Chamberlin's small group model, Sweezy's kinked demand curve model.

Collusive oligopoly - cartels aiming at joint profit maximization and market sharing cartels – price leadership models; by low cost firm, by a dominant firm -brometric price leadership.

Public policy towards oligopoly: Antitrust laws, predatory pricing, tying.

Module IV: Theory of Games (24 hours)

Pay of matrix-Pure vs. mixed strategy – dominant strategy and Nash equilibrium - Prisoner's dilemma - Zero-sum game & non zero-sum game - Repeated games - enforcing a cartel – sequential games – game of entry deterrence.

Game Applications - important issues in game theory - cooperation, competition, coexistence and commitment.

Module V: Marginalist Controversy & Managerial and Behavioral Theories of the Firm (24 hours)

Hall and Hitch Report and full cost pricing principle - Gordon's attack on marginalism - Bain's limit pricing - collusion with and without new entrant - Sylos Labini's Limit pricing model - Baumol's theory of sales revenue maximization - single product model without advertizing-Marris' model of managerial enterprise - Williamson's model of managerial discretion – Cyert and March's behavioural model.

Reading List

Module-I

1. Koutsyiannis, A (2013), *Modern Microeconomics*, Macmillan Press, London (P-53-61)
2. Baumol, W.J (2009), Economic Theory and Operations Analysis, Prentice-Hall (P) Ltd, New Delhi.

Module-II

1. Mandal, RK (2007), *Micro Economic Theory,* Atlantic Publishers (P) Ltd (P-155-162,169-178,181-206)
2. Besanko, David & Braeutigam, Ronald (2015), *Micro Economics,* Wiley India (P) Ltd, New Delhi (P-163-169,191-195)
3. Raa, Thijsten (2013) *Micro Economics, Equilibrium and Efficiency,* Palgrave Macmillan (P.122-126)

4. Varian H.R (2003), *Intermediate Micro Economics,* East – West Press Edition (P-364-393)
5. Costa Da G.C (2001), *Value and Distribution* (P.79-81, 89-95)
6. Koutsyiannis, A (2013), *Modern Microeconomics*, Macmillan Press, London (P-77-78, 85, 99-101,114-121,126-137)
7. Snyder, Christopher &Nicholson, Walter (2012), Microeconomic Theory-Basic Principles and Extensions, Cengage learning (P-273-332)

Module-III

1. Salvatore, Dominick (2009), *Principles of Microeconomics* (P-301-303,309-314)
2. Mankiw, Gregory.N (2012), *Principles of Microeconomics*, 6th Edn, Cengage Learning (P-313,318-323,335-344,355-365)
3. Koutsyiannis, A (2013), *Modern Microeconomics*, Macmillan Press, London (P-202-212,216-232,237-252,412-413)
4. Krugman, Paul & Wells, Robin (2005), *Micro Economics'*, Worth Publishers, New York (P-325-328)
5. Mandal, RK (2007), *Micro Economic Theory,* Atlantic Publishers (P) Ltd (P-227-241,242-265,266-287)
6. Pindyck, Robert.S, Rubinfield, Daniel, L, Mehta, Premlal, L (6^{th} edition), *Micro Economics* (P. 346-348,351-354,460-479)
7. Serrano, Roberto, Feldman, Allan, M (2013), *A short course in intermediate micro economics with Calculus,* Cambridge University Press (204-212,223-235)
8. Mandal, RK (2007), *Micro Economic Theory,* Atlantic Publishers (P) Ltd (P-227-241,242-265)
9. Varian H.R (2010), *Intermediate Micro Economics*: *A Modern Approach,* East– West Press Edition (440-520)
10. Snyder, Christopher &Nicholson, Walter (2012), *Microeconomic Theory-Basic Principles and Extensions*, Cengage learning (449-477)

Module-IV

1. Varian H.R (2013), *Intermediate Micro Economics*, East – West Press Edition (P-525-565)

2. Pindyck, Robert.S, Rubinfield, Daniel, L, Mehta, Premlal, L(6th edition), *Micro Economics* (P. 355-365,369-391)
3. Serrano, Roberto, Feldman, Allan, M (2013), Snyder, Christopher &Nicholson, Walter (2012), *Microeconomic Theory-Basic Principles and Extensions*, Cengage learning (225-269)
4. *A short course in intermediate micro economics with Calculus,* Cambridge University Press (242-260)
5. Salvatore, Dominick (2009) *Principles of Microeconomic*s (P-365-371)
6. Koutsyiannis, A (), *Modern Microeconomics*, Macmillan Press, London (P-406-412)
7. Snyder, Christopher &Nicholson, Walter (2012), *Microeconomic Theory-Basic Principles and Extensions*, Cengage learning (225-269)

Module-V

1. Koutsyiannis, A (), *Modern Microeconomics*, Macmillan Press, London (P-256-267,284-287,305-313,325-331,352-364,368-370)
2. Archibald G.C (Ed) (1971), *Theory of the firm*, Penguin (P) Ltd
3. Bain,J (1958),*Barriers to New Competition*, Harvard University Press, USA

EC 212: ECONOMICS OF GROWTH AND DEVELOPMENT

(Hours per semester: 110
Hours per week: 6)

Objectives

Development Economics represents an engaging branch of Economics. A course on the Economics of Growth and Development connects students of Economics to academic concerns, policies and practical solutions relevant for progression of all economies. The objective of this paper is to familiarizing students with the conceptual routes, theoretical dynamics and practical strategies of growth and development. It is expected that this course would orient them towards major themes of development, lead them towards more methodical probes and equip them with adequate analytical knowledge.

Course Contents

Module 1: **Approaches to Development (20 hours)**

Evolution of Development Economics-Approaches to development-Utilitarian- Social indicators- Basic needs- Quality of life- Redistribution with growth- Sustainable development- Responsible well being- Development ethics- Entitlements approach- Capabilities and functionings- Human development- Development as freedom- Human rights based approach- social capital.

Measurement of human development-Income poverty and Human poverty- Multidimensional Poverty Index-Institutions and economic development- Market- State- Civil Society-Behavioural development economics- Migration and development - Todaro Model.

Module 2: Theories of Economic Growth and Development-I (20 hours)

Classical theory-Adam Smith, Ricardo, Marx. Theory of Schumpeter - Harrod-Domar. Mahalanobis model-Joan Robinson. Solow-Swan model.Mead Kaldor–Mirrlees-Pasinetti.

Module 3: Theories of Economic Growth and Development-II (20 hours)

Production Function approaches: Learning by doing; Total Factor Productivity; Ramsay's rule and optimal savings; Golden Rule of Accumulation; Hicks and Harrod; Endogenous growth models (Romer; Uzawa-Lucas, AK).

Module 4: Structural aspects of development (20 hours)

Dualistic theories- Fei Ranis - Modernisation theory, Structuralist approaches: Furtado Singer-Prebisch - Dependency Theories: Samir Amin; Gundar Frank - Neo-Marxist approach, Baran - World systems approach-Emmanuel Wallerstein - Basic principles of Neo Liberalism.

Module 5: Emerging Issues (30 hours)

Inequality: Convergence Vs Divergence - Globalisation and Development: Views of Stiglitz - Participatory Development: tyranny / transformation Post 2015 development agenda - Impasse in development studies - Alternatives to the impasse.

Reading List

Module 1:

Basic reading list:

1. Thirlwall,A.P. 2006.Growth and Development :With Special Reference to Developing Economies. Macmillan.UK.
2. Todaro,M.P and Smith. 2014. Economic Development. Pearson Education.USA.
3. Fukuda-Parr and Shiva Kumar (eds.).Readings in Human Development.OUP.Oxford.

Additional reading List:

1. Sen, Amartya.1999. Development as Freedom. OUP.Oxford.
2. UNDP.Human Development Reports.1991;1994; 1995;1997;2000;2010
3. World Development Report.2015.Mind, Society and Behaviour. World Bank.Washington.
4. Chambers,R. 2005.Ideas for Developemnt.Earthscan.London
5. Gasper, D.2004.The Ethics of development.Edinburgh Uty.Press.Edinburgh
6. Ros,Jaime.2013.Rethinking Economic Development,Growth and Institutions. OUP.Oxford
7. Howell, Jude and J.Pearce.2002.Civil Society and Development. Lynne Rienner.London
8. Desai, Vandana and R.B.Potter.2014. The Companion to Development Studies. Routledge.London
9. Galbraith,J.K..1962. Economic Development in Perspective.Harvard University Press.USA

10. Mahbub-ul Haq.1995.Reflections on Human development. OUP.Oxford.

Modules 2, 3&4

Basic reading list:

1. Thirlwall,A.P. 2006.Growth and Development :With Special Reference to Developing Economies. Macmillan.UK.
2. 2.Todaro,M.P and Smith. 2014. Economic Development. Pearson Education.USA.
3. Ghatak, Subrata.1998.Introduction to Development Economics.Routledge.NY.
4. Jomo.K.S (ed.). 2005. The Pioneers of Development Economics. Zed Books. London
5. Meier,G.M and Rauch.2005.Leading Issues in Economic Development. Oxford University Press. Oxford.
6. 6.Palgrve Dictionary of Economics

Additional reading List:

1. 1.Meier.G.M &Seers.2000.Pioneers in Development.OUP.Oxford.
2. Dasgupta, Dipankar.2010. Modern Growth Theory. OUP.Oxford.
3. Solow.R.M. 2000. Growth Theory: An Exposition. OUP.Oxford.
4. 4.Ray,Debaraj.1998. Development Economics. Princeton .New Jersey.
5. Becker.G.S.1993. Human Capital. The University of Chicago Press. Chicago.
6. 6.Behrmans and Srinivasan.1995. Handbook of Development Economics. Vol.3. Elsevier.Amsterdam.
7. Kant, Rajani.1994. (ed.)Paradigms in Economic Development. M.E.Sharpe.NY.
8. Cypher,J.M. and J.L.Dietz. (eds.) 2004. The Process of Economic Development. Routledge.London.

Module 5.

Basic reading list:

1. Khan, Sharukh Rafi. 2014. A History of Developemnt Economics Thought.:Challenges and Counter Challenges. Routledge.London.
2. Krugman, P. 1995. The fall and rise of development Economics. In Development, Geography and Economic Theory, Chapter 1. Cambridge: MIT Press.
3. Schuurman,F.J.(eds.). 2004. Beyond the Impasse: New Directions in Development Theory. Zed Books.London.
4. Stiglitz,J. 2002. Globalisation and its Discontents.Norton&Co.USA.

5. Cooke,B. and Uma Kothari (eds.) . 2004. Participation: the New Tyranny? Zed Books.London.
6. Shorrocks, A. and Ralph Hoven (eds.).2004. Growth, Inequality and Poverty. OUP.Oxford.
7. Thomas Eicketty.Capital in the 21st Century

Additional reading List:

1. Cypher,J.M. and J.L.Dietz. (eds.) 2004. The Process of Economic Development. Routledge.London.
2. Munck and Hearn. (eds.).1999.Critical Development Theory. Zed Books.London.
3. Odekon, M (ed.). 2006.Encyclopedia of World Poverty.Sage.London.Vol.I
4. Sunna.C and Gualerzi (eds.).2016. Development economics in the Twenty –First Century.Routledge.London.
5. Odekon, M (ed.). 2006.Encyclopedia of World Poverty.Sage.London.Vol.I
6. Stiglitz,J. 2007. Making Globalisation Wok. Norton&Co.USA.
7. Kuznets, Simon. Economic Growth and Income Inequality. *The American Economic*
Leeson and Minogue.(eds.) 1988.Perspectives on Development. Routledge.London.

EC 213: INDIAN ECONOMIC POLICY - I

(Hours per semester: 110
Hours per week: 6)

Objectives

The Purpose of this course on Indian Economy is to enable the students to have an understanding of the various issues of the Indian Economy with a policy perspective. The focus of the syllabus is on the development perspectives of Indian Economy during the post Liberalization period since 1991.

Course Contents

Module 1 Economic Policy prior to 1991 (10 hours)

Mixed Economy- Centralized planning and Five Year Plans- Market intervention Policies-Public Sector Investment Policies.

Module 2 Structural Adjustment Reforms (20 hours)

Liberalization,Privatization and Globalization-Changes in reforms implemented by successive central Governments in India-NITI Ayog and discontinuation of Central Planning-Global Economic Crisis and its impact on Indian Economy- Recent Trends in Economic Growth and Structural Change-Demonetization and its effects on Indian Economy

Module 3 Population, Unemployment and Poverty (24 hours)

Demographic Changes- Trends and Patterns, New Population Policy, Urbanisation and its trend-Unemployment- Methods of estimating Unemployment and their limitations, Various committees for measuring Unemployment and their recommendations , Recent Employment Guarantee Programmes- Global Migration and Foreign Remittances - Poverty in India - Estimation of Poverty and their limitations, Recent committee Reports - Tendulkar, Saxena, Hashim and Rangarajan - Poverty Eradication Programmes .

Module 4 Agricultural Policies and Agricultural Development (20 hours)

Trends, Pattern and Performance of Agriculture Growth – Land Reforms and its impact, Changes in land use and cropping pattern, New Agriculture Policy 2000 onwards, Agricultural marketing, credit and finance - WTO and Indian Agriculture- Current Issues in Indian agriculture(agriculture credit, debt problems, subsidy etc).

Module 5 Industrial Policy and Industrial development (18 hours)

New Industrial Policies, Structural changes in Indian Industries since the reform period- Role of FDI in India's industrialization process, ICT based industrial development strategy - Impact of economic reforms on Small Scale industries.

Module 6 Service Sector in India (18 hours)

An overview of Service Sector in India - Transport and Communication, IT, Tourism (Growth, Performance , Market size and exports) - Power Policy and Power Development- FDI inflow in Service Sector, Role of WTO in Service Sector, Contribution of Service Sector to India's GDP.

Basic Reading List

1. Kapila Uma (ed) (2016) *Indian Economy Since Independence: A Comprehensive and Critical Analysis of India's Economy 1947-2016*, Academic Foundation, New Delhi
2. Ruddar Dutt and Sundaram (2016): *Indian Economy*, S Chand and Company, New Delhi
3. J K Mishra and V K Puri (2014*):Indian Economy: The Development Experience,* Himalaya Publishing House, Mumbai
4. B A Prakash (ed) (2012)*The Indian Economy Since 1991:Economic Reforms and Performance*, Pearson, New Delhi
5. India 2016, Publication Division, New Delhi
6. Government of India, *Economic Survey* (Annual Issues), Ministry of Finance, New Delhi,Accessible via URL-http://indiabudget.nic.in/

Additional Reading List

1. Ahulwalia, I.J. and I.M.D. Little (Eds) (1999), *India's Economic Reforms and Development*, (Essays in honour of Manmohan Singh), Oxford University Press, New Delhi.
2. Anne. O. Krueger. (ed) (2002), *Economic Policy Reforms and Indian Economy*, Oxford University Press, New Delhi.
3. Bhramananda P R and V A Panchamukhi (Ed) (2001) *Development Experience in Indian Economy*, Interstate Perspectives, Bookwell, New Delhi
4. Banik Nilanjan (2015) *The Indian Economy: A Macro Economic Perspective*, Sage Publications,New Delhi

5. Balakrishnan Pulapre (ed) (2012) *Economic Reforms and Growth in India*, Orient Black Swan, New Delhi
6. Chakravarthi S (1996). *Development Planning: The Indian Experience*, Oxford University Press
7. M.M.Sury, Vibha Mathur (2013), *Five Year Plans of India: First Five YearPlan(1951-52 to 1955-56to Twelfth FiveYear Plan(2012-13 to 2016-17),* Volume I ,New Century Publication.
8. R K Mishra and K Trivikraman(ed)(2013) The *Global Financial Crisis: Challenges and Oppurtunities*, Academic Foundation, New Delhi
9. Reddy Rammohar C (2017) *Demonetization and Black Money,* Orient Blackswan, New Delhi
10. Jalan, B. (1992), *The Indian Economy – Problems and Prospects,* Viking, New Delhi
11. Joshi, V. and I.M.D. Little (1999) *India : Macro Economics and Political Economy*, 1964-1991, Oxford University Press, New Delhi.
12. Kaushik Basu (ed) (2004), *India's Emerging Economy*, Oxford University Press, New Delhi.
13. Bhattacharya, Aditya and Marzit, Sugata(Eds)(2004),*Globalization and Developing Economies; Theory and Evidence*, Manohar, New Delhi
14. Jha Raghbendra (Ed)(2003); *Indian Economic Reforms,* Hampshire, U.K.
15. Chug, Ram L. and Uppal.J.S. (1985) *Black Income in India.* Tata McGraw Hill, New Delhi.
16. Aravind Panagariya(2004) *India in the 1980s and 1990s: Triump of Reforms*, IMF Working Paper, W/P o4/43, Washington DC.
17. Jagadisg Bhagwati, Aravind Panagariya(2012), *Reforms and Economic Transformation in India*,Oxford University Press.
18. Montek S Ahluwalia (2002), *Economic Reforms in India Since 1991: Has gradualism worked*? Journal of Economic perspective, Vol.16, No.3, PP6788
19. Ashim Goyal(Ed), *The Oxford Hand book of the Indian Economy in the 21st century: Understanding the Inherent Dynamism*, Oxford University Press, New Delhi.
20. Gopalji and Suman Bhakri(2013), *Indian Economy, Performance and Policies*, Pearson, New Delhi.

21. Agarwal A N (2013), *Indian Economy: Problems of Development and Planning*, Vikas Publishing House, New Delhi.
22. Kapila Uma(2013*), Two Decades of Economic Reforms in India: Towards Faster, Sustainable and more Inclusive growth*(3rd edition), Academic Foundation, New Delhi.
23. Mahendra K Premi (2009), *India'sChanging Population Profile*, National Book Trust, New Delhi.
24. Sivaramakrishna K C, Amitabh Kundu*, Hand book of Urbanisation*, Oxford University Press, New Delhi.
25. Radhakrishnan R, Shovan Roy(Ed), *Hand book of Poverty in India*, Oxford University Press, New Delhi.
26. Byres TJ (Ed) (1998), *The Indian Economy: Major Debates since Independence*, Oxford University Press, New Delhi.
27. Dipak Mazumdar,Sandip Sarkar(2008),*Globalization, Labour Markets and Inequality in India*, International Development Research Centre.

EC 214: QUANTITATIVE METHODS FOR ECONOMICS

(Hours per semester: 110
Hours per week: 6)

Objectives

The key objective of this paper is to provide the students an insight into the importance of quantitative methods in Economics and enable them to introduce and apply these techniques in finding solutions to economic problems. The course also aims at: (1) familiarizing the students the basic quantitative techniques used in economic analysis, (2) enabling the students in making use of a quantitative approach in formulating economic problems, and (3) inculcating analytical ability in finding solutions to mathematically formulated economic problems.

Course Contents

Module I Matrix Algebra (25 hours)

Evaluation of higher order determinant- Minors and Cofactors- Laplace method-Bordered Hessian determinant- Solution of simultaneous equations - Cramer's rule and inverse method - Characteristic equations and Eigen values- Cayley Hamilton theorem - Quadratic forms- Leontiff open input- output model.

Module II Optimisation Techniques (25 hours)

Optimisation of economic functions- Optimisation with equality constraints -Lagrange method - Optimisation with inequality constraints - Linear programming -Characteristics of Linear Programming Problem(LPP) - Formulation of LPP - Solution of LPP using Simplex method – Duality - Uses of dual LPP and Shadow prices.

Module III Differential and Difference Equations (30 hours)

Concept of Differential equations - First order linear differential equations and their solutions - Concept of difference equations - First order linear difference equations and their solutions - Uses of differential and difference equations in economics-Dynamic stability-Lagged income determination model, Harrod and Cobweb models.

