KARPAGAM
ACADEMY OF HIGHER EDUCATION
Enable | Enlighten | Enrich
(Deemed to be University)
(Established Under Section 3 of UGC Act, 1956)

Karpagam Academy of Higher Education Virtual Exchange Program - 2022 - 2023 Courses and Projects for Inbound Students

KARPAGAM ACADEMY OF HIGHER EDUCATION

(Deemed to be University)
(Established Under Section 3 of UGC Act, 1956)
(Accredited by NAAC with A+ grade in the second cycle)
Coimbatore, Tamil Nadu, India.
www.kahedu.edu.in | info@kahedu.edu.in

About KAHE:

The Karpagam Academy of Higher Education (KAHE) is a deemed to be a University established under Section 3 of the UGC Act 1956 in 2008 as approved by the Ministry of Human Resource and Development, Government of India, AICTE Council of Architecture, and Pharmacy Council of India (PCI). KAHE functions with a student strength of about 8000 and offers more than 70 graduate, post-graduate, and Ph.D. programmes in four faculties: Faculty of Arts, Science, Commerce and Management (FASCM), Faculty of Engineering(FoE), Faculty of Architecture, Design, and Planning (FADP), and Faculty of Pharmacy (FoP).

The state of the art research facilities is established as various centres Drug Testing Centre, Tribology Centre, Advanced Battery Research, Cancer Research, Centre for Alternative Fuels, Engines and Emissions, Material Science, and Geotechnical Facility.

The academic activities of KAHE have been witnessed by the National Assessment and Accreditation Council (NAAC) with an A+ Grade, National Institutional Ranking Framework (NIRF) in its premium band, Institution's Innovation Council with the highest star rating, and Atal Ranking of Institutions on Innovation Achievements (ARIIA) as one among top 50 institutions in India.

About the office of international relations

The office of International Relations (OIR) facilitates the Karpagam Academy of Higher Education to collaborate with other international Institutions and Organizations across the globe for various academic activities. OIR has placed a high focus on international relationships. Resulting, MoUs with countries such as the USA, Canada, Argentina, Russia, Northern Cyprus, Australia, Romania, South Korea, Malaysia, Taiwan, Philippines, Vietnam, Ethiopia, for students exchange, faculty exchange, Joint research, and resource sharing and these partnerships have been put into action.

KAHE focuses on these collaborations from various Faculties such as Arts, Science Commerce and Management, Engineering, Pharmacy, and Architecture for Academic and allied activities such as courses, project work, Internships, and research purposes.

Exchange Programme

KAHE believes that there are no boundaries in the pursuit of knowledge. Therefore, to supplement it, KAHE designed the curriculum for its partner university students to opt for credit/ non-credit courses. The courses are handpicked by viewing the faculty's expertise, and trending technologies and to fulfill the requirements of the global standards. Similarly, the titles of the projects are listed by the faculty members who are part of our academic, research, and Center of excellence wings for the inbound students.

Course Completion

Candidates who are enrolling for these courses shall maintain a minimum of 75% attendance, participate in the continuous / internal assessments and attend final examinations for the successful completion of the course. Successful candidates will be issued with the soft copy of **Course completion certificate** and **Transcript**.

Course Regulations

Credits   : 2 per course
Instruction hours   : 30 Hours
Medium of instruction : English
Continuous Internal Assessment (CIA)

Pattern of Internal Question Paper- CIA I &II

Maximum Marks	40
Duration	45 Minutes
Part- A	It will be an online Examination. 20 Two Mark Questions, uniformly covering the completed syllabus. All the 20 Questions are to be answered. (**20 x 2 =40 Marks**).

Final Assessment (FA)

PATTERN OF FINAL EXAM QUESTION PAPER (FA)

Maximum Marks	60
Duration	60 Minutes
Part - A	It will be an online Examination. 20 Objective type Questions, covering all the 5 units. **30*2=60 Marks (Online Examination)**

PASSING REQUIREMENTS

Passing minimum: The passing minimum for CIA is 20 (i.e. out of 40 marks). The passing minimum for ESE is 30 (i.e. out of 60 marks). The overall passing minimum for theory course is 50 (Sum of his/her score in CIA and FA) out of 100 marks.

AWARD OF LETTER GRADES

Letter grade	Marks Range	Grade Point	Description
O	91 - 100	10	OUTSTANDING
A+	81- 90	9	EXCELLENT
A	71-80	8	VERY GOOD
B+	66- 70	7	GOOD
B	61 – 65	6	ABOVE AVERAGE
C	55 - 60	5	AVERAGE
D	50 - 54	4	PASS
RA	<50	-	REAPPEARANCE
AB		0	ABSENT

Karpagam Academy of Higher Education
Virtual Exchange Program- ODD/ FALL 2022

S.NO.	Course Code	Name of the Course	Course offered by	Department	Page Number
1.	22IREN001	English for Effective Communication	Dr. Selvalakshmi.S	English/ FASCM	6
2.	22IREN002	Plant Tissue Culture	Dr. Barathkumar, S.	Biotechnology/ FASCM	8
3.	22IREN003	Professional English	Dr. D. Solomon Paul Raj	English/ FASCM	11
4.	22IREN004	Visual Basic.NET	Ms.S.S.SenthilPriya	Computer Science	13
5.	22IREN005	CRISPR – Cas9 Technology	Dr. T. SoundaraRajan	Biotechnology/ FASCM	15
6.	22IREN006	Node.Js	Dr.G.Anitha	Computer Applications	17
7.	22IREN007	Mastering Second Language through Reading, Writing, and Grammar	Mr. Udhayakumar M	English/	19
8.	22IREN008	Organic Terrace Gardening	Dr. Kongkona Saikia	Biochemistry	21
9.	22IREN009	Health and Fitness	Dr. Brindha. E	Biochemistry	23
10.	22IREN010	Vermicomposting and Biofertilizer	Mr.A.John Britto Paulin	Microbiology	26
11.	22IREN011	Graphics Tools - Photoshop	Mrs.A.Faritha banu	Computer Science	28
12.	22IREN012	Software Testing Tools	Dr. V.Sangeetha	Computer Science	30
13.	22IREN013	Intellectual Property Rights	Dr. J. Sudarvel	Commerce	32
14.	22IREN014	E -Commerce	Dr. B.Geetha Bai.	Commerce	34
15.	22IREN015	Electronic Communication Devices	Dr. S.Saira Banu	Physics	36
16.	22IREN016	Engineering Mathematics - I	Dr. M. Deivanayaki	Science and Humanities	38
17.	22IREN017	Engineering Mathematics - II	Dr. R. Janagaraj	Science and Humanities	40
18.	22IREN018	Engineering Materials and Metallurgy	Dr.S.Manivannan	Mechanical Engineering	42
19.	22IREN019	CMOS Design	Mr.G.R.Mahendra Babu	Electronics and Communication Engineering	45
20.	22IREN020	Wireless Ad Hoc and Sensor Networks	Dr. R. Dhanapal	Computer Science and Engineering	47
21.	22IREN021	Repairs & Rehabilitation of RC Structures	Ms. R. Sindhu	Civil Engineering	50

22.	22IREN022	Computer Networks	Mr.T. Mohanraj	Computer Science and Engineering	52
23.	22IREN023	Design of Machine Elements	Mr. S. Aravind	Mechanical Engineering	54
24.	22IREN024	Thermodynamics – 2	Dr. Debabrata Barik	Mechanical Engineering	56
25.	22IREN025	Human Anatomy and Physiology	Dr. K. Yamini Yasoda	Biomedical Engineering	58
26.	22IREN026	Instrumental Methods of Analysis – Theory	Dr. S. Sathianarayanan	Pharmacy	60
27.	22IREN027	Industrial Pharmacy – I	Ms. K. Gayathri	Pharmacy	63
28.	22IREN028	Physical Pharmaceutics-I	Dr. G. Saravanan	Pharmacy	66
29.	22IREN029	Pharmacology II– Theory	Mr.M.Kannan	Pharmacy	69
30.	22IREN030	Etiopathogenisis of Diseases	Dr. K.Elango	Pharmacy	71
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English for Effective Communication

Faculty	: Faculty of Arts, Science, Commerce and Management
Course Code	: 22IREN001
Department	: English
Day(s) of the Week	: Tuesday
Course Time/ Session	: 14:10 -16:00 (Indian time)
No. of Sessions	: 16
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Dr. Selvalakshmi.S
E-mail	: selvalakshmi.s@kahedu.edu.in
Prerequisite	: Students pursuing any Degree or Diploma can register this course.

Course Objectives:

- To help the students improve their listening, speaking, reading, and writing skills and broaden their knowledge.
- To lay the groundwork for better pronunciation, and effective communication.
- To enhance the students' ability to reach their full potential and improve their communication skills.

Course Outcomes:

- The fundamentals of phonetics, improving the pronunciation.
- Provide adequate practice in professional settings to students to help them improve their language abilities.
- Students' communication competency will be improved, and their formal writing abilities will also be improved.
- Understand their abilities to increase their proficiency in the language.
- Recognise the significance of reading and understanding the texts and internalise written communication is in academic life.

