

College of Agricultural Information Technology
Anand Agricultural University
Anand – 388 110

AAU/AIT/BoS Meeting/ 335-45

Date: 08-06-2023

Minutes of the 7th Meeting of the Board of Studies of Faculty of Agricultural Information Technology was held on June 3, 2023, 14:30 hrs. at Conference room, College of Agricultural Information Technology, AAU, Anand.

Following Members remained present:

1.	Dr. D. R. Kathiriya, Dean, Faculty of Agricultural Information Technology, AAU, Anand	Chairman
2.	Dr. D. R. Kathiriya, Head of Department, Department of Agricultural Information Technology, CAIT, AAU, Anand	Member
3.	Dr. R. S. Parmar, Head of Department, Department of Agricultural Science, CAIT, AAU, Anand	Member
4.	Dr. H. B. Patel, Director of Extension Education, AAU, Anand	Member
5.	Dr. M. K. Jhala, Director of Research and Dean PG Studies, AAU, Anand	Member
6.	Dr. Rajiv Vasant Deokar, 464, Vir Abhimanyu Path, Phugewadi, Opp. Mega Mart, Pune-411012 (Maharashtra)	Co-opted Member
7.	Dr. K. P. Patel, Retd. Principal & Dean, B-1, 91, Svayam Symphony, opp: Madhuvan Resort Near Rolcon Engg. Gate, Anand - Sojitra Road, Anand-388345 (Gujarat)	Co-opted Member
8.	Dr. D. D. Parekh, Assistant Registrar (Academic), AAU, Anand	Member Secretary

Following member could not remain present and their leave of absence were granted:

1.	Dr. Atul Patel, Director, Dept. of Computer Science, CHARUSAT, Changa	Co-opted Member
2.	Er. Devesh Patel, Progressive Farmer, Boriavi-387	Co-opted Member
3.	Dr. Hraday K. Desai, Technical consultant, vasudhara Dairy Mota Pondha Ta: Kaprada-396161	Co-opted Member

Dr. D. R. Kathiriya, Dean, Faculty of AIT chaired the meeting and welcomed all the members to the Board of Studies for the Faculty of AIT meeting. Dr. M. K. Jhala, Director of Research and Dean PG Studies gave opening remarks and Dr. D. D. Parekh, Member Secretary briefed agenda items listed below and requested the house for discussion and following resolutions were passed.

ITEM NO. 7.1 Confirmation of the minutes of 6th Meeting of the Board of Studies for the Faculty of Agricultural Information Technology held on 02-07-2022

The Minutes were confirmed.

(Action: Principal and Dean, Agril. I.T.)

ITEM NO. 7.2 Action taken on the minutes of 6th Meeting of the Board of Studies for the Faculty of Agricultural Information Technology held on 02-07-2022

Report on the action was noted.

(Action: Principal and Dean, Agril. I.T.)

Proposal for Syllabus Revision to bridge the gap between academia and industry for enhancement of student engagement and motivation

Dr. D. R. Kathiriya, Dean, Faculty of AIT briefed about the necessity of revision of current syllabus of B. Tech. (AIT) and presented the courses proposed for changes/modifications for the discussion and suggestion. Dr. D. K. Parmar described the proposed changes in details. Following suggestions were given by the members of the Board of Studies of the Faculty of AIT:

7.3.1 For first semester, Committee discussed thoroughly and accepted to change the course curriculum and not to change the credits for MATH 111, hence course of MATH 111 with modified course curriculum remain as 3(2+1).

For second semester, for the subject MATH 121 2(2+0), the Committee has discussed the matter and approved with revision of course curriculum and credits.

7.3.2 Committee discussed the matter and agreed to omit the subject of second semester AIT 123 – Computer Organization and Architecture 2(2+0) to introduce the new course of Electronic Governance.

7.3.3 Dr. D. R. Kathiriya enlightened the importance of the subject and the committee discussed the matter and approved to introduce the subject Electronic Governance AIT 123 2(2+0) during second semester.

7.3.4 Committee discussed the matter to omit the subject of System Analysis and Design AIT 213 3(2+1) with an advise to revise the course content of Software Engineering AIT 221 3(3+0) offered during forth semester to overcome the lacuna of the omitted subject.

7.3.5 The ICT entrepreneurs and the passed out students in their feedback have emphasised the importance of current trends in UI and UX in the industry and suggested to introduce UI/UX Designing in the proposed syllabus. Committee discussed the matter thoroughly and agreed on importance of the subject and approved to introduce the subject UI/UX Designing AIT 213 3(3+0) during third semester.

7.3.6 With respect to point no. 7.3.4, the course content of Software Engineering AIT 221 3(3+0) at forth semester is needed to be revised to overcome the lacuna of the System Analysis and Design subject. Committee approved the matter.

7.3.7 & 7.3.8 Committee discussed the matter and approved to revise the course curriculum of the subjects Fundamentals of Artificial Intelligence AIT 315 3(2+1) at 5th semester and Machine Learning AIT 322 2(1+1) at 6th semester considering the demands of present era.

7.3.9 Committee discussed the matter and approved to change the course curriculum for the subject Protected Cultivation and Green Technology AGRI 323 (elective-IV) 3(2+1) at 6th semester.

7.3.10 Committee discussed the matter and approved to change the course title(s), course contents and course codes for Basic Electronics AIT 124 3(2+1) in second semester, Basic Instrumentation AGRI 211 3(2+1) in third semester and Advanced Automation and Sensor Technology AGRI 322 3(2+1) in sixth semester. The proposed changes are as per the table below:

Semester	Existing		Proposed	
	Subject Code	Subject Title	Subject Code	Subject Title
Second	AIT 124	Basic Electronics	EI 121	Basic Electronics
Third	AGRI 211	Basic Instrumentation	EI 212	Basic Instrumentation
Sixth	AGRI 322	Advanced Automation and Sensor Technology	EI 323	Embedded and IoT system

7.3.11 To chronologically align the project subjects at higher semesters, the committee agreed to shift the subjects with modified credits as below:

Existing				Proposed			
Semester	Course Title	Course Code	Credits	Semester	Course Title	Course Code	Credits
IV	Project – I	PRJT 221	1*(0+1)	IV	Seminar-II	SMNR 221	1*(0+1)
V	Project – II	PRJT 311	3*(0+3)	V	Project – I	PRJT 311	1*(0+1)
VI	Seminar-II	SMNR 321	1*(0+1)	VI	Project-II	PRJT 321	1*(0+1)
VII	Project-III	PRJT 411	3*(0+3)	VII	Project-III	PRJT 411	1*(0+1)

7.3.12 Committee discussed the matter and agreed to shift the subjects with modified subject codes in which Dr M.K. Jhala advised to ensure the feasibility of the courses which are proposed for shifting by managing the total required semester credits. The changes are as under:

Existing			Proposed		
Semester	Subject Code	Subject Title	Semester	Subject Code	Subject Title
Sixth	AIT 321	E-Content Development Using Advanced Multimedia	Fifth	AIT 314	E-Content Development Using Advanced Multimedia
Fifth	AIT 314	E-Content Development Using Multimedia	Forth	AIT 225	E-Content Development Using Multimedia
Forth	AIT 225	Web Data Management	Sixth	AIT 321	Web Data Management

For all the above points, Dr. N. I. Shah suggested to make a tabular format with existing and proposed changes in the course curriculum and then put it in Academic Council.

