OFFICE OF THE REGISTRAR

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

Ref. No.: MU/RO/2021/476   04th March 2021

OFFICE ORDER

Sub.: Reconstitution of Board of Studies for Department of Chemical Engineering

The Board of Studies for the Department of Chemical Engineering is reconstituted as per Rule 7 of the Statutes of Mewar University, as under:

1) Prof. (Dr.) Tanveer Ahmed Kazi, Dean, Engineering — Chairman
2) Prof. (Dr.) Mr. Mahesh Kumar Singla- Senior Engineer, Hindustan Zinc. — External Member
3) Prof. (Dr.) Dr. Chaitanya Dhoke, SINTEF Industry — External Member
4) Mr. Dinesh Kumar, Assistant Professor — Internal Member
5) Mr. Sunil Kumar Katheria, Assistant Professor — Internal Member
6) Mr. Rahul Kumar, Head & Assistant Professor — Convener

The terms of reference for the Board of Studies are as provided in Rule 7 of the Statutes.

The Chairman of the Board of Studies may associate any member in the meeting, as special invitee if it is considered his association will contribute in the task of the meeting with the approval of the President/Vice Chancellor.

The Convener of the Meeting is advised to hold the meeting of the BOS seeking convenience of the Chairman in the first week of June 2021. The proceedings of the meeting may be sent to the VC/Registrar as early as possible.

The External Members shall be entitled for TA/DA and sitting fees as per the norms prescribed by the Mewar University.

Registrar
Registrar
Mewar University
Gangrar, (Chittorgarh)

Copy to:
- PS to Hon'ble Chairperson (for kind information)
- PS to Hon'ble President (for kind information)
- PS to Hon'ble Pro-President (for kind information)
- All concerned Deans/Directors/HoD's (for kind information & necessary action)
- Accounts/Examination/Library/Store/Warden/Security/IT Head.
- Coordinator, IQAC Cell.
- Record file.

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)
DEPARTMENT OF CHEMICAL ENGINEERING

DATE: 03.06.2021

Minutes of Meeting of Board of Studies

The Boards of Studies Meeting of the Department of Chemical Engineering, Faculty of Engineering and Technology was held on 03rd June 2021 in Room No. 135 at 11:00 am onwards to approve the new/changes in curriculum and Syllabus revision for session 2021-22.

The following members were present: **(Annexure 1)**

1) Prof. (Dr.) Tanveer Ahmed Kazi, Dean, Engineering	- Chairman
2) Prof. (Dr.) Mr. Mahesh Kumar Singla- Senior Engineer, Hindustan Zinc.	- External Member
3) Prof. (Dr.) Dr. Chaitanya Dhoke, SINTEF Industry	- External Member
4) Mr. Dinesh Kumar, Assistant Professor	- Internal Member
5) Mr. Sunil Kumar Katheria, Assistant Professor	- Internal Member
6) Mr. Rahul Kumar, Head & Assistant Professor	- Convener

At the outset, Mr. Rahul Kumar (Head, Chemical Engineering) warmly welcomed all the board members. The Head also appreciated the presence of outside experts who took the pain and keen interest to attend this meeting.

Agenda 1: To approve minutes of the previous BOS, held on 05-06-2020

Resolution: Minutes of the previous BOS of the Chemical Engineering Department held on 05-06-2020 were discussed and approved.

Agenda 2 Brief presentation of academic activities of the department before the BOS Committee by the convener

Resolution: Mr. Rahul Kumar presented departmental activities conducted related to curricular development, research development, faculty development and Industrial collaboration were presented.

Agenda 3: Review of Existing Programmes/Courses

Resolution: The Committee reviewed and approved the scheme and syllabus of courses for B.Tech Chemical Engineering students for the upcoming session from 2021-22. **(Annexure 2)**

Agenda 4: Introduction of New Programmes/Course

Resolution: BOS Committee members suggested adopting the AICTE Curriculum and approved a new scheme and syllabus of B. Tech (Chemical Engineering) of the AICTE Curriculum from session 2021-22. **(Annexure 4)**

Agenda 5: To recommend the approved syllabus to Academic Council.

Resolution: Members of the Board of Studies approved the syllabus and recommended the same be forwarded to the Academic Council for their approval.

The meeting was dissolved with thanks to the Chair and all the Board of Studies Members.
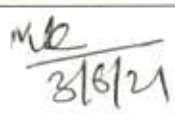
MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)
DEPARTMENT OF CHEMICAL ENGINEERING

DATE: 03.06.2021

Annexure 1: Attendance Sheet

S.NO.	Name& Designation	Designation in BOS	Signature
1	Prof. (Dr.) Tanveer Ahmed Kazi, Dean, Engineering	Chairman	
2	Prof. (Dr.) Mr. Mahesh Kumar Singla	External Member	3/6/21
3	Prof. (Dr.) Pankaj Kumar Pandey	External Member	
4	Mr. Dinesh Kumar, Assistant Professor	Internal Member	03.06.2
5	Mr. Sunil Kumar Katheria, Assistant Professor	Internal Member	03/06/21
6	Mr. Rahul Kumar, Head & Assistant Professor	Convener	

MEWAR UNIVERSITY CHITTORGARH (RAJASTHAN)

Faculty of Engineering and Technology

Scheme and Syllabus

of

Master of Technology (Regular)
Environmental Science and Engineering

MEWAR UNIVERSITY CHITTORGARH (RAJASTHAN)
Faculty of Engineering and Technology

Two - Year (Regular) M Tech: Environmental Science and Engineering

Eligibility for Admission: The Master of Technology (Environmental Science and Engineering) is an inter-disciplinary post-graduate Programme. A candidate for being eligible for admission to the Master of Technology in Environmental Science and Engineering in the faculty of engineering and technology should have passed B.Sc. (Engg.)/B.Tech/ B.E. or any other equivalent engineering degree in the relevant discipline / branch or M.Sc. degree (Chemistry / Biochemistry / Biotechnology / Physics / Agriculture / Forestry / Mining / Geography) from any recognized Indian or foreign University.

A candidate should have at least 55% marks or equivalent CGPA in the qualifying examination (50% marks or equivalent CGPA for Scheduled Caste/Scheduled Tribes Candidates) on the basis of which the admission is being sought.

Overview of the Programme: The normal duration of programme shall be four-Semesters for regular students. However, in exceptional circumstances one-year extension may be granted with approval of the Vice-Chancellor of the University.

The complete programme comprises of 12 theory courses (08 Core and 04 elective) and 02 Lab courses followed by the dissertation in two phases. Student has to obtain at least 40 % marks to pass the examination (both internal and external examination separately) for all the courses specified in the scheme of the programme. The degree will be awarded on the basis of cumulative marks obtained in all the four semesters and the division obtained will be as under:

MEWAR UNIVERSITY CHITTORGARH (RAJASTHAN)

Two - Year (Regular) M Tech: Environmental Science and Engineering

First Semester

Course Code	Course Title	Contact Hours per week		Credit Hours	Internal Assessment/Evaluation		External Examination /Viva-voce	Total Marks
		L	P		Assignments /Lab Record	Teacher's Evaluation		
ESE – 611	Environmental Chemistry and Microbiology	4	-	4	30	10	60	100
ESE – 613	Water Treatment Processes	4	-	4	30	10	60	100
ESE – 615	Ecology	4	-	4	30	10	60	100
ESE – 711/713/715	Elective – I (Water Quality Management)	4	-	4	30	10	60	100
ESE – 712/714/716	Elective – II (Air Quality modeling)	4	-	4	30	10	60	100
ESE – 617	Environmental Engg. Lab-I	-	2	2	10	10	30	50
Total Semester Credits = 22							Total Semester Marks = 550	

Second Semester

Course Code	Course Title	Contact Hours per week		Credit Hours	Internal Assessment/Evaluation		External Examination /Viva-voce	Total Marks
		L	P		Assignments /Lab Record	Teacher's Evaluation		
ESE – 612	Air and Noise Pollution	4	-	4	30	10	60	100
ESE – 614	Wastewater Treatment Processes	4	-	4	30	10	60	100
ESE – 616	Solid and Hazardous Waste Management	4	-	4	30	10	60	100
ESE – 721/723/725	Elective – III (Environmental Issues, Protection and Laws)	4	-	4	30	10	60	100
ESE – 722/724/726	Elective – IV (Renewable Energy Sources)	4	-	4	30	10	60	100
ESE-618	Environmental Engg. Lab- II	-	2	2	10	10	30	50
Total Semester Credits = 22							Total Semester Marks = 550	

Third Semester

Course Code	Course Title	Contact Hours per week		Credit Hours	Internal Assessment/Evaluation		External Examination /Viva-voce	Total Marks
		L	P		Assignments /Report	Teacher's Evaluation		
ESE – 621	Industrial Waste Management	4	-	4	30	10	60	100
ESE – 623	Environmental Impact Assessment	4	-	4	30	10	60	100
ESE – 625	Seminar	-	6	6	-	-	150	150
ESE – 629	Dissertation (Phase I)	-	8	8			200	200

Total Semester Credits = 22 **Total Semester Marks = 550**

Fourth Semester

Course Code	Course Title	Contact Hours per week		Credit Hours	Internal Assessment/Evaluation		External Examination /Viva-voce	Total Marks
		L	P		Report	Supervisor (s) Evaluation		
ESE – 630	Dissertation	-	16	16	50	-	350	400

Total Semester Credits = 16 **Total Semester Marks = 400**

LIST OF ELECTIVES

ELECTIVE – I

1. ESE – 711   Advance Water Supply and Wastewater Management
2. ESE – 713   Bioremediation: Principles and Applications
3. ESE – 715   Water Quality Management

ELECTIVE – II

1. ESE – 712   Environmental Planning and Management
2. ESE – 714   Air Quality Modelling
3. ESE – 716   Advanced Computational Methods and Optimization

ELECTIVE – III

1. ESE – 721   Environmental Issues, Protection and Laws
2. ESE – 723   Life Cycle Analysis and Design for Environment
3. ESE – 725   Surface Water Quality Modeling and Control

ELECTIVE – IV

1. ESE – 722 .   Renewable Energy Sources
2. ESE – 724   Environmental Risk Assessment
3. ESE – 726   Geographic Information System (GIS) in Environmental Engineering

MEWAR | MEWAR UNIVERSITY

MEWAR UNIVERSITY CHITTORGARH (RAJASTHAN)
Faculty of Engineering and Technology

SCHEME AND CURRICULUM
Four – Year (Regular)   B Tech: Petrochemical Technology

Category/Terminology used:

BS = Basic Sciences #includes Mathematics, Physics and Chemistry courses;

ES = Engineering Arts and Sciences #includes Fundamental Engineering courses;

HS = Humanities, Social science and Management #to provide a wide exposure to different areas of Humanities, Social science and Management;

CHE = Chemical Engineering # includes core courses of Chemical Engineering and elective courses offered by the parent department to provide an opportunity to the student to specialize significantly in one sub area of Chemical Engineering*;

OE = Open Electives to provide an opportunity to the student to develop interdisciplinary knowledge base or to specialize significantly in an area outside Mechanical Engineering**;

ELGA = English Language and General Awareness***.