Weekly syllabus

Week	Lecture Topics
1	**Lecture 1:** Communication and Language-Essentials of Pronunciation
	Lecture 2: Introduction to Phonetic Symbols
2	**Lecture 3:** Sounds- Consonants
	Lecture 4: Vowels
3	**Lecture 5:** Diphthongs
	Lecture 6: Vocabulary- Synonyms, Antonyms, Prefixes and Suffixes
4	**Lecture 7:** Conversational English- Group Discussion
	Lecture 8: Conversational English- Interview

5	**Lecture 9:** Conversational English -Debate
	Lecture 10: Conversational English - Meeting
6	**Lecture 11:** Conversational English - Dialogue Writing
	Lecture 12: Comprehension passages –Differentiate between facts and opinion
	Internal Assessment I
7	**Lecture 12:** Skimming
	Lecture 14: Scanning
8	**Lecture 15:** Reading passages on products, equipment and gadgets
	Lecture 16: Technical Writing
9	**Lecture 17:** Technical Writing: Paragraph Writing, Coherence, Cohesion and Punctuation
	Lecture 18: Letter Writing-Personal/Formal
10	**Lecture 19:** Layout of the Letters
	Lecture 20: Resume Writing
11	**Lecture 21:** Subject-Verb Agreement
	Lecture 22: Types of Sentences
12	**Lecture 23:** Parts of Speech
	Lecture 24: Modals
	Internal Assessment II
13	**Lecture 25:** Tense: Present
	Lecture 26: Past
14	**Lecture 27:** Future
	Lecture 28: Revision
15	**Lecture 29:** Presentation- With Faculty review
	Lecture 30: Group Final Presentation
16	Presentation- With Faculty review/ Group Final Presentation
17	Final Exam

Suggested Readings:

- Hargie Owen, 2019. The Handbook of Communication Skills, Fourth Edition, Routledge Publisher, London.
- Roche, Marc. Business English Communication: Advanced Skills ©. Master English for Business and Professional Purposes. How to Communicate at Work. 2020.
- Smith, Leila, and Roberta Moore. *English for Careers*. Prentice Hall, 2020.

Plant Tissue Culture

Faculty	: Faculty of Arts, Science, Commerce and Management
Course Code	: 22IREN002
Department	: Biotechnology
Day(s) of the Week	: Friday
Course Time/ Session	: 14:10 -16:00 (Indian time)
No. of Sessions	: 16
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Dr. Barathkumar, S.
E-mail	: barathkumar.s@kahedu.edu.in
Prerequisite	: Students pursuing Degree or Diploma in Biological Science / Botany / Zoology / Microbiology / Horticulture / Agriculture / Genomics / Biotechnology / Environmental Science can register this course.

Course Objectives:

- To enhance the skills in Plant Tissue Culture tool for the large scale plant propagation, disease elimination, plant improvement and production of secondary metabolites.
- To offer hands on training for learning the basics with an insight to laboratory practices along with exposure to "lab- to-land" transfer.
- Entrepreneur's, who wish to establish their own labs, will be benefitted with the lab-to-land training.

Course Outcomes:

- Understanding the concepts and principles of Plant tissue culture and learning the techniques of sterilization and monitoring method of sterilization.
- Students Possesses knowledge about safety and ergonomy rules, ensuring safe and sterile work at the laboratory applying in vitro techniques.
- Enlighten students about methods to conserve germplasm under In vitro. Production of Secondary metabolites through cell culture.

Weekly syllabus

Week	Lecture Topics
1	**Lecture 1:**Introduction, History and scope of Plant Tissue Culture **Lecture 2:**Definetions and concepts and techniques used in plant tissue culture
2	**Lecture 3:** Laboratory arrangement of plant tissue culture **Lecture 4:** Laboratory contaminants- it's control and measures

3	**Lecture 5:** Nutritional requirements & plant growth Macro and micro nutrients - organic supplements **Lecture 6:** Role of Micro and macro nutrients, Vitamins and carbon source in tissue culture
4	**Lecture 7:** Phytohormones – types and roles **Lecture 8:** Tissue culture media and types
5	**Lecture 9:** Sterilization - glassware, instruments and phytohormones and media **Lecture 10:** Media preparation- pH, Temprature, Solidifying agent
6	**Lecture 11:** Surface sterilization of explants **Lecture 12:** Slant Preparations etc. Maintenance of cultures, Environmental Conditions Internal Assessment I
7	**Lecture 12:** Explant selection and explants types **Lecture 14:** Inoculation of cultures
8	**Lecture 15:** Callus Induction **Lecture 16:** Stages in callus development
9	**Lecture 17:** Aseptic seed germination **Lecture 18:** Micropropagation through various explants
10	**Lecture 19:** Sub culture techniques **Lecture 20:** Organogenesis
11	**Lecture 21:** Shoot regeneration **Lecture 22:** Rooting medium and Rhizogenesis
12	**Lecture 23:** Estimation of growth **Lecture 24:** Hardening techniques Internal Assessment II
13	**Lecture 25:** Cell suspension culture and applications **Lecture 26:** Hairy root culture technique
14	**Lecture 27:** Artificial seed production **Lecture 28:** Role of tissue culture in Plant Biotechnology
15	**Lecture 29:** Methods for production of haploid cell lines **Lecture 30:** Techniques and significance of Androgensis and Gynogenesis
16	Presentation- With Faculty review/ Group Final Presentation
17	Final Exam

Suggested Readings:

- Sunghun Park (2021). Plant Tissue Culture – Techniques & Experiments, 4th Edition, Elsevier publication
- Agnès Ricroch, Surinder Chopra & Marcel Kuntz, (2021), Plant Biotechnology - Experience and Future Prospects, 2nd edition, Springer publication.

- Slater, A., Scott, N.W., & Fowler, M.R. (2008). Plant Biotechnology: The Genetic Manipulation of Plants. Oxford University Press.
- Sant Saran Bhojwani & Prem Kumar Dantu, (2013) Plant Tissue Culture: An Introductory Text, Springer, India

Professional English

Faculty	: Faculty of Arts, Science, Commerce and Management
Course Code	: 22IREN003
Department	: English
Day(s) of the Week	: Tuesday
Course Time/ Session	: 14:10 -16:00 (Indian time)
No. of Sessions	: 14
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Dr. D. Solomon Paul Raj
E-mail	: sololmonpaulraj.davidatnakumar@kahedu.edu.in
Prerequisite	: Students pursuing any Degree or Diploma can register this course.

Course Objectives:

- To hone the language Skills in more depth through professional and other activities in the classroom.
- To understand the fundamental phrase structures.
- To help students improve their language abilities, both technically and creatively.
- To educate students and exhibit their talents and other nuances of language.

Course Outcomes:

- The course aims to improve learners' English language proficiency by delivering complete learning experiences through a communicative approach and task-based exercises.
- The capacity to develop their creativity and critical thinking to change themselves into morally and ethically responsible members of society.
- The classroom activities are designed to achieve specific goals to assist students to learn while having a good time.

Weekly Syllabus

Week	Lecture Topics
1	**Lecture 1:** Communication-An Overview-Definition of communication **Lecture 2:** Process of communication- Features of successful professional communication **Lecture 3:** Importance of communication-Purpose of professional
2	**Lecture 4:** Communication-Different forms of communication. **Lecture 5:** Communication Network in an Organisation- **Lecture 6:** Barrier to communication
3	**Lecture 7:** Verbal Barriers-Nonverbal barriers **Lecture 8:** Barriers for Listening-Miscellaneous Barriers. **Lecture 9:** Listening Skills- Speaking Skills and Pubic Speaking Skills

4	Internal Assessment – I & Lecture 10: Enhancing the Soft skills
5	Lecture 11: Etiquettes in Corporate World Lecture 12: Interpersonal Lecture 13: Intrapersonal skills
6	Lecture 14: Positive attitude Lecture 15: Parts of Speech – An overview
7	Lecture 16: Parts of Speech – An overview Lecture 17: Parts of Speech – An overview
8	Lecture 18:Tenses & Sentences Lecture 19: Tenses & Sentences- Subject verb Agreement- Question Tags
9	Lecture 20: Subject verb Agreement- Question Tags Lecture 21: Subject verb Agreement- Question Tags
10	Lecture 21: Introduction- Writing for your Reader- Lecture 22: The 4 Cs of Successful Writing Internal Assessment - II
11	Lecture 23: The Resume- Memos and Reports- Lecture 24: Sound-Alike and Look-Alike Words
12	Lecture 25: Nonverbal communication and Etiquettes
13	Lecture 26: Teamwork and Leadership Skills Lecture 27: Group discussion
14	Lecture 29: Presentation_ With Faculty review Lecture 30: Group Final Presentation
15	Final Exam

Suggested Readings:

- Bailey Stephen. Academic Writing- A Practical Guide for Students, Routledge Farmer, London and New York.2019(e-book)
- Hall, John Lesslie. English Usage. 2017.
- Koneru, Aruna. English Language Skills, Tata McGraw Hill Education India, 2019 .
- Schuh, Mari. Communication Skills. Pebble, 2021.

Visual Basic.Net

Faculty	: Faculty of Arts, Science, Commerce and Management
Course Code	: 22IREN004
Department	: Computer Science
Day(s) of the Week	: Monday
Course Time/ Session	: 14:30-16:30(Indian time)
No. of Sessions	: 16
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Ms.S.S.SenthilPriya
E-mail	: senthilpriya.ssampathkumar@kahedu.edu.in
Prerequisite	: Students pursuing Degree or Diploma in Computer Science / Computer Application / Software System / Computer Technology / Artificial Intellengence and Data Science / Cyber security can register this course.

Course Objectives:

- Integrate variables and constants into calculations applying VB.NET
- Design, formulate, and construct applications with VB.NET
- Implement lists and loops with VB.NET controls and iteration
- Build integrated VB.NET solutions using functions
- Translate general requirements into data-related solutions using database concepts

Course Outcomes:

- Familiarize the Visual basics frameworks and IDE.
- Recognize the properties and events of the VB framework.
- Apply the Looping concepts to do the iterations.
- Understand and apply the functions in visual basic Programming.
- Understand the additional Concepts with database connections in Visual basic Programming.