After considering the inputs from the members, the matter was resolved as under:

“It is resolved to accept the amendments/modifications in the proposed syllabus (as per Annexure I) for implementing the same from the academic year 2022-23 in anticipation of approval from the Faculty of AIT for the benefit of the first year students and subsequent batch students and subject to final approval by the Academic Council.”

(Action: Principal and Dean, Agril. IT)

Item No. 7.4 Adoption of 5th Dean's Committee Recommendations for the Examination Pattern of the UG course at the College of Agricultural Information Technology

Dr. M. K. Jhala expressed his concern about the External Evaluation for the Faculty of AIT, since no such another college is offering such degree programme in SAUs. Dr. D. R. Kahiriya suggested to club both the existing internal theory examinations as a single Internal Theory Examination keeping the same total internal 20 marks and the remaining (other than internal theory examinations) examination pattern of Faculty of AIT will stay unchanged.

After considering the inputs from the members, the matter was resolved as under:

“It is resolved to accept the proposed change in the examination pattern, which will be implemented from the academic year 2022-23 in anticipation of approval from the Faculty of AIT for benefit of the first year students and subsequent batch students and subject to final approval by the Academic Council.”

(Action: Principal and Dean, Agril. IT)


Assistant Registrar (Academic)

AAU, Anand

Semester wise subjects for B. Tech. (AIT)

Semester -I

Course No	Subject Name	TH	PR	CR	HRS
AIT 111	Fundamentals of Computers	2	1	3	4
AIT 112	Programming in C	2	2	4	6
AIT 113	Introduction to Web Scripting	2	1	3	4
AGRI 111	Fundamentals of Agronomy	2	1	3	4
AGRI 112	Introductory Botany	1	1	2	3
AGRI 113	Fundamentals of Horticulture	1	1	2	3
MATH 111	Engineering Mathematics - I	1	1	2	3
ENG 111	Comprehension and Communication Skills in English	1	1	2	3
PE 111	NCC /NSS / PHYSICAL EDUCATION	0	1	1*	
TOTAL CREDITS		12	9	21	30

Semester -II

Course No	Subject Name	TH	PR	CR	HRS
AIT 121	Data Structure Through C	2	2	4	6
AIT 122	Introduction to Multimedia	1	2	3	5
AIT 123	Electronic Governance	2	0	2	2
AGRI 121	Environmental Studies and Disaster Management	2	1	3	4
AGRI 122	Principles of Integrated Pest and Disease Management	2	1	3	4
AGRI 123	Soil and Water Conservation Engineering	1	1	2	3
MATH 121	Engineering Mathematics -II	2	0	2	2
EI 121	Basic Electronics	2	1	3	4
PE 121	NCC /NSS / PHYSICAL EDUCATION	0	1	1*	
TOTAL CREDITS		14	8	22	30

Semester - III

Course No	Subject Name	TH	PR	CR	HRS
AIT 211	OOP Using Java	2	1	3	4
AIT 212	Relational Database Management System	2	1	3	4
AIT 213	UI/UX Designing	3	0	3	3
AIT 214	Website Development Using PHP	2	1	3	4
AGRI 211	Fundamentals of Agricultural Economics	2	0	2	2
AGRI 212	Fundamentals of Soil Science	2	1	3	4
AGRI 213	Fundamentals of Agricultural Extension Education	1	1	2	3
EI 212	Basic Instrumentation	2	1	3	4
PE 211	NCC /NSS / Physical Education	0	1	1*	
SMNR 211	SEMINAR-I	0	1	1*	
TOTAL CREDITS		16	6	22	28

Semester -IV

Course No	Subject Name	TH	PR	CR	HRS
AIT 221	Software Engineering	3	0	3	3
AIT 222	Introduction to .Net Framework and ASP.NET	2	2	4	6
AIT 223	Computer Networks	2	1	3	4
AIT 224	Operating System with Unix/Linux	2	1	3	4
AIT 225	E-Content Development Using Multimedia	1	2	3	5
AGRI 221	Agricultural Meteorology and Climate Change	2	1	3	4
AGRI 222	Entrepreneurship Studies and Business Communication	2	0	2	2
STAT 221	Statistical Methods	2	1	3	4
PE 221	NCC /NSS / Physical Education	0	1	1*	
SMNR 221	SEMINAR-II	0	1	1*	
TOTAL CREDITS		16	8	24	32

* Non Credit Course

Semester –V

Course No	Subject Name	TH	PR	CR	HRS
AIT 311	Advance ASP.NET	2	1	3	4
AIT 312	Python Programming	2	1	3	4
AIT 313	Elective-I	2	1	3	4
AIT 314	E-Content Development Using Advance Multimedia	1	2	3	5
AIT 315	Fundamentals of Artificial Intelligence	2	1	3	4
AGRI 311	Communication Skills and Personality Development	2	0	2	2
AGRI 312	Elective – II	2	1	3	4
AGRI 313	GIS and Remote Sensing Techniques	2	1	3	4
PRJT 311	Project – I	0	1	1*	
TOTAL CREDITS		15	8	23	31

Semester –VI

Course No	Subject Name	TH	PR	CR	HRS
AIT 321	Web Data Management	2	1	3	4
AIT 322	Machine Learning	1	1	2	3
AIT 323	Application Development in Mobile Technology	2	1	3	4
AIT 324	Data Analysis with MATLAB	2	1	3	4
AIT 325	Image Processing	2	1	3	4
AGRI 321	Elective – III	2	1	3	4
AGRI 322	Elective – IV	2	1	3	4
EI 323	Embedded and IoT system	2	1	3	4
PRJT 321	Project – II	0	1	1*	
TOTAL CREDITS		15	8	23	31