Module IV Statistical Methods (30 hours)

Theoretical Probability Distributions- Binomial, Poisson and Normal Distribution- Tests of Normality-Histogram, P-P plot, Q-Q plot , Jarque – Bera test -Methods of Sampling - Parameters and statistics - Sampling distribution of mean - Standard error- Z, t, F, and chi- square distributions –

Hypothesis :meaning and types - Type I and Type II errors - Confidence interval - Procedure of testing hypotheses - Z, t, F, and chi-square tests.

Basic Reading List

Module - I, II and III

1. Allen, R.G.D. (2008). Mathematical Analysis for Economists. New Delhi: AITBS Publishers.
2. Yamane, Taro. (2012). Mathematics for Economists: An Elementary Survey. New Delhi: Prentice Hall of India.

Module – IV

1. Gupta, S.P. (2014). Statistical Methods. New Delhi: Sulthan Chand and Sons.
2. Olive, David. (2014). Statistical Theory and Inference. Switzerland: Springer International Publishing.

Additional Reading

1. Baumol, V.J. (1997). Economic Theory and Operations Analysis. New Delhi: Prentice Hall of India.
2. Chiang, A.C. & Wainwright, K. (2005). Fundamental Methods of Mathematical Economics - 4th Edition. New Delhi: McGraw-Hill.
3. Chiang, A.C. (1984). Fundamentals of Mathematical Economics. New Delhi: McGraw Hill.
4. Dowling, E.T. (2011). Introduction to mathematical Economics, Schaum's Outline Series. New Delhi: McGraw Hill.
5. Gupta, S.C. (2012). Fundamentals of Statistics. Mumbai: Himalaya Publishing House.
6. Hoy, Michael., John, Livernois., Chris, McKenna., Ray, Rees. &Thanasis, Stengos. (2012). Mathematics for Economics, Third Edition. PHI Learning.
7. Monga, G.S. (2001). Mathematics and Statistics for Economics. New Delhi: Vikas Publishing House.
8. Nagaraja, H.N., Sen, P.K. & Morrison, D.F. (2012). Statistical Theory and Applications. New York: Springer.
9. Thod, C.H. (2002). Testing for Normality. New York: Marcel Dekker Inc.

CORE PAPERS IN SECOND SEMESTER

EC 221: MICRO ECONOMICS - II

(Hours per semester: 120
Hours per week: 7)

Objectives

This course is intended to give insights into developments in the areas of theories of distribution, general equilibrium, welfare economics, uncertainty and informational asymmetry and behavioral economics.

Course Contents

Module I: Distribution (25 hours)

Marginal productivity theory – adding up problem - Euler's theorem - technical progress and factor shares: Hicks & Harrod.

Macro theories of distribution - Ricardo's dynamic model - Marxian theory of distribution - degree of monopoly theory - Neo-Keynesian model.

Module II: General Equilibrium (20 hours)

General Vs. partial equilibrium - Walrasian system - tatonnement process - existence, uniqueness and stability of an equilibrium - graphical treatment of general equilibrium 2×2×2 model.

Module III: Welfare Economics (25 hours)

Concerns of welfare economics - role of value judgments – Bergson's social welfare function -Arrow's impossibility theorem - the theory of second best – Scitovsky's double compensation criterion - Rawl's theory of justice- A.K Sen's social welfare function – equity-efficiency trade-off.

Module IV: Economics of Information (20 hours)

Economics of search - search cost - search and advertizing - asymmetric information and market for lemons - adverse selection - market signalling - moral hazard – principal-agent problem.

Module V: Behavioral Economics and Bounded Rationality (30 hours)

Classical and neo-Classical views of human nature - behavioral economics – framing - anchoring effect – bracketing - uncertainty – law of small numbers - asset integration and loss aversion -role of time and emotions in economic decisions - role of constraints and information -

satisficing – ameliorating - path dependence - bounded rationality - altruism and common good-strategic interaction and social norms .

Reading List

Module I

1. Krugman, Paul & Wells, Robin (2005), *Micro Economics*, Worth Publishers, New York (P-290-297)
2. Costa Da G.C (2001), *Value and Distribution* (P-213-246,423-435)
3. Mandal, RK (2007), *Micro Economic Theory,* Atlantic Publishers (P) Ltd (P-288-297)

Module II

1. Costa Da G.C (2001), *Value and Distribution* (P-247-249,264-266)
2. Koutsyiannis, A (), *Modern Microeconomics*, Macmillan Press, London (P-486-488,489-491,495-504,510-515)
3. Pindyck, Robert.S, Rubinfield, Daniel, L, Mehta, Premlal, L (6th edition), *Micro Economics* (P. 450-460)
4. Mandal, RK (2007), *Micro Economic Theory,* Atlantic Publishers (P) Ltd, Noida (P-311-323)
5. Basu.K, Pattanaik.P, & Suzumura(Ed)(2001), Choice ,Welfare and Development,clarendon Press, Oxford University Press (P.32-64)
6. Snyder, Christpher &Nicholson, Walter (2012), Microeconomic Theory-Basic Principles and Extensions, Cengage learning (P-409-428)

Module III

1. Maddala, G.S, Miller Ellen (2004), Micro economics, Tata Mc Graw Hill (P-519-522)
2. Salvatore, Dominick (2009) *Principles of Microeconomic*s (P-502-509)
3. Cowell Frank, A (2005), *Microeconomics, Principles and Analysis,* Oxford University Press (P-225-227)
4. Yew-Kwang Ng (2004), *Welfare Economics, Towards a more complete analysis*, Palgrave Macmillan (P-1-18, 34, 92-98)
5. Basu.K, Pattanaik.P, & Suzumura(Ed)(2001), *Choice ,Welfare and Development*,clarendon Press, Oxford University Press

6. Farrell M.J(Ed) (1973), *Readings in Welfare Economics*, The Mac Millan Press, London (P-144-166)
7. Feldman, Allan, M, & Serrano, Roberto (2nd Edn), *Welfare Economics and Social Choice Theory*, Springer
8. Snyder, Christpher &Nicholson, Walter (2012), *Microeconomic Theory-Basic Principles and Extensions,* Cengage learning (P-428-446)

Module IV

1. Pindyck, Robert.S, Rubinfield, Daniel, L, Mehta, Premlal, L (6th edition), *Micro Economics* (P. 511-525,567-585)
2. Salvatore, Dominick (2009) *Principles of Microeconomic*s (P-545-560)
3. Hubbard, Glen.R, Patrick, Anthny, Brien, O, *Microeconomics* (P-536-545)
4. Varian H.R (2003), *Intermediate Micro Economics*, East – West Press Edition (P-667-688)
5. Snyder, Christpher &Nicholson, Walter (2012), *Microeconomic Theory-Basic Principles and Extensions*, Cengage learning (P-579-618)

Module V

1. Pindyck, Robert.S, Rubinfield, Daniel, L, Mehta, Premlal, L (6th edition), *Micro Economics* (P. 561-564)
2. Goodwin, Harris, Roach & Torras (3rd edn), "*Microeconomics in context*, M.E Sharpe. Inc, USA (visit www.gdae.rg/micro)
3. Varian H.R (2013), *Intermediate Micro Economics,* East – West Press Edition (566-581)
4. Koutsyiannis, A (2013), *Modern Microeconomics*, Macmillan Press, London (P-258,389-390)

EC 222: ECONOMICS OF SOCIAL SECTOR AND ENVIRONMENT

(Hours per semester: 110
Hours per week: 6)

Objectives

This course is designed to enable students to: (1) Understand and apply the key economic concepts in the context of social sectors like education, environmentand healthcare, (2) Appreciate how economic factors contribute to the development and implementation of educational policies, (3) Identify the major theories governing the development of human resources, school improvement and development, (4) Recognize the important linkages between the environment and economics, (5) Be aware of the key environmental issues around the globe, and (6) Understand approaches to identify and value costs and outcomes to include in economic evaluation of the environment through benefit cost analysis.

Course Contents

Module 1: Economics of Education (20 hours)

Human Capital – Components of Human Capital – Education as an instrument for economic Growth – Demand for Education – Supply of Education – Determinants of demand for Education – Costs of Education - Private Costs and Social Costs- Benefits of Education – Direct, Indirect and Social Benefits – Wastage and Stagnation in Education – Causes and Measures-Manpower Planning-Meaning and Techniques of Forecasting.

Module 2: Economics of Health (20 hours)

Nature and Scope of Health Economics – Health Dimensions of Development – Determinants of Health – Economic Dimensions of Healthcare – Demand for and Supply of Healthcare – Healthcare Financing – Inequalities of Health – Class and Gender Perspectives – Healthcare Sector in India-Health Insurance Schemes in India-RSBY,ESIS,AABY, JBY.

Module 3: Economics of Environment and Environmental Valuation (25 hours)

Environmental Economics – Meaning and Significance – Interlinkage between economy and Environment – Material Balance Model – Law of Entropy – Environmental Kuznets' Curve

Environmental Valuation – Use Values, Non-use Values, Option Values – Approaches to Environmental Valuation – Direct Methods – Contingent Valuation Method, Trade off Games Method, Costless Choice Method, Delphi Method – Indirect Methods – Revealed Preference

Methods – Travel Cost Method, Hedonic Pricing Method, Preventive Expenditure Method, Surrogate Market Approach, Wage Differential Approach– Cost Based Methods and Other methods of Valuation – Cost Benefit Analysis.

Module 4: Environmental Policies and Issues (25 hours)

Environmental Externalities – Design of Environmental Policy – Quantity Based Instruments – Market based Instruments – Pigouvian tax and Subsidy Approach – Non-Market Instruments – Command and Control – Mixed Instruments – Marketable permits – Tradeable Pollution Permits -Bargaining Solution – Coase Theorem – Informal Regulation – Collective Action – Grass Root Movements (Chipko Movement, Save Silent Valley Movement, Narmada Bachao Andolan, Appiko Movement)– Monitoring and Enforcement – The New Model of Pollution Control – Major Environmental Policies and Legislations in India.

Global Environmental Issues – Climate Change Problems, Global Warming, Bio Diversity Loss, Acid Rain, Deforestation, Environmental Pollution.

Module 5: Economics of Natural Resource Management (20 hours)

Natural Resources – Resource Taxonomy – Theories of Optimum Use of Exhaustible and Renewable Resources – Common Property Resource Management – Tragedy of Commons.

Environment Development Trade off – Sustainable Development – Indicators of Sustainable Development – Equity and Sustainable Development – Environment and Trade in the WTO Regime – Environment and System of National Accounts – Green GDP.

Reading List

Module 1

1. Environmental Education in India (2002) Association of Indian Universities, New Delhi.
2. Schultz., T.W. (1971) Investment in human Capital, Free Press, New York
3. Joy A. Palmer, 1998, Environmental Education in 21st century, Routledge, London.
4. Kolstad, D. Charles (2010), Environmental Economics, Oxford University Press.
5. Cohn E. and T. Gaske (1989), Economics of Education, Pergamon Press, London.
6. McMohan, W.W. (1999), Education and Development: Measuring the Social Benefits, Oxford University Press.
7. Becker G.S. (1974), Human Capital (2nd Edition), National Bureau of Economic Research, New York.

8. McMohan, W.W. (1999), Education and Development: Measuring the Social Benefits, Oxford University Press, Oxford.
9. Padmanabhan, C.B. (1984), Financial Management in Education, Select Books, New Delhi.
10. Tilak, J.B.G. (1994), Education for Development in Asia, Sage Publications, New Delhi.
11. Vaizey, J. (1962), Economics of Education, Faber and Faber, London.
12. Woodhall, M. (1992), Cost Benefit Analysis in Educational Planning, UNESCO, Paris.

Module 2

1. Klarman H. E. (1965), The Economics of Health, Columbia University Press. New York.
2. Olsen, Jan Abel (2010); Principles in Health Economics and Policy, Oxford University Press
3. Berman P. and M.E. Khan (1993), Paying for India's Health Care, Sage publications, New Delhi
4. Anand, N.K. &ShikhaGoel (2008); Health Economics, AITBS Publishers, New Delhi.
5. Folland, Sherman, Allen C. Goodman and MironStano (2007), The Economics of Health and Health Care, Pearson Prentice Hall.
6. Baru, R.V. (1998), Private Health Care in India: Social Characteristics and Trends, Sage Publications, New Delhi.
7. Berman, P. and M.E. Khan (1993), Paying for India's Health Care, Sage Publications, New Delhi.
8. Panchamukhi, P.R. (1980), Economics of Health: A Trend Report in ICSSR, A Survey of Research in Economics, Vol. VI, Infrastructure, Allied, Delhi.
9. World Bank (1993), The World Development Report, (1993): Investing in Health, Oxford University Press, New York.
10. Bhattacharya, Jay, Timothy Hyde, and Peter Tu. *Health Economics*. Basingstoke: Palgrave Macmillan, 2014. Print.

Module 3

1. M. Karpagam (1999); Environmental Economics, Sterling Publishers.
2. Hanley N., J.F. Shogern and B. White (1997), Environmental Economics in Theory and Practice, Macmillan.

3. Smith V. Kerry (1996), Estimating Economic values for Nature: Methods for Non Market Valuation, Edward Elgar, Cheltenham, UK Case Studies (India)
4. Hussen, A M (2005), Principles of Environmental Economics, Routledge, London & New York.
5. Eugine, T. (2004), "Environmental Economics" B.K. Offset Press, New Delhi.
6. Hanley, N. (1997), Environmental Economics in Theory and Practice, Macmillan, London.
7. Mitchell, R.C. and R.T. Carson (1993), Using Surveys to Value Public Goods: Resources for the Future, Washington, D.C.

Module 4

1. Kolstad, D. Charles (2010), Environmental Economics, Oxford University Press.
2. Bhattacharya N. Rabindra (ed.) (2001); "Environmental Economics An Indian Perspective", Oxford University Press.
3. Eugine, T. (2004), "Environmental Economics" B.K. Offset Press, New Delhi.
4. Hanley N., J.F. Shogern and B. White (1997), Environmental Economics in Theory and Practice, Macmillan.
5. Hoel, M. (1997), 'International Coordination of Environmental Policies' in New Dimensions in the Economic Theory of Environment, Carrao Carlo and Domenico Siniscalco (Eds.), Cambridge University Press, Cambridge.
6. Larsen, B. and A. Shaw (1994), Global Tradable Carbon Permits, Participation Incentives, and Transfers, Oxford Economic Papers, Vol. 46.
7. Ostrom, E. (1990), Governing the Commons: The Evolution of Institutions for Collective Actions, Cambridge University Press, Cambridge
8. Karan P.P. (1994), "Environmental Movements in India", Geographical Review, American Geographical Society.
9. www.unep.org

Module 5

1. Sankar, U (Ed.) (2001), Environmental Economics, Oxford University Press, New Delhi.
2. Bhattacharya; Environmental Economics-OUP, 2002.
3. M. Karpagam (1999); Environmental Economics, Sterling Publishers.
4. Rangarajan, Mahesh (Ed.) (2007); Environmental Issues in India A Reader, Pearson.

5. Kolstad, D. Charles (2010), Environmental Economics, Oxford University Press.
6. Hanley N., J.F. Shogern and B. White (1997), Environmental Economics in Theory and Practice, Macmillan.
7. Tom Tietenberg- Environmental and Natural Resource Economics- Addison Wesley publishers- seventh edition
8. David Anderson,Environmental Economics and Natural resource management- Routledge publishers- fourth edition
9. David W Pearce, R Kerry Turner-Economics of Natural Resources and Environment- John Hopkins University Press
10. John Blewitt- Understanding Sustainable Development- Earth scan publishers
11. Michael D Kaplowitz- Property rights, Economics and Environment- Volume 5- Routledge publishers
12. Thomas Sterner- Policy instruments for Environmental and Natural resource management- Routledge publishers

EC 223: INDIAN ECONOMIC POLICY - II

(Hours per semester: 110
Hours per week: 6)

Objectives

The objectives of this course are: (1) to introduce the basic concepts of economics to the students so as to enable them for further learning in Indian and Kerala Economy, (2) to equip the students with the basic idea for further learning, and (3) to help them to analyze the sectoral development that has taken place India as well as in Kerala economy.

Course Contents

Module -1 Changing Structure of Labour Market (20 hours)

Structural Changes in India's Labour market – Challenges and Reforms, Labour market informalisation , Feminization and Gender inequality –Its Impact and effects, Job insecurity, New Industrial Policy and changing role of Trade Union, Child labour, Reforms in Labour laws.

Module -2 Financial Sector in India (24 hours)

Money and Capital markets - Growth of Banking Sector in India – RBI and Monetary Management – Internal and external balances – Money supply, sources and measurement- Modern functions of commercial banks – Recent initiatives in banking sector (Mergers, foreign banks, NPA, Digitalization, Privatization) - Monetary and Financial Sector Reforms - Financial Inclusion

Module – 3 External Sector in India (24 hours)

External sector reforms since 1991- Recent developments in India's external sector – Current account deficit, exchange rate policy , foreign trade and capital flows, EXIM policy, Role of FDI in India's economic development - recent changes in the structure , composition and direction of India's foreign trade – recent policy changes and India's export.

Module 4 Financial and Social Sector –Kerala Economy (18 hours)

GSDP – Recent trends and pattern - Public expenditure in Kerala – Composition and trends – Financial issues – Social Sector in Kerala – Health and Education.

Module 5 Sectoral Issues of Kerala Economy (24 hours)

Changes in the cropping and land use pattern, Problems faced by Agriculture sector - Industrial backwardness in the State – Educated Unemployment – urbanization - Development of

IT – Tourism - Impact of Migration and remittances on Kerala economy - In-migrant workers in Kerala.

Basic Reading List

1. Kapila Uma (ed) (2016) *Indian Economy Since Independence: A Comprehensive and Critical Analysis of India's Economy 1947-2016*, Academic Foundation, New Delhi
2. Ruddar Dutt and Sundaram (2016): *Indian Economy*, S Chand and Company, New Delhi
3. J K Mishra and V K Puri (2014*):Indian Economy: The Development Experience,* Himalaya Publishing House, Mumbai
4. B A Prakash (ed) (2012)*The Indian Economy Since 1991:Economic Reforms and Performance*, Pearson, New Delhi
5. India 2016, Publication Division, New Delhi
6. Government of India, *Economic Survey* (Annual Issues), Ministry of Finance, New Delhi,Accessible via URL-http://indiabudget.nic.in/
7. State Planning Board, *Kerala Economic Review (Annual Issues).*

Basic Reading List (Kerala Economy)

1. Centre for Development Studies, *Poverty Unemployment and development policy*, Orient Longman, Bombay.
2. B.A.Prakash (Ed) (1994). *Kerala's Economy: Performance, Problems Prospects*, Sage Publications, New Delhi.
3. B.A.Prakash (Ed.) (2004) *Kerala's Economic Development: Performance and Problems in the Post-Liberalisation period.* Sage Publications, New Delhi.
4. M..Oommen (Ed) (1999) *Rethinking Development: Kerala's Development Experience*.
5. B.A.Prakash (Ed) 1999, *Kerala's Economic Development: Issues and Problems*, Sage Publications. New Delhi.
6. P.P.Pillai (1994) *Kerala Economy: Four Decades of Development*, John Mathai Foundation Trichur.
7. M.A.Oomen 1993, *Essays on Kerala's Economy*, Oxford and IBH.
8. K.C.Zachariah, K.P.Kannan and S.IrudayaRajan (Ed) 2002. *Kerala's Gulf Connection* C.D.S, Thiruvananthapuram.