Weekly syllabus

Week	Lecture Topics
1	**Lecture 1:** Introduction to .NETFramework **Lecture 2:** Common Language Runtime (CLR) ,Framework Class Library(FCL)
2	**Lecture 3:** Visual Studio.Net **Lecture 4:** Integrated Development Environment
3	**Lecture 5:** Languages Supported **Lecture 6:** VB.Net features
4	**Lecture 7:** IDE- Menu System **Lecture 8:** Elements of visual basic.net

5	**Lecture 9:** Properties **Lecture 10:** Events of Form
6	**Lecture 11:** Methods of Form **Lecture 12:** Lable of Forms Internal Assessment I
7	**Lecture 13:** Data Types, **Lecture 14:** Keywords
8	**Lecture 15:** Declaring Variables and Constants **Lecture 16:** Operators
9	**Lecture 17:** Understanding Scope and accessibility of variables **Lecture 18:** Conditional Statements
10	**Lecture 19:** Functions **Lecture 20:** Procedures
11	**Lecture 21:** Built-In Dialog Boxes **Lecture 22:** Menus and Toolbar
12	**Lecture 23:** Object Oriented Concepts **Lecture 24:** Constructor Internal Assessment II
13	**Lecture 25:** Destructor **Lecture 26:** Exception handling
14	**Lecture 27:** File Handling **Lecture 28:** Stream classes
15	**Lecture 29:** Data Access withADO.Net **Lecture 30:** Data Access with Server Explorer
16	Presentation- With Faculty review/ Group Final Presentation
17	Final Exam

Suggested Readings:

- Steven Holzner, (2005) "Visual Basic.Net Black Book",Dreamtech Press.
- Ray Yao, (2017) "Visual Basic in 8 Hours" , Ruby C. Perl
- Philip Conrod, (2019) ,Learn Visual Basic 2019 Edition: A Step-By-Step Programming Tutorial 16th Edition,kidware software

CRISPR – Cas9 Technology

Faculty	: Faculty of Arts, Science, Commerce and Management
Course Code	: 22IREN005
Department	: Biotechnology
Day(s) of the Week	: Monday
Course Time/ Session	: 14:30-16:30 (Indian time)
No. of Sessions	: 15
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Dr. T.Soundara Rajan
E-mail	: drsoundararajan.t@kahedu.edu.in
Prerequisite	: Students pursuing under graduate Degree or Diploma in Biological Science / Botany / Zoology / Microbiology / Bioinformatics / Proteomics / Genomics / Biotechnology / can register this course.

Course Objectives:

- This course is planned to deliver postgraduate students in life sciences/biomedical research programs familiarity with the principles of molecular biology and recombinant DNA technology.
- During the course, students will learn about the principles of CRISPR and how itis applied to animal and plant cells, with emphasis on the molecular mechanisms of how CRISPR-based genome engineering works.
- In addition, this course will provide students with a base of knowledge on the various and often evolving applications of this technology for research, gene-therapy and the discovery of novel therapeutics.

Course Outcomes:

- To design CRISPR based editing tools for target gene of interest.
- To choose the right format of gene editing tool and delivery strategy for their cell type or embryos.
- To familiar with experimental design and potential pitfalls to consider when applying this technology to their own research.

Weekly syllabus

Week	Lecture Topics
1	**Lecture 1:** Basic Principles of Molecular Biology. DNA to proteins.
	Lecture 2: Basic structure of an organism.
2	**Lecture 3:** Damage repair mechanisms of cell - I
	Lecture 4: Damage repair mechanisms of cell - II
3	**Lecture 5:** Consequences of DNA mutation and damage - I
	Lecture 6: Consequences of DNA mutation and damage – II
4	**Lecture 7:** CRISPR and Genetic Engineering. Three phases of CRISPR-based adaptive immunity.

	Lecture 8: CRISPR's origins as a defense mechanism deployed by bacteria – I
5	**Lecture 9:** CRISPR's origins as a defense mechanism deployed by bacteria - II **Lecture 10:** CRISPR's origins as a defense mechanism deployed by bacteria - III
6	**Lecture 11:** CRISPR-Cas9 system in genetic editing. **Lecture 12:** Features of CRISPR-Cas9 and its status as a Type II CRISPR system. Internal Assessment I
7	**Lecture 13:** Treating Genetic Diseases. CRISPR in conjunction with stem cells to cure β-thalassemia. **Lecture 14:** Gene editing in the research and treatment of genetic diseases.
8	**Lecture 15:** CRISPR usage to treat a polygenic disease like diabetes. **Lecture 16:** Gene edited human stem cells to treat muscular dystrophy.
9	**Lecture 17:** CRISPR clinical trials - I **Lecture 18:** CRISPR clinical trials - II
10	**Lecture 19:** CRISPR as a research tool to study cancer. **Lecture 20:** CRISPR tool to develop cancer immunotherapy.
11	**Lecture 21:** CRISPR to treat cancerous cells directly. **Lecture 22:** CRISPR in cancer clinical trials. Internal Assessment II
12	**Lecture 23:** CRISPR's application to agriculture and potential to solve worldwide food challenges. **Lecture 24:** CRISPR-based abiotic stress tolerance engineering.
13	**Lecture 25:** Potential benefits of CRISPR-Cas systems in crops - I **Lecture 26:** Potential benefits of CRISPR-Cas systems in crops - II
14	**Lecture 27:** Ethical issues associated with microbes and animal genome editing. **Lecture 28:** Ethical issues associated with plant genome editing.
15	**Lecture 29:** Adaptations and limitations of existing rules regulating the gene-editing of crops. **Lecture 30:** Novel CRISPR-Cas systems
16	Final Exam

Suggested Readings:

- The CRISPR/Cas9 System: Applications and Technology. 1t Ed. Edited by Alfred A. Bertelsen. 2019. Nova Science Publishers Inc.
- CRISPR/Cas Genome Editing Strategies and Potential for Crop Improvement. 1st Ed. Edited by Anjanabha Bhattacharya, Vilas Parkhi, Bharat Char. 2020. Springer.
- Genome Engineering via CRISPR-Cas9 System. 1st Ed. Edited by Vijai Singh, Pawan K. Dhar. 2020. Academic Press Inc.
- Applications of CRISPR-Cas9 in Translational Research. 1st Ed. Edited by Jawed Iqbal. 2022. Springer Singapore.

Node.JS

Faculty	: Faculty of Arts, Science, Commerce and Management
Course Code	: 22IREN006
Department	: Computer Applications
Day(s) of the Week	: Friday
Course Time/ Session	: 10:00am -12:00pm (Indian time)
No. of Sessions	: 16
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Dr.G.Anitha
E-mail	: anitha.g@kahedu.edu.in
Prerequisite	: Students pursuing Degree or Diploma in Computer

Science / Computer Application / Software System / Computer Technology / Artificial Intelligence and Data Science / Cyber security can register this course.

Course Objectives:

- To prepare the technical concepts behind Node.js.
- To understand the various modules, Events and Event Emitter classes, and its methods.
- To analyse the file system operations and database connectivity.

Course Outcomes:

- The student will understand the basic concept of Node.js, working models of Node.js webserver, buffers and streams,
- The structure of Node applications using various modules, Events and Event Emitter classes, file system
- Able to build the web server applications using modules and database connectivity.

Weekly Syllabus:

Week	Lecture Topics
1	**Lecture 1**: Introduction to Node JS –Introduction, What is Node JS, Advantages of Node JS **Lecture 2:**Traditional Web Server Model -Node.js Process Model
2	**Lecture 3:** Setup Dev Environment -Install Node.js on Windows **Lecture 4:**Working in REPL, Node JS Console
3	**Lecture 5:** Node JS Modules -Functions, Buffer, Module **Lecture 6:** Module Types, Core Modules, Local Modules

| 4 | **Lecture 7:** Exports-Node Package Manager -What is NPM, Installing Packages Locally |
	Lecture 8: Adding dependency in package
5	**Lecture 9:** Installing packages globally
	Lecture 10: Updating packages
6	**Lecture 11:** Creating Web server
	Lecture 12: Handling http requests, Sending requests
7	**Lecture 13:** Events: Event Emitter class
	Lecture 14: Returning event emitter
8	**Lecture 15:** Inhering events
	Lecture 16: Example programs using Even Emitter Class
	Internal Assessment I
9	**Lecture 17:** File System -Fs. Read File, Writing a File
	Lecture 18: Writing a file asynchronously
10	**Lecture 19:** Opening a file
	Lecture 20: Deleting a file
11	**Lecture 21:** Updating a file
	Lecture 22: Other I/O operations
12	**Lecture 23:** Debugging Node JS Application
	Lecture 24: Core Node JS debugger
13	**Lecture 25:** Debugging with Visual Studio.
	Lecture 26: Sample programs using file system operations
14	**Lecture 27:** Database connectivity-Connection string, Configuring
	Lecture 28: Working with select command, Updating records, Deleting records
	Internal Assessment II
15	**Lecture 29:** Template Engines – usage of Template Engine
	Lecture 30: Vash Template Engine, Jade Template Engine, Example programs.
16	Group Final Presentation
17	Final Exam

Suggested Readings:

- John Bach, Alexander Aronowitz, Node.js: Your guide to learn node.js easily and in simple steps, 2021, 4th Edition, Independent Publications.

- Mem Lnc, Claudia Alves , Node.js Web Development: Unmatched Power for Building Fast and Secure Apps, 2020, Independent Publications.

- David Herron, Node.js Web Development: Server-side web development made easy with Node 14 using practical examples, 2020, 5th Edition, Packt Publications.

- Basarat Ali Syed, Beginning Node.js, 2019, First Edition, Apress Publications.

Mastering Second Language through Reading, Writing, and Grammar

Faculty : Faculty of Arts, Science, Commerce and Management
Course Code : 22IREN007
Department : English
Day(s) of the Week : Tuesday
Course Time/ Session : 14:10 -16:00 (Indian time)
No. of Sessions : 16
Grades : Undergraduate
Credits : 2
Teaching Mode : Google meet
Course Instructor : Mr. Udhayakumar M
E-mail : udhyakumar.m@kahedu.edu.in
Prerequisite : Students pursuing any Degree or Diploma can register this course.