* Non Credit Course

Semester-VII

Course No	Subject Name	TH	PR	CR	HRS
EXPL 411	Educational Tour	0	3	3	6
EXPL 412	Experiential Learning - I	0	6	6	12
EXPL 413	Experiential Learning - II	0	6	6	12
EXPL 414	Experiential Learning - III	0	5	5	10
PRJT 411	Project –III	0	1	1*	
SSD 411	Soft Skills Development	0	1	1*	
TOTAL CREDITS		0	20	20	40

* Non Credit Course

Semester—VIII

Course No	Subject Name	TH	PR	CR	HRS
PRJT 421	Project cum Internship	0	20	20	40

ELECTIVE SUBJECTS

Elective-I	Subject Name	TH	PR	CR	HRS
1	Information Retrieval	2	1	3	4
2	Data Warehouse and Data Mining in Agriculture	2	1	3	4
Elective-II	Subject Name				
1	Fundamentals of Crop Physiology	2	1	3	4
2	Nanotechnology and Precision Farming	2	1	3	4
3	Farm Machinery and Power	2	1	3	4
Elective-III	Subject Name				
1	Operations Research	2	1	3	4
2	Crop Simulation Models	2	1	3	4
3	Agricultural Marketing, Trade and Prices	2	1	3	4
Elective-IV	Subject Name				
1	Protected Cultivation and Green Technology	2	1	3	4
2	Bioinformatics Computing	2	1	3	4

Summary of the Courses

EXISTING SYLLABUS				PROPOSED SYLLABUS	
Sector	No. of Courses	Credits	Sector	No. of Courses	Credits
AIT	31	119	AIT	30	116
AGRI	18	47	AGRI	16	41
Allied	4	11	Allied	7	18
Total	53	177	Total	53	175

Detailed Course Content

MATH 111 ENGINEERING MATHEMATICS – I 3 (2+1) <u>Matrices:</u> Elementary transformations, rank of a matrix, reduction to normal form, Gauss-Jordan method to find inverse of a matrix, Eigen values and Eigen vectors, Cayley-Hamilton theorem, linear transformation, orthogonal transformations, diagonalisation of matrices, quadratic forms. PAQ form, Echelon form, Solution of linear equations, nature of rank, using Cayley-Hamilton theorem to find inverse of A. <u>Differential calculus:</u> Taylor's and Maclaurin's expansions; indeterminate form; curvature, function of two or more independent variables, partial differentiation, homogeneous functions and Euler's theorem, composite functions, total derivatives, maxima and minima. <u>Integral calculus:</u> volumes and surfaces of revolution of curves; double and triple integrals, change of order of integration, application of double and triple integrals to find area and volume. <u>Vector calculus:</u> Differentiation of vectors, scalar and vector point functions, vector differential operator Del, Gradient of a scalar point function, Divergence and Curl of a vector point function and their physical interpretations, identities involving Del, second order differential operator; line, surface and volume integrals, Stoke's, divergence and Green's theorems (without proofs).	MATH 111 ENGINEERING MATHEMATICS – I 3 (2+1) Unit I <u>Differential calculus</u> <u>Indeterminate form, Taylor's and Maclaurin's expansions, function of two or more independent variables, partial differentiation, homogeneous functions and Euler's theorem, Modified Euler's theorem total derivatives. Beta and Gamma function with their properties and duplications formula without proof.</u> Unit II <u>Graph Theory</u> Graphs, Definition & basic concepts of finite & infinite graph, Incidence & Degree, Isomorphism, Subgraph, Walk, Path & circuits, Operations on graphs, connected graph, Disconnected graph & components, Complete graph, Regular graph, Bipertite graph, Euler's graph, Hamiltonian paths & circuits, Weighted graphs, Applications, Directed & Undirected graphs, Connectivity of graphs. Definition & properties of trees, Pendent vertices in a tree, Distance between two vertices Centre, Radius & diameter of a tree, Rooted & binary trees, Representation of Algebraic structure by Binary trees, Binary search trees, Spanning trees & fundamental circuits. Unit III <u>Matrices</u> <u>Elementary row and column transformation, rank of matrix, Linear dependence, consistency of linear system of equations, characteristic equation, Caley –Hamilton theorem, Eigen value, Eigen vector.</u> Unit IV <u>Descriptive Statistics</u> Mean, Median, Mode, Standard, deviation, Skewness, Fitting of Linear, Quadratic, Exponential and Logarithmic curves, Least squares method
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Objective:

This course focuses on Study and analysis of electronic governance systems used by various government departments.

Theory:**Unit I**

Introduction to constitutional rights, citizen charter, government human resources hierarchy, Government Planning and Processing, Accounts and Transactional systems

Unit II

Scope of e-governance, Factors affecting e-governance, Citizen centric design, Stakeholders of e-government project, e-government portal types – C2G, B2G, G2G

Unit III

Introduction to the Right to Information Act, Introduction to the IT Act, Transparency, e-democracy, role of print, audio-visual and social media, privacy and security issues. Services to the Citizen through: Utility bill payment, land records, Employment exchange, examination results etc.

Unit IV

Tools and protocols for e-governance -- Biometric, MICR, Barcode, Public Key Cryptography, GIS

Unit V

Study, analysis and evaluation of various e-government projects of India such as:

1. Soil Health Card
2. GSWAN
3. E-dhara
4. Online Admissions
5. OJAS
6. Online Tendering
7. Passport Application
8. Electronic Fund Transfer using NEFT/RTGS
9. Ticket booking through GSRTC and IRCTC
10. E-filing of Taxes
11. Online Judiciary Information System
12. UIDAI/Aadhar Card Project
13. MNREGA
14. PDS (Ration Card)
15. Driving Licence

Reference books:

1. E-governance concepts and case studies, Prabhu C.S.R., PHI India
2. "E-Government: From Vision to Implementation - A Practical Guide With Case Studies" by Subhash Bhatnagar and Milan J. Nakhate

MATH 121**ENGINEERING MATHEMATICS – II****3 (2+1)**

Ordinary differential equations: Exact and Bernoulli's differential equations, equations reducible to exact form by integrating factors, equations of first order and higher degree, Clairaut's equation, Differential equations of higher orders, methods of finding complementary functions and particular integrals, method of variation of parameters, Cauchy's and Legendre's linear equations, simultaneous linear differential equations with constant coefficients, series solution techniques, Bessel's and Legendre's differential equations.

Functions of a Complex variable: Limit, continuity and analytic function, Cauchy-Riemann equations, Harmonic functions.