9. Mathew Kurian and Raju John (Ed) (2014) *Kerala Economy and its Emerging Issues*, National Book Stall, Thiruvananthapuram
10. Asokan A, Mary Oommen and Priyesh C A (Ed) (2016) *Kerala Economy in Retrospect and Prospect, Kerala Economic Association*, Thiruvananthapuram
11. Zachariah K.C. and S. IrudayaRajan (2012):*Kerala's Demographic Future:Issues and Policy Options*, Academic Foundation, New Delhi
12. Jerry Alwin(2014):*Recent Trends in Kerala State Finances*, Serials Publications, New Delhi
13. *Kerala Perspective Plan 2030*, Volume I to IV, Kerala State Planning Board
14. Siddharth Sasthri (1992) , *Financing of State Five Year Plan in India*, Mittal Publications.

Additional Reading List

1. National council of Applied Economic Research (1962), Techno Economic Survey of Kerala, NCAER, New Delhi.
2. E.T.Mathew 1997, *Employment and Unemployment in Kerala* , Sage Publications, NewDelhi
3. K.K.George, 1993, *Limits to Kerala Model of Development*, C.D.S Thiruvanathapuram.
4. K.C. Zachariah ET Mathew and IrudayaRajan, (2003), *Dynamics of Migration in Kerala*, Orient Longman, New Delhi.
5. Planning Commission (2008), *Kerala Development Report*, Academic Foundation, New Delhi.
6. B A Prakash& V R Prabhakaran Nair(ed) (2008) *Kerala's Development Issues in the New Millenium*, Serials Publications, New Delhi
7. B N Ghosh&Padmaja D Namboothiri (ed)(2009) The *Economy of Kerala: Yesterday,Today and Tommorow*, Serial Publications,New Delhi
8. State Planning Board ,*Economic Review*, Various Years, , Thiruvananthapuram
9. Tapas K Sen(2012)*Recent Developments in Kerala State Finances*,WP 449,CDS
10. Parayil Govindan (2000) (ed.), Kerala : *The Development Experience – Reflections on Sustainability and Replicability*, Zed Books, London
11. R. Sthanumoorthy (ed) (2006) *Kerala Economy: Achievements and Challenges*, ICFAI University Press, New Delhi.

12. Rajasenan, D. and Gerard De Groot (ed) (2005), *Kerala Economy : Trajectories, Challenges and Implications*, CUSAT, Kochi.
13. K Rajan(ed)(2009):*Kerala Economy:Trends During the Post Reform Period* ,Serials Publication,New Delhi
14. Zachariah K.C. and S. IrudayaRajan(2012):*Kerala`s Gulf Connection 1998-2011:Economic and Social Impacts of Migration*,OrientBlackswan,New Delhi
15. Government Kerala (2001) White paper on State Finance, Govt of Kerala, Thiruvananthapuram.
16. Government Kerala (2016) White paper on State Finance, Govt of Kerala, Thiruvananthapuram.
17. Govt of Kerala: *Report of Public Expenditure Review Committee, Various Years*
18. NCAER (2001) *South India; Human Development Report*, Oxford University Press, New Delhi.
19. A.K.G Centre for Research and studies (1994) International Congress on Kerala Studies, Abstracts of paper, 5 volumes AKG Centre, Thiruvananthapuram.
20. Institute of Social Sciences (1996) International Conference on Kerala's Development Experience, Abstracts of papers, Institute of social sciences New Delhi.
21. Mahendradev S (2010), *Inclusive Growth in India,* Oxford University Press , New Delhi
22. Bhavani T A, Bhanumurthy N R,(2011), *Financial Access in Post Reform India*, Oxford University Press , New Delh
23. Mohan Rakesh(Eds) (2011), *Growth with Financial Stability*, Oxford University Press , New Delhi
24. MihirRakshit (2010), *Money and Finance in the Indian Economy*, Oxford University Press, New Delhi
25. Indian Institute of Bank and finance*; Bank Financial Management*, Mac Millan Publishers(2010)
26. Prasanna Chandra (9th edition) ,*Financial Management Theory and Practice*, MC Graw Hill Education.
27. Manoranjan and Sharma(2007), *India's Transforming Financial Sector*, Atlantis
28. Benson Kunjukunju,*Commercial banking in India- Growth,Challanges and Strategies*

29. K.N.Harilal, K.J.Joseph(2003), Stagnation and Revival of Kerala Economy: An Open Economy Perspective, EPW, Vol.38, No.23(Jun7-13)PP -2286-2294.
30. Thomas Isaac TM, Michael Tharakan PK(1995), *Kerala Emerging Persepective: Overview of International Congress on Kerala Studies* ;Social Scientist, Vol.23, No,13, (Jan – Mar.1995), PP3-36.
31. Suraj B Gupta, *Monetary Economics*, S.Chand and Company, New Delhi.

EC 224: ECONOMETRICS AND RESEARCH METHODOLOGY

(Hours per semester: 110
Hours per week: 6)

Objectives

The objectives of this course are: (1) to create an understanding among the students on basic econometric methodology, (2) to train the students in applying economic theories to real economic data by means of empirical models, and (3) to give a comprehensive idea on the process of doing research in economics.

Course Contents

Module I: Introduction to Econometrics (25 hours)

Meaning, scope and methodology of Econometrics - Sample Regression Function and Population Regression Function - Simple linear Regression Model – Assumptions, Estimation through Ordinary Least Squares (OLS) Approach - Gauss Markov Theorem - Multiple Regression Model - Testing the Significance of Regression – t, Analysis of variance (ANOVA), F and the concept of R^2 and adjusted R^2.

Module II: Violation of the CLRM Assumptions (20 hours)

Auto-correlation, Heteroscedasticity, Multicollinearity, Specification Errors, Errors of Measurement - Nature, Consequences, Tests and Remedial measures.

Module III:Dummy Variables Regression Models (20 hours)

Dummy Variable Technique and its Applications - Comparing two regressions, interaction effects, seasonal analysis, piece-wise linear regression.

ModuleIV: Introduction to Time series Econometrics (20 hours)

Basic Concepts: Stationarity and Non Stationarity – Random Walk Models – Testing Stationarity - Unit Root- Integrated Process - Basic Concepts of ARMA and ARIMA Process.

Module V: Introduction to Research Methodology (25 hours)

Meaning, purpose and scope of Social Science Research - Types of Research - Stages of Research Process - Formulation of research problem, Research Design Setting, Theoretical Frame, Review of Literature, Objectives and Hypothesi, Methods of Data Collection, Analysis of Data, Hypothesis Testing and drawing conclusions, Report Writing and Lay out of the Research Report.

Reading List

Modules I, II, III & IV

1. Gujarathi , D.&Sangeetha, N. (2007). Basic Econometrics (4th ed) New Delhi: McGraw Hill
2. Koutsoyianis, A. (1977). Theory of Econometrics (2nd ed). London .The Macmillian Press Ltd.

Modules V

1. Kothari, C. R. (2004). Research Methodology Methods & Techniques, New Age International Publishers, Delhi.
2. Gerald Guthrie(2012),Basic Research Methods, Sage, New Delhi.
3. Majumdar, P.K. (2011), Research Methods in Social Sciences, Viva Books, New Delh
4. Rowena Murray(2010), How to Write a Thesis, Tata McGraw Hill, New Delhi.

Additional Reading List

1. Cochran, W. G. (1999).Sampling Techniques, John Wiley & Sons (Asia) Ltd.
2. Greene W. H. (1997). Econometric Analysis, New Delhi, Pearson.
3. Johnston J. (1991).Econometric Methods, NewYork, McGraw Hill.
4. Intriligator M. D. (1991) Econometric Methods, Techniques and Applications, Prentice Hall, Englewood Cliffs, New Jersey.

CORE PAPERS IN THIRD SEMESTER

EC 231: MACRO ECONOMICS - I

(Hours per semester: 120
Hours per week: 7)

Objectives

Macro Economics paper has two parts, spread across third and fourth semesters. In the third semester, the important areas covered under Macro Economics I are development of macro economics after Keynesian revolution including Neo-classical and Keynesian synthesis, behaviour foundations of macro economics, theoretical foundations of demand and supply of money and macroeconomic model in an open economy context. The important objective of the paper is that the students should able to understand the structural underpinnings of theoretical development of macroeconomic thoughts and their application.

Course Contents

Module 1: Introduction (5 hours)

A brief introduction to competing schools of macroeconomic thought-Market clearing and non market clearing approaches to macroeconomics-Determination of output, employment and price level in Classical and Keynesian models

Module 2: Neo-classical and Keynesian Synthesis (25 hours)

The ISLM model- Keynesian and Neo-Classical Version- Extensions of ISLM model with govt sector- Relative efficiency of fiscal and monetary policies- ISLM model with labour market and flexible prices- Three Sector Macro Model

Module 3 Behavioral Foundations of Macro economics (30 hours)

Consumption function: Current Income Theories (views of Keynes, Kuznet's consumption puzzle, Drift hypothesis of Smithies and views of Duesenberry)- Fischer's Inter-temporal Choice model- Normal Income Theories (views of Friedman and Modigliani and others)- Endogenous Income Theory – Robert Hall Random Walk Hypothesis- David Laibson Behavioral Hypothesis- Empirical Evidence

Investment function: Neo-classical theory of investment – MEC and Keynesian theory of investment - Cost of capital and MEC- Accelerator theory of investment (simple and flexible)- Capital Stock Adjustment Principle –Interaction of Accelerator and Multiplier – Profit theory of

investment- Financial theory of investment – Tobin's q ratio- Modigliani-Miller theory - Investment under Uncertainty, Asymmetric Information and Irreversible Investment.

Module 4: Demand and Supply of Money (30 hours)

Demand for money: Keynesian view- Post Keynesian approaches of demand for money- Patinkin's Real balance effect- Approaches of Tobin, Baumol and Friedman- Modern monetary theory of Randall and Wray

Supply of money: Financial Intermediation- Mechanistic model of bank deposit determination- Behavioral model of money determination- Money Multiplier and its determination- Demand determined view of money supply process- Methods of monetary control- Interest elasticity of money supply – central bank's policy alternatives- Inside money and Outside money- Money supply determination in an open economy- Asset market equilibrium – Fisher effect-Disequilibrium money and Buffer stock models

Module 5: Macro economics of an open economy (30 hours)

Balance of payment and Keynesian analysis - Internal and External Equilibrium- Money and Capital Flows and Equilibrium in an Open Economy– Mundel-Fleming model- Fixed and Flexible Exchange Rate with Capital Mobility –Monetary and fiscal policy under fixed and flexible exchange of capital mobility- the Impossible Trinity -Monetary Approach to Balance of Payment

Basic Reading List

1. Mankiw, G. (2011), Macro Economics, Worth Publishers, New York
2. Rudiger Dornbusch, Stanley Fischer and Richard Startz (2006), Macroeconomics, McGraw-Hill.
3. Levacic, R. and A. Rebman (2006), Macro Economics, Mac Millen Press Ltd.
4. Froyen, R.(2008). Macroeconomics, Pearson India
5. Snowdon, B. H. Vane and P. Wynarezyk (2002), A Modem Guide to Macro Economics: An Introduction to Competing Schools of Thought, Edward Elgar.
6. Kamran Dadkhah (2010), Evolution of Macro Economic Theory and Policy, Springer
7. David Romar (2011), Advanced Macro Economics, McGra-Hill, 4th Edition
8. Andre B.Abel and Ben S. Bernanke (2010), Macro Economics, 4th Edition, Pearson
9. G.K.Shaw, Michael J, Mc Croshie and David Greenway, Macro economics, Theory and Practice, Blackwell.

Additional Reading List

Module 1

1) Nattrass, Nicholi and Vishaka Varma (2014) Macroeconomics Simplified: Understanding Keynesian and Neo Classical Macroeconomic systems, Sage Publications India, New Delhi
2) Branson W.A (1989), Macro Economic Theory and Policy, 3rd edition, Harper and Row, New Delhi.
3) Lefteris Tsoulfidis (2010), Competing Schools of Economic Thought, Springer

Module 2

1. Hicks J.R (1937) Mr Keynes and the Classics: A Suggested Interpretations, Econometrica, April
2. Nattrass, Nicholi and Vishaka Varma (2014) Macroeconomics Simplified: Understanding Keynesian and Neo Classical Macroeconomic systems, Sage Publications India, New Delhi
3. Branson W.A (2005), Macro Economic Theory and Policy, 3rd edition, Harper and Row, New Delhi

Module 3

1. Garner Ackley (1989), Macroeconomics Theory and Policy, Collier Macmillian
2. Edward Shapiro (2001 Reprint), Macroeconomic Analysis, Galgotia Publications Ltd, New Delhi
3. Fred R. Glahe (1985), Macro Economics: Theory and Policy, Harcourt College Pub
4. A.J. Westaway and T.G.Weyman Johnes (1978), Macro Economics, Theory, Evidence and Policy, Longman
5. M.Farrel (1966), New Theories of Consumption Function, in Readings in Macro Economics by Mullar (Ed.) Holt,Rinehart & Winston of Canada Ltd

Module 4

1. Laidler D.E.W (1977), Demand for Money: Theory and Evidence, Dum-Don Valley, New York
2. McKinen, G,E (1978), Money, The Price Level and Interest Rates, Prentice Hall of India, New Delhi

3. Friedman, M (1956), Studies in Quantity Theory of Money, The University of Chicago Press, Chicago
4. Éric Tymoigne and L. Randall Wray, "Modern Money Theory 101: A Reply to Critics," Levy Economics Institute of Bard College, Working Paper No. 778 (November 2013).
5. Scott T. Fullwiler, "Modern Monetary Theory—A Primer on the Operational Realities of the Monetary System," Wartburg College; Bard College - The Levy Economics Institute (August 30, 2010)
6. Wray, L. Randall (2000), The Neo-Chartalist Approach to Money (Working Paper No. 10), UMKC Center for Full Employment and Price Stability
7. Wray, L. Randall (December 2010), Money (Working Paper No. 647), Levy Economics Institute of Bard College

Module 5

1. Gordon R and S.G.Harris (1988), Macroeconomics, Addison Wesley, Massachusetts
2. Mankiw, N.G and D.Romar (Eds.) (1991), New Keynesian Economics, (2 Vols.) MIT Press, Cambridge
3. D.Fisher (1978), Monetary Theory and the Demand for Money, Martin Robertson
4. Dornbush R (1980), Open Economy Macro Economics, Basic Books
5. Frankel J and Johnson H.G (1976), Monetary Approach to Balance of Payments

EC 232: INTERNATIONAL ECONOMICS – I

(Hours per semester: 110
Hours per week: 6)

Objectives

This course offers an introduction to the main theoretical tools and policies that are central to the study of international trade, but with an emphasis on application to the trade flows, trading blocks and international macroeconomic events that characterize the global economy today. The ability to use economic analysis to reach a deeper understanding of international trade will be an important formative element for those who intend to develop careers in international business and management.

Course Contents

Module I: New Trade Theories: Salient Features (30 hours)

Neo-technological trade theories- Kravis theory of Availability, Linder's theory of Volume of Trade and Demand pattern, Posner's Imitation gap, Vernon's Product Cycle Theory.Intra-industry Trade Models- Krugman's Model (1979), Brander-Krugman Model (1983). Empirical work on Intra-industry trade-Strategic Trade Theory Models: Krugman's Model (1984), Brander and Spencer's Model (1985)-Neo –Heckscher –Ohlin Theory, Monopolistic Competition and International trade, Oligopoly and International trade.

Module II: Trade in Services (20 hours)

Emerging pattern of services trade- The scope and potential of Services trade in Developing Countries-GATS.Trade in Factors of Production and in Intermediate Good- Capital inflow and welfare- Emigration versus capital inflow- Fragmentation, Outsourcing and trade.Traded vs non-traded goods.

Module III: New Protectionism (20 hours)

The political economy of protectionism-Non-tariff barriers- Voluntary Export restraints and Import Expansion- Subsidies, Administered and Contingent Protection and fair trade: Dumping and Antidumping- Countervailing duty, Safeguard actions-Neo Protectionism.

Module IV: Economic Integration (20 hours)

Types of integration-Customs union: Partial and general equilibrium analysis-Trade creation and Trade diversion-Free trade areas, Emerging issues in SAFTA, ASEAN and EU.

Module V: Trade and Development. (20 hours)

Terms of Trade and UDCs - Theory of Immiserising growth-Dutch disease - Rybenzynski theorem – Technical progress and trade- Structural changes in trade and Economic development- Global and National scenario.

Basic Reading List

1. Oliver Cattaneo, InternationalTtrade in Services: New Trends and Opportunities for Developing Countries, World bank, Washington DC, 2010.
2. Feenstra Robert C (2004), Advanced International Trade- Theory and Evidence, Princeton University Press, Princeton
3. Carbaugh, R J (2008) - International Economics, (11th Edition) Thomson South Western, New Delhi
4. Salvatore, D (2008) - International Economics, (8th Edition). Wiley India, New Delhi
5. Krugman P R and Obsfeild M (2009) - International Economics- Theory and Policy, (8th Edition) Pearson, Dorling Kindersley (India) Pvt. Ltd, New Delhi
6. Soderston, B and Reed G.(1994) - International Economics, 3rd Edition, McMillan Press Ltd. London
7. Kindleberger, C P -International Economics, R.D. Irwin, Homewood
8. BhagwatiandSrinivasan (1983), Lectures on international trade, The MIT Press.
9. Bhagwati, J. N. (1987), International trade: Selected readings, Second Edition, MIT Press, Cambridge, Massachusetts
10. Appleyard D. R and Field A J (2014) -International Economics (8th Edition) McGraw Hill, New Delhi
11. Richard E Caver and Harry G Johnson, Readings in International economics
12. Grimwade Nigel (2001), International Trade, (Second Edition), Routledge, London
13. Grubel H G and Lloyd P J (1975), Intra-industry Trade, Macmillan, London.
14. Haberler G (1961), A Survey of International Trade Theory, International Finance Section, Department of Economics, Princeton University.
15. Reinert K A (2012), An Introduction to International Economics, Cambridge university Press, New York
16. Richard Baldwin and Charles Wyplosz (2004), The Economics of European Integration, McGraw Hill, New York.

17. Gandolfo, Giancarlo,(2016), International Finance and Open Economy Macro economics, Springer.
18. Gandolfo, Giancarlo,(2014), International Trade Theory and Policy, Springer.

Additional Readings List

1. J. N. Bhagwati, A. Panagariya and T.N. Srinivasan. Lectures on International Trade, MIT Press, 1998.
2. L. Rivera-Batiz and M. Olivia. International Trade: Theory, Strategies and Evidence, Ch.3, Oxford University Press, 2003.
3. Stolper W. F. & Samuelson P. A. (1941) – "Protection & Real Wages" – Review of Economic Studies, Vol. 9, No. 1, pp. 58 -73.
4. Kravis I. B. (1956) – "Availability & Other Influences on the Commodities Composition of Trade "– Journal of Political Economy, Vol. LXIV, April, pp. 143 – 155.
5. Linder S. B. (1961) – An Essay on Trade & Transformation - New York, John Wiley .
6. Posner M. V. (1961) – "International trade & Technical change" – Oxford Economic Papers, Vol. 13, No. 3, pp. 323 - 341.
7. Vernon R. (1966) – "International Investment & International Trade in the Product Cycle" - Quarterly Journal of Economics, Vol. 80, No. 2, pp. 190 – 207.
8. Grubel H. & Lloyd P. (1975) – Intra – Industry Trade: The Theory and Measurement of International Trade in Differentiated Products- London, Macmillan.
9. Dixit A. K. & Stiglitz J. (1977) – "Monopolistic competition & Optimum Product Variety" – American Economic Review, Vol. 67, No. 3, pp. 297 -308.
10. Krugman Paul R. (1979) – "Increasing Returns, Monopolistic Competition and International Trade "– Journal of International Economics, Vol. 9, No. 4, pp. 469 - 479.
11. Brander James & Krugman Paul (1983)- "A Reciprocal Dumping Model of International Trade "– Journal Of International Economics, Vol. 16, Nos. 3 – 4, pp. 313 – 321.
12. Brander James (1981) –" Intra-Industry Trade in Identical Commodities" – Journal of International Economics, Vol. 11, No. 1, pp. 1 – 14.
13. Krugman Paul R. (1984) – "Import Promotion as Export Promotion" in - Henry Kierzkowski (Ed) - Monopolistic Competition and International Trade – Oxford, Oxford University Press.