* There are twelve (12) elective courses offered by the department to provide wider choices and flexibility to the students to cater to their academic interests. The student will have to choose any four out of these.

** There are ten (10) open elective courses offered by the other departments out of which the student will have to choose any two out of these.

*** One Course on English Language and General Awareness in each semester has been included with a definite objective; students should be encouraged to acquire a certain level of language proficiency and general awareness that are necessary to nurture them into competent professionals.

In addition to above, six hours per week to be spent on sports activities, NSS, NCC, social responsibilities, computer skills and programming, technical activities (quizzes, workshops, invited talks on emerging topics, extra classes, make up classes, industrial visits etc.)

Requisite weightage has been provided to all categories of the courses with an objective of holistic academic development of the students. The total credits for the programme will be 212 distributed to all above categories.

First Semester (Common to all Disciplines)

Course Code	Course Title	Contact Hours per week			Credit Hours	Internal Assessment/Evaluation		External Examination /Viva-voce	Total Marks
		L	T	P		Assignments / Lab Record	Teachers' Evaluation		
BS-101	Engineering Physics-I	3	1	-	4.0	35	15	50	100
BS-103	Engineering Mathematics-I	3	1	-	4.0	35	15	50	100
BS-105	Engineering Chemistry	3	1	-	4.0	35	15	50	100
ES-101	Engineering Graphics & Drawing	1	3	-	4.0	35	15	50	100
ES-103	Fundamentals of Computers and Programming	3	1	-	4.0	35	15	50	100
ES-105	Basics of Electrical Engineering	3	1	-	4.0	35	15	50	100
BS-107	Physics Lab-I	-	-	2	1.0	15	10	25	50
BS-109	Chemistry Lab	-	-	2	1.0	15	10	25	50
ES-107	Computer Lab	-	-	2	1.0	15	10	25	50
ES-109	Electrical Engineering Lab	-	-	2	1.0	15	10	25	50
ES-111	Workshop Practice-I	-	-	2	1.0	15	10	25	50
ELGA-101*	English Language and General Awareness-I	1	-	-	1.0	-	-	25	25
		17	08	10					
	Total Semester Credits = 30							Total Semester Marks=875	

*Compulsory but not counted towards credit hours

Second Semester (Common to all Disciplines)

Course Code	Course Title	Contact Hours per week			Credit Hours	Internal Assessment/Evaluation		External Examination /Viva-voce	Total Marks
		L	T	P		Assignments /Lab Record	Teachers' Evaluation		
BS-102	Engineering Physics-II	3	1	-	4.0	35	15	50	100
BS-104	Engineering Mathematics-II	3	1	-	4.0	35	15	50	100
ES-102	Introduction to Environmental Sciences	3	1	-	4.0	35	15	50	100
ES-104	Introduction to CADD	3	1	-	4.0	35	15	50	100
ES-106	Basics of Electronics Engineering	3	1	-	4.0	35	15	50	100
ES-108	Basics of Mechanical Engineering	3	1	-	4.0	35	15	50	100
BS-108	Physics Lab-II	-	-	2	1.0	15	10	25	50
ES-110	Electronics Engineering Lab	-	-	2	1.0	15	10	25	50
ES-112	Workshop Practice-II	-	-	2	1.0	15	10	25	50
ES-114	CAD Lab	-	-	2	1.0	15	10	25	50
HS-102	Language Lab	-	-	2	1.0	15	10	25	50
ELGA-102*	English Language and General Awareness-II	1	-	-	1.0	-	-	25	25
	Total Semester Credits = 30	19	06	10			Total Semester Marks=875		

*Compulsory but not counted towards credit hours

B.tech: Petrochemical Technology

Third Semester

Course Code	Course Title	Contact Hours per week			Credit Hours	Internal Assessment/Evaluation		External Examination /Viva-voce	Total Marks
		L	T	P		Assignments/ Lab Record	Teachers' Evaluation		
PC-201	Transforms and Partial Differential Equations	3	1	-	4.0	35	15	50	100
PC-203	Physical Chemistry	3	1	-	4.0	35	15	50	100
PC-205	Environmental Science and Engineering	4	-	-	4.0	35	15	50	100
PC-207	Industrial Chemical Technology	3	1	-	4.0	35	15	50	100
PC-209	Electrical Drives and Control	3	1	-	4.0	35	15	50	100
PC-211	Data Structures	3	1	-	4.0	35	15	50	100
PC-213	Electrical Machines Laboratory	-	-	2	1.0	15	10	25	50
PC-215	Data Structures Laboratory	-	-	3	1.5	25	15	35	75
PC-217	Chemical Technology Laboratory	-	-	3	1.5	25	15	35	75
ELGA-201	English Language and General Awareness-III	1	-	-	1.0	-	-	25	25
		20	05	08					

Total Semester Credits = 29

Total Semester Marks = 825

*Compulsory but not counted towards credit hours

Fourth Semester

Mewar University Chittorgarh (Rajasthan)

Course Code	Course Title	Contact Hours per week			Credit Hours	Internal Assessment/Evaluation		External Examination /Viva-voce	Total Marks
		L	T	P		Assignments / Lab Record	Teachers' Evaluation		
HS-202	Fundamentals of Business & Economics	3	1	-	4.0	35	15	50	100
PC-202	Organic Chemistry	3	1	-	4.0	35	15	50	100
PC-204	Materials Technology	4	0	-	4.0	35	15	50	100
PC-206	Process Calculations	3	1	-	4.0	35	15	50	100
PC-208	Fluid Flow Operation	3	1	-	4.0	35	15	50	100
PC-210	Mechanical Operations	3	1	-	4.0	35	15	50	100
PC-212	Physical and Organic Chemistry Laboratory	-	-	2	1.0	15	10	25	50
PC-214	Fluid Flow Operation Laboratory	-	-	3	1.5	25	15	35	75
PC-216	Mechanical Operations Laboratory	-	-	3	1.5	25	15	35	75
ELGA-202	English Language and General Awareness-IV	1	-	-	1.0	25	15	25	25
		20	05	08					

Total Semester Credits = 29.0

Total Semester Marks=825

B.tech: Petrochemical Technology

Fifth Semester

Course Code	Course Title	Contact Hours per week			Credit Hours	Internal Assessment/Evaluation			Total Marks
		L	T	P		Assignments / Lab Record	Teachers' Evaluation	External Examination /Viva-voce	
PC-301	Numerical Methods	3	1	-	4.0	35	15	50	100
PC-303	Heat Transfer	3	1	-	4.0	35	15	50	100
PC-305	Mass Transfer Fundamentals	3	1	-	4.0	35	15	50	100
PC-307	Chemical Engineering Thermodynamics	3	1	-	4.0	35	15	50	100
PC-309	Natural Gas Engineering	3	1	-	4.0	35	15	50	100
PC-311	Petroleum Exploration and Exploitation Techniques	3	1	-	4.0	35	15	50	100
PC-313	Heat Transfer Laboratory	-	-	3	1.5	25	15	35	75
PC-315	Numerical Method Laboratory	-	-	3	1.5	25	15	35	75
PC-317	Mass Transfer Laboratory	-	-	2	1.0	15	10	25	50
ELGA-301	English Language and General Awareness-V	1	-	-	1.0	-	-	25	25
		19	06	08					

Total Semester Credits = 29.0   Total Semester Marks=825

Sixth Semester

Course Code	Course Title	Contact Hours per week			Credit Hours	Internal Assessment/Evaluation		External Examination /Viva-voce	Total Marks
		L	T	P		Assignments/ Lab Record	Teachers' Evaluation		
PC-302	Process Instrumentation Dynamics and Control	2	2	-	4.0	35	15	50	100
PC-304	Mass Transfer Operations	3	1	-	4.0	35	15	50	100
PC-306	Chemical Reaction Engineering - I	3	1	-	4.0	35	15	50	100
PC-308	Process Equipment Design and Drawing I	3	1	-	4.0	35	15	50	100
PC-310	Petrochemical Unit Processes	3	1	-	4.0	35	15	50	100
PC-312	Petroleum Crude Processing Technology	3	1	-	4.0	35	15	50	100
PC-314	Process Instrumentation Dynamics and Control Laboratory	-	-	2	1.0	15	15	50	100
PC-316	Technical Analysis Laboratory	-	-	2	1.0	15	10	25	50
PC-318	Chemical Reaction Engineering Laboratory	-	-	2	1.0	15	10	25	50
PC-320	Seminar -	-	-	2	1.0	25	25	-	50
ELGA-302	English Language and General Awareness-VI	-	-	-	1.0	-	-	25	25
	Total Semester Credits = 29.0	**18**	**07**	**08**				**Total Semester Marks=825**	