Fourier series: Infinite series and its convergence, periodic functions, Fourier series, Euler's formulae, Dirichlet's conditions, functions having arbitrary period, even and odd functions, half range series, Harmonic analysis. Fourier Sine and Cosine Series, Fourier series for function having period $2L$, Elimination of one and two arbitrary function.

Partial differential equations: Formation of partial differential equations Higher order linear partial differential equations with constant coefficients, solution of non-linear partial differential equations, Charpit's method, and application of partial differential equations (one dimensional wave and heat flow equations, Laplace Equation.

MATH 121**ENGINEERING MATHEMATICS – II****2 (2+0)****Ordinary Differential Equation**

Reorientation of differential equation, Exact differential equation and Integrating factors, First order and higher degree odes, solvable for p , y and x , Modelling of Real-world problems particularly Engineering, Spread of epidemic, Spread of new technological innovations, RC and RL network, Formation of partial differential equations, Higher order linear partial differential equations, Classification of Second order pde.

Fourier Series

Definition, Fourier series with arbitrary period, in particular periodic function with period 2 . Fourier series of even and odd function, Half range Fourier series.

Laplace Transform

Laplace transform, Existence theorem, Laplace transform of derivatives and integrals, Inverse Laplace transform, Unit step functions, Dirac – delta functions, Laplace transform of periodic functions, Convolutions theorem, Application to solve simple linear and simultaneous differential equations.

Finite Differences and Interpolation

Finite Differences, Forward, Backward and Central operators, Interpolation by polynomials, Newton's forward, Backward interpolation formulae, Gauss & Stirling's central difference formulae, Newton's divided and Lagrange's formulae for unequal intervals, Newton-Cotes formula, Trapezoidal and Simpson's formulae, error formulae, Gaussian quadrature formulae.

AIT 124 Basic Electronics 3(2+1) Unit I <u>Circuit Concepts Electrical Quantities, Lumped Circuit Elements, Kirchhoff's Laws, Meters and Measurements, Analogy between Electrical and other Non-Electrical Physical Systems, A case study</u> Unit II <u>Circuit Analysis Techniques Thevenin and Norton Equivalent Circuits, Node-Voltage and Mesh-Current Analysis, Superposition and Linearity, Computer Aided Circuit Analysis, A Case Study</u> Unit III <u>Analog Building Blocks and Operational Amplifiers Basic ideas The Amplifier Block, Ideal Operational Amplifier, Practical Properties of Operational Amplifiers, Applications of Operational Amplifiers</u> Unit IV <u>Digital Building Blocks Digital System Building Blocks, Digital System Components, Computer Systems Signal Processing Signals and Spectral Analysis, Modulation, Sampling and Multiplexing, Interference and Noise</u> Unit V <u>Communication Systems Waves, Transmission Lines, waveguides and Antenna Fundamentals, Analog Communication Systems, Digital Communication Systems Basic Control Systems Feedback Control Systems, Digital Control Systems</u>	EI 121 Basic Electronics 3(2+1) Unit I <u>DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, ohm's law, Kirchhoff's current and voltage laws, analysis of simple circuits with dc excitation, Mesh loop analysis, Nodal Analysis, Thevenin, Norton and Superposition Theorems.</u> Unit II Diode theory and applications Basic idea about forward bias, reverse bias and VI characteristics, ideal diode, second, surface mount diodes, Zener diode, Testing of diode with multi-meter, half wave rectifier, full wave rectifier, bridge rectifier, Design of un-regulated DC power supply, Clipping circuit, Clamping circuit, Reading datasheet of semiconductor diode. Unit III Bipolar junction transistors, construction and working, BJT Common Emitter, Common Base and Common Collector characteristics, BJT Amplifier, Testing of bipolar junction transistor with multi-meter, Reading datasheet of BJT Unit IV <u>The Amplifier Block, Introduction to Operational Amplifier ,Op-amp Parameters: input offset voltage, and current, input bias current, differential input resistance, input capacitance, offset voltage adjustment range, input voltage range, common mode rejection ratio, supply voltage rejection ratio, slew rate, gain, Ideal Operational Amplifier, Practical Properties of Operational Amplifiers, Inverting and Non-Inverting Amplifier , Summing , scaling, differential ,Integrator ,Differentiator, instrumentation Operational Amplifiers.</u>
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Unit I**Introduction**

Categories of Information Systems (OAS, TPS, MIS, DSS), Role of a System Analyst, Software Process Models (Linear v/s. Prototyping v/s. RAD models), Introduction to Modern Information Systems

Unit II**System Analysis**

Preliminary Investigation, Feasibility Study (Technical, Economical, Operational), Fact-finding Techniques (Interview, Questionnaire, Record Scanning, Observation), Specification Tools (Decision Tree, Decision Table, Data Flow Diagram of various levels, Data Dictionary, Structured English), Project Scheduling, CPM, PERT and Gannt.

Software Development Life Cycle Models: Waterfall Model, Iterative Model , V-Model , Spiral Model, Big Bang Model, Prototyping Model

Unit III**System Design**

Design Objectives, Input Design, Output Design, UI Design, Architecture and Component Level Design, File Organization, Database Design, Input Validation, CASE tools, Backup and Recovery Design.

Unit IV**Post Design**

OOP v/s. POP, Software versioning, Software Testing, Documentation, Training (In-House, Outsourced, CBT), Software Licensing (Proprietary v/s. Free and Open Source Software), Disaster Recovery and Business Continuity Planning, Zero Day Attacks

Unit V**Case Study**

Complete Case Study of a Standalone, Client - Server or Web Based Information System e.g. Shopping Cart, e-Governance., Online Reservation, Accounts and Inventory Maintenance, Rental Library etc. with appropriate documentation and modeling of Questionnaires, Interviews, DFD, E-R, Data Dictionary by using tools such as x-Dia, MS Visio, MS Project.

UNIT-I

AGILE DEVELOPMENT: Agile Practices, Overview of Extreme Programming, Planning, Testing, Refactoring.

UNIT-II

AGILE DESIGN: What Is Agile Design?, SRP: The Single-Responsibility Principle, OCP: The Open-Closed Principle, LSP: The Liskov Substitution Principle, DIP: The Dependency-Inversion Principle, ISP: The Interface-Segregation Principle.

UNIT-III

UX and UX Design, The Wheel: UX Processes, Lifecycle, Methods and Techniques, Scope, rigor, complexity and Project perspective, Agile lifecycle Processes and the Funnel model of Agile UX.