14. Brander James & Spencer Barbara (1985) – "Export subsidy and International Market share rivalry"– Journal of International Economics, Vol. 18, Nos. 1 – 2, pp. 83 – 100.
15. Krugman Paul R. & Obstfeld Maurice (2000) – International Economics – Theory & Policy - New Delhi, Addison –Wesley Longman, pp. 138 – 140.

EC 233: PUBLIC ECONOMICS

(Hours per semester: 110
Hours per week: 6)

Objectives

The important objective of this course is that the student should able to understand the regulatory and developmental responsibilities of government in a democratic country like India. It covers the theoretical and empirical dimensions of public goods and public choice, fiscal instruments and fiscal federalism with special reference to Indian context. It also covers the present fiscal management issues of India.

Course Contents

Module 1: Role of Government (18 hours)

Economic rationale of the Modern State: Market Failure and the Rationale for Government Intervention; Natural Monopolies; Asymmetric Information; The Problem of Externalities and their Internalization - Government failure.

Module II: Theory of Public Goods and Public Choice (22 hours)

Concepts, Characteristics of Public Goods: Economic analysis of Public Goods, Efficient Provision of public good; Partial Equilibrium Analysis, Optimal Provision of Public Good; General Equilibrium Analysis. Merit goods, Impure Public Goods and The Theory of Clubs: Buchanan Model-Tiebout Model, Common property Resources; Tragedy of the commons. Public Choice theory: Problem of Collective Choice Defined, Majority Voting, An economic Theory of politics.

Module III: Fiscal Policy Instruments (28 hours)

Fiscal policy for Stabilization: Classical and Keynesian - Principles of Taxation: Benefit and ability to pay approaches; Theory of Tax Incidence; Theory of optimal Taxation: Trade off between equity and efficiency ; Theory and measurement of dead weight losses- The Problem of Double Taxation.

Theoretical and Empirical Analysis of Public Expenditure: Pure Theories of Public Expenditure, Wagner and Wiseman Peacock Hypothesis. Criteria of public Investment; Social cost- benefit analysis- Public Expenditure Management & Control: Concepts.

Theories of Public debt: classical and Compensatory views; Sources of Public debt; Burden of Public Debt; Principles of Management and Repayment.

Module IV: Fiscal Federalism: Theory and Practice (20 hours)

Principles of Federal (Multi Unit) Finance: Imbalances in Federal Finance; Vertical and horizontal imbalance; Fiscal federalism in India: Constitutional Assignment of Functions and Sources of Revenue- Reports of Finance Commissions: Union and State - Local finance in India: Issues in Fiscal Decentralisation in India in the context of 73rd and 74th constitutional amendments.

Module V: Indian Public Finance: Current Scenario (22 hours)

Indian Tax System: An Assessment; Tax and non- Tax Revenue of the Union, States and local bodies; VAT, CENVAT, Organisational structure of Goods and Services Tax (GST), Practical Issues in Tax reforms in India. **-** Structure, Trends and Pattern of Public Expenditure in India- Public debt in India: liabilities, Growth and Problems - **Fiscal imbalance: Revenue, Fiscal and Primary Deficits;** Fiscal Responsibility and Budget Management Act- Budget Analysis.

Basic Reading List

1. Jean-Jacques Laffont (1989) Fundamentals of Public Economics, MIT press, Boston.
2. Brown .C.V & Jackson P.M (1991), Public Sector Economics, Blackwell Publishers Inc, Massachusetts, USA.
3. Holley H.Ulbrich (2003), Public Finance in Theory and Practice, Thompson South-Western, Singapore.
4. Musgrave, R.A. and P.B. Musgrave (2004), Public Finance in Theory and Practice, Fifth Edition, McGraw Hill, Kogakusha, Tokyo.
5. David N. Hyman (2005), Public Finance: A Contemporary Application of Theory to Policy, 8th Edition, Cengage Learning.
6. Rosen, Harvey (2013), Public Finance, McGraw Hill, New York.

Additional Reading List

Module I

1. Anthony B. Atkinson & Joseph E. Stieglitz, (1980), Lectures on Public Economics, Mc Graw-Hill. Book Company (UK) Limited, Great Britain
2. Allan H. Meltzer and Scott F. Richard, (1981) "A Rational Theory of the Size of Government", Journal of Political Economy, Vol. 89, No. 5
3. Joseph E. Stieglitz, (2010), Economics of Public Sector, W.W. Norton & Company.
4. Francesco Forte (2011) Principles of Public Economics a Public Choice Approach, Sapienza – University of Rome, Italy.
5. Joaquim Silvestre (2013) Public Microeconomics Efficiency and Equity in Public Policy, University of California, Davis, US.

Module II

1. Alan J. Auerbach and Martin Feldstein, (1985 & 1987) Handbook of Public Economics Vol. 1 & 2, Elsevier, Amsterdam, North Holland.
2. Thomas A. Husted and Lawrence W. Kenny, (1997) "The Effect of the Expansion of the Voting Franchise on the Size of Government", Journal of Political Economy, Vol. 105, No. 1.
3. John Cullis and Phillip Jones (1998), Public Finance and Public Choice, Second Edition, Oxford University Press, New York.
4. Dennis C. Mueller, (2003) "The size of government", In Public Choice III, Cambridge University Press, Cambridge.
5. Hindriks J and Myles GD. (2006), Intermediate Public Economics, Prentice Hall of India Ltd. New Delhi.
6. Jonathan Gruber, (2009) "Public Goods", In Public Finance and Public Policy, Worth Publishers, Chapter- 7.

Module III

1. Ramsey F.P., (1927) "A Contribution to the Theory of Taxation", The Economic Journal, Vol. 37, No. 145.
2. Paul A. Samuelson, (1955) "Diagrammatic Exposition of a Theory of Public Expenditure", Review of Economics and Statistics, Vol. 37, No. 4.

3. Alan T. Peacock, (1979) The Economic Analysis of Governments, and Related Themes, St Martin Press, New York.
4. Alan J. Auerbach and Martin Feldstein, (1985 & 1987) Handbook of Public Economics Vol. 1 & 2, Elsevier, Amsterdam, North Holland.
5. Michael J. Boskin, (1988) "Concepts and Measures of Federal Deficits and Debt", In Kenneth Joseph Arrow and Michael J. Boskin (eds.), The Economics of Public Debt, International Economic Association, Macmillan Press, New York.
6. Joel Slemrod, (1990) "Optimal Taxation and Optimal Tax Systems", The Journal of Economic Perspectives, Vol. 4, No. 1.
7. Sijbren Cnossen, (1992) Key Questions in Considering a Value Added Tax for central and Eastern Europe Countries, IMF Staff Papers, Vol. 39, No. 2.
8. Raghbendra Jha, (1998) Modern Public Economics, Routledge, London.
9. Alan J. Auerbach and James R. Hines, (2002) "Taxation and economic efficiency", In Alan J. Auerbach and Martin Feldstein (eds.), Handbook of Public Economics: vol. 3, North-Holland, Amsterdam, Chapter- 21.
10. Alan J. Auerbach and James R. Hines, (2002) "Taxation and economic efficiency", In Alan J. Auerbach and Martin Feldstein (eds.), Handbook of Public Economics: vol. 3, North-Holland, Amsterdam,
11. Don Fullerton and Gilbert E. Metcalf, (2002) "Tax Incidence", In Alan J. Auerbach and Martin Feldstein (eds.), Handbook of Public Economics: vol. 4, North-Holland, Amsterdam, Chapter- 26.
12. Amaresh Bagchi, (2005) Readings in Public Finance, Oxford University Press, USA.
13. Jonathan Gruber, (2009) "Public Goods", In Public Finance and Public Policy, Worth Publishers

Module IV

1. Charles M. Tiebout, (1956) "A pure theory of local expenditures", Journal of Political Economy, Vol. 64, No. 5.
2. Wallace E. Oates, (1999) "An Essay on Fiscal Federalism", Journal of Economic Literature, Vol. 37, No. 3.

3. Richard A. Musgrave, (1999) “Fiscal federalism”, In James M. Buchanan and Richard A. Musgrave (eds.), Public Finance and Public Choice: Two contrasting Visions of the State, MIT Press,Cambridge, .
4. Amaresh Bagchi and Pinaki Chakraborty, (2004) “Towards a Rational System of Centre-State Revenue Transfers”, Economic and Political Weekly, Vol. 39.
5. Rangarajan C. and Srivastava D.K. (2011) Federalism and Fiscal Transfers in India, Oxford
6. Per Molander (2012) Fiscal Federalism in Unitary States ,ZEI Studies in European Economics and Law.

Module V

1. Gulati, I. S., (1991) “Reducing the Fiscal Deficit: Soft and Hard Options”, Economic and Political Weekly, Vol. 26, No. 29.
2. National Institute of Public Finance and Policy (India) (1994) Reform of Domestic trade Taxes in India: Issues and Option: Report of a Study Team, New Delhi.
3. Sudipto Mundle, (1997) Public Finance Policy Issues for India, Oxford University Press, New Delhi.
4. Amaresh Bagchi, (2005) Readings in Public Finance, Oxford University Press, New Delhi.
5. Pinaki Chakraborty, (2005) “Debt Swap in a Low Interest Rate Regime: Unequal Gains and Future Worries”, Economic and Political Weekly, Vol. 40, No. 40, pp. 4357-4362.
6. Prabhat Patnaik, (2001) “On Fiscal Deficits and Real Interest Rates”, Economic and Political Weekly, Vol. 36.
7. Mihir Rakshit, (2000) “On Correcting Fiscal Imbalances in the Indian Economy - Some Perspectives”, Money and Finance, ICRA Bulletin, July September.
8. Reserve Bank of India (1985) Report of the Committee to Review the Working of Monetary System, Mumbai. 43
9. Rao, M. Govinda, (2003) “Reform in Central Sales Tax in the Context of VAT”, Economic and Political Weekly, Vol. 38, No. 7, pp. 627-636
10. Mahesh C. Purohit and Vishnu Kanta Purohit (2014), The Oxford Handbook of Tax System in India: An Analysis of Tax Policy and Governance, Oxford.

11. Jalan, Marjit, Santra (2016) India Public Finance and Policy Report 2016: Fiscal Issues and Macro Economy , Oxford.
12. Bimal Jain, IshaBansal (2016) Goods and Services Tax introduction and way forward, Bloomsbury, New Delhi.

CORE PAPERS I N FOURTH SEMESTER

EC 241: MACRO ECONOMICS - II

(Hours per semester: 120
Hours per week: 7)

Objectives

The important areas included in this portion are the theoretical development of the macroeconomic issues of inflation, unemployment and business fluctuations. The development of macro economics after Keynesian revolution, divided into classical school and Keynesian school, and the impacts of various macroeconomic policies in the society are also covered here. By learning this paper, the students should able keep abreast with the latest development of macroeconomics development.

Course Contents

Module 1: Theory of Inflation and Unemployment (20 hours)

Classical, Keynesian and monetarists approaches of inflation- Structuralist Theory of Inflation – Measuring inflation- Costs of inflation and Inflation Targeting –Benefits of inflation

Philips curve analysis- Short run and Long Run Philips curve- Samuelson and Solow's views- the Natural Rate Unemployment Hypothesis- Tobin's modified Philips curve- NAIRU- Adaptive Expectations- Expectation Augmented Philips curve- Cost of reducing inflation and unemployment- Increasing Natural Rate of Unemployment and Hysteresis Hypothesis –Philips curve and Rational expectation- New Micro Economics in Labour Market- Search theory- DMP (Diamond, Mortenson, Pissarides) model.

Module 2: Business Cycle (20 hours)

Cyclical behaviour of economic variables – Direction and Timing – Aggregate demand Shocks and Aggregate Supply Shocks – Business cycle theories of Keynes, Samuelson, Hicks, Kaldor and Goodwin – Real Business Cycle Theory**-** Political Business Cycle theories (views of Nordhaus, Hibbs and Alesina) – Financial and economic crisis 2007-2009- Causes and consequences (Financial Innovation, Asset Risk and Diversification, Impact on Real Sector)– View points by Conservative and Keynesian economists (Eugene Fama, Paul Krugman etc)

Module 3: Modern Development in Macro Economics –Classical school (25 hours)

Monetarism- Rational Expectations- New Classical Macro Economics- Views of Muth, Wallace, R.E.T Sargent and Lucas (Lucas Surprise Labour Function, the Inter Temporal

Substitution Model, Policy Ineffectiveness Argument, The Lucas Critique)- Supply Side Economics- Supply Shocks and Stagflation- Wedge Model- Laffer Curve- Policy Implication- The Dynamically Stochastic General Equilibrium model (DSGE)

Module 4: Modern Development in Macro Economics – Keynesian school (25 hours)

Neo-Keynesianism- Disequilibrium Keynesians: Reinterpretation of Keynes by Clover and Leijonhufvud- the Dual Decision Hypothesis- Quantity Constrained Model of Malinvaud and Barro- Coordination Failure

Fundamental arguments of Post Keynesians- Kalecki's Pricing Model- Financial Instability Model of Hymn Minsky

New Keynesian macro economics- Nominal Rigidities- Real Rigidities- Small Menu Cost Model-Implicit Wage Contract Model- Efficiency Wage Theories- Insider Outsider Model and Hysteresis- Coordination Failure- Policy Implications – New Political Macro Economics-New Neo Classical Synthesis

Module 5: Macroeconomic Policy Issues (30 hours)

The theory of economic policy- Target and Instrumental variables – Tinbergen Rule- Case for and Against Activists Policy- Policy Lags

Monetary Policy –Conduct of Monetary Policy –Rules vs Discretion – The Time Inconsistency Proposition –Rules of Monetary policy- Taylor Rule- Monetary Targeting and Inflation Targeting –Central Bank Independence and credibility

Fiscal policy –Crowding out – Budget deficits and Debt– Seignorage- Measurement problem of Govt Debt- Views on Govt Debt – Traditional View- Barro-Ricardo Equalization Problem –Political Economy Theories of Budget Deficit- Effects of deficits- Income Policy and Wage Guideposts-Alternative Strategies to Reduce inflation – Gradualism vs Cold Turkey – Disinflation and Sacrifice Ratio – Okun's Law – Growth vs Stability.

Basic Reading List

1. Mankiw, G. (2011), Macro Economics, Worth Publishers, NewYork
2. Rudiger Dornbusch, Stanley Fischer and Richard Startz (2006), Macroeconomics, McGraw-Hill.
3. Levacic, R. and A. Rebman (2006), Macro Economics, Mac Millan Pres Ltd.
4. Froyen, R.(2008). Macroeconomics, Pearson India

5. Snowdon, B. H. Vane and P. Wynarezyk (2002), A modem Guide to Macro Economics: An introduction to competing schools of thought, Edward Elgar.
6. Kamran Dadkhah (2010), Evolution of Macro Economic Theory and Policy, Springer
7. David Romar (2011), Advanced Macro Economics, McGra-Hill, 4th Edition
8. Andre B.Abel and Ben S. Bernanke (2010), Macro Economics, 4th Edition, Pearson
9. G.K.Shaw, Michael J, Mc Croshie and David Greenway, Macro economics, theory and Practice, Blackwell.

Additional Reading List

Module 1

1. Garner Ackley (1989) Macro Economics: Theory and Practice, Collier Macmillan
2. I.Frisch H (1983), Theories of Inflation, Cambridge University Press, Cambridge
3. Haggar, A,J (1977), Inflation: Theory and Policy, Macmillan, London
4. Hudson, J (1982), Inflation: A Theoretical Survey and Synthesis, George Alien and Unwin, London
5. Oliver Blanchard (2011), Macro Economics, Pearson
6. A.J.Westaway and T.G.Weyman Johnes (1978), Macro Economics, Theory, Evidence and Policy, Longman
7. Errol D'Souza (2008), Macro Economics, Pearson

Module 2

1. A.J.Westaway and T.G.Weyman Johnes (1978), Macro Economics, Theory, Evidence and Policy, Longman
2. Stanley Bober (2010), Economics of Cycles and Growth, Witely.
3. Lucas, Robert E, "Understanding Business Cycle" in K.Brunner and A.Meltzer (eds.) Stabilisation of the Domestic and International Economy, Carnegie-Rochester Series on Public Policy 5 (Amsterdam: North-Holland) 1976.
4. Kydland, Finn E. and Edward C. Presscot "Time to Build and Aggregate Fluctuations", Econometrica 50: 1345-1370, 1982.

Module 3

1. Friedman A (1968), The Role of Monetary Policy, The American Economic Review, Vol 58, No 1 (March 1968)

2. G.Mankiew (1989) Real Business Aspects- A Keynesian Perspective, Journal of Economic Perspective, Vol 3
3. David Laidler, New Classical Contribution to Macro Economics (In Macro Economic Reader) edt by B.Snowdon and H.R.Vane, Routledge
4. Finn E Kydland, Edward C. Presscot, Rules Rather than Discretion, The Journal of Political Economy, Vol 85, N.3 (June 1977)
5. Thomas Mayer, The Structure of Monetarism (in Macro Economic Reader) ed by B.Snowden and H.R.Vane, Routledge
6. Charles A Plosser, Understanding Real Business Cycles, (ibid.) Routledge
7. Lefteris Tsoulfidis (2010), Competing Schools of Economic Thought, Springer
8. Farrokh K Langdna (2009), Macro Economic Policy: Demystifying Monetary and Fiscal Policy,
9. Brian Snowdon and Howard R.Vane (Ed) (2003), A Macro Economic Reader, Routledge.
10. Ben J. Haijdra Frederick Van Der Ploeg (2002), Macroeconomics, OUP
11. A.J.Westaway and T.G.Weyman Johnes (1978), Macro Economics, Theory, Evidence and Policy, Longman

Module 4

1. Robert J Gordon, What is now Keynesian Economics? (in Macro Economic Reader) ed by B.Snowden and H.R.Vane, Routledge
2. Finn E Kydland, Edward C. Presscot, Rules Rather than Discretion, The Journal of Political Economy, Vol 85, N.3 (June 1977)
3. Lefteris Tsoulfidis (2010), Competing Schools of Economic Thought, Springer
4. Ben J. Haijdra Frederick Van Der Ploeg (2002), Macroeconomics, OUP
5. M.J.C Surrey (1976), Macroeconomic Themes, Wily Eastern.
6. James K Galbraith and William Darity Jr (1994), Macroeconomics, Houghton.
7. Goodfriend, Marvin; *King, Robert G* (1997), "The New Neoclassical Synthesis and the Role of Monetary Policy", NBER Macroeconomics Annual, NBER Chapters, National Bureau of Economic Research, **12**: 231–83
8. Kocherlakota, Narayana R (May 2010), "Modern macroeconomic models as tools for economic policy", Federal Reserve Bank of Minneapolis

9. Woodford, Michael (2009), "Convergence in Macroeconomics: Elements of the New Synthesis", American Economic Journal: Macroeconomics, **1** (1): 267–79

Module 5

1. Friedman A (1968), The Role of Monetary Policy, The American Economic Review, Vol 58, No 1 (March 1968)
2. Finn E Kydland, Edward C. Prescott, Rules Rather than Discretion, The Journal of Political Economy, Vol 85, N.3 (June 1977)
3. *Frederic S. Mishkin* (2011), Macroeconomic: Policy and Practice, Pearson Education Limited.
4. Prabhat Patnaik (1995), Macroeconomics (edt.), OUP, New Delhi
5. Kocherlakota, Narayana R (May 2010), "Modern macroeconomic models as tools for economic policy", Federal Reserve Bank of Minneapolis

EC 242: INTERNATIONAL ECONOMICS - II

(Hours per semester: 110
Hours per week: 6)

Objectives

The objective of this course is to introduce to students the theories of international finance flows, determination of interest and exchange rates in interconnected economies, macroeconomic policies available to the government, and the nature of financial crises. The course also aims to provide a framework for consistent reasoning about international flows of goods, factors of production, and financial assets, trade policy and monetary policy in open economy.