Course Objectives:

- To improve the reading and writing skills and understanding the nuances.
- To understand the nuances writing techniques
- To hone the various strategies in reading and writing using grammar

Course Outcomes:

- The fundamentals of grammar, which will assist the participants in improving their reading and writing skills.
- It strengthens students' ability to write academic papers, essays and summaries and also improves speaking ability in English both in terms of fluency and comprehensibility.

Weekly syllabus

Week	Lecture Topics
1	**Lecture 1:** Introduction to reading **Lecture 2:** Basic principles of reading
2	**Lecture 3:** Types of readers **Lecture 4:** Problems in reading
3	**Lecture 5:** Reading methods **Lecture 6:** Introduction to writing skill
4	**Lecture 7:** Basic principles of writing **Lecture 8:** Problems in writing
5	**Lecture 9:** Types of writing **Lecture 10:** Writing methods
6	**Lecture 11:** Strategies to overcome difficulties in reading **Lecture 12:** Stages of reading

7	**Lecture 13:** Intensive reading techniques	
	Lecture 14: Extensive reading techniques	
8	**Lecture 15:** Process of reading	
	Lecture 16: Levels of reading: literal, inferential	
9	**Lecture 17:** Evaluative meaning	
	Lecture 18: Strategies to improve writing	
10	**Lecture 19:** Stages of writing	
	Lecture 20: Traits of writing	
11	**Lecture 21:** Process of writing: pre-writing, drafting	
	Lecture 22: Process of writing: revising and editing	
12	**Lecture 23:** Integrating grammar in reading	
	Lecture 24: Integrating grammar in writing	
	Internal Assessment II	
13	**Lecture 25:** Intensive Reading	
	Lecture 26: Extensive reading	
14	**Lecture 27:** Pre-writing	
	Lecture 28: Writing	
15	**Lecture 29:** Post writing	
	Lecture 30: Role of grammar in writing	
16	Presentation- With Faculty review/ Group Final Presentation	
17	Final Exam	

Suggested Readings:

- McCarthy, Michael. *English Grammar*. 2021.Andrew P. Johnson, 2008. Teaching Reading and Writing: A Guidebook for Tutoring and Remediating Students, R & L Education.

- Collins, Peter, and Carmella Hollo. *English Grammar*. Bloomsbury Academic, 2019, https://doi.org/10.1057/978-1-137-50740-2.

- Lester, Mark. *McGraw-Hill Education Handbook of English Grammar & Usage*. 2018.

Organic Terrace Gardening

Faculty	: Faculty of Arts, Science, Commerce and Management
Course Code	: 22IREN008
Department	: Biochemistry
Day(s) of the Week	: Tuesday, Thursday
Course Time/ Session	: 14:20 -15:20 (Indian time)
No. of Sessions	: 15
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Dr. Kongkona Saikia
E-mail	: kongkonasaikia.sobhasaikia@kahedu.edu.in
Prerequisite	: Students pursuing Degree or Diploma in Biological Science / Botany / Agriculture / Microbiology / Horticulture / Genomics / Biotechnology / Environmental Science can register this course.

Course Objectives:

- To examine the basics of organic gardening and organic farming.
- To build a factual baseline of cropping knowledge with organic methods and to encourage creative thinking in agricultural problem solving on the farm or in the garden.
- To introduce students to the holistic concept of organic farming as a system where there is a complex interrelationship of parts, similar to that of living ecosystems.

Course Outcomes:

- Upon completion of the course, the students will have a clear grasp of organic gardening techniques and methods.
- It will help to develop an ecological approach to gardening that includes soil health, water, nutrients, etc.
- The course will familiarize the students with the challenges faced during organic gardening/farming which can be applied to real time farming.
- Further, the course will help the students understand the applications and importance of bio-based fertilizers and pesticides

Weekly syllabus

Week	Lecture Topics
1	**Lecture 1:** Introduction to organic gardening- history and concept; organic terrace gardening. **Lecture 2:** Medicinal plants- importance and scope; cultivation of medicinal plants.
2	**Lecture 3:** Introduction to Horticulture- concept and importance. **Lecture 4:** Organic farming- basic concept and components of organic

	farming.
3	**Lecture 5:** Plant propagation- overview of different propagation methods and its importance.
	Lecture 6: Sexual propagation- formation of pollen and egg.
4	**Lecture 7:** Seeds- structure and characteristics of good seeds; viability tests.
	Lecture 8: Seed germination; pre-germination treatments.
5	**Lecture 9:** Seed dormancy- techniques to break dormancy; growing plants from seeds.
	Lecture 10: Asexual propagation- methods and importance.
6	**Lecture 11:** Asexual propagation- methods and importance.
	Lecture 12: Propagation by grafting- selection of stock and scion, types of grafting.
7	**Lecture 13:** Vermicomposting- method and importance.
	Lecture 14: Internal Assessment I
8	**Lecture 15:** Soil for horticultutre- soil profile and types of soil.
	Lecture 16: Physical, chemical and biological properties of soil.
9	**Lecture 17:** Soil fertility and productivity, and essential plant nutrients.
	Lecture 18: Soil colloids, soil organic matter, and humus.
10	**Lecture 19:** Soil sampling and testing.
	Lecture 20: Orchard- introduction and selection of site.
11	**Lecture 21:** Establishment of an orchard- orchard plan and system of planting.
	Lecture 22: Tillage and land preparation.
12	**Lecture 23:** Laying out of orchards- methods of laying out
	Lecture 24: Fertilization requirement for orchard
13	**Lecture 25:** Orchard floor management.
	Lecture 26: Plant Protection Measures- Integrated pest & disease managements and Botanical pesticides.
14	**Lecture 27:** Organic pesticides, bio-pesticides; Control of pests & diseases of important crops /vegetables.
	Lecture 28: Importance of Bio fertilizers in soil productivity
15	**Lecture 29:** Sources of nutrients for organic agriculture- organic manure, green manure.
	Lecture 30: Internal Assessment II
16	Final Exam

Suggested Readings:

- Manibhushan Rao, 2018. Textbook of horticulture, Trinity Press, India.
- K P Sudheer, V Indira, 2020. Postharvest Technology Of Horticultural Crops, New India Publishing Agency, India.
- H K Baimey, N Hamamouch, Y A Colombia, 2020. Horticultural Crops, IntechOpen, United Kingdom.

Health and Fitness

Faculty	: Faculty of Arts, Science, Commerce and Management
Course Code	: 22IREN009
Department	: Biochemistry
Day(s) of the Week	: Thursday
Course Time/ Session	: 14:10 16:00 (Indian time)
No. of Sessions	: 16
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Dr. Brindha. E
E-mail	: drbrindha.e@kahedu.edu.in
Prerequisite	: Students pursuing any Degree or Diploma can register this course.

Course Objectives:

- To understand the importance of health and fitness
- To provide skills to equip the students acquire skills in physiological responses and adaptation.
- To understand the functioning of Endocrine System and its responses and adaptations.
- To impart knowledge on importance of warm-up and flexibility.

Course Outcomes:

- Acquire skills to execute fitness components
- Job opportunity in the neural adaptations training
- Gain knowledge on Hormones & Exercise
- Depth of understanding about the Neuromuscular Facilitation Stretching

Weekly syllabus

Week	Lecture Topics
1	**Lecture 1:** Definition, Benefits, Health Benefits & Performance Benefits. **Lecture 2:** Fitness Components Health Related Fitness components (Muscular Strength, muscular Endurance)
2	**Lecture 3:** Cardiovascular endurance, flexibility and Body Composition) **Lecture 4:** Skill Related Fitness components (Power, Speed, Agility, balance and Coordination, Reaction time).
3	**Lecture 5:** Neural Adaptations to Training:- Functional organisation of the Nervous System Central and Peripheral Nervous System **Lecture 6:** Somatic Nervous System, Autonomic Nervous System
4	**Lecture 7:** Neuron, Neural Synapses **Lecture 8:** Brain, Spinal Cord, Motor Units, Recruitment
5	**Lecture 9:** Firing Rate, Motor Unit Synchronisation

	Lecture 10: Endocrine System Responses and Adaptations
6	**Lecture 11:** Hormone Actions, Types
	Lecture 12: Endocrine Glands, Hormone Production, Release
	Internal Assessment I
7	**Lecture 12:** Transportation and Receptor Interaction
	Lecture 14: Hormones & Exercise, Testosterone, Oestrogen, Catecholamines
8	**Lecture 15:** Glucagon, Cortisol
	Lecture 16: Insulin, Growth Hormone
9	**Lecture 17:** Responses and Adaptations of the Cardiorespiratory System - Anatomy of the Heart.
	Lecture 18: Major blood vessels, Regulation of Heart
10	**Lecture 19:** Blood Components
	Lecture 20: Cardiovascular function and Variables (Heart rate, Blood pressure, Stroke Volume, Cardiac Output)
11	**Lecture 21:** Cardio Vascular Responses, Blood Lipids, Respiratory System
	Lecture 22: Lung Volumes and Capacities, Control of Breathing Pulmonary Adaptations to training.
12	**Lecture 23:** Ventilatory Muscle-Specific Training
	Lecture 24: Warm-Up, Flexibility - role in Injury
	Internal Assessment II
13	**Lecture 25:** Physiology, Effect on Performance
	Lecture 26: Post-activation Potentiation
14	**Lecture 27:** Dynamic vs Static warm-up
	Lecture 28: Prevention, Facilitation Stretching, Practical Aspect of Stretches)
15	**Lecture 29:** Types of Stretching (Static, Dynamic, Proprioceptive Neuromuscular)
	Lecture 30: Discussion and review.
16	Presentation- With Faculty review/ Group Final Presentation
17	Final Exam

Suggested Readings:

- Acebes-Sanchez, J., Diez-Vega, I., Rodriguez-Romo, G. (2019). Physical Activity among Spanish Undergraduate Students: A Descriptive Correlational Study. International Journal of Environmental Research and Public Health. 16(15). https://doi.org/10.3390/ijerph16152770 Al Dababseh, M.F.,
- Badicu, G., Chacón, C., Zurita-Ortega, F., Castro-Sanchez, M., & Balint, L. (2019). Mediterranean Diet and physical activity in Romanian and Spanish university students - a comparative study. Physical Education of Students, 23(4), 172-178. https://doi.org/10.15561/20755279.2019.0402

- Bodnar, I., Pavlova, I., Dukh, T., Wąsik, J., Mosler, D., & Svyshch, Y. (2019). Effects of mutual learning in physical education to improve health indicators of Ukrainian students. Physical Education of Students, 23(5), 229-235. https://doi.org/10.15561/20755279.2019.0503.
- Belgorod: Politerra. (in Russian) Chernenko, S., Honcharenko, O., & Marchenko, S. (2019). Informative Indicators of Functional and Motor Fitness of Students of Higher Education Institutions. Teorìâ Ta Metodika Fìzičnogo Vihovannâ, 19(3), 107-115. https://doi.org/10.17309/tmfv.2019.3.01
- Gavrishova, E.V., Grachev, A.S., & Tret'yakov, A.A. (2020). Use of information and communication technologies in the organization of additional health activities of students, taking into account the type of motivation. Theory and Practice of Physical Culture, 1, 44–47.
- De Bruijn, A.G.M., Kostons, D., van der Fels, I.M.J., Visscher, C., Oosterlaan, J., & Hartman, E., et al. (2019). Importance of aerobic fitness and fundamental motor skills for academic achievement. Psychology of Sport and Exercise, 43, 200–209. https://doi.org/10.1016/j.psychsport.2019.02.011 https://doi.org/10.18844/prosoc.v5i1.3382
- Drogomeretsky, V.V., Tret'yakov, A.A., Nesterenko, G.L., & Kondratenko, P.P. (2018). Correction of posture disorders in students by means of health-improving swimming. Theory and Practice of Physical Culture, 7, 39–41.
- Eather, N., Riley, N., Miller, A., Smith, V., Poole, A., & Vincze, L., et al. (2019). Efficacy and feasibility of HIIT training for university students: The Uni-HIIT RCT. Journal of Science and Medicine in Sport, 22(5), 596–601. https://doi.org/10.1016/j.jsams.2018.11.016
- Kadutskaya, L. A., Voloshina, L. N., Kondakov, V. L., & Irkhin, V. N. (2020). Adaptation model of organization of students' motor activity. Teoriya i Praktika Fizicheskoy Kultury, 2020(1), 20–21.
- Eken, Özgür, Özkol, M., & Varol, S. (2020). Acute effects of different stretching and warm up protocols on some anaerobic motoric tests, flexibility and balance in junior male judokas. Pedagogy of Physical Culture and Sports, 24(4), 169-174. https://doi.org/10.15561/26649837.2020.0403 Fields, J. B., Metoyer, C. J., Casey, J. C., Esco, M. R., Jagim, A. R., & Jones, M. T. (2018). Comparison of body composition variables across a large sample of national collegiate athletic association women athletes from 6 competitive sports. Journal of Strength and Conditioning Research, 32(9), 2452-2457. https://doi.org/10.1519/jsc.0000000000002234
- Garcia-Hermoso, A., Correa-Bautista, J.E., Izquierdo, M., Tordecilla-Sanders., A, Prieto-Benavides, D., & Sandoval-Cuellar, C., et al. (2019). Ideal Cardiovascular Health, Handgrip Strength, and Muscle Mass Among College Students: The FUPRECOL Adults Study. Journal of Strength and Conditioning Research, 33(3), 747–754.
- Kharisov, I., & Nenasheva, A. (2018). Physical fitness of students practicing various artistic gymnastic routines. Minerva Ortopedica E Traumatologica, 69(3), 49-54. https://doi.org/10.23736/s0394-3410.18.03874-2
- Khudolii, O. (2019). Research Program: Modeling of Young Gymnasts' Training Process. Teorìâ Ta Metodika Fìzičnogo https://doi.org/10.17309/tmfv.2019.4.02 Vihovannâ, 19(4), 168–178.
- https://journals.lww.com/acsm healthfitness/fulltext/2019/11000/worldwide_survey_of_fitness_trends_for_2020.6.aspx
- https://www.frontiersin.org/articles/10.3389/fpsyg.2020.590172/full
- https://journals.lww.com/acsm-healthfitness/fulltext/2021/01000/worldwide_survey_of_fitness_trends_for_2021.6.aspx

Vermicomposting and Biofertilizer

Faculty	: Faculty of Arts, Science, Commerce and Management
Course Code	: 22IREN010
Department	: Microbiology
Day(s) of the Week	: Monday, Wednesday
Course Time/ session	: 03:00 -04:00Pm
No. of Sessions	: 15
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Mrs.A.John Britto Paulin
E-mail	: johnbrittopaulin.arumairaj@kahedu.edu.in
Prerequisite	: Students pursuing Degree or Diploma in Biological Science / Botany / Zoology / Microbiology / Agriculture / Horticulture / Chemistry / Entomology Biotechnology / Environmental Science can register this course.

Course Objectives:

- To make the students understand about vermicompost and its economic value
- To give a knowledge about the organic materials used in vermicompost.
- To make the students understand about effects of sewage water on Development of worms.
- To provide knowledge on algal fertilizer and its effect as biofertilizer.
- To teach on utilization of biofertilizers in agriculture.

Course Outcomes:

- Understand about vermicompost and it application
- Produce organic fertilizer using worm and organic waste.
- Know about waste water management.
- Understand algae as biofertilizer and its production.
- Gain knowledge about using the biofertilizer in agricultural fields.

Weekly syllabus

Week	Lecture Topics
1	**Lecture 1:** Vermicomposting - Introduction **Lecture 2:** Small Scale Earthworm farming - Earthworm compost
2	**Lecture 3:** Conventional commercial composting **Lecture 4:** Earthworm Composting larger scale
3	**Lecture 5:** Earthworm Farming (Vermiculture) **Lecture 6:** Extraction
4	**Lecture 7:** Vermicomposting processing

	Lecture 8: Study of Vermiculture
5	**Lecture 9:** Vermiwash
	Lecture 10: Vermicompost equipments, devices
6	**Lecture 11:** Study the effects of vermicompost & vermiwash on short duration crop plant- Green gram
	Lecture 12: Study the effects of vermicompost & vermiwash on short duration crop plant- Tomato
	Internal Assessment I
7	**Lecture 13:** Preparation vermibeds
	Lecture 14: Maintenance of vermicompost & climatic conditions
8	**Lecture 15:** Harvesting, packaging of Vermicompost
	Lecture 16: Transport and storage of Vermicompost
9	**Lecture 17:** Separation of life stages
	Lecture 18: Effects of sewage water on development of worms
10	**Lecture 19:** Environmental risk and benefits
	Lecture 20: Algae fertilizer preparation techniques
11	**Lecture 21:** Types of algae fertilizer
	Lecture 22: Production of broth culture
	Internal Assessment II
12	**Lecture 23:** Production of sterile carrier-based inoculants
	Lecture 24: Production of non-sterile carrier-based inoculants
13	**Lecture 25:** Production of liquid inoculants
	Lecture 26: Storage of Biofertilizers
14	**Lecture 27:** Effect of growth and yield of Agricultural crop-Paddy
	Lecture 28: Effect of growth and yield of Agricultural crop-vegetables
15	Presentation- With Faculty review/ Group Final Presentation
16	Final Exam

Suggested Readings:

- The Worm Farmer's Handbook by Rhonda Sherman. 2018
- Vermicompost Production by Dr. S Rehan Ahmad. 2020
- Vermitechnology by M. Seetha Lekshmy, R. Santhi. 2018
- Biofertilizers: Study and Impact by Editors Inamuddin Inamuddin, Mohd Imran Ahamed , Rajender Boddula , Mashallah Rezakazemi. Scrivener Publishing. 2021
- Biofertilizers Volume 1: Advances in Bio-inoculants by Editors: Amitava Rakshit, Vijay Meena, Manoj Parihar, H.B. Singh, A.K. Singh. 2021

Graphics Tools - Photoshop

Faculty	: Faculty of Arts, Science, Commerce and Management
Course Code	: 22IREN011
Department	: Computer Science
Day(s) of the Week	: Monday, Wednesday
Course Time/ Session	: 02:30 -04:00Pm
No. of Sessions	: 16
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Mrs.A.Faritha banu
E-mail	: farithabanu.ahamedsheriff@kahedu.edu.in
Prerequisite	: Students pursuing Degree or Diploma in Computer Science / Computer Application / Software System / Computer Technology / Artificial Intellengence and Data Science / Cyber security can register this course.

Course Objectives:

- Identify and specify file formats and image resolution for print and web.
- Identify the major regions of the Photoshop workspace and explain the
- function of each: Menu bar and context menus, Options bar, Toolbox, palettes, and document window(s).
- Train the student in Adobe Photoshop CC to create new visuals, edit images, add effects and overlays, and eventually create professional designs.
- The ability to create interactive website.
- Demonstrate proficiency with layers (naming, organizing sets, styles, adjustment layers).

Course Outcomes:

- Acquire a basic knowledge by the basic tools found in Adobe Photoshop to create and edit images.
- Understand more advanced features of Adobe Photoshop tools.
- Create composite images that demonstrate advanced selection and layering techniques.
- Apply painted masks, selection-based masks, gradient masks, and blend modes to create sophisticated image effects.
- Create adjustment layers for editable, non-destructive changes to image coloration and exposure.
- Create interactive website with the tools and advanced features.