UNIT-IV

The nature of UX design, Bottom up versus Top-down Design, Generative Design :ideation, sketching, critiquing, Prototype candidate design

UNIT-V

UX evaluation methods and techniques, Empirical UX evaluation :UX goals , metrics and Targets Analytic UX evaluation: Data collection methods and Techniques, Connecting Agile UX with Agile Software Engineering

AGRI-211**Basic Instrumentation****3(2+1)**

Unit I Study of Transducers: Description of transduction principles, classification, Guidelines for selection, Requirements, Types and Application of Transducers. Electrical Transducers Selection and Considerations, examples of Advanced Precision Agriculture Components, Objectives, Mass Flow Sensor, Site specific spraying, Fertilizer spreader, Sensors and actuators, Controllers, Networks in Agriculture.

Unit II Measurement of Electrical and Non Electrical Quantities: Classification, selection criteria, characteristics; Sensors & Actuators Construction, Working Principles, Application of Transducers. Force and Torque; Flow; Temperature; Liquid Level measurement and control.

Unit III Introduction to Microprocessor & Microcontroller: Introduction of Microprocessor; Microcontrollers and Embedded processors, Overview of AVR family, AVR Microcontroller architecture, Register, AVR status register, ROM space and other hardware modules, ATmega32 pin configuration & function of each pin.

Unit IV AVR Assembly Language Programming: Addressing modes of AVR, Data transfer, Arithmetic, Logic and Compare, Rotate and Shift, Branch and Call instructions. AVR data types And assembler directives, AVR assembly language programs, AVR I/O Port Programming, Time delay loop, BCD, ASCII conversion Program, Look up table, Bit addressability, MACROs.

Unit V Advanced Technologies and Automation in Agriculture: Introduction, Examples of Advanced Precision Agriculture Components, Objectives, Mass Flow Sensor, Site specific spraying, Fertilizer spreader, Sensors and actuators, Controllers, Networks in Agriculture. Real time irrigation control system.

EI-221 Basic Instrumentation 3(2+1)**Unit I**

Introduction to Instrumentation and Measurements, Types of Measurements, Instrument Characteristics, Sensors and Transducers, Guide Lines for Selection of Sensor and Transducers.

Unit II

Measurement of Resistance using Wheatstone bridge, Kelvin's single and Double Bridge, Measurement of Inductance using Maxwell's Inductance bridge, Maxwell's Inductance capacitance bridge and Anderson's bridge, Measurement of Capacitance using Schering Bridge and Wien's bridge.

Unit III

Resistive Displacement, Capacitive Displacement and Inductive Displacement sensor, Piezo electric sensor, Light Dependent Resistor, Photo Diode, Photo Transistor and Photo Resistor. Moisture and Humidity sensor.

Unit IV

Temperature Sensor: RTD, Thermistor, Thermo-Couple Temperature IC, optical and radiation Pyrometer Principal, Construction, practical Working and Limitations. Application to Agriculture.

Unit V

Flow Sensor: Bernoulli's theorem, Venturi flow meter, Flow nozzle, orifice flow meter, propeller flow meter, Electromagnetic Flow meter, and Ultrasonic Flow meter. GPS Sensor: Principal, Construction and Working, Application to Agriculture.

AIT 221 SOFTWARE ENGINEERING 3(3+0) UNIT I Introduction Introduction to Software Engineering, Software Components, Software Characteristics, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. <u>Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.</u> UNIT II Software Requirement Specifications (SRS) and Software Project Management Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modelling, SRS Document, IEEE Standards for SRS. Cost Estimation, Project Scheduling, Quality Assurance Plan, Project Monitoring Plans, Gantt Charts (Timeline chart for the entire project) , PERT (Program evaluation and review technique) , CPM (Critical path method) UNIT III Software Design Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, Software Measurement and Metrics: Various Size Oriented Measures: Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs. UNIT IV	AIT 221 SOFTWARE ENGINEERING 3(3+0) UNIT I Introduction Introduction to Software Engineering, Software Components, Software Characteristics, Software Engineering Processes, Software Quality Attributes, <u>Various Software Development Life Cycle (SDLC) Models.</u> UNIT II Software Requirement Specifications (SRS) and Software Project Management System Analysis, <u>Feasibility Study (Technical, Economical, Operational), Fact-finding Techniques (Interview, Questionnaire, Record Scanning, Observation), Specification Tools (Decision Tree, Decision Table, Data Flow Diagram of various levels, Data Dictionary, Structured English) SRS Document, IEEE Standards for SRS, Project Cost Estimation, Project Scheduling, Gantt Chart, PERT(Program Evaluation and Review Technique), CPM(Critical Path Method)</u> UNIT III Software Design <u>Design Objectives, Input Design, Output Design, UI Design, Architecture and Component Level Design, File Organization, Database Design, Input Validation, Backup and Recovery Design. Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures. Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.</u> UNIT IV Software Reliability and Software Testing Software Reliability: Concept of Software Reliability, Reliability Models, Limitations of
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Structured Programming Coding and Software Testing

~~Programming practices, Verification, Monitoring and Control, Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.~~ Testing Objectives, UNIT Testing, Integration Testing: Testing Fundamentals, Functional Testing, Structural Testing, Test Plan activities, UNIT testing, Integration Testing.

UNIT V

Software Reliability and Maintenance

Reliability: Concept of Software Reliability, Reliability Models, Limitations of Reliability Models Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering. Software Configuration Management Activities, Change Control Process, Software Version Control, An Overview of CASE Tools.

Reliability Models. Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Reengineering, Reverse Engineering. Software Configuration Management Activities, Change Control Process, Software Version Control, Software Licensing (Proprietary v/s. Free and Open Source Software), An Overview of CASE Tools.

Software Testing: Testing Fundamentals, Manual and Automated Testing, Blackbox and Whitebox Testing, Functional Testing, Structural Testing, Test Plan activities, unit testing, integration Testing. Software Configuration Management Activities, Change Control Process, Software Version Control, An Overview of CASE Tools.

UNIT V

CASE STUDY

Examples

- Hotel Automation System
- Book Shop Automation Software
- Word processing Software
- Software Component Cataloguing Software.
- Payroll System
- Banking System
- Purchase Order System
- Library Management System
- Railway Reservation System
- Bill Tracking System
- College Admission System

Objective(s)

After completing the course the student shall be able to create e-content for different fields and devices using action script programming, creating Animation, create platform for interactive media, creating different video footages with transitions and effect, Export video in a variety of formats, Importing audio and applying Sound effect to short film, provide the best audio impact for the video's story.