*Compulsory but not counted towards credit hours

B.tech: Petrochemical Technology

Seventh/Eighth Semester

Course Code	Course Title	Contact Hours per week			Credit Hours	Internal Assessment/Evaluation		External Examination /Viva-voce	Total Marks
		L	T	P		Assignments	Teachers' Evaluation		
PC-421	Departmental Elective-I [Process Equipment Design and Drawing - II]	3	1	-	4.0	35	15	50	100
PC-422	Departmental Elective-II [Chemical Reaction Engineering - II]	3	1	-	4.0	35	15	50	100
PC-423	Departmental Elective-III [Petrochemical Derivatives]	3	1	-	4.0	35	15	50	100
PC-424	Departmental Elective-IV [Petroleum Secondary Processing Technology]	3	1	-	4.0	35	15	50	100
OE-431	Open Elective-I []	3	-	-	3.0	25	-	50	75
OE-432	Open Elective-II []	3	-	-	3.0	25	-	50	75
IT-001	Industrial Training (21-45 Days)	-	-	12	6.0	-	-	150	150
	Total Semester Credits = 28.0	18	04	12				Total Semester Marks=700	

Seventh/Eighth Semester

Course Code	Course Title	Contact Hours per week			Credit Hours	Internal Assessment/Evaluation		External Examination /Viva-voce	Total Marks
		L	T	P		Training/ Project Report	Teachers' Evaluation		
PC-441/442	Industrial Training/Project	-	-	40	20	150	100	250	500
PC-450	Comprehensive Academic and General Proficiency Viva-Voce	-	-	-	02	-	-	50	50
		-	-	40					

Total Semester Credits = 22.0

Total Semester Marks=550

LIST OF DEPARTMENTAL ELECTIVES (12)
CHE-421/422/423/424

- ❖ Process Equipment Design and Drawing
- ❖ Fluidization Engineering
- ❖ Petrochemical Derivatives
- ❖ Polymer Technology
- ❖ Petroleum Secondary Processing Technology
- ❖ Process Optimization

- ❖ Chemical Reaction Engineering - II
- ❖ Chemical Reactor Analysis
- ❖ Process Integration
- ❖ Nuclear Reactor Technology
- ❖ Novel Separation Processes
- ❖ Energy Management in Process Industries

LIST OF OPEN ELECTIVES (10)
OE-431/432

- ❖ Remote Sensing And GIS
- ❖ Advanced Engineering Mathematics
- ❖ Quality Control And Reliability
- ❖ Soft Computing
- ❖ Operations Management

- ❖ Entrepreneurship
- ❖ Consumer Electronics
- ❖ Security In Computing
- ❖ Modeling and Simulation
- ❖ Microprocessors and Microcontrollers

MEWAR UNIVERSITY CHITTORGARH (RAJASTHAN)

Faculty of Engineering and Technology

Scheme and Syllabus

of

Master of Technology (Regular)

Cement and ceramic technology

MEWAR UNIVERSITY CHITTORGARH (RAJASTHAN)

Faculty of Engineering and Technology
Two Year (Regular) M Tech: Cement and Ceramic Technology

Eligibility for Admission: A candidate for being eligible for admission to the Master of Technology in *Cement and Ceramic Technology* in the faculty of engineering and technology should have passed B.Sc. (Engg.)/ B.Tech/ B.E. / or any other equivalent degree in the relevant discipline / branch from any recognized Indian or foreign University.

A candidate should have at least 55% marks or equivalent CGPA in the qualifying examination (50% marks or equivalent CGPA for Scheduled Caste/Scheduled Tribes Candidates) on the basis of which the admission is being sought.

Overview of the Programme: The normal duration of programme shall be four Semesters for Regular students. However, in exceptional circumstances one-year extension may be granted with approval of the Vice-Chancellor of the University.

The complete programme comprises of 12 theory courses (08 Core and 04 elective) and 02 Lab courses followed by the dissertation in two phases. Student has to obtain at least D Grade to pass the examination (both internal and external examination separately) for all the courses specified in the scheme of the programme. The degree will be awarded on the basis of cumulative marks obtained in all the four semesters and the division obtained will be as under:

1

MEWAR UNIVERSITY CHITTORGARH (RAJASTHAN)
Scheme of Two Year (Regular) M Tech: Cement and Ceramic Technology

First Semester

Course Code	Course Title	Contact Hours Per Week		Credit Hours	Internal Assessment/Examination		External Examination /Viva-Voce	Total Marks
		L	P		Assignments /Lab Record	Teacher's Evaluation		
CCT-611	Cement Technology –I	4	-	4	30	10	60	100
CCT-612	Applied Mathematics	4	-	4	30	10	60	100
CCT- 711/712/713	Elective I (Fuel technology & furnace engineering)	4	-	4	30	10	60	100
CCT-622	Refractories	4		4	30	10	60	100
CCT- 721/722/723	Elective II (Nano Ceramics)	4		4	30	10	60	100
CCT-613	Material Characterization Lab	-	2	2	15	10	25	50
	Total Semester Credits=			13			Total Semester Marks=	550

Second Semester

Course Code	Course Title	Contact Hours Per Week		Credit Hours	Internal Assessment/Examination		External Examination /Viva-Voce	Total Marks
		L	P		Assignments /Lab Record	Teacher's Evaluation		
CCT-621	Cement Technology -II	4	-	4	30	10	60	100
CCT-631	Advanced techniques for material Characterization	4	-	4	30	10	60	100
CCT- 731/732/733	Elective III (Advance glass technology)	4	-	4	30	10	60	100
CCT-642	Phase Equilibria and kinetics of ceramics system	4	-	4	30	10	60	100
CCT- 741/742/743	Elective IV (Cement Process Engineering)	4		4	30	10	60	100
CCT -623	Cement Lab	-	2	2	15	10	25	50
	Total Semester Credits=		2	22	15	10	25	550

Third Semester

Course Code	Course Title	Contact Hours Per Week L	Contact Hours Per Week P	Credit Hours	Internal Assessment/Examination Assignments /Lab Record	Teacher's Evaluation	External Examination /Viva-Voce	Total Marks
CCT -641	Structural Clay Engineering	4	-	4	30	10	60	100
CCT -632	Ceramic Coating Technology	4	-	4	30	10	60	100
CCT -651	Seminar	-	6	6	-	-	150	150
CCT-652	Dissertation(Phase I)	-	8	8	-	-	200	200
	Total Semester Credits=			22			Total Semester Marks=	550

Fourth Semester

Course Code	Course Title	Contact Hours Per Week L	Contact Hours Per Week P	Credit Hours	Internal Assessment/Examination Teacher's Evaluation	External Examination /Viva-Voce	Total Marks
CCT -653	Dissertation (phase II)	16	16	Report 50		350	400
	Total Semester Credits=	16				Total Semester Marks=	400

LIST OF ELECTIVES

ELECTIVE I

1. CCT-711- Fuel Technology & Furnace Engineering
2. CCT-712 -Ceramic Fabrication Process
3. CCT-713- Electrical & Electronic Ceramics

ELECTIVE II

1. CCT – 721-Nano Ceramics
2. CCT -722- Bio-Ceramics
3. CCT -723 -Environmental Engineering

ELECTIVE III

1. CCT -731- Technology of Ceramic White wares
2. CCT -732- Quality Control & Management in Ceramics
3. CCT -733- Advance glass technology

ELECTIVE IV

1. CCT -742- Polymer Technology
2. CCT- 743- Cement Process Engineering

OFFICE OF THE REGISTRAR
MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

Ref. No.: MU/RO/2021/760   6th May 2021

OFFICE ORDER

Sub.: **Reconstitution of Board of Studies for Department of Electronics and Communication Engineering**

The Board of Studies for the Department of Electronics and Communication Engineering is reconstituted as per Rule 7 of the Statutes of Mewar University, as under:

1) Prof. (Dr.) Tanveer Ahmed Kazi, Dean of Engineering — Chairman
2) Dr. Navneet Kumar Agrawal, Associate Professor, CTAE, Udaipur (Raj.) - External Member
3) Mr. Sunil Sharma–Asst. VP-Projects (E&I), Wonder Cement, Nimbahera - External Member
4) Mr. JitendraVaswani, Assistant Professor — Internal Member
5) Mr. Ritesh Kumar Ojha, Assistant Professor — Internal Member
6) Ms. Sukriti Nuwal, Mathematics, Sangam School of Excellence, Bhilwara - Alumni
7) Mr. Gaurav Sharma, Head & Assistant Professor — Convener

The terms of reference for the Board of Studies are as provided in Rule 7 of the Statutes.

The Chairman of the Board of Studies may associate any member in the meeting, as special invitee if it is considered his association will contribute in the task of the meeting with the approval of the President/Vice Chancellor.

The Convener of the Meeting is advised to hold the meeting of the BOS seeking convenience of the Chairman in the fourth week of June 2021. The proceedings of the meeting may be sent to the VC/Registrar as early as possible.

The External Members shall be entitled for TA/DA and sitting fees as per the norms prescribed by the Mewar University.

Registrar
Mewar University
Gangrar, (Chittorgarh)

Copy to:

- PS to Hon'ble Chairperson (for kind information)
- PS to Hon'ble President (for kind information)
- PS to Hon'ble Pro-President (for kind information)
- All concerned Deans/Directors/HoD's (for kind information & necessary action)
- Accounts/Examination/Library/Store/Warden/Security/IT Head.
- Coordinator, IQAC Cell.
- Record file.

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

DATE: 22/06/2021

Minutes of Meeting of Board of Studies

Minutes of the BOS of the Department of Electronics and Communication Engineering meeting held on 22-06-2021 at 11.30 AM.

The following members were present: (**Annexure 1**)

1) Prof. (Dr.) Tanveer Ahmed Kazi, Dean of Engineering   - Chairman
2) Dr. Navneet Kumar Agrawal, Associate Professor, CTAE, Udaipur (Raj.) - External Member
3) Mr. Sunil Sharma–Asst. VP-Projects (E&I), Wonder Cement, Nimbahera - External Member
4) Mr. JitendraVaswani, Assistant Professor   - Internal Member
5) Mr. Ritesh Kumar Ojha, Assistant Professor   - Internal Member
6) Ms. Sukriti Nuwal, Mathematics, Sangam School of Excellence, Bhilwara - Alumni
7) Mr. Gaurav Sharma, Head & Assistant Professor   - Convener

At the outset, Mr. Gaurav Sharma, Head, Electronics & Communication Engineering, warmly welcomed all the board members. The Head also appreciated the presence of outside experts who took the pain and keen interest to attend this meeting.

Agenda 1: To approve minutes of the previous BOS, held on 22-06-2020

Resolution: Minutes of the previous BOS of the Electronics & Communication Engineering department held on 22-06-2020 were discussed and approved.