Weekly syllabus

Week	Lecture Topics
1	**Lecture 1:** Photoshop's Environment - Introduction

	Lecture 2: Sizing Images Raster and Vector Graphics
2	**Lecture 3:** Photoshop Environment Elements
	Lecture 4: Navigating in Photoshop
3	**Lecture 5:** Image Size and Resolution
	Lecture 6: Cropping
4	**Lecture 7:** Selecting Image Areas & Layers
	Lecture 8: The Rectangular and Elliptical Marquee Tools
5	**Lecture 9:** The Lasso Tools - Saving Selections
	Lecture 10: The Magic Wand Tool - The Magnetic Lasso Tool
6	**Lecture 11:** Modifying Selections -Floating Versus Fixed Selections
	Lecture 12: Undoing Previous Steps -Copying Selections
	Internal Assessment I
7	**Lecture 13:** Creating Layers: Transforming Layers - Copying Layers between Images
	Lecture 14: Arranging Layers -Saving Images in Photoshop Format.
8	**Lecture 15:** Blending & Compositing
	Lecture 16: Image Modes Defringing
9	**Lecture 17:** Opacity and Blending Modes
	Lecture 18: Feathering Edges Mode Characteristics
	Internal Assessment II
10	**Lecture 19:** Grayscale and Bitmap Modes
	Lecture 20: Color Modes
11	**Lecture 21:** Color and Painting Selecting Colors
	Lecture 22: Painting Tools · The Clone Stamp Tool Text
12	**Lecture 23:** Layer Effects, and Filters Type Layers
	Lecture 24: Layer Effects · Filters
13	**Lecture 25:** Merging and Flattening Layers
	Lecture 26: Adjusting Images
14	**Lecture 27:** Brightness/Contrast
	Lecture 28: Levels Adjustment Layers
15	**Lecture 29:** Toning Tools
	Lecture 30: Hue/Saturation
16	Presentation- With Faculty review/ Group Final Presentation
17	Final Exam

Suggested Readings:

- Robin Nichols,(2020) Mastering Adobe Photoshop Elements 2020: Supercharge your image editing using the latest features and techniques in Photoshop Elements, Paperback – Import, 2nd Edition.
- Rafiq Elmansy (2010), Photoshop 3D for Animators, Focal Press Book publication.
- https://web.thisisbeast.com/adobe-photoshop-7-0-studio-techniques-pdf
- http://www.adobe.com/products/photoshop/main.html

Software Testing Tools

Faculty   : Faculty of Arts, Science, Commerce and Management
Course Code   : 22IREN012
Department   : Computer Science
Day(s) of the Week   : Monday, Wednesday
Course Time/ Session   : 15:10 -16:10 (Indian time)
No. of Sessions   : 16
Grades   : Undergraduate
Credits   : 2
Teaching Mode   : Online
Course Instructor   : Dr. V.Sangeetha
E-mail   : drsangeetha.v@kahedu.edu.in
Prerequisite   : Students pursuing Degree or Diploma in Computer Science / Computer Application / Software System / Computer Technology / Artificial Intellengence and Data Science / Cyber security can register this course.

Course Objectives:

- To introduce the fundamental concepts of software testing.
- To Analyze, specify and document software requirements for a software system.
- To Design, select and apply the most appropriate software process for a given project, plan for a software project, identify its scope and risks,
- To estimate cost and time for a software engineering process.
- To expose the criteria for test cases.
- Be familiar with test management and test automation techniques

Course Outcomes:

- Identify suitable life cycle models to be used and translate a requirement specification to a design using an appropriate software testing methodology.
- Apply systematic procedure to write test cases.
- Analyze a problem and identify and define the computing requirements to the problem.
- Formulate appropriate testing strategy for the given software system.
- Create appropriate test cases for software engineering process.
- Develop software projects based on current technology, and test the Software using testing tools.

Weekly syllabus

Week	Lecture Topics
1	**Lecture 1:** Introduction to Software testing
	Lecture 2: Manual Testing
2	**Lecture 3:** Types of Testing unit testing, White box and Black box testing
	Lecture 4: Integrated testing, performance Testing, Load Testing

3	**Lecture 5:** Software Design Techniques
	Lecture 6: Software Testing Life Cycle
4	**Lecture 7:** Software Test Design Techniques
	Lecture 8: Steps to write a Test Case
5	**Lecture 9:** Software Test Process
	Lecture 10: Software Test Plan
6	**Lecture 11:** Software Test cases -How to report a defect
	Lecture 12: Defect Report
	Internal Assessment I
7	**Lecture 12:** Introduction to Automated Testing
	Lecture 14: Strategies of Automated Testing
8	**Lecture 15:** Scripts used for Automated testing
	Lecture 16: Tools used for Automated Testing
9	**Lecture 17:** Introduction to QTP Testing
	Lecture 18: Introduction to Functional Test Partner
10	**Lecture 19:** Introduction to Win runner
	Lecture 20: Introduction to Selenium
11	**Lecture 21:** Testing done in Selenium -Demo
	Lecture 22: How to imply Java scripts in testing selenium
12	**Lecture 23:** Testing Methodologies
	Lecture 24: Internal Assessment II
13	**Lecture 25:** Working of Automated Testing
	Lecture 26: Working of Automated Testing
14	**Lecture 27:** Graphical User Interface testing
	Lecture 28: Graphical User Interface testing
15	**Lecture 29:** Framework approach in Automation
	Lecture 30: Revision
16	Presentation- With Faculty review/ Group Final Presentation
17	Final Exam

Suggested Readings:

- Andreas Spillner, Hans Schaefer and Tilolinz (2021) Software Testing Foundation : A study guide for certified test, Kindle Edition.
- Paul C. Jorgensen, (2014). Software Testing: A Craftsman's Approach, Fourth Edition, CRC Press (Taylor & Francis)
- William E Perry, (2006) Effective Methods for Software Testing , Third Edition, Wiley Publication.

Intellectual Property Rights

Faculty	: Faculty of Arts, Science, Commerce and Management
Course Code	: 22IREN013
Department	: Commerce
Day(s) of the Week	: Wednesday
Course Time/ Session	: 14:10 -16:00 (Indian time)
No. of Sessions	: 16
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Dr. J. Sudarvel
E-mail	: drjsudarvel.j@kahedu.edu.in
Prerequisite	: Students pursuing any Degree or Diploma can register this course.

Course Objectives:

- To provide comprehensive knowledge to the students regarding the general principles of IPR, Concept and Theories, India and International Regime Relating to IPR, Copyrights and its related rights and registration aspects
- To familiarise the trademarks and registration aspects, Design, Geographical Indication, Plant Variety and Layout Design Protection and their registration aspects, Current trends in IPR and Career Opportunities in IP.

Course Outcomes:

- To understand the knowledge on patent and copyright for their innovative research works, during their research career, information in patent documents provide useful insight on novelty of their idea from state-of-the art search.
- To develop the idea or innovations Pave the way for the students to catch up Intellectual Property (IP) as a career option a. R&D IP Counsel, b. Government Jobs – Patent Examiner, c. Private Jobs, d. Patent agent and Trademark agent, and e. Entrepreneur

Weekly syllabus

Week	Lecture Topics
1	**Lecture 1:** Introduction to Intellectual Property Rights
	Lecture 2: Concept and Theories
2	**Lecture 3:** Kinds of Intellectual Property Rights
	Lecture 4: Kinds of Intellectual Property Rights
3	**Lecture 5:** Need for Protecting IPR
	Lecture 6: IPR in India: Genesis and development
4	**Lecture 7:** IPR in abroad
	Lecture 8: Major International Instruments concerning Intellectual Property Rights

5	**Lecture 9:** Introduction of Patents - Elements of Patentability
	Lecture 10: Registration Procedure for Patent
6	Internal Assessment I
7	**Lecture 13:**Rights and Duties of Patentee
	Lecture 14: Introduction of Copyright
8	**Lecture 15:** Kinds of copyright
	Lecture 16: Registration Procedure for copyright
9	**Lecture 17:** Term of protection, Ownership of copyright
	Lecture 18: Introduction of Trademarks - Different kinds of Trademarks
10	**Lecture 19:** Non-Registrable Trademarks
	Lecture 20: Registration Procedure for Trademarks
11	**Lecture 21:** Introduction of Design
	Lecture 22: Registration Procedure for Design
12	Internal Assessment II
13	**Lecture 25:** Introduction of Geographical indication and difference between GI and trademarks
	Lecture 26: Registration Procedure for Geographical indication, effect of registration and term of protection
14	**Lecture 27:** Introduction of Plant variety protection and benefit sharing and farmers' rights
	Lecture 28: Registration Procedure for Plant Variety Protection, effect of registration and term of protection
15	**Lecture 29:** Introduction of Layout Design protection, Procedure for registration, effect of registration and term of protection
	Lecture 30: Career Opportunities in IP - IPR in current scenario
16	Presentation- With Faculty review/ Group Final Presentation
17	Final Exam

Suggested Readings:

- Simon Klopschinski, Christopher Gibson & Henning Grosse Ruse-Khan (2021) The Protection of Intellectual Property Rights Under International Investment Law, OUP Oxfor
- P. Narayanan (2020) Intellectual Property Law (Revised with Updated and Amended Statutes), Eastern Law House
- Nithyananda, K V. (2019). Intellectual Property Rights: Protection and Management. India, IN: Cengage Learning India Private Limited.
- Neeraj, P., & Khusdeep, D. (2014). Intellectual Property Rights. India, IN: PHI learning Private Limited.
- Ahuja, V K. (2017). Law relating to Intellectual Property Rights. India, IN: Lexis Nexis.
- Journal of Intellectual Property Rights (JIPR): NISCAIR

E -Commerce

Faculty	: Faculty of Arts, Science, Commerce and Management
Course Code	: 22IREN014
Department	: Commerce
Day(s) of the Week	: Tuesday
Course Time/ Session	: 14:10 -16:00 (Indian time)
No. of Sessions	: 16
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Dr. B. Geetha Bai
E-mail	: drgeethabai.b@kahedu.edu.in
Prerequisite	: Students pursuing Degree or Diploma in Commerce / Accountancy / Management studies/ Economics / Finance / Business Administration can register this course.