UNIT I

Introduction to action script 3.0, Using Code Snippets and Navigating the flash Timeline - Adding action script using code snippets, Working with frame labels, Looping playback with action script, conditional statement to control timeline , Working with properties, methods, events and functions, Crating animation with action script - controlling movie clip properties with tween, Using action script and components to load content, Using array and loop in action script 3.0.

UNIT II

Crating and formatting text with action script - Creating Text Fields, Setting Text Field Attributes, Selecting Text, Formatting Text, Formatting with HTML and CSS , creating a scroll bar using action script, Controlling sound with action script - ActionScript Sound Architecture, Internal and External Sounds, Playing, Stopping, and Pausing Sounds, Changing Sound Volume and Pan, control video using action script - Encoding, Components, Full-Screen Video, Captions. adding FLVplayback controls.

UNIT III

Introduction to Adobe Premiere Pro, Basic workflow, Keyboard shortcuts, Touring the workspace, Working with Panels, Using the Source Monitor and Program Monitor, Set preferences, **Project setup, Importing footage** - Supported file formats, Importing sequences, clip lists and compositions, Editing sequences and clips - Add clips to sequences, Working with markers, Trimming clips, Rendering and previewing sequences, Synchronizing audio and video with Merge Clips, Working with captions, **Graphics, titles, and Motion Graphics templates** - Create titles and motion graphics, Essential Graphics Panel , Motion Graphics Templates

UNIT IV

Effects and transitions - Applying, removing, finding, and organizing effects, Viewing and adjusting effects and keyframes, Effect presets, Masking and tracking, Stabilize motion with the Warp Stabilizer effect, Change duration and speed of clips, Motion: position, scale, and rotate clips, Adjustment Layers, Audio and Video effects and transitions, **Animation and keyframes** - Adding, navigating and setting keyframes, **Editing audio** - Editing, repairing, and improving audio using Essential Sound panel, Organize assets in the Project panel, **Compositing in Premiere Pro** - Blending modes, Compositing, alpha channels, and adjusting clip opacity, **Exporting media from Premiere Pro** - Workflow and overview for exporting, Exporting projects for other applications

UNIT V

Audition Introduction : Audio interfacing and Audition environment, Wave form View : Basic Editing, Signal processing, Mastering, Sound design, Creating and recording files , Multi

track View : Basic multi track orientation, Track parameters, Clips, Creating music with sound libraries, Creating music by overdubbing and multi track recording, Mixing strategies, Working with Video.

Reference Book(s)

1. Adobe Animate CC Classroom in a Book, Author: Russell Chun by Adobe Press
2. Adobe Premiere Pro CC Classroom in a Book, Author: Maxim Jago by Adobe Press
3. Adobe Audition CC Classroom in a Book, Author : Adobe Creative Team by Adobe Press.
4. Adobe Animate CC Help, Reference PDF by adobe Creative Team
5. Adobe Premiere Pro CC Help, Reference PDF by adobe Creative Team
6. Adobe Audition CC Help, Reference PDF by adobe Creative Team

SMNR 221	SEMINAR-II	0	1	1*	
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Objective(s)

After completing the course the student shall be able to create advance e-content creation for different field and devices as per industries/organization needs using Vector Graphics, Logo, Icon in 2D and 3D, controlling a puppet, typographic portrait and cartoon character, video compositing, motion graphics design, 3D animation, green screen composition, Create high-quality visual effects(VFX), Creating Interior Visualizations, Modeling Lighting and Rendering, Create virtual studio and virtual product workflow, Learn the creative aspects and finer nuances of animation and video production, starting from pre-production to post production, including storyboarding and character animation.

UNIT I

Adobe Illustrator CC/ Inkscape - Workspace basics, Properties panel, Tools, Drawing basics, Draw simple lines and shapes, Perspective drawing, Symbols, Create 3D objects, Edit artwork using Image Trace, Select colors, About painting, Select and arrange objects, Reshape objects, Import, export, and save.

Character Animator Workspace – Start, Rig, Record, stream, Character Animator workflow - Create Character Animator project, Create your first character, Control the puppet using webcam, microphone, and mouse, Adjust the behaviour of your puppet, Record and refine your performance, Export the recorded scene, Use your scene in other applications

UNIT II

After Effects Planning and setup, General user interface items, Working other applications, Workspaces, panels, and viewers, Projects and compositions basic, Precomposing, nesting, and pre-rendering, Importing footage - Working with footage items, Layers and properties - 3D layers, Cameras, lights, and points of interest, Animation and keyframes - Compositing tools for VR/360 videos, Apply immersive video effects, Create Motion Graphics templates in After Effects, Speed, Time-stretching and time-remapping, Tracking 3D camera movement, Animating with Puppet tools, Tracking and stabilizing motion.

UNIT III

Drawing, painting, and paths, Creating shapes and masks, Managing and animating shape paths and masks, Mask Tracking, Creating and editing text layers, Animating text, Compositing and transparency, Alpha channels, masks, and mattes, Keying, Roto Brush, Refine Edge, Expression basics, Working with expressions, expression reference, Expression example, Basics of rendering and exporting still images and still-image sequences, Export an After Effects project as an Adobe Premiere Pro project.

UNIT IV

Intro to 3D Software, The Workspace - User-Interface Elements, Viewports, ViewCube, Mouse Buttons, Quad Menus, Display of Objects in a viewport, Viewport Navigation, Transforming Objects using Gizmos, Graphite Modeling Tools set, Command Panel, Time Slider and Track Bar, Setting Up a Project Workflow, Architectural Model – creating walls, doors, window, floor, ceiling, furniture, Character poly modelling

UNIT V

Introduction to Materials: Interiors and Furniture, The Slate Material Editor, Material Types, Creating a Multi/Sub-Object Material, Textures and UV Workflow- UV Unwrapping,

Applying the Color and bump Map, Character Studio: Rigging, Creating and Modifying the Biped with modifier, Character Studio: Animation - Adding a Run-and-Jump Sequence, Adding Freeform Animation, Introduction to Lighting - Standard Lights, Target Spotlight, Target Direct Light, Free Spot or Free Direct Light, Omni Light, Rendering - Rendering Setup, Render Processing, Creating a Camera, Using Cameras, Animating a Camera.

Reference Book(s)

1. Adobe Illustrator CC Classroom in a Book (2018 release) , Author : Brain Wood by Adobe press
2. Adobe After Effects CC Classroom in a Book (2018 release), Author : Lisa Fridsma by Adobe press
3. Adobe After Effect CC Help, Reference PDF by adobe Creative Team
4. Adobe Illustrator CC Help, Reference PDF by adobe Creative Team
5. Autodesk 3ds Max 2015 Essentials: Autodesk Official Press
6. Autodesk 3ds Max 2014 Essentials: Autodesk Official Press by Randi L. Derakhshani.