Agenda 2: Brief presentation of academic activities of the department before the BOS Committee by the convener

Resolution: Mr. Gaurav Sharma, (Head, Electronics & Communication Engineering) presented a departmental activity report mentioning all the activities conducted related to curricular development, research and development, faculty development, and Industrial collaboration.
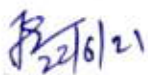
Agenda 3: Review of Existing Programmes/ Courses

Resolution: The Committee reviewed the scheme and syllabus of the M. Tech (DC) and M.Tech (VLSI) programme and approved the scheme and syllabus for the session 2021-22. (**Annexure 2**)

Agenda 4: Introduction of New Programme/Course

Resolution:

1. The BOS Committee approved the syllabus of three new courses in M. Tech. (VLSI) for PG students from session 2021-22 are mentioned below. **(Annexure 3)**

- Micro Sensors and Interface Electronics
- Scripting Languages and Verification
- RFIC Design

2. BOS Committee members suggested to adopt AICTE Curriculum and approved a new scheme and syllabus of B. Tech (Electronics & Communication Engineering) of the AICTE Curriculum from session 2021-22. **(Annexure 4)**

Agenda 5: Any other suggestions by BOS Committee

Resolution: Suggestion regarding subject scheme and syllabus-

1. The importance and possibilities of departmental research activities were discussed and suggestions were given for the up-gradation of the syllabus.

2. In the future, the courses and programs should be designed and developed according to today's demand so that it will be a good opportunity to attract students and industries also.

Agenda 6: To recommend the approved syllabus to Academic Council.

Resolution: Members of the Board of Studies approved the syllabus and recommended the same be forwarded to the Academic Council for their approval.

The meeting was dissolved with thanks to the Chair and all the Board of Studies Members.
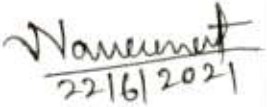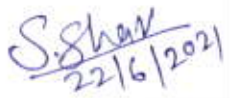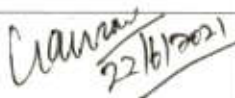
MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

DATE: 22/06/2021

Annexure 1: Attendance Sheet

S.NO.	Name& Designation	Designation in BOS	Signature
1	Prof. (Dr.) Tanveer Ahmed Kazi, Dean Engg.	Chairman	_signed 22/6/2021_
2	Dr. Navneet Kumar Agrawal, Associate Professor, CTAE, Udaipur (Raj.)	External Member	_Navneet 22/6/2021_
3	Mr. Sunil Sharma – Asst. VP-Projects (E&I), Wonder Cement, Nimbahera.	External Member	_S.Sharma 22/6/2021_
4	Mr. JitendraVaswani, Assistant Professor, Electronics & Comm. Engg.	Internal Member	_signed 22/6/21_
5	Mr. Ritesh Kumar Ojha, Assistant Professor, Electronics & Comm. Engg.	Internal Member	_signed 22/6/2021_
6	Ms. SukritiNuwal, Mathematics Faculty, Sangam School of Excellence, Bhilwara(Raj.)	Alumni	_SuKN 22/6/2021_
7	Mr. Gaurav Sharma, Head, Electronics & Comm. Engg.	Convener	_signed 22/6/2021_

MICROSENSORS AND INTERFACE ELECTRONICS

Introduction to Micro and Smart Systems Microsystems and scaling law, MEMS &Micro machines, Evolution of Microsystems, Silicon and Non-silicon Micro and Smart Systems, Market for Microsystems.

Microsystem Materials and Properties Materials - Silicon, Silicon oxide and nitride, Thin Metal films (Cr, Au, Ti, Pt), Polymers (SU8, PMMA, PDMS), Glass and Quartz. Important material properties-Young modulus, Poisson's ratio, density, piezoresistive coefficients, TCR, Thermal Conductivity, Material Structure.

Micro System Technology Single Crystal Silicon Growth, Wafer Cleaning, Oxidation, Diffusion, Ion implantation, PVD, CVD, Electroplating, Lithography, Bulk Micromachining, Surface Micromachining, LIGA, Bonding and Packaging.

Introduction to Sensors and Actuators Electrostatic, Piezoelectric, Piezoresistive, Electromagnetic, Thermo pneumatic, Shape Memory Alloy, Thermoelectric, Optical and Resonant.

BOOKS

M. Madou, Fundamentals of Microfabrication and Nanotechnology, CRC Press, Third Edition, 2011.

Anderia De Marcellis, Giuseppe ferri, Analog circuits and systems for voltage-mode and current-mode sensor interfacing applications, Springer, 2011.

N. Maluf, K Williams, An Introduction to Microelectromechanical Systems Engineering,Artech House Inc,Second Edition, 2004

S. Senturia, Microsystem Design, Springer Publisher, 2007.

SCRIPTING LANGUAGES AND VERIFICATION

PERL Basics History and Concepts of PERL - Scalar Data - Arrays and List Data - Control structures – Hashes - Basics I/O - Regular Expressions – Functions - Miscellaneous control structures - Formats.

Advanced Topics in PERL Directory access - File and Directory manipulation - Process Management - Packages and Modules.

TCL Basics An Overview of TCL and Tk -Tcl Language syntax – Variables – Expressions – Lists - Control flow – procedures - Errors and exceptions - String manipulations.

Advanced Topics in TCL Accessing files- Processes. Applications - Controlling Tools - Basics of Tk.

BOOKS

Larry Wall, Tom Christiansen, John Orwant, "Programming PERL", Oreilly Publications, Fourth Edition, 2012.

John K. Ousterhout, Ken Jones, "Tcl and the Tk Toolkit", Pearson Education, Second Edition, 2010.

Christian B Spear, "SystemVerilog for Verification: A guide to learning the Testbench language features", Springer publications, Third Edition, 2012.

Ray Salmei, "The UVM Primer: A Step-by-Step Introduction to the Universal Verification Methodology" Boston Light Press; First edition, 2013.

RFIC DESIGN

Introduction to RF & Wireless Technology: Complexity design and applications - Choice of Technology - Basic concepts in RF Design: Nonlinearly - Time Variance - Intersymbol Interference - random processes - Noise. Definitions of sensitivity - dynamic range - conversion Gain and Distortion.

High Frequency Model of RF Transistors and Matching Networks: MOSFET behaviour at RF frequencies - Noise performance and limitation of devices - Impedance matching networks - transformers and baluns.

Analog& Digital Modulation for RF Circuits: Coherent and Non coherent detection - Mobile RF Communication systems and basics of Multiple Access techniques - Receiver and Transmitter Architectures and Testing: Heterodyne - Homodyne, Image-reject, Direct-IF and subsampled receivers - Direct Conversion and two steps transmitters.

Low Noise Amplifiers and Mixers Low Noise Amplifiers: Common Source LNA - Common Gate LNA -Cascode LNA. Mixers: Design of Active and Passive Mixers.

BOOKS

B.Razavi, RF Microelectronics, Pearson Education Limited, Second Edition, 2013.

HoomanDarabi, Radio-Frequency Integrated Circuits and Systems, Cambridge University Press, First Edition, 2015.

Gu, Qizheng, RF System Design of Transceivers for Wireless Communications, Springer, 2010

Bosco Leung, VLSI for Wireless Communication, Springer, Second Edition, 2011

MEWAR UNIVERSITY

REVISED SYLLABUS EFFECTIVE FROM 2021-22

COURSE: B. Tech BRANCH: Electronics and Communication Engineering

I SEMESTER

S.No.	Category	Course Code	Course Title	Contact hours per Week			Total contact hours	Credits	TA	End Term Part 1	End Term Part 2 / Viva-Voce	Internal Practical	End Term Practical	Total Marks
				L	T	P								
1	Basic Science course	BSC101	Physics	3	1	0	4	4	15	35	50	0	0	100
2		BSC102	Mathematics-1	3	1	0	4	4	15	35	50	0	0	100
3		BSC103	Chemistry	3	1	0	4	4	15	35	50	0	0	100
4		BSC104	Physics Lab	0	0	2	2	1	0	0	0	25	25	50
5		BSC105	Chemistry Lab	0	0	2	2	1	0	0	0	25	25	50
6	Engineering Science Courses	ESC101	Basic Electrical Engineering	3	1	0	4	4	15	35	50	0	0	100
7		ESC102	Engineering Graphics & Design Lab	0	0	4	4	2	0	0	0	50	50	100
8		ESC103	Basic Electrical Engineering Lab	0	0	2	2	1	0	0	0	25	25	50
	TOTAL			12	4	10	26	21						650

II SEMESTER

S.No.	Category	Course Code	Course Title	Contact hours per Week			Total contact hours	Credits	TA	End Term Part 1	End Term Part 2 /Viva-Voce	Internal Practical	End Term Practical	Total Marks
				L	T	P								
1	Basic Science course	BSC106	Mathematics -II	3	1	0	4	4	15	35	50	0	0	100
2	Engineering Science Courses	ESC104	Programming for Problem Solving	3	1	0	4	4	15	35	50	0	0	100
3		ESC105	Engineering Mechanics	3	1	0	4	4	15	35	50	0	0	100
4		ESC106	Basic Electronics	3	1	0	4	4	15	35	50	0	0	100
5		ESC107	Programming for Problem Solving Lab	0	0	4	4	2	0	0	0	50	50	100
6		ESC108	Workshop Practices Lab	0	0	4	4	2	0	0	0	50	50	100
7	Humanities and Social Sciences including Management courses	HSMC101	English	2	0	0	2	2	10	15	25	0	0	50
8		HSMC102	English Lab	0	0	2	2	1	0	0	0	25	25	50
9	Mandatory courses	MC-1	Environmental Science	2	0	0	2	0	0	0	0	0	0	0
	TOTAL			16	4	10	30	23						700