Course Contents

Module – 1: Foreign Exchange Market (28 hours)

Evolution of foreign exchange rate determination mechanism. Speculation and arbitrage, role of expectations, currency swaps, future and options – Asset approach to exchange rate – Portfolio balance approach – FOREX management strategy – Management of foreign exchange with special reference to India – Indian Rupee and its fluctuations in international currency market.

Module – 2: BOP Approach (24 hours)

Monetary model of BOP under fixed and flexible exchange rates – Devaluation and BOP crisis – Effects of Devaluation- Elasticity and Absorption Approach-Marshall - Lerner Condition – Foreign trade multiplier– Recent trends in BOP in India

Module – 3: Open Economy Adjustment Policies (20 hours)

Internal and external balance – Swan diagram – Assignment problem – Expenditure Switching and Changing policies – Combining monetary and fiscal policies

Module – 4: International Financial Management (19 hours)

Euro currency market and international bond market – Analysis of international capital budgeting – Issues in overseas funding choices – Funding and risk management – Aspects of European debt crisis –Euro crisis and Brexit.

Module – 5: International Financial Institutions (19 hours)

Institutions for International Relations and Liquidity-Evolutionary and operational developments in international institutions- IMF, IBRD, IDA, UNCTAD, ADB, WTO. Problems and prospects of WTO Agreement in present Global trading- India and International institutions

Basic Reading List

Module 1

1. Copeland L. (CL) Exchange rates and International Finance, 5th edition, 2008
2. Foreign Exchange and Risk Management C . Jeevanandam Sulthan Chand and Son
3. Maurice .D.Levi-International Finance: The Markets and Financial Management of Multinational Business Mc Graw Hills 1990 1995

Module 2

1. Appleyard, D.R. and Field. A.J. International Economics, New York: Irwin McGraw Hill, 1998.
2. Francis Cherunilam-International Economics Mc Graw Hills Education 2008
3. International Economics by Dennis R. Appleyard; Steven Cobb; Alfred J. Field
4. Paul.R.Krugman and Maurice Obsterfeld – International Economics, Pearson Education 2009 Dorling Kindersley (India) Pvt ltd.

Module 3

1. Peter Isard - Exchange Rate Economics,Cambridge University Press, 1995 Business & Economics
2. Kenen, Peter B. International Economics. Cambridge. Cambridge University Press,1996

Module 4

1. Shapiro - Capital Budgeting And Investment Analysis, Pearson Education India, 2008
2. G. Shailaja, International Finance, University Press Hyderbad
3. Bierman, H. and S. Smidt, 1992, The Capital Budgeting Decision, Macmillan Company, New York.

Module 5

1. Krugman, P.R. International Economics. New Delhi: Pearson, 2007.
2. Salvatore, D. International Economics. Singapore: John Wiley & Sons, 2002.

3. Carbaugh, R.J. International Economics. Singapore: Thompson Asia, 2002.
4. K C Rana and K N Verma – International Economics, Vishal Publishing House P O 2012

Additional Reading List

1. Paul.R.Krugman and Maurice Obsterfeld – International Economics, Pearson Education 2009 Dorling Kindersley (India) Pvt ltd.
2. Krugman and Obsterfield-International Economics: Theory and Policy, Education Dorrbusch, Open Economy Macro Economics, Basic Books,Inc Publishers
   Stern R.M-International Trade and Finance Cambridge University Press
3. Avadhani.V.M. International Finance Theory and Practice-Himalaya Publishing House Delhi
4. Cooper R.N.(ed) International Finance Penguine books U.K. 1969
5. Apte.P G.International Finance Management Tata Mc Graw Hills Delhi 1995
6. Rodrigues .R.M. and Carter International Financial Management, Prentice Hall New Delhi 1984
7. A Textbook of Foreign Trade and Foreign Exchange B.K.Chaudhri O.P.Agarwal Himalaya Publishing House
8. International Financial Management-Madhu V.J. Excel Books,New Delhi

EC 243: FINANCIAL SECURITIES MARKET ANALYSIS

(Hours per semester: 110
Hours per week: 6)

Objectives

This course is designed to provide comprehensive study of the significance of Securities Market in modern financial system. It includes a discussion of the efficient securities markets theory in finance, covers bond pricing, price-earnings models of share valuation, and introduces the top down approach to investment decisions. The emphasis is on a thorough coverage of modern finance theory as applied to investment analysis, balanced with a consideration of new developments in the discipline, and of the application of both old and new theoretical perspectives to understand the current environment for financial investment decisions.

Course Contents

Module I : Securities Market (20 hours)

The role and significance of Securities Market in modern financial system - Levels of Securities Market: Primary Market (New issue market) and Secondary Market (Stock exchange and Over the counter market) - Primary stages in issue of shares (origination, underwriting and distribution) – IPO – FPO - Methods of floatation of new issues (public issue, rights issue, bonus issue, private placement, offer to the employees) - Listing procedure of shares in securities market: objectives and advantages.

Module II : Stock Market in India (20 hours)

Nature and functions of stock exchanges - Stock exchanges in India: NSE and BSE, National Commodities and Derivatives Exchange Ltd (NCDEX). Stock exchange indices and its construction- Nifty (Mini Nifty, Sectoral indices like Bank Nifty), Sensex. Stock market participants: individual retail investors, institutional investors (mutual funds, banks, insurance companies and hedge funds), corporations and foreign institutional investors (FIIs). Dematerialization and depository system - Major depositories (NSDL & CDSL). Credit Rating Agencies (CRISIL, ICRA, CARE). Speculation and other Issues in stock market (Insider trading). Regulatory aspect: SEBI.

Module III : Stock Investment Decision Analysis (20 hours)

Security Analysis - Fundamental analysis - PE Ratio (price to earnings), EPS (earning per share), Book value (price to book value ratio), Working Capital Ratio, Return on Equity Ratio (ROE), Debt Equity Ratio, Dividend yield, Price-Sales Ratio(P/S ratio) - Technical analysis: Significance of Trend lines, Dow Theory and Elliot-Wave Theory - Efficient Market Hypothesis (Weak form-Semi strong form-Strong form). Portfolio Management: Definition, Objectives and **Markowitz Portfolio Theory.**

Module IV: Stock Market Trading in India (25 hours)

Basic requirements for Stock Investment/Trading (Stock Broker, Saving Account, Demat Account, Trading Account, Internet Facilities). Types of investment in stock market (short term and long term investment). Methods of buying and selling stocks (Market order, Limit order and Stop loss order). Types of stock trading (Day trading and Delivery trading). Online share trading and Offline share trading. Current Settlement System in the stock market. Tax implications of investing in stocks (Exemption of dividend and long- term capital gains from tax).

Basic Concepts in share trading- Open, High, Low, Close, Volume, Bid price, Offer price, Bid quantity, Offer quantity, Short selling, Penny stocks, Large cap stocks, Mid cap stocks, Small cap stocks, Transaction cycle, Margin trading, Bull phase, Bear phase, Dividend (interim and final dividend) and Bonus shares. Brokerage charge and Securities transaction tax.

Module V: Market for Derivatives and Mutual Funds (20 hours)

Economics of Derivatives (Forwards, Swaps, Futures and Options), Futures Contracts-Pricing of Futures Contracts, Hedging with Futures Contracts, Financial Futures, Commodity Futures, Use of Future Contracts, Economics of Options Contracts – Call Option, Put Option, Option premium, Payoffs of option before expiration, Major factors in Option Pricing: Intrinsic value and Time value. Hedging Strategies in Futures and Options: Short Hedges and Long Hedges. Mutual Funds: Liquid Funds, Debt Funds, Equity Funds, Balanced Funds. NAV of mutual fund schemes. Systematic Investment Plan (SIP).

MODULE VI: Practical Session (5 Hours)

Online trading- live markets-trade related aspects and derivatives.

[Note: Scheme for Continuous Assessment (CA) of this paper: (a) attendance – 5 marks, (b) assignment -5 marks, (c) for attending 5 hours of practical work on online trade - 5 marks, and (d) test paper - 10 marks; total - 25 marks]

Reading List

Module I

1. Bhalla, V.K. (2013). Investment Management: Security Analysis and Portfolio Management, New Delhi, S.Chand and Company Pvt Ltd.
2. Bhole, L. M. (2009). Financial Institutions and Markets: Structure, Growth and Innovations, New Delhi, Tata McGraw – Hill Education Pvt Ltd.
3. Gurusamy, S. (2009). Indian Financial System, New Delhi, Tata McGraw – Hill Education Pvt Ltd.
4. Kevin, S. (2015). Security Analysis and Portfolio Management, New Delhi, Prentice-Hall of India Pvt Ltd.
5. Khan, M. Y. (2013). Indian Financial System, New Delhi, McGraw Hill Education (India) Pvt Ltd.
6. Mahipal Singh (2011). Security Analysis with Investment and Portfolio Management, Delhi, ISHA Books.
7. Pandya, F.H. (2013). Security Analysis and Portfolio Management, Mumbai, Jaico Publishing House.
8. Ranganatham, M & Madhumathi, R. (2012). Investment Analysis and Portfolio Management, New Delhi, Dorling Kindersley (India) Pvt Ltd.
9. Sasidharan, K & Mathews, Alex.K. (2011). Security Analysis and Portfolio Management, New Delhi. Tata McGraw- Hill Education Private Ltd.
10. Subhash Chandra Das (2015). The Financial System in India: Markets, Instruments, Institutions, Services and Regulations, Delhi, PHI Learning Private Ltd.

Module II

1. Avadhani, V.A. (2012). Marketing of Financial Services, Mumbai, Himalaya Publishing House.
2. Bhalla, V.K. (2013). Investment Management: Security Analysis and Portfolio Management, New Delhi, S.Chand and Company Pvt Ltd.
3. Chandra, Prasanna (2009). Investment Analysis and Portfolio Management, New Delhi, Tata McGraw- Hill Education Pvt Ltd.

4. Dhanesh Khatri (2010). Security Analysis and Portfolio Management, Delhi, Macmillan Publishers India Ltd.
5. Gurusamy, S. (2009). Indian Financial System, New Delhi, Tata McGraw – Hill Education Pvt Ltd.
6. Khan, M. Y. (2013). Indian Financial System, New Delhi, McGraw Hill Education (India) Pvt Ltd.
7. Pandya, F.H. (2013). Security Analysis and Portfolio Management, Mumbai, Jaico Publishing House.
8. Raghunathan, V. (2005). Stock Exchanges and Investments, New Delhi, Tata McGraw-Hill Publishing Company Ltd.
9. Ramesh Babu, G. (2007). Portfolio Management: Including Security Analysis, New Delhi, Concept Publishing Company.
10. Samuel Thomas (2014). Security Analysis and Portfolio Management, Delhi, PHI Learning Private Ltd.

Module III

1. Bhalla, V.K. (2013). Investment Management: Security Analysis and Portfolio Management, New Delhi, S.Chand and Company Pvt Ltd.
2. Fischer, D. E and Jordan, R.J. (2009). Security Analysis and Portfolio Management, New Delhi, Prentice-Hall of India Pvt Ltd.
3. Graham, B & David Dodd (2008). Security Analysis, New Delhi, McGraw- Hill Professional.
4. Gurusamy, S. (2009). Indian Financial System, New Delhi, Tata McGraw – Hill Education Pvt Ltd.
5. Kevin, S. (2015). Security Analysis and Portfolio Management, New Delhi, Prentice-Hall of India Pvt Ltd.
6. Ramesh Babu, G. (2007). Portfolio Management: Including Security Analysis, New Delhi, Concept Publishing Company.
7. Ranganatham, M & Madhumathi, R. (2012). Investment Analysis and Portfolio Management, New Delhi, Dorling Kindersley (India) Pvt Ltd.
8. Sasidharan, K & Mathews, Alex.K. (2011). Security Analysis and Portfolio Management, New Delhi. Tata McGraw- Hill Education Private Ltd.

9. Subhash Chandra Das (2015). The Financial System in India: Markets, Instruments, Institutions, Services and Regulations, Delhi, PHI Learning Private Ltd.
10. Teweles.R.J & Bradley.E.S. (2012). The Stock Market, John Wiley& Sons, Inc.

Module IV

1. Bhalla, V.K. (2013). Investment Management: Security Analysis and Portfolio Management, New Delhi, S.Chand and Company Pvt Ltd.
2. Border, John & Evan J. Houpt (2015). Stock Market for Beginners Book, Publisher: John Border.
3. Dhanesh Khatri (2010). Security Analysis and Portfolio Management, Delhi, Macmillan Publishers India Ltd.
4. Gurusamy, S. (2009). Indian Financial System, New Delhi, Tata McGraw – Hill Education Pvt Ltd.
5. Mahipal Singh (2011). Security Analysis with Investment and Portfolio Management, Delhi, ISHA Books.
6. Orli Zuravicky (2005). The Stock Market, New York, The Rosen Publishing Group, Inc.
7. Ranganatham, M & Madhumathi, R. (2012). Investment Analysis and Portfolio Management, New Delhi, Dorling Kindersley (India) Pvt Ltd.
8. Ramesh Babu, G. (2007). Portfolio Management: Including Security Analysis, New Delhi, Concept Publishing Company.
9. Sasidharan, K & Mathews, Alex.K. (2011). Security Analysis and Portfolio Management, New Delhi. Tata McGraw- Hill Education Private Ltd.
10. Subhash Chandra Das (2015). The Financial System in India: Markets, Instruments, Institutions, Services and Regulations, Delhi, PHI Learning Private Ltd.

Module V

1. Bhole, L. M. (2009). Financial Institutions and Markets: Structure, Growth and Innovations, New Delhi, Tata McGraw – Hill Education Pvt Ltd.
2. Brahmaiah, B. & Subba Rao, P. (1998). Financial Futures & Options, New Delhi, Himalaya Publishing House.
3. Chandra, Prasanna (2008). Financial Management: Theory and Practice, New Delhi, Tata McGraw- Hill Publishing Company Ltd.

4. Dhanesh Khatri (2010). Security Analysis and Portfolio Management, Delhi, Macmillan Publishers India Ltd.
5. Fischer, D. E and Jordan, R.J. (2009). Security Analysis and Portfolio Management, New Delhi, Prentice-Hall of India Pvt Ltd.
6. Hull, John.C. (2004). Options, Futures and Other Derivatives, New Delhi, Prentice-Hall of India Pvt Ltd.
7. Kevin, S. (2015). Security Analysis and Portfolio Management, New Delhi, Prentice-Hall of India Pvt Ltd.
8. Kumar, S.S.S. (2010). Financial Derivatives, New Delhi, PHI Learning Pvt Ltd.
9. Ranganatham, M & Madhumathi, R. (2012). Investment Analysis and Portfolio Management, New Delhi, Dorling Kindersley (India) Pvt Ltd.
10. Sasidharan, K & Mathews, Alex.K. (2011). Security Analysis and Portfolio Management, New Delhi. Tata McGraw- Hill Education Private Ltd.
11. Somanathan, T.V. & Nageshwaran, V. Anantha (2015), The Economics of Derivatives, Cambridge University Press, Delhi.
12. Bouchaud, Jean – Philippe and Potters, Marc (2011), Theory of Financial risk and Derivative pricing- From Statistical Physics to Risk management, Cambridge University Press, Delhi.

EC 244: DISSERTATION

Objectives

The objective of dissertation work is to develop research aptitude and skills among the students.

Course Description

A well structured dissertation work meeting standard requirements of academic writing.

Dissertation Format

General Guidelines

1. Selection of a Topic
2. Pilot Survey, if needed
3. Significance of the Study
4. Review of Literature
5. Research Gap (Optional for PG)
6. Formulation of Research Questions /Issues
7. Research objectives
8. Hypotheses (Optional for PG)
9. Theoretical framework (Optional for PG)
10. Conceptual Framework – Conceptualization & Operationalization (precise and specific meaning of the terms / concepts /variables)
11. Coverage (Universe/ Sample & period of study)
12. Data source (Primary/Secondary)
13. Tools of analysis (Analytical Framework)
14. Social Relevance of the study
15. Limitations of the study
16. Chapter outlines
    - **i.** Introductory Chapter
    - **ii.** Other Background Chapters
    - **iii.** Result/Analysis Chapter(s)
    - **iv.** Conclusion Chapter
17. Appendices
18. Bibliography /References & Webliography

Structure of the Report

A. Title Page/ Cover Page

a. Title page

b. Title of the project

c. Name of the candidate/candidate code

d. Degree for which project is submitted.

e. Name of the college

f. Month and year the project is presented

B. Declaration of the student

C. Certificate of the supervising teacher

D. Acknowledgments

E. Table of contents

a. List of Tables

b. List of Figures

c. Glossary

d. List of abbreviations

F. Chapter Outlines (Chapter Titles and Page Numbers)

G. Abstract/ Executive Summary (One page)

H. The Main Text

a. Introductory Chapter: Items 3 to 15 mentioned above

b. Other Chapters **-** Analysis, Results Interpretation

c. Conclusion Chapter: Conclusions, Recommendations & Summary

I. End Notes (after each Chapter)

J. Bibliography (at the end of the thesis)

K. Appendices

a. Questionnaire

b. Interview Schedule

c. Observation Schedule (optional)

d. Coding Frame (optional)

e. Letters sent to sample members (optional)

f. Any Other

Length of the Project

1. Report length 50 to 70 pages excluding Appendix and Certificates
2. Alignment : Justify
3. Font :Times New roman
4. Font size : 12
5. Line spacing : 1.5
6. No Page Border

Departmental Requirement

(To be kept at the Department by the Supervisor)

Supervisor- Student Meeting Log

Date/Time	Discussion Areas	Summary of Discussions	Signature of the Supervisor
	Topic selection		
	Clarify Objectives		
	Literature Review		
	Seminar 1		
	Research Design		
	Collect Data		
	Analyze Data		
	Write up		
	Supervisor's Comments		
	Final Draft -Seminar 2		

Name of the Supervisor:

Name of the Student:

Notes: The dissertation work may be started in the Third Semester itself for timely completion of the work at the end of the IV Semester.

OPTIONAL PAPERS IN THIRD SEMESTER

EC 201: AGRICULTURAL ECONOMICS

(Hours per semester: 110
Hours per week: 6)

Objectives

The objective of this course is to develop the knowledge and understanding of basic principles and practice of Economics as required in Agricultural Economics. The course also aims at equipping the students with the knowledge and skills required to analyze the agricultural economic issues for efficient use of scarce resources in agriculture sector and its development, consistent with the interest of all stake holders.

Course Contents

Module l Agricultural Economics (15 hours.)

Scope of Agricultural Economics-Farming systems; types-Organizational structure; traditional (subsistence),corporate, co-operative, collective, state farming- Theories of agricultural development ; Schultz, Mellor, Lewis and Boserup.