Practical(s)

Adobe illustrator/Inkscape and Character Animator

1. Create a logo for an organization/Company
2. Create a typographic portrait and cartoon character or animate character
3. Create an icon for something – experiment with different styles (3d, web2.0, simple, etc)
4. Create your first character, control puppet with your webcam, mic and mouse, adjust the behavior of your puppet, record and refine your performance, export your recorded scene and use your scene in other application.

After Effects

1. Create a Photo slideshow animation in After Effects.
2. Create Kinetic Typography motion graphics.
3. Create Motion Graphics templates and Cinematic Title Animation.
4. Create 3d scene from still picture using Camera Mapping and 3D Environment.
5. Create a Lower Third in After Effects & use it in Premiere Pro with Live Text Templates.
6. Create green screen composition for video footage.
7. Create a video clip using Motion Tracking and Rotoscoping.

3Ds MAX / BLENDER

1. Create Architectural Model - Creating Interior Visualizations, Modeling Lighting and Rendering
2. Animating Text - Using Modifiers, particles
3. Design 3D company logo
4. Create Character Poly Modeling
5. Create virtual studio and virtual product
6. Create Product Presentation Workflow
7. Create environments to build the scenes for your movie or visualization

AIT 315 FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE 3(2+1) UNIT I <u>Introduction to Artificial Intelligence (AI);</u> <u>Scope of AI: natural language processing,</u> <u>robotics, expert system, Games, theorem</u> <u>proving</u> UNIT II Knowledge: Acquisition of knowledge, Knowledge based system, Representation of knowledge, Knowledge organization and manipulation. UNIT III Symbolic approach: Syntax and Semantics for Propositional Logic (PL) and First order predicates logic (FOPL), Conversion to clausal form, Inference rules, Non deductive inference methods UNIT IV <u>Search and Control strategies: Blind search,</u> <u>Breadth first search, Depth first search, Hill</u> <u>climbing method, Best First search, Branch</u> <u>and Bound search.</u> UNIT V Expert System: Introduction to expert system, Characteristics and features of expert system, Applications of Expert System, Importance of Expert system, Rule based system architecture; Software Agents.	AIT 315 FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE 3(2+1) UNIT I <u>Introduction to Artificial Intelligence (AI);</u> <u>Scope of AI: natural language processing,</u> <u>robotics, expert system, Games, theorem</u> <u>proving, AI evolution, Knowledge Based and</u> <u>Rule based systems, Ethics and issues with</u> <u>AI</u> UNIT II <u>Search and Control strategies: Blind search,</u> <u>Breadth first search, Depth first search, Hill</u> <u>climbing method, Best First search, Branch</u> <u>and Bound search.</u> UNIT III Neural Networks, Classification, Regression, Activation Functions, CNN, RNN, Transfer Learning, Deep Learning, Generative Adversarial Networks UNIT IV Natural Language Processing, Corpus, Tokenization, Stemming, Sentiment Analysis
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PRJT 311	Project – I	0	1	1*	
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Objective(s)

After learning the course, the student will be able to understand the overall vision of the Semantic Web, to analyze the current technology stack (URIs, XML, RDF/S, OWL), to understand how one could use these technologies for building something useful, to define and test an ontology, to define schema mappings and to install and use tools for semantic data management

UNIT I**Data Model**

Introduction to Modeling Web Data, Semi structured data, XML, Web Data Management with XML, XML Standards, XML and syntax, XML Data Model, XLink, and XPointer

UNIT II**XPath and XQuery**

Introduction, Basics of XPath and XQuery, XPath: Steps and path expressions, Evaluation of path expressions, Generalities on axes and node tests, Axes, Node tests and abbreviations, Predicates, XPath 2.0; FLWOR expressions in XQuery: Defining variables -the for and let clauses, Filtering - the where clause, The return clause, Advanced features of XQuery; XPath foundations.

UNIT III**Typing**

Motivating Typing, Automata, Schema Languages for XML, Typing Graph Data: Graph Semistructured Data, Graph Bisimulation, Data guides.

XML Query Evaluation

XML fragmentation, XML identifiers: Region-based identifiers, Dewey-based identifiers, Structural identifiers and updates; XML evaluation techniques: Structural join, Optimizing structural join queries, Holistic twig joins.

UNIT IV**Ontologies, RDF, and OWL**

Introduction, Ontologies by example, Web resources, URI, namespaces, RDF, RDFS: RDF Schema, OWL, Ontologies and (Description) Logics.

Querying Data through Ontologies

Introduction, Querying RDF data: notation and semantics, Querying through RDFS ontologies, Answering queries through DL-LITE ontologies.

UNIT V**Data Integration**

Introduction, Containment of conjunctive queries, Global as view mediation, Local as view mediation, Ontology-based mediators, Peer-to-Peer Data Management Systems.

Building Web scale applications

Web search, web crawlers, web information retrieval, Web graph mining and hot topics in web search, Distributed systems, failure management, Required properties of a distributed system, P2P networks, Hash-based structures, distributed indexing, Distributed computing with Map Reduce

Reference Book(s)

1. Serge Abiteboul, Ioana Manolescu, Philippe Rigaux, Marie-Christine Rousset and Pierre Senellart, “Web Data Management”, Cambridge University Press, 2011
2. Bhavani Thuraisingham, “Web Data Management and Electronic Commerce”, CRC Press, 2000
3. Bhavani Thuraisingham, “XML Databases and the Semantic Web”, CRC Press, 2002
4. Athena Vakali and George Pallis, “Web Data Management Practices: Emerging Techniques and Technologies”, IGI Publishing, 2007, ISBN-10: 1599042282; ISBN-13: 978-1599042282

Practical(s)

1. Create an XML file defining an article in newspaper.
2. Create an XML file containing list of students. Also create stylesheet file to display list in an HTML format.
3. Create an XML file containing list of students. Using XPath display following information
 - a. Information of a student with ID No : 101
 - b. All the student in the sorted order according to their CGPA
4. Create an XForm to collect information from staff member regarding their publications. Details like Year of Publication, National/International, Title, Conference/Journal etc.
5. From the above gathered information, using XQuery find out the number of publication in a specific year.
6. Demonstrate the use of AJAX.
7. Study of XMLSPY tool.
8. Create an RSS for the events occurring in your institute.
9. Write a program to read the articles in RSS created in above practical.
10. Study of RDF (Resource Description Framework)

AIT 322
MACHINE LEARNING
2 (1+1)

Unit I

Introduction: Learning Problems, designing a learning system, Issues with machine learning.