III SEMESTER

S.No.	Category	Course Code	Course Title	Contact hours per Week L	T	P	Total contact hours	Credits	TA	End Term Part 1	End Term Part 2 / Viva-Voce	Internal Practical	End Term Practical	Total Marks
1	Basic Science course	BSC107	Mathematics III (PDE, Probability & Statistics)	3	1	0	4	4	15	35	50	0	0	100
2		BSC108	Biology for Engineers	2	0	0	2	2	10	15	25	0	0	50
3	Professional Core courses	EC301	Electronic Devices	3	1	0	4	4	15	35	50	0	0	100
4		EC302	Digital System Design	3	1	0	4	4	15	35	50	0	0	100
5		EC303	Data Structure and Algorithm	3	1	0	4	4	15	35	50	0	0	100
6		EC304	Network Theory	3	1	0	4	4	15	35	50	0	0	100
7		EC305	Electronic Devices Lab	0	0	2	2	1	0	0	0	35	40	100
8		EC306	Digital System Design Lab	0	0	2	2	1	0	0	0	35	40	100
9	Humanities and Social Sciences including Management courses	HSMC201	Organizational Behavior	3	0	0	3	3	10	25	40	0	0	75
	TOTAL			20	5	4	29	27						725

IV SEMESTER

S.No.	Category	Course Code	Course Title	Contact hours per Week			Total contact hours	Credits	TA	End Term Part 1	End Term Part 2 / Viva-Voce	Internal Practical	End Term Practical	Total Marks
				L	T	P								
1	Professional Core courses	EC401	Analog and Digital Communication	3	1	0	4	4	15	35	50	0	0	100
2		EC402	Analog Circuits	3	1	0	4	4	15	35	50	0	0	100
3		EC403	Microcontrollers	3	1	0	4	4	15	35	50	0	0	100
4		EC404	Signals and Systems	3	1	0	4	4	15	35	50	0	0	100
5		EC405	Electronic Measurement and Instrumentation	3	1	0	4	4	15	35	50	0	0	100
6		EC404	Analog and Digital Communication Lab	0	0	2	2	1	0	0	0	25	25	50
7		EC405	Analog Circuits Lab	0	0	2	2	1	0	0	0	25	25	50
8		EC406	Microcontrollers Lab	0	0	2	2	1	0	0	0	25	25	50
9		EC407	Electronic Measurement and Instrumentation Lab	0	0	2	2	1	0	0	0	25	25	50
10	Humanities and Social Sciences including Management	H-102	Universal Human Values 2: Understanding Harmony	3	0	0	3	3	10	25	40	0	0	75
	TOTAL			18	5	8	31	27						775

V SEMESTER

S.No.	Category	Course Code	Course Title	Contact hours per Week			Total contact hours	Credits	TA	End Term Part 1	End Term Part 2 / Viva-Voce	Internal Practical	End Term Practical	Total Marks
				L	T	P								
1	Professional Core courses	EC501	Electromagnetic Waves	3	1	0	4	4	15	35	50	0	0	100
2		EC502	Digital Signal Processing	4	0	0	4	4	15	35	50	0	0	100
3		EC503	Computer Architecture	3	1	0	4	4	15	35	50	0	0	100
4		EC504	Digital Signal Processing Lab –	0	0	2	2	1	0	0	0	25	25	50
5	Professional Elective	ECEL521	Elective-I	3	0	0	3	3	10	25	40	0	0	75
6	Elective	ECEL522	Elective-II	3	0	0	3	3	10	25	40	0	0	75
7	Humanities and Social Sciences including Management courses	HSMC501 (OEC II)	Humanities I /(Effective Technical Communication)/	2	0	0	2	2	10	15	25	0	0	50
8	Project (Summer internship)	PROJ-ECE 501	Minor Project/ Seminar/Summer Internship	0	0	2	2	1	0	0	0	25	25	50
	TOTAL			18	2	4	24	22						600

VI SEMESTER

S.No.	Category	Course Code	Course Title	Contact hours per Week			Total contact hours	Credits	TA	End Term Part 1	End Term Part 2 /Viva-Voce	Internal Practical	End Term Practical	Total Marks
				L	T	P								
1	Professional Core courses	EC601	Control System	3	0	0	3	3	10	25	40	0	0	75
2	Core courses	EC602	Computer Network	0	0	2	2	1	0	0	0	25	25	50
3	Professional Elective	ECEL621	Elective-III	3	0	0	3	3	10	25	40	0	0	75
4	Elective	ECEL622	Elective-IV	3	0	0	3	3	10	25	40	0	0	75
5	Open Elective courses	ECOEC-601	Open Elective-I	3	0	0	3	3	10	25	40	0	0	75
6	Mandatory courses	MC-II	Essence of Indian Knowledge Tradition	2	0	0	2	0	0	0	0	0	0	0
7	Project	PROJ-EC 601	Project-II(Major Project)	0	0	10	10	5	0	0	0	125	125	250
	TOTAL			14	0	12	26	18						600

VII SEMESTER

S.No.	Category	Course Code	Course Title	Contact hours per Week			Total contact hours	Credits	TA	End Term Part 1	End Term Part 2 / Viva-Voce	Internal Practical	End Term Practical	Total Marks
				L	T	P								
1	Professional Elective	ECEL721	Elective-V	3	0	0	3	3	10	25	40	0	75	75
2		ECEL722	Elective-VI	3	0	0	3	3	10	25	40	0	75	75
3	Open Elective courses	ECOEC-602	Open Elective II	3	0	0	3	3	10	25	40	0	75	75
4		ECOEC-603	Open Elective III	3	0	0	3	3	10	25	40	0	0	75
5	Mandatory courses	MC-III	Constitution of India	2	0	0	2	0	0	0	0	0	0	0
6	Project (Or Summer internship)	PROJ-EC 701	Short Term Training (21-45 Days)/ Project-III	0	0	6	6	3	0	0	0	0	150	150
	TOTAL			14	0	6	20	15						450

VIII SEMESTER

S.No.	Category	Course Code	Course Title	Contact hours per Week			Total contact hours	Credits	Project Report	Internal Evaluation	Industry Evaluation	Internal Practical	End Term Practical	Total Marks
				L	T	P								
1	Project	PROJ-ECE 402	Industrial Internship Project-IV	0	0	20	20	10	100	100	300	0	0	500
	TOTAL			0	0	20	20	10						500

163

5000

Sr. No.	Course Code	Course Name	Course Category
1	ECOEC601	Renewable Energy	Open Elective-I
2		Internet of Things	
3		Energy Efficiency and Audit	
4		Electronics in Agriculture	
5	ECOEC602	Robotics	Open Elective-II
6		Disaster Management	
7		Entrepreneurship	
8	ECOEC603	Artificial Intelligence	Open Elective-III
9		Introduction to E-governance	

Professional Open Elective

Sr. No.	Category	Course Code	Course Name
1	Professional Elective-I	ECEL521	Power Electronics
2			Embedded System
3	Professional Elective-II	ECEL522	Bio-Medical Electronics
4			Linear Integrated Circuit
5	Professional Elective-III	ECEL621	Fiber Optic Communications
6			Microwave Theory and Techniques
7	Professional Elective-IV	ECEL672	Introduction to MEMS
8			VLSI Devices and Design
9	Professional Elective-V	ECEL721	Digital Design using VHDL
10			Mobile Communication and Networks
11	Professional Elective-VI	ECEL722	Digital Image Processing
12			Satellite Communications

Professional Elective Courses

OFFICE OF THE REGISTRAR

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

Ref. No.: MU/RO/2021/698   8th April 2021

OFFICE ORDER

Sub.: Reconstitution of Board of Studies for Department of Computer Applications

The Board of Studies for the Department of Computer Applications reconstituted as per Rule 7 of the Statutes of Mewar University, as under:

1) Dr. Tanveer Ahmad Kazi, Dean, Faculty of Computer Science & System Studies   - Chairman
2) Dr. Dilendra Hiran, Director, Pacific College of Computer Application Pacific University, Udaipur, Rajasthan   - External Member
3) Mr. BachchaLal Pal Verma, Assistant Professor   - External Member
4) Mr. M. Rashid, Assistant Professor   - Internal Member
5) Mr. Shiv Kumar, Assistant Professor, CSE Department   - Internal Member
6) Dr. Avneent Kumar, Sangam University, Assistant Professor   - Alumni
7) Mr. Ravindra Verma, Assistant Professor & Head   - Convener

The terms of reference for the Board of Studies are as provided in Rule 7 of the Statutes.

The Chairman of the Board of Studies may associate any member in the meeting, as a special invitee if it is considered his association will contribute to the task of the meeting with the approval of the President/Vice-Chancellor.

The Convener of the Meeting is advised to hold the meeting of the BOS seeking the convenience of the Chairman in the month of May 2021. The proceedings of the meeting may be sent to the VC/Registrar as early as possible.

The External Members shall be entitled for TA/DA and sitting fees as per the norms prescribed by Mewar University.

Registrar
Mewar University
Gangrar, (Chittorgarh)

Copy to:

- PS to Hon'ble Chairperson (for kind information)
- PS to Hon'ble President (for kind information)
- PS to Hon'ble Pro-President (for kind information)
- All concerned Deans/Directors/HoDs (for kind information & necessary action)
- Accounts/Examination/Library/Store/Warden/Security/IT Head.
- Coordinator, IQAC Cell.
- Record file.

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF COMPUTER APPLICATIONS

DATE: 18.05.2021

Minutes of Meeting of Board of Studies

The Board of Studies Meeting of the Department of Computer Application was held on 18th May 2021 in Room No. 135 at 11:00 am onwards to approve the new/changes in curriculum and Syllabus revision for session 2021-22.

The following members were present: **(Annexure 1)**

1) Dr. Tanveer Ahmad Kazi, Dean, Faculty of Computer Science & System Studies   - Chairman
2) Dr. Dilendra Hiran, Director, Pacific College of Computer Application Pacific University, Udaipur, Rajasthan
   - External Member
3) Mr. BachchaLal Pal Verma, Assistant Professor   - External Member
4) Mr. M. Rashid, Assistant Professor   - Internal Member
5) Mr. Shiv Kumar, Assistant Professor, CSE Department   - Internal Member
6) Dr. Avneent Kumar, Sangam University, Assistant Professor   - Alumni
7) Mr. Ravindra Verma, Assistant Professor & Head   - Convener

Mr. Ravindra Verma (Head of the Department of Computer Application) warmly welcomed all the board members. The Head also appreciated the presence of outside experts who took the pain and keen interest to attend this meeting.