Module 2: Agricultural Production (30 hours)

Production function in Agriculture; factor-product relationships, product-product relationships, factor-factor relationships - Supply response models; Cobweb,Nerlove models-Resource use efficiency - Farm size productivity relationship in Indian Agriculture-Cost concerned supply- price relationship-Farm management; principles, need, relevance-Farm management decisions -Principles of factor substitution - Cost principles; opportunity cost, comparative advantage - Limitations of farm management-Farm Budgeting; types, techniques-RAINBOW Revolution -Green Revolution –Second green revolution –Ever green revolution-Farm mechanization

Module 3: Agricultural Marketing and Supply Response (25 hours)

Agricultural Marketing; distinction-Marketed and marketable surplus- Efficiency in Agricultural marketing; need, criteria for judging efficiency, problems- Agricultural marketing system in India; current scenario, problems, measures, institutional set up, support systems-Regulated Markets –Co-operative markets.

Behavior of agricultural prices –Demand and supply of agricultural products –Supply response in Agriculture;different views - Uncertainty and crop insurance-Commission on Agricultural Cost and Prices; role, functions, performance.

Module 4 : Determination and Behaviour of Agricultural Prices (20 hours)

Nature of agricultural prices- Price income elasticity and stability-Procurement, support prices- Input subsidies; issues, challenges-PDS and food security

Module 5-Leading issues in Indian Agriculture (20 hours)

Agricultural development in India; share, contribution, impact on economy- Post reform agriculture- Land reforms in India and its impact on agrarian structure-National Agricultural policy-Agriculture and environment-Rural indebtedness;causes, effects counter measures-Issue of commercialization of agriculture-New economic policy and agriculture –Globalization of Indian agriculture –Role of MNCs –privatization and corporatization-AoA and its impacts.

Reading List

Module 1

1. Bilgrami, SAI: (1996). Agricultural Economics, Himalaya Publishing House, Delhi.
2. Soni.R.N. (2004) Leading Issues in agricultural Economics, Vishal Publishing Co. Jalandhar.
3. Sadhu.A.N and Amarjith Singh, (IS)1). Fundamentals of Agricultural Economics, Himalaya Publishing House, Bombay.
4. Y. Haymi and V. Rutan, (1971), Agricultural Development, An International prospective, John Hopkins.

Module 2

1. E.D-Heady (1961), Economics of Agricultural production and Resource use. Prentice Hall.
2. A. Rudra, (1982), Indian Agricultural Economics
3. D.Metcalf, (1969). The Economics of Agriculture.
4. Soni.R.N. (2004), Leading Issues h Agricultural Economics, Vishal Publishing. Co Jalandhar.
5. C.H. Hanumantha Rao. (1965). Agricultural Production Functions, Costs and Returns in India, Tata. McGraw Hill

6. R.K.Lekhi and Jogindersingh (2004) Agricultural Economics ,Kalyani Publications ,Liudhiana

Modules 3

1. S.S.Acharya and N. Argwall (1998), Agricultural Marketing in India.
2. Soni.R.N. (2004),. Leading Issues ii Agricultural Economics, Vishal Publishing Co Jalandhar.
3. Tyagi.D.S. (1974). Fanners Responses to Agricultural Prices in India, A Study in decision making. New Delhi, Heritage Publishers.
4. Khusro. AM (1968), Readings in Agricultural Economics, Bombay, Allied.
5. Sidhu D.S. (1990), Some Aspects of Agricultural Marketing and Pricing Policies India, UAE, Oct- December.
6. Acharya.S.S. (1998), "Agricultural Marketing in India: Some facts and Emerging Issues: UAE, July-Sept.
7. H.Evan Drummond John W.Godwin (2004) Agricultural Economics, Pearson Education, Delhi.

Module 4

1. K Subbaran and D.E.Janvry, (1985), Agricultural price policy and Income Distribution in India.OUP.
2. S.Subba Reddy ,P.RaghuRam,T.V.NeelakandaSastry and I.Bhavani Devi (2004)Agricultural Economics ,Oxford and IBH,Newdelhi
3. A.S.Kahlon and D.S.Tyagi. Agricultural pace policy on India, Hentage Publishers.
4. Rath, N.K.(1985). "Prices, costs of Production and Terms of Trade of Indian Agriculture, IJAE, Oct-Dec.
5. R.N. Soni, (2004), Leading Issues in Agricultural Economics, Vishal Publishers, Jalandhar.
6. Umakapila (1999) Indian Economy since Independence - academic Foundation
7. G.S. Bhalla and Y.K. Alagh (1979), Performance of Indian Agriculture - wise study, sterling.
8. M.L. Dantwada (ed.) (1985) Agricultural Growth in India, Indian Agricultural Economics.
9. R.K. Sampath (1980) Economic Efficiency in Indian Agriculture.

10. Datwala M.J et.al (1991) Indian Agricultural Development since India Oxford and IBH, New Delhi.

Module 5

1. Raj.K.N.etal. (1988), Essays in the commercialisation of Indian -Agriculture New Delhi.
2. Soni,R.N.(2004),. Leading Issues in agricultural Economics, Vishal Publications, Jalandhar.
3. Robet.E.B. .Lacas, G.A.Papanck (Ed.) The Indian Economy, OUP 2000.
4. R.K.Lekhi and Jogindersingh (2004) Agricultural Economics ,Kalyani Publications ,Liudhiana

EC 202: ECONOMICS OF INSURANCE

(Hours per semester: 110
Hours per week: 6)

Objectives

This course on Insurance Economics attempts to give a fairly comprehensive view of the subject to the post-graduate students in Economics and pave the way for possible future expansion of the teaching of an important branch of Economics. The objectives of the paper are: (1) to obtain an overview of the essential concepts in insurance economics, (2) to develop an understanding of the structure of the insurance industry, (3) to understand the main types of insurance available to business and individual, (4) to understand the implications of asymmetric information for insurance contracting, and (5) to be able to explain and evaluate real-life insurance product design from an economic point of view.

Course Contents

Module 1 : The Economic Foundations of Insurance and Risk Management (27 hours)

Pure risk and speculative risk, Expected utility and decision making under uncertainty-St Petersburg paradox, NM theory, Friedman – Savage Hypothesis and modification of Markowitz.

Insurance-Definition- Mathematical, Legal and Economic Principles-Probability, Law of large numbers, Utmost good faith, proximate cause, Insurable interest, Risk pooling and risk sharing.

Social vs. Private insurance.Reinsurance-Fundamentals, types and distribution systems.

Module 2 : Insurance and Economic Development (20 hours)

Role of insurance in Economic development-insurance and risk management, saving, financial intermediary, Economies of scale in Investment and efficiency in capital allocation. Relationamong Economic development, insurance density and insurance penetration- case study of international comparison.

Module 3 : Life and Health Insurance (27 hours)

Meaning and types of life insurance products - Motives of life insurance demand-Human Life Value principle of S.S Huebner - Selection and classification of risk- Basics of Actuarial valuations of life and health insurance premium - Underwriting- concept and mechanisms.

Life insurance in India- Historical evolution, post-reform developments, market for annuities - Distribution channels - Operational behavior of LIC - Health insurance in India.

Module 4 : Non-life or General Insurance (18 hours)

Meaning, Types of products - Basic concepts-Comprehensive, Liability, Working principles, TPAs - General insurance in India- History, Post-reform growth and developments, tariff issues. GIC of India.

Module 5: Regulatory Intervention (18 hours)

Different types of information asymmetry in Insurance market- Role and need of regulation-History of Insurance regulation in India- Insurance reforms and birth of IRDA - Performance of IRDA - Indian insurance in the Global platform-Future potential in Indian insurance business.

Basic Reading List

1. Bailey R (Ed.) (1999) Underwritting in Life and insurance, LOMA, Atlanta,
2. Bhargava, B .D (2008): *Insurance: Meaning and Principles*, Pearl Books, New Delhi
3. Bhave, S R (1970): *Saga of Security: Story of Indian Life Insurance (1870-1970),* Life Insurance Corporation of India, Vakil and Sons, Bombay.
4. Bhole, LM (1990) The Indian Financial System, Tata McGraw Hill, New Delhi.
5. Bickelhaupt, D.L. (1992) General insurance, Irwin Inc. Burr Ridge, III.
6. Black K. J. and H.D. SKipper, In (2000) Life and Health insurance, Prentice Upper Saddle, River, New Jerssey.
7. Desai, G R (1973): *Life Insurance in India: Its History and Dimensions of Growth,* Mac Millan India, New Delhi.
8. Finsinger, and M.V.Pauly, (eds) (1986), The Economic of insurance Regulation A Cross National Study, Macmillan, London.
9. Graves EE and L. Hayes (Eds) (1998) (1999) Mc Gill's Life insurance, The American College, ElynMawr, .
10. Huebner S S, Kenneth Black Jr (1982): *Life Insurance,* 10th Edition, Prentice Hall, INC, Englewood Cliffs, New Jersey,
11. Skipper, Jr. H.D. (Ed.) (1998) International Risk and insurance : An Environmental Managerial Approach Erwin McGraw Hill, Boston.

12. Srivastava, D. C and Srivastava,S (2001) : *Indian Insurance Industry – Transition and Prospects* , New Century Publication , Delhi,

Additional Reading List

Module 1

1. Dionne.G. and S.E. Harrington (Eds.) (1997), Foundations of Insurance Economics, Kluwer Academic Publishers, Boston.
2. Pteffer I. and D.R.Klock (1974); Perspectives on Insurance. Prentice Hall. Inc. Engleworn, Cliffs.
3. Rejda, George E (2004) : *Principles of Risk Management and Insurance* , 8th Edition, Pearson Education, Delhi.
4. Skipper, Harold D Jr and Jean Kwon (2007) : *Risk Management and Insurance: Perspectives in a Global Economy.* , Blackwell Publication, Malden.
5. Yaari ME (1995) Uncertain Life insurance and the Theory of Consumer, Review of Economic Studies, vol.32.

Module 2

1. Karl, Borch (1974): *Research Papers in Insurance Model*, Lexington Books, Massachusetts.
2. Kutty, Shashidar, K (2008): *Management of Life insurance*, Phh publishing, New Delhi.
3. Warsaw, B and Hill, R D (1986) : *The Insurance Industry in Economic Development* , New York University Press.

Module 3

1. Agarwala, A. N. (1961): *Life Insurance in India: A Historical and Analytical Study*, Allahabad Law Journal Press, Allahabad.
2. Bawa, SumninderKaur (2007): *Life Insurance Corporation of India*, *Impact of Privatisation and Performance,* Regal Publications, New Delhi.
3. Black, Kenneth Jr and Skipper, Harold D.Jr (1987): *Life Insurance,* 11th Edn, Englewood Cliffs, Prentice Hall, New Jersey,
4. Desai, G R (1973): *Life Insurance in India: Its History and Dimensions of Growth,* Mac Millan India, New Delhi.

Module 4

1. Benjamin B (1991): General Insurance, Heinemann, London

2. Gopalakrishnan, G (1994): *Insurance Principle and Practice*, Sterling Publishers, New Delhi.
3. Insurance Institute of India, General Insurance (IC- 34) Mumbai.

Module 5

1. Conant, Susan et.al (1996): *Managing for Solvency and Profitability in Life and Health Insurance Companies*, Life Office Management Association Inc, Atlanta.
2. Cummins, David J and Bertrand Vernad (2006): *Handbook of International Insurance; between Global dynamics and Local contingencies.* , Huebner International Series of Risk, Insurance *and* Economic Security; Springer, NewYork.
3. Skipper, Jr.,Harold D (1998) : *The Structure of Insurance Markets Worldwide*, International Risk and Insurance , Irwin Mc Graw Hill , Boston.

EC 203: LABOUR ECONOMICS

(Hours per semester: 110
Hours per week: 6)

Objectives

The objective of this course is to develop abilities in understanding the functioning of labour markets. It introduces students to the economics of labour market through a blend of theoretical and empirical analyses. It also deals with different aspects of the labour market such as labour organization, labour relations and labour legislations, wage and employment theory, collective bargaining theory and social security and welfare measures, etc.

Course Contents

Module I: Introduction to Labour Market (24 hours)

Nature of Labour - labour market - nature and characteristics (with special emphasis on developing countries like India) - demand for labour - theories of demand for labour (Wage Fund theory and Marginal Productivity theory) - supply of labour - supply curve of labour to the firm – short run and long run.

Module II: Employment and Unemployment (27 hours)

Employment and development – concept and measurement of unemployment in India - issues relating to employment - rationalization, technological change and modernization- rural unemployment and educated unemployment in India – India's employment policy under the five year plans – Its evaluation – Task force on employment opportunities (2001)

Module III: Wage Determination (18 hours)

Concept of wages- - classical, neo-classical and bargaining theories of wage determination- -wage determination in different market conditions - wage and non-wage components of labour remuneration - wage differentials - wage policy in India.

Module IV: Organized Labour (27 hours)

Industrialization and emergence of unionism- collective bargaining – concept and process - the goals of organized labour – growth and relevance of trade unions in India- achievements and failures of trade union movements- industrial disputes - methods to settle industrial disputes- Collective – grievance redressal - worker's participation in management.

Module V: State and Labour (14 hours)

Changing role of state in Indian Labour market - institutional framework – directive principles of state policy - labour legislations in India - Labour Laws (India and ILO)-Labour reforms (India and WTO)- Structural reforms and labour markets.

Reading List

1. Jetli N K(2004), India: Economic Reforms and labour Policy, New century publications, new Delhi, India
2. Punekar S D(1978), Labour Welfare, Trade Unionism and Industrial Relations, Himalaya publications
3. Dtt G,(1996), Bargaining power wages and Employment: An Analysis of Agricultural Labour Market, Indu publication, New Delhi
4. Lester.R.A (1 964), Economics of Labour (2nd Edition), Macmillian, New York.
5. Hicks J R(1932), The Theory of Wages, Oxford
6. Ramaswamy, K.V. (Ed.)(2015), Labour, employment and Economic Growth in India, Cambridge University Press, Delhi

Module I

1. Mc Cormic C B and Smith (Ed) (1968), The Labour Market, Penguin,.
2. Rees A, (1978), Economics of Work and Pay, New York ; London : Harper and Row
3. Sen A K, Employment, (1975), Technology and Development, Oxford University Press
4. Hunter and Mulvey, (1983), Economics of Labour, Macmillan,
5. Lester R A, (1964), Economics of Labour, Macmillan,
6. Bloom and Northrup (1955), Economics of Labour relations, Richard D Irvin, INC, Homewood, Illimois
7. Saxena R C(1986), Labour Problems and Social Welfare, K. Nath & co, Educational Publishers, New Kotwali, Meerut
8. Phelps W Orme (1961) Introduction to Labour Economics, McGraw-Hills Book Company, INC, New York

Module II

1. Das N, (1960), Unemployment, Full Employment and India, Asia

2. Deshpande L K, P R Brahmanand and E A G Robinson (Ed.) (1983) Employment Policy in Developing Economy, Macmillan.
3. Kannappan S (1983), Employment Problems and Urban Labour Markets in Developing Nations, University of Michigan

Module III

1. Binswange, H.P M,R Rosen, Weg (Eds)(1984) Contractual Arrangements, Employment and Wages in rural Labour Markets in Asia, Yale University Press, New Haven
2. Deshpande L K and J C Jandesara (Eds)(1970) : Wage Policy and Wage Determination in India, Bombay University,.
3. Hicks J R(1932), The Theory of Wages, Oxford,
4. Madan B K (1977), The Real Wages of Industrial Labour in India- Management Development, Institute, New Delhi,
5. Mazuman, D (1986) Microeconomics Issues of labour markets in developing countries, EDI Service Paper no.40, World Bank, Washington D C

Module IV

1. Breman, J (1996) Footloose Labour Working in india's Informal Economy Cambridge university press, Cambridge
2. Mamoria C B (1966) Labour Problems and Social Welfare in India, Kitab Mahal,
3. Punekar S D,(1978) Labour Welfare, Trade Unionism and Industrial Relations, Himalaya Publications
4. Singh V B (Eds), (1970) Industrial Labour in India- Popular Prakasham,

Module V

1. Deshpandi, S G Standing and K Deshpande (1998), Labour Flexibility in a Third world Metropolis, Common Wealth publisher, NewDelhi
2. Hauseman,S (1991) Industrial restructuring with Job Security, Harvard university Press, Cambridge
3. MHRD, GoI (1987), Sham Shak Report of the national Commission on Self employed Women and women workers in the informal sector, Ministry of human Resource Development
4. Jetli N K(2004) ,India:Economic Reforms and labour Policy, New century publications.

EC 204: LAW AND ECONOMICS

(Hours per semester: 110
Hours per week: 6)

Objectives

The course covers the descriptive, theoretical and empirical analysis of various issues in the law and economics. This includes how the legal aspect influences the economic behavior and how economic tools can be used for the better understanding of law etc. It covers the method of law and economics, property rights, Contract, accidents and liabilities, crime and punishment, the legal procedures of dispute resolution. The course should enable the students to analyse the legal issues in connection with economic situation concretely.