Unit II

Supervised and Unsupervised learning: Decision Tree Representation, Appropriate problems for Decision tree learning, Algorithm, Hypothesis space search in Decision tree learning, Issues in Decision tree learning, K- Nearest Neighbour Learning.

Unit III

Artificial Neural networks and genetic algorithms: Neural Network Representation, Appropriate problems for Neural Network Learning, Perceptrons, Multilayer Networks and Back Propagation Algorithms, Remarks on Back Propagation Algorithms

Unit IV

Bayesian Learning: Bayes Theorem, Bayes Theorem and Concept Learning, Maximum Likelihood and Least squared Error Hypothesis, Maximum likelihood hypothesis for Predicting probabilities, Minimum Description Length Principle, Bayes Optimal Classifier, Gibbs Algorithm, Naïve Bayes Classifier

AIT 322
MACHINE LEARNING
2 (1+1)

Unit I

Introduction: Learning Problems, designing a learning system, Issues with machine learning, Supervised vs Unsupervised Learning, Regression vs Classification, Bias vs Variance, Train-Test split, Python Libraries (NumPy, SciPy, Matplotlib, Pandas, Scikit-Learn, StatsModels), Hyper-parameter tuning, model selection, cross-validation

Unit II

Regression: Linear algebra review (Matrix Multiplication), Gradient Descent, Least squared Error, Loss/cost Function, Simple and Multiple Regression, Handling quality parameters using dummy variables, Imputation of missing values

Unit III

Classification: Bayes Theorem, Maximum Likelihood, Naïve Bayes Classifier, Logistic Regression, LDA, k-NN, SVM, Decision Tree, Random Forests, Feature selection, Confusion Matrix

Unit IV

Unsupervised Learning: Linear algebra review (Eigen Value, Eigen Vectors), Dimensionality Reduction, PCA, hierarchical clustering, k-means clustering

Unit V

Neural networks : Neural Network Representation, Appropriate problems for Neural Network Learning, Perceptrons, Multilayer Networks and Back Propagation Algorithms, Remarks on Back Propagation Algorithms

AGRI 323 (ELECTIVE-IV) PROTECTED CULTIVATION AND GREEN TECHNOLOGY 3 (2+1) <u>UNIT I</u> <u>Green house technology: Introduction, Types of Green Houses; Plant response to Green house environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes.</u> <u>UNIT II</u> <u>Green house equipments, materials of construction for traditional and low cost green houses. Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air green house heating systems, green house drying. Cost estimation and economic analysis.</u> <u>UNIT III</u> <u>Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation. Drying and dehydration; moisture measurement, EMC, drying theory, various drying method, commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer). Material handling equipment; conveyer and elevators, their principle, working and selection.</u> <u>UNIT IV</u> <u>Classification of energy sources, contribution of these of sources in agricultural sector, Familiarization with biomass utilization for biofuel production and their application, Familiarization with types of biogas plants and gasifiers, biogas, bioalcohol, biodiesel and biooil production and their utilization as bioenergy resource, introduction of solar energy, collection and their application, Familiarization with solar energy gadgets: solar cooker, solar water heater, application of solar energy: solar drying, solar pond, solar distillation, solar photovoltaic system and their application, introduction of wind energy and their application.</u>	AGRI 323 (ELECTIVE-IV) PROTECTED CULTIVATION AND GREEN TECHNOLOGY 3 (2+1) <u>UNIT I</u> <u>Green house technology: Introduction, Types of Green Houses; Plant response to Green house environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes.</u> <u>UNIT II</u> <u>Green house equipments, materials of construction for traditional and low cost green houses. Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air green house heating systems, green house drying.</u> <u>UNIT III</u> <u>Cost estimation and economic analysis. Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation.</u> <u>UNIT IV</u> <u>Drying and dehydration; moisture measurement, EMC, drying theory, various drying method, commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer). Material handling equipment; conveyer and elevators, their principle, working and selection.</u>
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AGRI 322

ADVANCED AUTOMATION AND SENSOR TECHNOLOGY

3 (2+1)

Unit I Introduction to Embedded Systems: Embedded Systems, Processor Embedded into a System, Embedded Hardware Units and Devices In a System, Embedded Software in a system, Examples of Embedded Systems, Embedded System-on-chip (SOC). Classification of Embedded Systems, Skills Required for an Embedded System Designer.

Unit II Arduino Programming: Arduino introduction, I/O programming, Sensor Interfacing & data acquisition.

Unit III Overview of Industrial automation using robots: Basic construction and configuration of robot, Pick and place robot, Welding robot.

Unit IV Bridge Measurements: Wheatstone Bridge, Kelvin Bridge, AC Bridge and their Applications, Maxwell Bridge, Hay's Bridge, Unbalance Conditions, Wein Bridge, Anderson's Bridge, De Sauty's Bridge, Schering Bridge.

Unit V Instrument for Generation and Analysis of Waveforms (Digital Storage Oscilloscope): Introduction, The Sine Wave Generator, Frequency Synthesized Signal Generator, Frequency Divider Generator, Signal Generator Modulation, Sweep Frequency Generator, Pulse and Square Wave Generator, Function Generator, Wave Analyzers, Harmonic Distortion Analyzer, Spectrum Analyzer.

EI-322**Embedded and IoT system****3 (2+1)**

Unit I Introductions to Embedded system, Application and purpose of Embedded system, Quality Attributes of Embedded system, Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs.

Unit II Architecture of 8051 Microcontroller, microcontroller hardware, Pin diagram of 8051, input/output pins, ports and circuits. Internal RAM and ROM, SFR's, interfacing with external memory, timers and counters, interrupts. Serial data communication (UART).

Unit III Instruction Set of 8051 & Addressing modes: Classification of instruction set - Data transfer group, arithmetic group, logical group, single bit, branching group, CALL and RET instructions and their usage. Addressing modes - Immediate, register, direct, register indirect and indexed addressing modes. Accessing the data from internal and external memory. Programming and Interfacing of simple switch and LED to I/O ports to switch on/off LED with respect to switch status.

Unit IV Introduction to Architecture of Arduino, ESP 8266 and Raspberry PI, Instruction set of Arduino, ESP 8266 and Raspberry PI, Programming and Interfacing of various sensors with Arduino, ESP 8266 and Raspberry PI. Case Study for Embedded and IoT Design: Home Automation. Agriculture Environment – Industry – Health and Life style.

PRJT 321	Project – II	0	1	1*
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PRJT 411	Project –III	0	1	1*	
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