Agenda 1: To approve minutes of the previous BOS, held on 12-06-2020

Resolution: Minutes of the previous BOS of the Computer Application Department held on 12-06-2020 were discussed and approved.

Agenda 2: Brief presentation of academic activities of the department before the BOS Committee by the convener

Resolution: Mr. RavindraVerma (Head, Computer Applications) presented a departmental activity report mentioning all the activities conducted related to curricular development, research and development, faculty development, and Industrial collaboration.

Agenda 3: Review of Existing Programmes/Courses

Resolution:

- The existing course BCA presented for review for Session 2021-22.
- The existing course BCA-MCA (Integrated) is presented for review for Session 2021-22.
- The existing course MCA presented for review for Session 2021-22.
- The existing course MCA (Lateral) is presented for review for Session Session 2021-22.

Agenda 4: Introduction of New Programmes/Courses

Resolution:

1. Based on the industry demand, BOS committee members decided to offer four new courses for PGDCA students from the upcoming session 2021-22. The courses are mentioned below **(Annexure 2)**
- Data Communication And Cn
- Software Engineering
- Computer Architechture
- Web Technology

2. Suggestionsreceived from previous BOS committee members, four new courses will be introduced for the upcoming session 2021-22 for BCA students. The courses are mentioned below **(Annexure 3)**
- Machine Learning
- Concepts in Statistical Learning Theory
- Applied Cryptography
- High Speed Networks

3. Suggestionsreceived from previous BOS committee members, four new courses will be introduced for the upcoming session 2021-22 for MCA students. The courses are mentioned below **(Annexure 4)**
- IOT
- Java Based Web Stack
- Soft Computing
- Concepts In Statistical Learning

4. Suggestionsreceived from previous BOS committee members, three new courses will be introduced for the upcoming session 2021-22 for BCA-MCA students. The courses are

mentioned below (**Annexure 5**)

- Deep Leraning
- Digital Marketing

Agenda 5: To recommend the approved syllabus to Academic Council.

Resolution: Members of the Board of Studies approved the revised syllabus and recommended the same be forwarded to the Academic Council for their approval.

The meeting was dissolved with thanks to the Chair and all the Board of Studies Members.

18/5/21
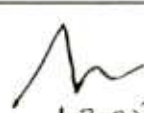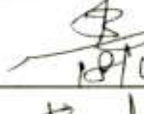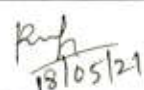
MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF COMPUTER APPLICATIONS

DATE: 18.05.202

Annexure 1: Attendance Sheet

S.NO.	Name & Designation	Designation in BOS	Signature
1	Dr. Tanveer Ahmad Kazi, Computer Science & System Studies	Chairman	18.05.2021
2	Dr. Dilendra Hiran, Director, Pacific University, Udaipur, Rajasthan	External Member	18.5.2021
3	Mr. Bachcha Lal Pal ~~Kumar~~, Assistant Professor	External Member	18.05.2021
4	Mr. M. Rashid, Assistant Professor	Internal Member	
5	Mr. Shiv Kumar, Assistant Professor, CSE Dept	Internal Member	18/05/21
6	Dr. Avneent Kumar, Sangam University, Ass. Prof.	Alumni	Avneet 18/05/21
7	Mr. Ravindra Verma, Assistant Professor	Convener	18/05/21
		Special Invitee (if any)	

DATA COMMUNICATION AND CN

Module – I

Overview of Data Communications and Networking. Physical Layer : Analog and Digital, Analog Signals, Digital Signals, Analog versus Digital, Data

Rate Limits, Transmission Impairment, More about signals. Digital Transmission: Line coding, Block coding, Sampling, Transmission mode.

Analog Transmission: Modulation of Digital Data; Telephone modems, modulation of Analog signals. Multiplexing : FDM , WDM , TDM , Transmission Media: Guided Media, Unguided media (wireless) Circuit switching and Telephone Network: Circuit switching, Telephone network.

Module –II

Data Link Layer Error Detection and correction: Types of Errors, Detection, Error Correction

Data Link Control and Protocols: Flow and Error Control, Stop-and-wait ARQ. Go-Back-N ARQ, Selective Repeat ARQ, HDLC, Point-to –Point Access: PPP ,Point –to- Point Protocol, PPP Stack, Multiple Access, Random Access, Controlled Access, Channelization.

Local area Network: Ethernet. Traditional Ethernet, Fast Ethernet, Gigabit Ethernet. Token bus, token ring Wireless LANs: IEEE 802.11, Bluetooth virtual circuits: Frame Relay and ATM.

Module – III

Network Layer: Host to Host Delivery: Internetworking, addressing and Routing

Network Layer Protocols: ARP, IPV4, ICMP, IPV6 ad ICMPV6 Transport Layer: Process to Process Delivery: UDP; TCP congestion control and Quality of service.

Module – IV

Application Layer : Client Server Model, Socket Interface, Domain Name System (DNS): Electronic Mail (SMTP) and file transfer (FTP) HTTP and WWW.

Text Books:

1. Data Communications and Networking: Behrouz A. Forouzan, Tata McGraw-Hill, 4 thEd

3. Computer Networks: A. S. Tannenbum, D. Wetherall, Prentice Hall, Imprint of Pearson 5 th Ed

Reference Book : .

1. Computer Networks:A system Approach:Larry L, Peterson and Bruce S. Davie,Elsevier, 4 th Ed

2. Computer Networks: Natalia Olifer, Victor Olifer, Willey India

3. Data and Computer Communications: William Stallings, Prentice Hall, Imprint of Pearson, 9 th Ed.

4. Data communication & Computer Networks: Gupta, Prentice Hall of India

5. Network for Computer Scientists & Engineers: Zheng, Oxford University Press

6. Data Communications and Networking: White, Cengage Learning

SOFTWARE ENGINEERING

UNIT-I

Introduction, Software Development Life Cycle models, System Concept: Definitions, Role of Software Engineer / Analysts / Users in the various phases of Systems Development Life Cycle, Integrated Systems, Sub-systems, Requirements Analysis, Software Design, Coding, Testing, Maintenance, Introduction to software processes and crises, Software life cycle models: build and fix, Waterfall Model, Prototyping Model, Iterative Enhancement Model, Spiral Model, Unified process, Requirement engineering, Types of requirements, Feasibility study, Requirement elicitation analysis, Documentation, Validation, Management.

UNIT-II

Software project planning, Cost estimation, COCOMO, COCOMO-II, Putnam model, Risk management, Software design, Modularity, Strategies, Function oriented design, Object oriented design, Software metrics, Introduction to metrics, Token count, Data structure metrics, If metrics, O-O metrics, Size metrics, Information flow metrics, Entropy based measures, Metric analysis

UNIT-III

Software reliability , Importance of software reliability, S/W reliability & H/w reliability, Failures and faults, Software quality, Reliability models: macro, Basic, Logarithmic, Poisson, Calendar time component, Micro models: estimating number of residual errors, Reliability allocation, CMM,ISO 9000. Testing, Levels of Testing- Functional Testing, Structural Testing, Activities during testing, Test Plan, Test Cases Specification, Reliability assessment, Debugging, Testing tools.

UNIT-IV

Software maintenance, Types of maintenance, Maintenance models, Reverse

engineering, Re-engineering, Introduction to Computer Aided Software Engineering (CASE) Types of Data Processing, Multimedia software engineering, Perspectives in multimedia software engineering, Syntax and semantics, Tools for multimedia development environment, Pragmatics, Multimedia software engineering applications. Agile software engineering: introduction to agile software development, Time measures, Quality, Learning, Globalization, Reflection, Delivery and cyclicality

Recommended Books:

□ Aggarwal K K, Singh Yogesh, Software Engineering, New Age International

□ Pressman R, Software Engineering- A Practitioners Approach, McGraw Hill

□ Jalote Pankaj, An Integrated Approach to Software Engineering, Narosa Publishing

□ Sommerville Ian, Software Engineering,4th edition, Addison Wesley

COMPUTER ORGANISATION AND ARCHITECTURE

UNIT - I:

Functional blocks of a computer: CPU, memory, input-output subsystems, control unit.

Computer Organization and Architecture - Von Neumann Data representation: signed number representation, fixed and floating point Representations, Character representation. Computer arithmetic – integer addition and Subtraction, Ripple carry adder, carry look-ahead adder, etc. Multiplication – shift-and add, Booth multiplier, Carry save multiplier, etc. Division restoring and non-restoring techniques, Floating point arithmetic.

UNIT – II:

Introduction to x86 architecture. Instruction set architecture of a CPU: Registers, instruction execution cycle, RTL Interpretation of instructions, addressing modes, instruction set. CPU Control unit design: Hardwired and micro-programmed design approaches

UNIT- III:

Memory system design: Semiconductor memory technologies, memory organization.

Memory organization: Memory interleaving, concept of hierarchical memory organization,

Cache memory, cache size vs. block size, mapping functions, Replacement algorithms, write policies.

UNIT – IV:

Peripheral devices and their characteristics: Input-output subsystems, I/O device interface,

I/O transfers – program controlled, interrupt driven and DMA, privileged and non-privileged

instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions, I/O device interfaces – SCII, USB

UNIT – V:

Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards.

Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency

TEXT BOOKS:

1. "Computer Organization and Design: The Hardware/Software Interface", 5th Edition by

David A. Patterson and John L. Hennessy, Elsevier.

2. "Computer Organization and Embedded Systems", 6th Edition by CarlHamacher,McGraw Hill Higher Education.

REFERENCE BOOKS:

1. "Computer Architecture and Organization", 3rd Edition by John P. Hayes,WCB/McGrawHill

2. "Computer Organization and Architecture: Designing for Performance", 10th Editionby William Stallings, Pearson Education.

3. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuringand Harry F. Jordan, Pearson Education

WEB TECHNOLOGY

UNIT I:

Web Basics and Overview: Introduction to Internet, World Wide Web, Web Browsers,

URL, MIME, HTTP, Web Programmers Toolbox. HTML Common tags: List, Tables, images, forms, frames, Cascading Style Sheets (CSS) & its Types. Introduction to Java Script, Declaring variables, functions, Event handlers (onclick, On submit, etc.,) and Form Validation.