Course Contents

Module 1 Method of Law and Economics (20 hours)

Economic Analysis of Law: Why lawyers study economics and economists study law – Law in L&E and Economics in L&E, Positive and normative approach of L&E, Criteria for analyzing legal and economic issues – Efficiency criteria – Pareto, Kaldor-Hicks and Nash Equilibrium, Fairness Criteria – Markets and efficiency and Market failure – Coase Theorem – Civil Law and Common Law traditions – Indian Court Structure – Nature of legal disputes, evolution of legal rules

Module 2 Economic Analysis of Property Rights (16 hours)

The Nature and Function of Property Rights: the definition – emergence – incentives – enforcement of property rights – Property Law and Coase Theorem – Normative Coase and Hobbes Theorem - Acquisition and Transfer of Property – Limited and Divided Ownership – Public Property – Eminent domain and regulation of property

Module 3 Economic Analysis of Contract and Consumers (17 hours)

Complete and Incomplete Contracts: Bargaining theory – Economic Theory of Contract – Remedies as Incentives - The Elements of Valid and Invalid Contracts, Contracts and Efficient Exchange – Performance of Contract and Breach – Duress - mutual assent – Fraud Mistake – Disclosure - Efficient Breach Model – Specific Performance, Self-Enforcement of Contracts

Module 4 Economic Analysis of Accidents and Product Liability (17 hours)

Liability and Deterrence: Basic Theory – Unilateral and Bilateral Accidents, Levels of Care and Activity – Victims Are Strangers to Firms, Victims Are Customers of Firms,

Extensions of the Analysis of Deterrence - Problems in the Negligence Determination, Implications of Findings of Negligence, Deterrent Rules of Negligence and Liability, Risk-Bearing, Risk Aversion and Insurance

Module 5 Economic Analysis of Crime and Punishment (20 hours)

Distinguishing Crimes and Torts - Property Rules, Liability Rules, and Criminal Sanctions, The Economic Model of Crime - The Offender's Decision to Commit a Crime and the Supply of Offenses, Does punishment deter crime - Optimal Punishment, The Optimal Fine, Gain Versus Harm-Based Fines, Fines and Imprisonment, Economics of the Death Penalty, Constitutional Issues, The Bail System, Private Protection, Plea Bargaining

Module 6 Legal Structures of Business and Economic Organizations (20 hours)

Corporations as Legal Entity – Governance of Capital, Shares, Debentures through Law – Legal Structure of Economic Institutions: RBI, IRD, MRTP, Competition Commission, SEBI – Rules of Merging and Acquisition – Distributive Justice under Property, Contract and Liability – Efficiency and Equity Principal for Taxation Law – Centre State Relations and Legality for Efficiency – Trade Agreements : WTO, GATT, TRIPS AND TRIMS, FEMA, Regional Trade Agreements

Basic Reading List

1. Bouckaert, B and G De Geest (1999) Encyclopedia of Law and Economics, Vol. 1-5, Edward Elgar
2. David Friedman (2000) Law's Order: What Economics has to do with Law and Why It Matters, Princeton University Press. New Jersey
3. Posner, Richard A (1998) Economic Analysis of Law, (5^{th} edition) Little Brown, Boston
4. Robert D Cooter and Thomas Ulen (2012) Law and Economics, Addison Wesley-Pearson
5. Seervai H M (1991) Constitutional Law of India, Vol. 1-3 NM Tripathi
6. Steven Shavell (1987) Economic Analysis of Accident Law" Harvard University Press: Cambridge MA
7. Steven Shavell (2004) "Foundations of Economic Analysis of Law, Harvard University Press: Cambridge MA
8. Thomas J Micely (2004) "Economic Approach to Law", Stanford University Press
9. Massey I T (1995) Administrative Law, Eastern Book Company
10. Yoram Barzel (1997) "Economic Analysis of Property Rights", Cambridge University Press

Additional Readings List (Articles)

1. Becker, Gary (1968) "Crime and Punishment: An Economics Analysis," *Journal of Political Economy*, Vol. 76, pp. 169-217.
2. Brown, John (1973) "Toward an Economic Theory of Liability," *Journal of Legal Studies*, Vol. 2, pp. 323-349.
3. Calabresi, Guido (1961) Some Thoughts on Risk Distribution and the Law of Torts, *The Yale Law Journal*, 70, 4, 499-553
4. Calabresi, Guido, and A. Douglas Melamed (1972) "Property Rules, Liability Rules, and Inalienability: One View of the Cathedral," *Harvard Law Review*, Vol. 85: 1089-1128.
5. Coase, Ronald (1960) "The Problem of Social Cost," *Journal of Law and Economics*, Vol. 3, pp. 1-44.
6. Coleman, Jules (1980) "Efficiency, Utility, and Wealth Maximization." *Hofstra Law Review* 8(3): 509-51.
7. Cooter, Robert (1985) "Unity in Torts, Contracts, and Property: The Model of Precaution," *California Law Review*, Vol. 73, pp. 1-51.
8. Cooter, Robert and Daniel L. Rubinfeld (1989) "Economic Analysis of Legal Disputes and Their Resolution," *Journal of Economic Literature*, Vol. 27, pp. 1067-1097.
9. Demsetz, Harold (1967) "Toward a Theory of Property Rights," *American Economic Review*, Vol. 57, pp. 347-359.
10. Donohue, John J. III and Steven D. Levitt (2001) "Legalized Abortion and Crime," *Quarterly Journal of Economics* 116(2): 379-420.
11. Dworkin, Ronald (1980) "Why Efficiency: A Response to Professors Calabresi and Posner." *Hofstra Law Review* 8(3): 563-90.
12. Farmer, Amy and Dek Terrell (2001) "Crime versus Justice: Is There a Trade-off?" *The Journal of Law and Economics*, Vol. XLIV (October): pp. 345- 366.
13. Friedmann, Daniel (1989) "The Efficient Breach Fallacy," *Journal of Legal Studies*, Vol. 18, pp. 1-24.
14. Gilbert, Richard and Oliver Williamson (1998) "Antitrust Policy," in *The New Palgrave Dictionary of Economics and the Law*, P. Newman, ed., Vol. 1, pp. 82-88.
15. Hardin, Garrett (1968) "The Tragedy of the Commons" *Science* 162: 1243-48.

16. Hirshleifer, Jack (1971) “The Private and Social Value of Information and the Reward to Inventive Activity,” *American Economic Review*, Vol.61, pp. 561- 574.
17. Klein et al. (2002) “Economics of Copyright ‘Fair Use’ in a Networked World.” *American Economic Review.* May
18. Kronman, Anthony (1978) "Mistake, Disclosure, and Information," *Journal of Legal Studies*, Vol. 7, pp. 1-34.
19. Landes, William (1971) An Economic Analysis of Courts, *Journal of Law and Economics*, 14, 1, 61-107
20. Landes, William and Richard Posner (1985) “A Positive Economic Theory of Products Liability,” *Journal of Legal Studies*, Vol. 14, pp. 535-567.
21. Levitt, Stephen (2004) “Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six That Do Not” *Journal of Economic Perspectives* 18(1): 163-190
22. Miceli, Thomas J. and Kathleen Segerson (2007) *The Economics of Eminent Domain: Private Property, Public Use, and Just Compensation*, Foundations and Trends in Microeconomics, Vol. 3, Issue 4.
23. Murthy, Ramana and Siddik Rabiyath (2010) Disposal Rates, Pendency and Filing in Indian Courts: an Empirical Study of the Two States of Andhra Pradesh and Kerala, in Babu, P G, Thomas Eger, A V Raja, Hans Bernd Schafer and T S Somasekar (eds.) Economic Analysis of Law in India: Theory and Application *Oxford University Press*, New Delhi
24. Posner, Richard (1977) "Gratuitous Promises in Economics and Law," *Journal of Legal Studies*, Vol. 6, pp. 411-426.
25. Posner, Richard A. (2005) “Intellectual Property: The Law and Economics Approach” *JEP* 19(2): pp. 57-73.
26. Posner, Richard and Andrew Rosenfield (1977) "Impossibility and Related Doctrines in Contract Law: An Economic Analysis," *Journal of Legal Studies*, Vol. 6: 83- 118.
27. Priest, George (1977) “The Common Law Process and the Selection of Efficient Rules,” *Journal of Legal Studies*, Vol. 6, pp. 65-82.
28. Rubin, Paul (1977) “Why is the Common Law Efficient?” *Journal of Legal Studies*, Vol. 6, pp. 51-63.
29. Shavell, Steven (1980) “Damage Measures for Breach of Contract,” *Bell Journal of Economics*, Vol. 11, pp. 466-490.

30. Stigler, George (1970) “The Optimum Enforcement of Laws,” *Journal of Political Economy*, Vol. 78, pp. 526-536.

EC 205: MATHEMATICAL ECONOMICS

(Hours per semester: 110
Hours per week: 6)

Objectives

The objectives of this course are: (1) to help the students to study the nature and extent of relationships among economic variables by using mathematical tools, and (2) to apply these tools in solving the economic and business problems.

Course Content

Module 1 Theory of Consumer (25 hours)

Estimation of price , income and cross elasticities, Utility maximization- Marsahll, Hicks and Samuelson, ordinary and compensated demand functions, direct and indirect utility functions, Slutsky equation- income, substitution, and price effects, Linear expenditure systems.

Module 2 Theory of Production (30 hours)

Homogenous and non-homogenous Production functions, Properties of linear homogenous production functions, Euler's Theorem, output elasticity and elasticity of substitution, Producer equilibrium- output maximization, cost minimization and profit maximization, cost functions and cost curves, properties of Cobb-Douglas, CES and VES production functions.

Module 3 Price and output Determination (25 hours)

Equilibrium under discriminating monopoly, Multi plant model, Cournot and Stackelberg models, Price leadership model, Baumol's static model of sales maximization, Williamsons model (illustrations with examples).

Module 4 Linear Programming and Game Theory (30 hours)

Dual theorem and its uses, slack and surplus variables, Maximisation simplex method, applications of linear programming, Basic concepts in game theory, maximin and minimax strategies, saddle point solutions, Two person zero sum game with examples, Solution with mixed strategies, Cooperative and non cooperative games (illustrations with examples necessary).

Reading List

1. Henderson, J. M. and R.E. Quandt (1980), Microeconomic Theory: A Mathematical Approach, McGraw Hill, New Delhi.
2. Koutsoyiannis, A. (2011), Modern Microeconomics, Macmillan Press,London.
3. Chiang, A.C. (1986), Fundamental Methods of Mathematical Economics, Mc Graw Hill, New York.
4. Mustafi, C. K. (1992), Operations Research: Methods and Practice, Wiley Eastern, New Delhi.
5. R.G.D.Allen, Mathematical Economics, Manmillan, London

EC 206: URBAN PLANNING

(Hours per semester: 110
Hours per week: 6)

Objectives

The important objective of this course is to introduce the discipline of planning and planning history; to expose planning theory and practice; and to make aware of the institutional mechanism involved in planning and implementation process. After studying this course students should able to understand the planning process, theory and practice and its role in planning of cities; appreciate of the role of historical developments in planning and its evolution and trace these influences to the current situation; understand the institutional mechanisms involved in urban planning and to develop capacity to understand multiple often conflicting factors to be balanced in planning for an urban area

Course Contents

Module I: Planning- History (20 hours)

Town planning history – Ancient Egypt, Mesopotamia and Indus valley. Greece and Rome, Medieval, Renaissance, Industrial and post industrial age, Colonial cities. Town planning in India. Contribution of individuals to city planning: Patrick Geddes, Lewis Mumford, Le-Corbusier, C.A.Doxiadis, Clarence Stein, Peter Hall etc.

Module II: Theories of City planning (22 hours)

Theories of city development including Concentric Zone Theory, Sector Theory, Multiple Nuclei Theory and other latest theories; Ebenezer Howard's Garden City Concept; and Green Belt Concept; City as an organism: a physical, social, economic and political entity; Emerging Concepts: globalcity, inclusive city, safe city, etc.; City of the future and future of the city; Shadow cities, divided cities; Models of planning

Module III: Urbanisation and Growth of Towns (22 hours)

Definition and process of Urbanisation, Urban- Rural Relationship, hierarchy of cities-urban growth and system of cities, growth of metropolitan cities and mega cities and its impact on natural development, with focus on the issues in metropolitan management and governance and possible alternative strategies to metropolitan growth control – development of new towns, and small and medium town development.

Module IV: Urban Planning Policy (26 hours)

Urban policy and planning – origin , development and goals of planning- nature of urban policy - Neighbourhoods in planning, Birth and development of the neighbourhood idea, The Indian neighbourhood, Urban renewal and its aftermath -rise of advocacy planning- role of NGOs in planning- Urban social movements Post-war developments –masterplan to structure plan and beyond – urban modelling – political influences and planning -nature of Urban programmes by international agencies like World Bank, UNCHS etc.

Institutional arrangements of urban planning with special reference to India– edicts, laws–New Towns and IDSMT, regional contexts of metropolitan plans, - Proposals of National Commission on Urbanization

Module V: Urban Planning Practice and Process (20 hours)

Planning system in India, Master plan, Structure plan, Detailed development plans,Comparison of planning systems in UK & USA with that of India.

Planning Surveys, Different types used for data identification for plan preparation, Areal photography and remote sensing techniques in planning

Reading List

1. AEJ Morris (1979): History of Urban Form from Pre-history to Renaissance, John Wiley and Sons, New York
2. Ministry of Urban Affairs & Employment, Govt. of India, New Delhi: Urban
3. Development Plans Formulation & Implementation Guidelines.
4. Aidan Southall (1998) – The City Time and Space, Cambridge University Press, Cambridge
5. H Carter (1972): The study of Urban Geography, Edward A Old, London.
6. F S Chaplin (1965): Urban Landuse Planning, Higg & Brothers, New York.
7. K V Sundaram(Ed) (1985): Geography & Planning", Concept Publishing Co., New Delhi.
8. Jacob S. Siegel (2002): Applied Demography: Applications to Business, Government, Law and Public Policy, Academic Press, San Diego

9. Dr. Ashal A. Bende & Mrs. Tara Kanitkar (1980): Principles of Population Studies, Himalaya Publishing House, Bombay.
10. Dand M. Heu (1978): Society& Population, Eastern Economy Edition
11. Aurthur J. Gallion (1993): Urban Pattern, John Wiley & Sons
12. Le Corbusier (2000): The City of Tomorrow, Dover Publications Inc.
13. Peter Hall (1978): Urban and Regional Planning, Routledge
14. Reading material on Urban Planning – ITPI New Delhi.
15. Kaiser Edward J., et.al.,(1995): Urban Landuse Planning, 4th (ed) Urbana, University of Illinois Press
16. Bola Ayeni (1979): Concepts and Techniques in Urban Analysis, Croom Helm, London.

OPTIONAL PAPERS IN FOURTH SEMESTER

EC 207: ADVANCED ECONOMETRICS

(Hours per semester: 110
Hours per week: 6)

Objectives

The objectives of this course are: (1) to develop analytical skills needed to work successfully with real economic data and (2) to make the students understand empirical research techniques thus equipping them in the formulation, specification and estimation of econometric models.

Course Contents

Module I: Dynamic Econometric Models (20 hours)

Autoregressive and Distributed Lag Models -Koyck Model, Nerlove's Partial Adjustment Model, Cagan's Adaptive Expectations Model - Instrumental Variables - Detecting Autocorrelation in Autoregressive models - Almon's Approach to Distributed Lag Models.

Module II: Estimation of Simultaneous Equation Models (26 hours)

Simultaneous Equation Models - Structural and Reduced form Equations, Simultaneous Equation Bias, Instrumental Variable Estimation - Identification Problem, The Rank and Order Condition, Methods of estimating simultaneous equation system, Recursive methods and OLS - Indirect Least Squares, 2SLS, 3SLS, FIML estimation techniques - Durbin – Wu – Hausman Test.

Module III: Introduction to Non Stationary Time Series (24 hours)

Stationarity and Non stationarity - Stationary time series and Non stationary time series Deterministic Trend- Difference Stationary and Trend-Stationary - Spurious Regressions -Tests of Non stationarity - Graphical Tests & Augmented Dickey-Fuller tests -Cointegration& Error Correction Model (ECM).

Module: IV Time Series Econometrics : Forecasting (20 hours)

AR, MA and ARIMA Modelling of Time Series Data - The Box- Jenkins (BJ Methodology -Vector Auto Regressive (VAR) and Causality - Measuring Volatility – The ARCH and GARCH Model

Module V: Introduction to Panel Data Models (20 hours)

Panel Data Set – Example to investigate dynamics - Fixed Effects Regressions – Withingroups fixed effects, First differences fixed effects - Random Effects Regressions - Assessing the appropriateness of fixed effects and random effects estimation.

Basic Reading List

Module I

1. Dougherty, Christopher (2011).Introduction to Econometrics, Oxford University Press, Newyork.
2. Gujarathi, D, &Sangeetha, N. (2007). Basic Econometrics (4th ed) New Delhi: McGraw Hill.

Module II

1. Gujarathi, D.&Sangeetha, N. (2007). Basic Econometrics (4th ed) New Delhi: McGraw Hill.
2. Woolridge, J. M. (2007). Introductory Econometrics: A Modern Approach (3rd ed.). New Delhi: Akash Press.

Modules III, IV & V

1. Dougherty, Christopher (2011).Introduction to Econometrics, Oxford University Press, Newyork.
2. Gujarathi, D,&Sangeetha, N. (2007). Basic Econometrics (4th ed) New Delhi: McGraw Hill.
3. Woolridge, J. M. (2007). Introductory Econometrics: A Modern Approach (3rd ed.). New Delhi: Akash Press.

Additional Reading List

1. Amemiya, T.(1995).Advanced Econometrics, Harvard University Press.
2. Baltagi, B. H. (1998). Econometric Analysis of Panel Data, New York: Springer.
3. Enders, Walter (2014). Applied Econometric Time series (4th edition) Wiley E-Text Student Package
4. Goldberger, A. S. (1998). Introductory Econometrics, Harvard University Press Cambridge Mass
5. Greene, W. H. (1997). Econometric Analysis, New Delhi, Pearson.
6. Johnston, J. (1991).Econometric Methods, NewYork, McGraw Hill.

7. Kennedy, I. (1998). A Guide to Econometrics (4th edition) MLT Press, NewYork
8. Kmenta, J. (1997).Elements of Econometrics (Reprint Edition), University of Michigan Press, Newyork.
9. Krishna, K. L. (ed) (1997). Econometric Application in India, Oxford University Press, New Delhi
10. Maddala (ed) 1993. Econometric Methods and Application Aldershot, U K
11. Pindyck andRubinfield (1976) Econometric Models and Economic Forecasts, McGraw Hill Kogakus Tokyo

EC 208: DEMOGRAPHY

(Hours per semester: 110
Hours per week: 6)

Objectives

The course covers the dynamics of population growth, theoretical side of population, demographic data sources and the link between demography and socio-economic development of a society. The course should enable the students to understand the theoretical, empirical and policy implications of demographic issues in a developing country like India

Course Contents

Module I: Introduction to Demography (20 hours)

Evolution **of** demography; Meaning, subject matter and importance of Demography. Concepts of population change and composition of population. Sources of Demographic data: Census, meaning, characteristics, importance, methods, problems; Sample surveys; Registration.

Module II: Population Dynamics (28 hours)

Fertility-Meaning; Concepts-CBR, ASBR, GFR, TFR, GRR, NRR; Factors affecting fertility; Theories of fertility; Mass education and fertility decline-Co-operation, Inequality and the family (Amartya Sen).

Mortality -Meaning; Concepts –CDR, ASDR, IMR, CMR, MMR, NMR, NNMR, CSDR, SDR. Factors affecting Mortality; Life tables-construction and uses. Demographic Dividend and Age pyramids. Concept of stationary, stable and quasi - stationary population.

Nuptiality-Meaning; Concepts-CMR, SMR, GMR; Determinants of Nuptality; Martial Dissolution.

Migration- meaning, measurement. Urbanisation- concept and measurement

Module III: Theories of population (20 hours)

Malthusian Theory; Optimum theory; Theories of Demographic Transition-views of C. P. Blacker, Boserup. Biological Theories of Population; Socio- economic theories of population-views of Marx and Leibenstein; Approaches of Meadows, and Simon.

Module IV: Demographic Data Base in India (26 hours)

Census-Nature of information collected—1991,2001, 2011; NFHS-I, II and III; District Level Household Survey(DLHS); Sample surveys India; Registration system in India. Methods

of measurement of population growth; Population Projection-Meaning, Importance and methods. Evolution of population policy in India-Shift from population control to reproductive and child health approach, National Population Policy 2000; Tasks before the National Population Commission.

Module V: Demographic Issues in India (16 hours)

Rural and urban demographics- Population, economy and environment linkages– Population aging in India –Causes, trends, issues and consequences.

Basic Reading List

1. Bouge, D.J. (1971), Principles of Demography, John Wiley, New York.
2. Bhende Asha A. And Tara Kanitkar, Population of Population Studies, Himalaya Publishing House.
3. Chiang, C.L. (1974), Life Tables and Mortality Analysis, WHO, Geneva.
4. Novell, C., Methods and Models in Demography, Bellhaven , Washington D.C.
5. NFHS Report.
6. Preston, Samuel H., Heuveline, Patrick, and Guillot, Michel (2001) Demography: Measuring and Modeling Population Processes. Oxford: Blackwell Publishers.
7. Sharma, Rajendra K., Demography and Population Problems, Atlantic Publications.
8. Shyrock, H., et al (1973), The Methods and Materials of Demography, U.S. Deptt. Of Commerce Press, London.
9. Srinivasan, K. And A. Shariff (1998), India: Towards Population and Demographic goals, Oxford University Press, New Delhi.

Supplementary Reading List

1. Agarwal, S.N. (1985), India's Population Problems, Tata McGraw Hill, Mumbai.
2. Bose, A., (1996), India's Basic Demographic Statistics, B. Publishing Corporation,New Delhi.
3. Chaubey, P.K. (2000), Population Policy in India, Kanishka Publishers .
4. Chenery, H. And T.N. Srinivisan (Eds)(1989), Handbook of Development Economics.
5. Coale, A.J. and E.H. Hoover(1958), Population Growth and Economic Development in low Income Countries –A Case Study of India's Prospects, Princeton University Press, Princeton.