Course Objectives:

- The course focuses on the three major driving forces that permeate all aspects of e-commerce: namely business development strategy, technological innovations, and social issues.
- It covers e-commerce technology infrastructure, business concepts, and social issues.
- E-commerce business models the e commerce security environment, security threats, technology solutions, marketing concepts, online retailing and service.
- The course also provides understanding of online social networks, auctions, and portals.

Course Outcomes:

- To understand the e-commerce business models and strategy describe the major types of e-commerce and perceive the process to be followed in building an e-commerce business model.
- To identify the key security threats in the e-commerce environment and understand online retailing, social networks and online auctioning.

Weekly syllabus

Week	Lecture Topics
1	**Lecture 1:** Introduction and E Commerce Revolution
	Lecture 2: Forces fuelling e commerce
2	**Lecture 3:** E-Commerce vs tradional commerce
	Lecture 4: Technological aspects of Ecommerce
3	**Lecture 5 :** Challenges in E Commerce
	Lecture 6: E-commerce Business Models ,

4	**Lecture 7:** The information superhighway
	Lecture 8: Types of Ecommerce
5	**Lecture 9:** E business tridants
	Lecture 10: E-commerce security
6	**Lecture 11:** Transaction security
	Lecture 12: Firewall management, www and security
7	**Lecture 13:** Electronic payment system
	Lecture 14: Electronic fund transfer
8	**Lecture 15:** E-tailing Business Models,
	Lecture 16: The Retail sector, Analyzing the viability of online firms.
	Internal Assessment I
9	**Lecture 17:** Common Themes in online retailing,
	Lecture 18: The Internet Today - The Future Infrastructure, The World Wide Web
10	**Lecture 19:** The Internet and the Web : Features
	Lecture 20: Internet Marketing Technologies
11	**Lecture 21:** The service sector: offline and online,
	Lecture 22: Online career services
12	**Lecture 23:** Online financial services, Online auctions
	Lecture 24: Internal Assessment II
13	**Lecture 25:** E-commerce and the service sector
	Lecture 26: Auctions, Social networks
14	**Lecture 27:** Online Travel Services Online communities
	Lecture 28: Online Communities and auctions
15	**Lecture 29:** Social networks
	Lecture 30: E-commerce portals
16	Presentation- With Faculty review/ Group Final Presentation
17	Final Exam

Suggested Readings:

- Dave Chaffey (2022) "E-Business and E-Commerce Management" 4th edition

- David Whitley (2021) E-Commerce-Strategy, Technologies & Applications, TMH

- Kamlesh K. Bajaj, (2021) E-Commerce- The cutting edge of business by TMH

Electronic Communication Devices

Faculty	: Faculty of Arts, Science, Commerce and Management
Course Code	: 22IREN015
Department	: Physics
Day(s) of the Week	: Tuesday
Course Time/ Session	: 14:10-16:00 (Indian time)
No. of Sessions	: 18
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Dr. S.Saira Banu
E-mail	: electronics.hod@@kahedu.edu.in
Prerequisite	: Students pursuing Degree or Diploma in Physics / Electronics / Electronics and Communication System can register this course.

Course Objectives:

- To enable the students to learn the basic principles used in communication systems
- To provide knowledge about communication medium, transmitter, receiver and modulation techniques
- To design simple systems for generating and demodulating AM and FM Signals.
- Analyze pulse modulation and sampling techniques.

Course Outcomes:

- Determine the performance of analog communication systems
- Determine the performance of modulation schemes in time and frequency domains.
- Determine the performance of systems for generation and detection of modulated analog signals.
- Understand the characteristics of pulse modulation and sampling techniques.

Weekly syllabus

Week	Lecture Topics
1	**Lecture 1:** Wave Propagation
	Lecture 2: EM waves, Free space propagation
2	**Lecture 3:** Surface wave propagation
	Lecture 4: Sky wave propagation, Space wave propagation
3	**Lecture 5:** Structure of Atmosphere
	Lecture 6: Skip Distance, Duct Propagation
4	**Lecture 7:** Antennas:
	Lecture 8: Current and Voltage Distribution
5	**Lecture 9:** Resonant antennas

	Lecture 10: radiation patterns and length calculations
6	Lecture 11: Non resonant antennas
	Lecture 12: Antenna gain and Effective radiated power
7	Lecture 13: Antenna resistance, Bandwidth, Beam width and Polarization
	Internal Assessment I
8	Lecture 14: Modulation Techniques: Introduction to Communication Systems
	Lecture 15: Information, Transmitter, Channel, Noise
9	Lecture 16: Receiver, Need for Modulation
	Lecture 17: Band width requirement
10	Lecture 18: Amplitude modulation
	Lecture 19: AM Transmitter block diagram
11	Lecture 20: Frequency modulation
	Lecture 21: Frequency Spectrum, Generation of FM
12	Lecture 22: Single Sideband Modulation
	Lecture 23: Introduction, Principles, Balanced modulator
13	Lecture 24: SSB Generation, SSB Reception Introduction to PAM, PWM and PPM Internal Assessment II
14	Lecture 25: Receiver: Introduction, Super heterodyne Receiver Choice of IF
	Lecture 26: Oscillator Frequencies
15	Lecture 27: AGC
	Lecture 28: Double conversion receiver
16	Lecture 29: Presentation- With Faculty review
17	Lecture 30: Presentation- With Faculty review
18	Group Final Presentation
19	Final Exam

Suggested Readings:

- Communication Systems Engineer A Complete Guide, Gerardus Blokdyk, 2020 Edition, 5STARCooks, ISBN-10 : 1867349612, ISBN-13 : 978-1867349617.

- Introduction to analog and digital communications, Simon Haykin and Michael Moher, Second Edition, John Wiley & Sons, Inc, ISBN: 0471432229

- Modern Digital and Analog Communication (Oxford Series in Electrical and Computer Engineering), B. P. Lathi, Zhi Ding, 5th Edition, Oxford University Press, ISBN-10:0190686847, ISBN-13:978-0190686840.

Engineering Mathematics - I

Faculty	: Faculty of Engineering
Course Code	: 22IREN016
Department	: Department of Science and Humanities
Day(s) of the Week	: Friday
Course Time/ Session	: 11:30-13:30 (Indian time)
No. of Sessions	: 14
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Dr. M. Deivanayaki
E-mail	: deivanayaki.m@kahedu.edu.in
Prerequisite	: Students pursuing degree in Mathematical Sciences, Engineering and Technology can register this course.

Course Objectives:

- To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- To understand geometrical aspects of curvature and elegant application of differential calculus.
- To familiarize the student with functions of several variables

Course Outcomes:

- To solve the rank, Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices and the students will be able to use matrix algebra techniques for practical applications.
- To have basic knowledge and understanding in one field of materials, differential calculus.
- To solve Partial Differential Equations and various Engineering problems.

Weekly Syllabus

Week	Lecture Topics
1	Lecture 1 An Introduction to Characteristic Equation Lecture 2 Eigen Values and Eigen Vectors of a real matrix Lecture 3 Eigen Values and Eigen Vectors : Properties
2	Lecture 5 Cayley Hamilton Theorem Lecture 6 Application of Cayley Hamilton Theorem Lecture 7 Application of Cayley Hamilton Theorem
3	Lecture 8 Diagonalisation Lecture 9 Orthogonal transformation of a symmetric matrix to diagonal form

4	**Lecture** **10** Quadratic forms
	Lecture **11** Reduction to canonical form through orthogonal Reduction
5	**Lecture** **12** Differential Calculus : An Introduction to Derivatives
	Lecture **13** Curvature in Cartesian co-ordinates
	Lecture **14** Centre, radius of curvature and Circle of Curvature
	Internal Assessment I
6	**Lecture** **15** Evolutes – Part 1
	Lecture **16** Evolutes – Part 1
7	**Lecture** **17** Envelopes
	Lecture **18** Problems in Evolutes
	Lecture **19** Evolutes as Envelope of normal
8	**Lecture** **20** Functions of Several Variables: Introduction to Partial Derivatives
	Lecture **21** Total derivative
	Lecture **22** Differentiation of implicit functions
9	**Lecture** **23** Homogeneous functions
	Lecture 24 Euler's theorem (without Proof)
	Lecture 25 Problems based on Application of Eulers Theorem
10	**Lecture** **26** Jacobians
	Lecture 27 Properties of Jacobians
11	**Lecture** **28** Taylor's Series
	Lecture **29** Taylor's Series expansion for two variables
12	**Lecture** **30** Maxima and Minima
	Lecture **31** Maxima and Minima of functions of two variables
13	**Lecture 32** Lagrangian Method of Undetermined Multipliers
	Lecture 33 Application of Lagrange's Method
	Internal Assessment II
14	Group Final Presentation
15	Final Exam

Suggested Readings:

- Grewal B.S., (2017), Higher Engineering Mathematics, 45th Edition, Khanna Publishers, New Delhi.
- Erwin Kreyszig, (2020), Advanced Engineering Mathematics, 10th Edition, John Wiley, India.
- Peter V. O'Neil,(2012), Advanced Engineering Mathematics, 7th Edition, Cengage learning.
- www.efunda.com
- www.mathcentre.ac.uk
- www.intmath.com/matrices-determinants

Engineering Mathematics - II

Faculty	: Faculty of Engineering
Course Code	: 22IREN017
Department	: Department of Science and Humanities
Day(s) of the Week	: Thursday
Course Time/ Session	: 11:30-13:30 (Indian time)
No. of Sessions	: 14
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Dr. R. Janagaraj
E-mail	: janagaraj.rajendran@kahedu.edu.in
Prerequisite	: Students pursuing degree in Mathematical Sciences, Engineering and Technology can register this course.