UNIT·II:

Introduction to XML: Document type definition, XML Schemas, Presenting XML ,

Introduction to XHTML, Using XML Processors: DOM and SAX.

PHP: Declaring Variables, Data types, Operators, Control structures, Functions.

UNIT III:

Web Servers and Servlets: Introduction to Servlets, Lifecycle of a Servlet, JSDK,

Deploying Servlet, The Servlet API, The javax. Servlet Package, Reading Servlet parameters,

Reading Initialization parameters. The javax.servlet HTTP package, Handling Http Request

& Responses, Cookies and SessionTracking.

UNIT IV:

Database Access: Database Programming using JDBC, JDBC drivers, Studying Javax.sql.*

package, Connecting to database in PHP, Execute Simple Queries, Accessing a Database

from a Servlet. Introduction to struts frameworks.

UNIT V:

JSP Application Development: The Anatomy of a JSP Page, JSP Processing. JSP

Application Design and JSP Environment, JSP Declarations, Directives, Expressions,

Scripting Elements, implicit objects. Java Beans: Introduction to Beans, Deploying java

Beans in a JSP page.

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY

Dreamtech (UNITs 1, 2)

2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES

By Márty Hall and Larry Brown Pearson (UNITs 3, 4,5)

3. Programming world wide web-Sebesta, Pearson Education,2007.

4. Internet and World Wide Web – How to program by Dietel and Nieto PHI/ Pearson

EducationAsia.

5. Jakarta Struts Cookbook, Bill Siggelkow, S P D O' Reilly for chap8.

INTRODUCTION TO MACHINE LEARNING

Unit 1:

Introduction to Machine Learning, Probability Theory, Model Selection, The Curse of Dimensionality, Decision Theory, Information Theory

Unit 2:

Probability Distributions: Binary Variables, Multinomial Variables, The Gaussian distribution, The Exponential Family, Nonparametric Methods

Unit 3:

Linear Models for Regression: Linear Basis Function Models, The Bias-Variance Decomposition, Bayesian Linear Regression, Bayesian Model Comparison, The Evidence Approximation, Limitations of Fixed Basis Functions

Unit 4: Linear Models for Classification L: Discriminant Functions, Probabilistic Generative Models, Probabilistic Discriminative Models, The Laplace Approximation, Bayesian Logistic Regression, Neural Networks and Kernel Methods

REFERENCES

TEXTBOOK:: Christopher M. Bishop. 2006. Pattern Recognition and Machine Learning (Information Science and Statistics). Springer-Verlag New York, Inc., Secaucus, NJ, USA.

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CONCEPTS IN STATISTICAL LEARNING

UNIT-1

THE LEARNING PROBLEM AND REGULARIZATION: The learning problem: risk functions, well-posed and ill-posed problems; Tikhonov Regularization; Iterative Regularization via Early Stopping; Manifold

Regularization; Structured Sparsity Based Regularization; Empirical and Structural Risk Minimization.

UNIT-2

LINEAR MODELS FOR REGRESSION: Subset Selection methods; Shrinkage Methods: Ridge Regression, LASSO, Group LASSO, Least Angle Regression.

UNIT-3

REGULARIZATION NETWORKS AND SVM: RKHSs, Mercer's Theorem, Representer theorem, VC Dimension, Hard & Soft margin SVMs; Multiple Kernel Learning, Risk/regret bounds for SVMs, Kernel regression, Convex losses for classification.

UNIT-4

ON-LINE LEARNING: Online classification/regression, Online learning from experts, Online convex optimization, Online-to-batch conversions.

ADVANCED TOPICS: Sparse Representation Classifier; Basis Pursuit (BP), M-BP, IrM-BP, M-FOCUSS; M-SBL; Bag-of-Words & Dictionary Learning; Proximal Gradient; ADMM; Auto-encoder & Deep Learning, Transfer Learning & Domain Adaptation;

UNIT-5

TARGET APPLICATIONS: Face Recognition and Verification, Video event representation, CBIR in Large Scale Datasets (e.g. ImageNet), Big Data Analytics, etc.

Suggested References:

☐ V. N. Vapnik; Statistical Learning Theory. Wiley, 1998

☐ T. Hastie, R.Tibshirani, J. Friedman, "The Elements of Statistical Learning: Data Mining, Inference and Prediction", Springer Series in Statistics, 2009.

Kevin R Murphy, "Machine Learning - A Probabilistic Perspective", The MIT Press, 2012

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APPLIED CRYPTOGRAPHY

UNIT-1

FOUNDATIONS ,Substitution Ciphers and Transposition Cipher, Block cipher, Stream cipher.

UNIT-2

CRYPTOGRAPHIC PROTOCOLS

Introduction to Protocols, Communications using Symmetric Cryptography, One-Way Functions, Communications using Public-Key Cryptography, Digital Signatures, Digital Signatures with Encryption, Random and Pseudo-Random Sequence Generation, Basic Protocols: Key Exchange, Authentication, Authentication And Key Exchange, Formal Analysis Of Authentication And Key-Exchange Protocols, Multiple-Key Public-Key Cryptography.

UNIT-3

CRYPTOGRAPHIC TECHNIQUES

Key Length & Management: Symmetric Key Length, Public-Key Key Length, Comparing Symmetric And Public-Key Key Length, ,Generating Keys, Nonlinear Keyspaces, Transferring Keys, Verifying Keys, UPDATING KEYS, Storing Keys, Backup Keys.

UNIT-4

CRYPTOGRAPHIC ALGORITHMS

Mathematical Theory, NUMBER THEORY, FACTORING, Prime Number Generation, Discrete Logarithms in a Finite Field,

Data Encryption Standard: Description of DES, Security of DES, Differential And Linear Cryptanalysis, Design Criteria, DES Variants, DES modes of operation, Other Stream Ciphers and One-Way Hash Functions RC4, One-Way Hash Functions, MD5, Secure Hash Algorithm (SHA), Message Authentication Codes

UNIT-5

PUBLIC-KEY ALGORITHMS : Background, RSA, Elliptic Curve Cryptosystems, Digital Signature Algorithm, KeyExchange Algorithms: DIFFIE-HELLMAN IMPLEMENTATIONS

PRETTY GOOD PRIVACY (PGP), SMART CARDS

1 Applied Cryptography protocols, algorithms, and source code in C, Second Edition, Bruce

Schneier, John Wiley & Sons

1996

2 Handbook of Applied Cryptography, by Alfred J. Menezes, Paul C. van Oorschot and Scott

A. Vanstone, CRC Press ISBN: 0-8493-8523-7.

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High Speed Networks

UNIT-1

. LAN Technologies: Fast Ethernet (802.3u), Gigabit Ethernet (802.3z), 10Gigabit ethernet (802.3ae), ATM, PoE (802.3af), EFM (802.3ah), EEE (802.3az), 40Gbps & 100Gbps Ethernet, latest high-speed versions of ethernet, RPR, VLAN, NAS

UNIT-2

WAN Technologies ,Packet over SONET/SDH (PoS), Multiprotocol Label Switching (MPLS), ATM, and Frame Relay, Subnet Bandwidth Management (SBM), QoS Architectures, QoS Support for Multicast

UNIT-3

Transport protocols High speed versions of TCP, indirect TCP, snooping TCP, mobile TCP, fast retransmit/fast recovery, transmission/timeout freezing, selective retransmission, TCP over 3G/4G networks, performance enhancing proxies

UNIT-4

. Network Protocols

Next generation networks, network control and service architectures, high speed network devices, interfaces and controllers, NAT, DHCPv6, IPv6, Mobile IPv6, multicasting, performance evaluation, programmable networks, content delivery networks, Network solutions for fully distributed architectures (Clouds, Grids)

UNIT-5

High speed wireless networks

4G/5G/6G, wireless broadband, mobile wireless broadband, WiFi4/5/6/6e and other latest high speed versions of wireless LAN, security issues in high speed wireless networks

REFERENCE BOOKS

1. Rich Seifert, "Gigabit Ethernet: Technology and Applications for High-Speed LANs" Addison Wesley, 2017

2. G. Carle, M. Zibchart, "Protocols for High Speed Networks" springer 2016

3. D.D. Choudhary, "High speed LAN technology handbook", springer 2010

4. . James F. Kurose and Keith W. Ross, "Computer Networking: A top down approach", Pearson Education, 6th edition. 2017

5. . A.S. Tanenbaum, "Computer Networks", 5th Edition, PHI 2010

6. . G. Keiser, "Local Area Networks", 2nd Edition, TMH 2002

7. D. Bertesekas and R. Gallager, "Data Networks", 2nd Edition, PHI 2010

8. William Stallings, "Data & Computer Communication", PHI, 10th Edition 2013

. INTERNET OF THINGS

Unit –I	**INTRODUCTION TO IOT** : Definitions and functional requirements – Vision and concept – identification – Open research issues – security and privacy – Components of Internet of Things: Control units – Sensors – Communication modules – Power sources. Communication technologies: RFID – Bluetooth – ZigBee – WiFi – RF Links –Wired Communication. Basics of sensors and actuators – Sensor technology – Actuators.
Unit –II	**IOT ECOSYSTEM USING WIRELESS TECHNOLOGIES:** Sensor data communication protocols – Radio frequency identification (RFID) technology – Wireless sensor networks technology – Architecture for IoT using mobile devices - Mobile technologies for supporting IoT ecosystem - Energy harvesting for power conservation in the IoT system - Data analytics – Knowledge acquiring, managing and storing processes.
Unit –III	**IOT REFERENCE ARCHITECTURE FOR ECOSYSTEM:** Infrastructure and Service discovery protocols for the IoT Ecosystem: Introduction - Layered architecture for IoT - Protocol architecture of IoT - Infrastructure Protocols - Device or service discovery for IoT - Protocols for IoT service discovery. Device integration protocols and Middleware. Internet-based connection: 6LoWPAN, TCP / IP suite. Web communication protocols for connected devices – Message communication protocols for connected devices – Web connectivity for connected devices network using gateway, SOAP, REST, HTTP RESTful and web sockets.
Unit –IV	**PROGRAMMING THE MICROCONTROLLER FOR IOT**: Arduino / equivalent Microcontroller platform: Microcontrollers – Development environment – Writing Arduino / equivalent software – Programming microcontroller for IoT. Reading from sensors – Connecting microcontroller with mobile devices: Communicating using Bluetooth and USB. Connecting microcontroller using Ethernet and WiFi. **FROM THE INTERNET OF THINGS TO THE WEB OF THINGS** : Designing RESTful smart things – Web-enabling constrained devices – The future Web of Things – Cloud computing: Basic services and architectures – Open cloud computing services for sensor management: COSM – Nimbits – Sensor Cloud. IoT cloud-based services using the Xively, Nimbits. Send data from microcontroller to cloud application –Case study: Big sensor data systems for smart cities– Other recent projects.
Reference Book	**"The Internet of Things" by Samuel Greengard** **"The Fourth Industrial Revolution" by Klaus Schwab** **"Getting started with Internet of Things" by Cuno Pfister** **"Learning Internet of Things" by Peter Waher**

JAVA BASED WEB STACK TECHNOLOGY

UNIT-1

Client & server side programming. Enterprise architecture styles: Single tier , 2-tier , 3-tier, n-tier; Relative comparison of the different layers of architectures.