6. Gulati, S.C. (1988), Fertility in India: An Econometric Study, Sage Publications, New Delhi.
7. Jacob S. Siegel and David A. Swanson (2004): The Methods and the materials of Demography, Second Edition, Elsevier Science. USA.
8. John weeks (2005): Population: An introduction to concepts and issues, Wordsworth Learning. Singapore 9th edition.
9. Pathak, K.B. AND F. Ram (1998):Techniques of Demographic Analysis, Himalaya Publishing House.
10. Simon, J. (1992), Population and Development in Poor Countries, Princeton University Press, Princeton.
11. Srinivasan, K. (1998): Basic Demographic Techniques and Applications, Sage Publications.

EC 209: ECONOMICS OF INFRASTRUCTURE

(Hours per semester: 110
Hours per week: 6)

Objectives

The role and significance of infrastructure in a country's development need to be thoroughly examined. The paper 'Economics of Infrastructure' deals with the various segments of infrastructure and its contribution as growth stimulants. The content of the paper expose the student wholly to the issues involved in the development of infrastructure in developing countries like India.

Course Contents

Module 1: Introduction (18 hours)

Infrastructure and economic development- Economic and social infrastructure- Characteristics of public utilities- The peak-load, off-load problem, Dual Principle Controversy- Economies of scale of joint supply- Methods of pricing in public utilities; Cross subsidization, free prices- Problem of Equity Vs Efficiency.

Module 2: Transport Economics (18 hours)

The structure of Transport Costs and Location of Economic Activities. Demand for transport- Models of Freight and passenger Demand- Pricing principles -Role of government in transport sector- Ports and Maritime Economics -Special problems of modes of transport in Indian context;

Module 3: Communications (20 hours)

Characteristics of postal services; Telephone services; coverage, traffic, pricing- Rate making in telephone utilities; principles of decreasing cost in telephone industry- Trends and growth in courier, mobile and cellular services in India; Internet connectivity and IT enabled services with special reference to developing economies-Technology and communication Policy in India.

Module 4: Energy and Water (26 hours)

Forms of energy and its primacy in economic development- Energy ratios as indices of economic development-Sustainability concerns and effect of energy shortages- The relative economics of thermal, hydel and nuclear power plants -Energy modelling - Issues in renewable

and non-renewable sources of energy- Energy policy of India-Water supply, management and conservation; rural and urban scenario.

Module 5: Social Infrastructure (28 hours)

Concept of social infrastructure; models of public and private infrastructure management; PPP models -Pricing of social services- Emerging role of social services in the Indian context-Education and manpower planning; problem of education financing and human resources development in India- Education policy of India- economic dimensions of health care- demand and supply of health care; financing of health care and resource constraints; institutional issues in health care delivery-Challenges in health care- poverty, malnutrition, illiteracy, gender inequality; global and Indian context-Health care policies in India.

Basic Reading List

1. Dash, L.N.(2007), *Economics of Infrastructure: Growth and Development*. Regal Publications (ISBN 818991711).
2. Das, R.C.(2017), *Social, Health and Environmental Infrastructures for Economic Growth*, in 'Advances, Finance and Accounting', IGI Global Business Reference Book Series, USA (ISSN 2327-5677).
3. Blaug M (1972): 'Introduction to Economics of Education', Penguin, London.
4. Henckel, T. and McKibbin, W. (2010) 'The Economics of Infrastructure in a Globalized World: Issues, Lessons and Future Challenges', 2010-39, Australian National University, Centre for Applied Macroeconomic Analysis.
5. Ahuja, A.K. (2008), Economics of Education, Authors Press. 1st edition.

Additional Reading List

1. Tilak, J.B.G (1994): 'Education for Development in Asia', Sage Publications, New Delhi.
2. Christine Kessides (1993) *The Contributions of Infrastructure to Economic Development: A Review of Experience and Policy Implications*, World Bank Discussion Paper No. 213, IBRD, The World Bank, Washington D.C.
3. John M. Cockburn, Yazid Dissou, Jean-Yves Duclos, Luca Tiberti (2013), *Infrastructure and Economic Growth in Asia*, in '*Economic Studies in Inequality, Social Exclusion and Well-Being*', Springer International Publishing (ISBN 3319031376, 9783319031378).

4. OECD (2007a) Infrastructure to 2030 – Volume 1 Telecom, Land Transport, Water and Electricity, OECD.
5. OECD (2007b) Infrastructure to 2030 – Volume 2 Mapping policy for Electricity, Water and Transport, OECD.
6. Hanushek, E.A. & Woessmann, L. (2015), The Knowledge Capital of Nations- Education and the Economics of Growth. MIT Press.
7. Mark V. Pauly, Thomas G McGuire, Pedro Pita Barros, (2011), 'Handbook of Health Economics', Volume 2 ,Business & Economics.
8. Saith Ashwani, Vijayabaskar, M. (2005), ICTs and Indian Economic Development: Economy, Work, Regulation. SAGE Publications, New Delhi.
9. Vikram Singh (2009), Impact of Information and Communication Technology on Public Life. University Science Press, New Delhi.
10. Eduardo Engel, Ronald D. Fischer, Alexander (2014), *The Economics of Public-Private Partnerships*, Cambridge University Press. (ISBN 978-1-107-03591-1).

EC 2010: INDUSTRIAL ECONOMICS

(Hours per semester: 110
Hours per week: 6)

Objectives

The course is designed to use theoretical models to understand industries and regulatory decision making and so students should expect to use diagrams and some basic mathematical models. It also provide guidelines to urge through knowledge to the students on the basic issues in the industrial development of India. In addition, course aims for the students acquire fair knowledge of international experience of industrial progress.

Course Contents

Module I: Basics and Scope of Industrial economics (15 hours)

Nature and scope – Structure Conduct Performance (SCP) paradigm. Market Power - Market concentration and its relationships .Additional cost concepts: switching costs, transaction costs. Asset specifying and holding up problems.

Module II: Industrial Decisions (20 hours)

Pricing decisions and its strategies - pricing policies: Administered pricing and LRMC based tariffs. Investment decisions- risk and uncertainty in project appraisal - OECD and UNIDO approaches to investment decisions.

Module III: Industrial Location and Regional Development (15 hours)

Determinant of Industrial Location- Theories of Industrial location- Weber, August Losch, Sergent Florence – Regional Growth and Regional imbalances - SEZ

Module IV: Industrial Labour (20 hours)

Structure of Industrial labour - Employment dimensions of Indian industry – industrial legislation, industrial relations, exit policy and social security- wage and problems of bonus – Industrial Labour: roblems, policies and reforms in India- unorganized labour market.

Module V: Industrial Finance (15 hours)

Importance of industrial finance- Sources: Owned, external and other sources of fund- Indian Industrial Finance: IDBI, IFCI, SFCs, SIDC, Commercial and cooperative banks, share market, insurance companies, pension funds, NBFIs etc.

Module VI: Industrial Policy (25 hours)

Public sector enterprises in India: efficiency, productivity and performance constraints - Industrial Policies (from 1948 to till now). Regional disparity and Economic plans – Pande committee, Wanchoo Committee -Govt. policy towards foreign capital- industrial growth and environmental preservation, pollution control policies.

Reading List

1. Barthwal, R.R, Industrial Economics, Wiley Eastern Ltd., New Delhi, 1985
2. Ahluwallia I J , Industrial Growth in India , Oxford University Press, New Delhi, 1985
3. Deepak Nayyar, Industrial Growth And Stagnation. Oxford University Press, 1994.
4. Deepak Nayyar, Trade and Industrialisation, Oxford University Press, New Delhi, 1977.
5. Desai B: Industrial Economy In India, Himalaya Publishing House, Mumbai, 1999.
6. Dilip Mookherjee, Indian Industry Policies and Performances, Oxford University Press 1995.
7. Divine, P.J, Jones, R.M, Lee, N, and Tyson, W.J., An Introduction To Industrial Economics, George Allen And Unwin Ltd., London, 1974.
8. Francis Cherunilam, , Industrial Economics : Indian Perspective , Himalaya Publishing House, Mumbai, 1994.
9. Isher Judge Alhuwalia, Industrial Growth In India, Oxford University Press, New Delhi,1985.
10. Sharma, A.K, Industrial Economics, Anmol Publication Pvt Ltd, New Delhi,2006
11. Stephen Martin, Advanced Industrial Economics, Basic Blackwell, 1993.
12. Paul R Ferguson & Glenys J Ferguson, Industrial Economics: Issues and Perspectives (second edition), New York University Press, Washington square, New York 1994
13. Dr.Renjana Seth, Industrial Economics, AneBooks Pvt. Ltd, New Delhi ,2010
14. Uma Kapila ,Indian Economy : Performance and Policies (14th edition),Academic Foundations 2014

EC 2011: WELFARE ECONOMICS

(Hours per semester: 110
Hours per week: 6)

Objectives

Evaluation of normative significance of economic events and issues forms the framework of welfare economics, branches of economics such as public finance, cost-benefit analysis and economics of government policy use welfare economic criteria as their foundation.

Course Contents

Module l : Introductory Welfare Economics (22 hours)

Concerns of welfare economics – value judgments in welfare economics - positive or normative? - concept of social welfare – different welfare criteria - the welfare assumptions behind GDP and NNP - individual and social welfare - determination of individual welfare: goods - determinants of social welfare: individual utilities.

Module 2 : Pre – Paretian Welfare Economics (20 hours)

Benthamite approach to aggregate Welfare - optimum resource allocation and welfare maximization - assumption of uniform income - utility functions of individuals - consumer's surplus and tax-bounty analysis - the neoclassical welfare economics - Marshall and Pigou.

Module 3 : Market Efficiency, Public Goods And Externalities (28 hours)

Welfare properties of market exchange – the 2X2X2 general equilibrium model - competitive equilibrium of an exchange economy - the first and second fundamental theorems of welfare economics - uncertainty in exchange – symmetric uncertainty - asymmetric information - Coase theorem and liability rules.

Public goods - public goods model - private financing of public good - free rider problem - the Wicksell – Lindahl tax system - fixed tax sharing and majority voting - the demand revealing tax scheme.

Divergence between private and social costs - problems of non-market interdependent-externalities of production and consumption - external economies and diseconomies.

Module 4: Welfare criteria (22 hours)

The Pareto- optimality criterion – Kaldor-Hicks Compensation Criterion – Scitovsky's double compensation criterion – Bergson's Social welfare function - Rawls' theory of social justice –Arrow's Impossibility theorem - reactions to Arrow's impossibility theorem.

Module 5: Social Choice (20 hours)

Social choice and individual Values – social interdependencies - external effects - Sen's contribution to welfare economics – the capability Approach - collective choice and social welfare – social choice and political decision-making -the economics of happiness and capability.

Reading List

1. Florio Massimo, (2014), Applied welfare economics: Cost benefit analysis of projects and policies. Routledge, London and New York.
2. Allan M Feldman and Serrano Roberto, Welfare economics and Social choice theory, Springer; 2nd ed. 2006 edition (23 December 2005)
3. Yew- Kwang Ng, Welfare Economics - Towards a more complete analysis, Palgrave Macmillan; 2004 edition (19 December 2003)
4. Luigino Bruni, Flavio Comim and Maurizio Pugno,p (Ed.) Capabilities and happiness, Oxford University Press, Published in 2008 page no 16 – 27
5. Sen Amartya, Collective Choice and Social Welfare, Penguin; Expanded edition edition (10 February 2017)
6. Koutsoyiannis (1997), Modern Microeconomics, Macmillan, London.
7. Baumol, W. J. (Ed.) (2001), Welfare Economics, Edward Elgar Publishing Ltd. U.K.
8. Nicholas, B. (Ed.) (2001), Economic Theory and the Welfare state, Edward Elgar Publishing Ltd., U. K.
9. Myint, H. (1948), Welfare Economics, Macmillan, London.
10. Pigou, A. C. (1962), The Economics of Welfare (4th Edition) Macmillan.
11. Dominick Salvatore, (2002) Microeconomics Theory and ApplicationsOxfordUniversity Press, New York, 2003.
12. Arrow, K. J. (1951), Social choice and Individual Values, Yale University Press,New Haven

EC 2012: WOMEN AND DEVELOPMENT

(Hours per semester: 110
Hours per week: 6)

Objectives

The objectives of this course are: (1) to interpret economic development policy concerns and debates from a feminist economics perspective, (2) to evaluate various popular schemes to reduce gender inequalities and promote women's well-being in developing countries especially India, (3) to introduce the role of women in the development process and the multiple dimensions of the role of women in the production process of the economy, and (4) to gain a critical perspective and knowledge of how gender matters in development economics.

Course Contents

Module 1: Introduction (20 hours)

Key concepts of women's studies –Feminist Economics –The Household – Power and Empowerment -Women in patriarchal and matriarchal societies and structures-patrilineal and matrilineal systems and relevance to present day society in India- Economic basis and functioning of patriarchy in developed and LDCs, particularly India - Gender bias in the theories of value, distribution, and population

Module 2: Women in Development (18 hours)

WID approaches - Welfare – equity - anti-poverty – efficiency – empowerment - critiques of efficiency - Gender planning frameworks and tools–Gender inequality indices: GII, MPI, WEIA, SIGI, GDI, GEM -Gender Inequalities in India– 'Towards Equality', Shramshakti - Gender and national planning – 'Women's role in the planned economy' - Five year plans – SAP - liberalization.

Module 3: Women in Household (17 hours)

Productive and unproductive work – visible and invisible work - households as a decision-making unit -The triple role of women -Resource Control and Bargaining Power - property rights - access to and control over economic resources – Nutrition - Vulnerability to Violence and Conflict -Sexual and Reproductive health - Education.

Module 4: Women and Social Security (28 hours)

Entitlement in ensuring economic independence and risk coverage - access to credit and insurance markets - Role of voluntary organizations - Self help groups in providing social

security - Effectiveness of collective bargaining - Review of legislation for women's entitlement protection of property rights - Schemes for safety net for women- Need for female labour unions; affirmative action for women and improvement in their economic and social status -Gender Mainstreaming in development policies - Gender sensitive governance - Gender Budgeting - Democratic decentralization (panchayats) and women's empowerment in India – The Kudumbashree experience in Kerala.

Module 5: Challenges to Women and Development (27 hours)

Demographic imbalance of female population: Age structure, Mortality rate, and Sex ratio — Missing Women - Factors affecting female entry in labour market: Wage differentials in agriculture, non-agriculture rural activities, informal sector, cottage and small scale industries, organized industry and services sector – occupational segregation, wage disparity, housewifization, feminization, flexibility and casualization - Ecological and Environmental concerns – Ecofeminism - Challenges pause by Globalizing social order

Reading List

Module I

1. Bonnie G Smith (2013): Women's Studies:The Basics. London: Routledge.
2. Beneria, Lourdes, GunseliBerik, and Maria Floro. 2015. Gender, Development and Globalization: Economics as if all People Mattered. Second Edition. Routledge, London.
3. Kabeer,N. (1994), Reversed Realities: Gender Hierarchies in Development Thought, Kali for Women, New Delhi.
4. Beneria, L. and M. Roldan (1987): The Crossroads of Class and Gender.Chicago: University of Chicago Press.
5. Mies, M. (1986/1998):Patriarchy and .Accumulation on a World Scale: Women in the Interns tional Division of Labour, Zed books, London.
6. Sen,G. and K.Brown, (1985):Development, Crises and Alternate Visions,Monthly Review Press, New York.
7. Bettio, Francesca and Alina Verashchagina (2008) Frontiers in the Economics of Gender, Routledge: London

Module 2

1. World Bank. (2012). Gender Equality and Development: World Development Report 2012. Washington, D.C: The World Bank. Overview, pp. 2-21.

2. Irene Tinker.(1990): Persistent Inequalities: Women and world development,New York: Oxford University Press
3. Government of India (1987): Shram Shakthi, Report of the National Commission on Self-employed Women and Women works in the Informal Sector, Ministry of Human 'Resource Development, New Delhi
4. Government of India (1974): Towards Equality - Report of the Committee on the Status of Women in India, Department of Social Welfare, Ministry of Education and Social Welfare, NewDelhi.
5. Leela Kasturi, (2004): Introduction and excerpts from the report of the sub committee women's role in planned economy, National planning committee series 1947, In M Chaudhuri (ed.) Feminism in India, Delhi: Women Unlimited.

Module 3

1. Agarwal, Bina.(1994): A Field of One's Own:Gender and Land Rights in South Asia, Cambridge;Press, Cambridge.
2. Dwyer,D. and J.Bruce (Eds.) (1988):Home Divided: Women and Income in the Third World, Stanford University Press, Stanford.
3. Evans H and C.Ungerson. (eds.) (1983): Sexual Divisions, Patterns and ProcessesTavistock, London.
4. Kabeer,N (1994): Reversed Realities: Gender Hierarchies in DevelopmentThought, Kali for Women, New Delhi.
5. Redcliff,N. and E.Mingione, (eds.) (1988); Beyond Employment Household Gender and Subsistence, Basil Blackwell, Oxford.
6. Sen,A.K. (1990), Genderand Cooperative Conflict's in Tinker (Ed.) Persistence Inequalities Women and Work Development, Oxford University Press, York.
7. Kapadia Karin. (ed.)(2002) Violence of Development: The Politics of Identity, Gender and Social Inequalities in India, Zubaan: New Delhi.
8. Nussbaum, Martha C (2001) Women and Human Development: Capabilities Approach, Cambridge University Press: New York

Module 4

1. Dantwala, V.L, H.Sethi and P.Visaria (1998), Social Change Through Voluntary Action, Sage Publications, New Delhi.

2. Jhabwala,R, and R,K.Subrariany. (2000) (Eds.) The Unorganized Sector: Work Security and Social Protection Sage Publications, New Delhi.
3. Buvinic M. and Lewis.J.P (Ed) Strengething the Poor; What Have We Learnt, OECD.
4. Carr, M. C.Martha and R.Jhabala (Eds) (1997), Speaking Out Women's Economic Empowerment in South Asia Vistaar Publications, New Delhi.
5. Hoffman, Saul D and Susan Averett (2010) Women and the Economy: Family, Work and Pay, Prentice Hall
6. Rai Shirin M (2013) Gender and the Political Economy of Development, Polity Press: UK

Module 5

1. Boserup, Ester (2007), Women's Role in Economic Development, George Allen andUnwin, London.
2. Baund. I.S (1992), Forms of Production and Women's Labour: Gender Aspects of Industrialization in India and Mexico Sage Publications, NewDelhi
3. Custers,P, (1997), Capital Accumulation and Women's Labour in Asian Economic Vistaar, New Delhi,
4. Kalpagam ,U. (1994), Labour and Gender, Survival in Urban India, Sage Publications, New Delhi.
5. King.M and Hill (Eids.) (1593), Women's Education Developing Countries Barriers Benefits and politics John Hopkins; Baltimore.
6. Blau, Francine D, Anne E Winkler and Marianne A Ferber (2009) The Economics ofWomen, Men and Work, Prentice Hall
7. Papola,T.; and A.N.Sharma (Ec s.) - 1999) Gender and Employment in India, Vikas Pub lishing House, New Delhi.
8. Babcok, Linda and Sara Laschever (2003), Women Don't Ask: Negotiations and GenderDivide. Princeton University Press: PrincetonSchultz
9. Ghosh Jayati (2009) Never Done and Poorly Paid: Women's Work in Globalizing India,New Delhi, Women Unlimited, 2009.
10. Raj, Maithreyi Krishna., R.M. Sudarshan and A. Shariff (1999), Gender, Population and Development, Oxford University Press, New Delhi.

11. Venkateswaran S. (1995), Environment, Development and the Gender Gap, SagePublications, New Delhi.