MVC Architecture: Explanation, Need, Drawbacks, J2EE WEB SERVICES, Different components & containers.

UNIT-2

Servlet: Introduction, Advantages over CGI, How it works?, Servlet life cycle, Servlet API (Different interfaces & classes of generic servlet & HTTP servlet), Accessing user information by means of Request & Response, Servlet session management techniques and relative comparison.

UNIT-3

JSP: Introduction, Comparison between JSP & servlet., Architecture/Life cycle, Different types of JSP architectures and relative comparison.; JSP tags ,Directives, Scripting elements, Actions; JSP implicit objects, Accessing user information using implicit objects.

UNIT-4

EJB :Introduction, Comparison of EJB & Java Beans , Applications, Drawbacks, Different types of enterprise beans, Services provided by EJB container.

RMI: Introduction and applications, Architecture ,Use of RMI Registry.

JNDI: Introduction and applications, Comparison between LDAP and JNDI

JDO (Java Data Objects): Introduction, Integration of EJB and JDO, JDO & RMI

UNIT-5

JINI :Introduction, Applications

JDBC: Introduction, Database driver ,Different approaches to connect an application to a database server, Establishing a database connection and executing SQL statements, JDBC prepared statements, JDBC data sources.

XML: Java & XML, XML syntax, Document type definition., Parsers, SAX parsers, DOM parsers, SAX vs. Dom, JAXP and JAXB.

Text :

1. "Professional JAVA Server Programming", Allamaraju and Buest ,SPD Publication

2. "Beginning J2EE 1.4" Ivor Horton, SPD Publication.

3. "Advanced Programming for JAVA 2 Platform" Austin and Pawlan, Pearson

Reference Books:

1. Internet & Java Programming by Krishnamoorthy & S. Prabhu(New Age Publication)

Soft Computing

UNIT-1

Neural Networks: History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Applications of Artificial Neural Networks. Competitive learning networks, Kohonen self organizing networks, Hebbian learning; Hopfield Networks, Associative Memories, The boltzman machine; Applications.

UNIT-2

Fuzzy Logic

Fuzzy Logic: Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation. Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations. Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.Fuzzy Logic: Classical Logic. Genetic algorithms(Gas),Evolution strategies(Ess), Evolutionary programming(EP), Genetic Programming(GP), Selecting, crossover, mutation, schema analysis, analysis of selection algorithms; convergence; Markov & other stochastic models.

UNIT-3

Other Soft computing approaches [7L]

Simulated Annealing, Tabu Search, Ant colony based optimisation, etc.

Text:

1. "Neuro-Fuzzy and Soft computing", Jang, Sun, Mizutani, Pearson

2. "Neural networks: a comprehensive foundation", Haykin, Pearson

3. "Genetic Algorithms", Goldberg, Pearson

4. "Fuzzy Sets & Fuzzy Logic", G.J. Klir & B. Yuan, PHI.

Reference:

1. "An Introduction to Neural Networks", Anderson J.A., PHI, 1999.

2. "Introduction to the Theory of Neural Computation", Hertz J. Krogh, R.G. Palmer, Addison-Wesley, California, 1991.

3. "An Introduction to Genetic Algorithm", Melanie Mitchell, PHI, 1998.

4. "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.

5. "Neural Networks: Algorithms, Applications and Programming Techniques", Freeman J.A. & D.M. Skapura, Addison Wesley, Reading, Mass, (1992).

CONCEPTS IN STATISTICAL LEARNING

UNIT-1

THE LEARNING PROBLEM AND REGULARIZATION: The learning problem: risk functions, well-posed and ill-posed problems; Tikhonov Regularization; Iterative Regularization via Early Stopping; Manifold

Regularization; Structured Sparsity Based Regularization; Empirical and Structural Risk Minimization.

UNIT-2

LINEAR MODELS FOR REGRESSION: Subset Selection methods; Shrinkage Methods: Ridge Regression, LASSO, Group LASSO, Least Angle Regression.

UNIT-3

REGULARIZATION NETWORKS AND SVM: RKHSs, Mercer's Theorem, Representer theorem, VC Dimension, Hard & Soft margin SVMs; Multiple Kernel Learning, Risk/regret bounds for SVMs, Kernel regression, Convex losses for classification.

UNIT-4

ON-LINE LEARNING: Online classification/regression, Online learning from experts, Online convex optimization, Online-to-batch conversions.

ADVANCED TOPICS: Sparse Representation Classifier; Basis Pursuit (BP), M-BP, IrM-BP, M-FOCUSS; M-SBL; Bag-of-Words & Dictionary Learning; Proximal Gradient; ADMM; Auto-encoder & Deep Learning, Transfer Learning & Domain Adaptation;

UNIT-5

TARGET APPLICATIONS: Face Recognition and Verification, Video event representation, CBIR in Large Scale Datasets (e.g. ImageNet), Big Data Analytics, etc.

Suggested References:

☐ V. N. Vapnik; Statistical Learning Theory. Wiley, 1998

☐ T. Hastie, R.Tibshirani, J. Friedman, "The Elements of Statistical Learning: Data Mining,

Inference and Prediction", Springer Series in Statistics, 2009.

Kevin R Murphy, "Machine Learning - A Probabilistic Perspective", The MIT Press, 2012

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DEEP LEARNING

UNIT I INTRODUCTION TO DEEP LEARNING Introduction to machine learning - Linear models (SVMs and Perceptron's, logistic regression)- Introduction to Neural Nets: What are a shallow network computes- Training a network: loss functions, back propagation and stochastic gradient descent- Neural networks as universal function approximates

UNIT II INTRODUCTION TO DEEP LEARNING History of Deep Learning- A Probabilistic Theory of Deep Learning- Backpropagation and regularization, batch normalization- VC Dimension and Neural Nets-Deep Vs Shallow Networks Convolutional Networks- Generative Adversarial Networks (GAN), Semi-supervised Learning

UNIT III DIMENTIONALITY REDUCTION Linear (PCA, LDA) and manifolds, metric learning - Auto encoders and dimensionality reduction in networks - Introduction to Convnet - Architectures – AlexNet, VGG, Inception, ResNet - Training a Convnet: weights initialization, batch normalization, hyperparameter optimization.

Reference Books:

1. B. Yegnanarayana, "Artificial Neural Networks" Prentice Hall Publications.

2. Simon Haykin, "Artificial Neural Networks", Second Edition, Pearson Education.

3. Laurene Fausett, "Fundamentals of Neural Networks, Architectures, Algorithms and Applications", Prentice Hall publications.

4. Cosma Rohilla Shalizi, Advanced Data Analysis from an Elementary Point of View, 2015.

5. 2. Deng & Yu, Deep Learning: Methods and Applications, Now Publishers, 2013.

6. 3. Ian Goodfellow, Yoshua Bengio, Aaron Courville, Deep Learning, MIT Press, 2016.

7. 4. Michael Nielsen, Neural Networks and Deep Learning, Determination Press, 2015.

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Digital Marketing

UNIT – I

Digital marketing, Understanding the Marketing Process, Increasing Visibility, Types of visibility, Examples of visibility, Visitor Engagement, Bringing Targeted Traffic, Inbound, Outbound, Understanding Conversion Process, Retention, Types of Retention, Performance Evaluation, Tools Needed.

UNIT – II

Understanding Internet, Difference between Internet & Web, understanding websites and domain names, extensions, Web server & web hosting, different types of web servers, Planning and conceptualizing a website, building website using CMS in Class.

UNIT– III

Understanding Google Analytics, set up Analytics account, add Analytics code in a website, understanding goals and conversions, setup goals, understanding bounce rate, Difference between bounce rate and exit rate, reduce bounce rate, Monitoring traffic sources.

UNIT– IV

Marketing on Social networking websites, viral marketing and its importance, Facebook Marketing, Twitter Marketing, LinkedIn Marketing, Google plus Marketing, Video Marketing, Pinterest Marketing.

UNIT – V

Introduction to SEO and its importance ,Google AdWords overview, Understanding AdWords Algorithm, creating search campaigns, Creating Ads, Tracking performance/conversion, Optimizing Search Campaigns, Creating Display Campaign.

Text Books

1. Michael Solomon and Tracy Tuten, Social Media Marketing, Pearson,2013

2. Scial Media Marketing for Beginners: Create Successful Campains, Gain more

Fans and boost sales from any social network by F.R.Media, 2/e, June 2014

Reference Books

1. Jan Zimmerman and Deborah Ng. Social Media Marketing All in one for

Dummies, 2012

DEPARTMENT OF COMPUTER APPLICATION

2. Douglas A.Norman, The Design of Everyday Things, Apr, 2011

3. Jack Z.Scissors and Roger B.Baron Advertising Media Planning, 2010

4. Bhatia Punit, Fundamentals of Digital Marketing, Pearson, 2017

5. Ian Doodson, The Art of Digital Marketing: The Definitive Guide to Creating Strategic, Targeted, and Measurable Online Campaign, Wiley, 2016