Course Objectives:

- To solve the rank, Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices and the students will be able to use matrix algebra techniques for practical applications.
- To have basic knowledge and understanding in one field of materials, differential calculus.
- To solve Partial Differential Equations and various Engineering problems.

Course Outcomes:

- To apply integration to compute multiple integrals, area, volume, integrals in polar and Cartesian coordinates, in addition to change of order and vector integration.
- To hone with the concepts of vector calculus, needed for problems in all engineering disciplines.
- Evaluate complex integrals using the Cauchy integral formula and the residue theorem and to appreciate how complex methods can be used to prove some important theoretical results.

Weekly Syllabus

Week	Lecture Topics
1	**Lecture 1:** An Introduction to Multiple Integrals **Lecture 2:** Cartesian Coordinates **Lecture 3:** Polar Coordinates
2	**Lecture 4 :** Area as double Integrals **Lecture 5:** Area as double Integrals - Application
3	**Lecture 6:** Change of order of Integration **Lecture 7:** Problems in Change of order of integration

4	**Lecture 8:** Triple Integrals **Lecture 9:** Triple integration in Cartesian co-ordinates
5	**Lecture 10:** Vector Calculus **Lecture 11:** Gradient, Divergence and Curl Internal Assessment I
6	**Lecture 12** Directional Derivatives **Lecture 13** Irrotational and Solenoidal vector fields
7	**Lecture 14** Vector integration **Lecture 15** Green's theorem, Gauss divergence theorem and Stoke's theorems **Lecture 16** Application of Green's theorem
8	**Lecture 17** Vector integration **Lecture 18** Application of Gauss divergence theorem
9	**Lecture 19** Vector integration **Lecture 20** Application of Stoke's theorem
10	**Lecture 21** Complex Integration **Lecture 22** Cauchy's integral theorem (statement only) **Lecture 23** Cauchy's integral formula (Statement Only)
11	**Lecture 24** Taylor series and Laurent series **Lecture 25** Application of Taylor and Laurent series
12	**Lecture 26** Residues **Lecture 27** Cauchy's residue theorem Internal Assessment II
13	**Lecture 28** Applications of Residue theorem **Lecture 29** Evaluation of real integrals around unit circle **Lecture 30** Evaluation of real integrals around semicircle
14	Group Final Presentation
15	Final Exam

Suggested Readings:

- Grewal B.S., (2017), Higher Engineering Mathematics, 45th Edition, Khanna Publishers, New Delhi.
- Erwin Kreyszig, (2020), Advanced Engineering Mathematics, 10th Edition, John Wiley, India.
- Peter V. O'Neil,(2012), Advanced Engineering Mathematics, 7th Edition, Cengage learning.
- www.intmath.com
- www.efunda.com
- www.mathcentre.ac.uk
- www.sosmath.com/diffeq/laplace/basic/basic.html

Engineering Materials and Metallurgy

Faculty   : Faculty of Engineering
Course Code   : 22IREN018
Department   : Mechanical Engineering
Day(s)of the Week   : Wednesday
Course Time/ Session   : 13:00-16:00 (Indian time)
No. of Sessions   : 12
Grades   : Undergraduate
Credits   : 2
Teaching Mode   : Online
Course Instructor   : Dr.S.Manivannan
E-mail   : manivannan.s@kahedu.edu.in
Prerequisite   : Students pursuing degree in Mechanical Engineering / Metallurgy/ Materials Engineering/ Foundry Engineering/ Materials Science and Engineering/ Process Engineering / Corrosion Engineering/Mineral Process Engineering / Ceramic Engineering/Mater degree in Physics/Material Science/Chemistry can register this course.

Course Objectives:

- To impart knowledge on metallurgical aspects of metals.
- To understand heat treatment processes on different grades of steel.
- To familiarize on selection of ferrous and non-ferrous materials for various applications.
- To impart knowledge on non-metallic materials
- To learn about the strengthening mechanisms for Non-ferrous alloys.
- To comprehend the significance of Non-Destructive Testing (NDT) methods.

Course Outcomes:

- Identify the metallurgical aspects of metals.
- Identify suitable heat treatment processes for various applications.
- Select appropriate ferrous and non-ferrous materials for various applications.
- Identify and select suitable non-metallic materials.
- Identify suitable strengthening mechanisms for Non-ferrous alloys.
- Work with non-destructive testing methods.

Weekly Syllabus

Week	Lecture Topics
1	**Lecture 1** Constitution of alloys **Lecture 2** Solid solutions, substitutional and interstitial **Lecture 3** Phase diagrams, Isomorphous, eutectic, peritectic, eutectoid and peritectoid reactions

2	**Lecture 4** Iron – Iron carbide equilibrium diagram **Lecture 5** Classification of steel **Lecture 6** Cast Iron, microstructure, properties and applications
3	**Lecture 7** Heat Treatment **Lecture 8** Definition – Full annealing, stress relief, recrystallisation and spheroidizing **Lecture 9** Normalising
4	**Lecture 10** Hardening and tempering of steel **Lecture 11** Isothermal transformation diagrams – cooling curves superimposed on TTT diagram, CCT Internal Assessment I
5	**Lecture 12** Ferrous and Non Ferrous Metals **Lecture 13** Effect of alloying elements on steel (Mn, Si, Cr, Mo, V, Ti) **Lecture 14** Stainless and tool steels
6	**Lecture 15** Network Hardware - HSLA - Maraging steels **Lecture 16** Gray, White malleable, Spheroidal Graphite irons **Lecture 17** Copper and Copper alloys – Brass, Bronze and Cupronickel,
7	**Lecture 18** Non-Metallic Materials **Lecture 19** Polymers – types of polymer, commodity and engineering polymers **Lecture 20** Properties and Applications of thermoplastics
8	**Lecture 21** PP, PVC, ABS, and PMMA **Lecture 22** Properties and Applications of PP, PVC, ABS, and PMMA **Lecture 23** T
9	**Lecture 24** Testing of Mechanical Properties and Inspection **Lecture 25** Mechanism of plastic deformation, slip and twinning, Types of fracture
10	**Lecture 26** Testing of materials under tension, compression and shear loads **Lecture 27** Hardness tests (Brinell, Vickers and Rockwell), Impact test - Izod and Charp Internal Assessment II
11	**Lecture 28** Testing of materials in Room Temperature and High Temperatures **Lecture 29** Fatigue **Lecture 30** Creep test, S-N curve
12	Group Final Presentation
13	Final Exam

Suggested Readings:

- G. E. Dieter. Mechanical Metallurgy. 3rd ed., Mc Graw-Hill Book Co., New York, ISBN 0–07–016893–8, (3rd edition), 2017.

- Callister's Materials Science and Engineering, 10th Edition, Global Edition William D. Callister Jr., David G. Rethwisch, ISBN: 978-1-119-45520-2 December 2019.
- Materials Science and Engineering : A First Course by Raghavan, V. Isbn : 9788120350922, eBook ISBN : 9789390544066, Edition : 6th Edition
- Physical Metallurgy, by Prof. Vijendra Singh, Publisher: Standard Publishers Distributors, 2005, ISBN: 8186308636, 9788186308639.
- Metal Forming: Mechanics and Metallurgy by William F. Hosford and Robert M. Caddel (4th edition), Cambridge University Press.
- Composite Materials: Science and Engineering; Krishan K. Chawla, Springer, 2012.
- W.S. Smith: Principles of Materials Science and Engineering, McGraw-Hill.
- Mechanical working of metals-Avitzur.
- Engineering Metallurgy-PartII-Higgins.
- Mechanical Metallurgy- White and Lemay.
- Volume 7: Powder Metallurgy, ASM Handbook – P.K. Samal and J. W. Newkird, ASM (2015).

CMOS Design

Faculty	: Faculty of Engineering
Course Code	: 22IREN019
Department	: Electronics and Communication Engineering
Day(s) of the Week	: Wednesday
Course Time/ Session	: 14:00-16:00 (Indian time)
No. of Sessions	: 14
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Mr.G.R.Mahendra Babu
E-mail	: mahendrababu.gr@kahedu.edu.in

Prerequisite   : Students pursing degree / diploma in Electrical Engineering / Electronics Engineering / Communication Engineering / Computer science Engineering / Embedded Systems / VLSI / Master degree in Physics can register this course.

Course Objectives:

- To learn the MOS process technology.
- To learn the basic MOS Circuits.
- To learn concept of various logic styles.
- To learn the concepts of VLSI implementation strategies.
- To familiarize the concept of Dynamic and Domino CMOS logic.
- To imparts the knowledge in various delay models

Course Outcomes:

- Explain the basic CMOS circuits and the CMOS process technology.
- Design different CMOS circuits using various logic families along with their circuit layout.
- Gain knowledge on complex gates
- Model the digital system using Hardware Description Language.
- Gain exposure on various delay models
- Implement simple circuits using HDL Programming

Weekly Syllabus

Week	Lecture Topics
1	**MOS TECHNOLOGY Lecture 1:** Chip Design Hierarchy – IC Layers – Photolithography and Pattern **Lecture 2:** Transfers – Basic MOS Transistors- CMOS Fabrication: n-well – p-well – twin tub.
2	**Lecture 3:** Latch up and prevention- Layout design rules- physical design **Lecture 4:** Basic concepts, CAD tool sets, physical design of logic gates-

3	**MOS TRANSISTOR PRINCIPLE Lecture 5:** Introduction to MOSFET: Symbols, Enhancement Mode **Lecture 6:** Depletion mode transistor operation –Threshold voltage
4	**Lecture 7:** Drain current derivation – Non-ideal behavior of the MOS Transistor. **Lecture 8:** NMOS and CMOS inverter
5	**Lecture 9:** Determination of pull up to pull down ratio –Delay Models **Lecture 10:** RC Delay model, linear delay model.
6	**Lecture 11:** Gate delays – Logical Effort - CMOS Static Logic **Lecture 12:** Transmission Gate Logic Tri-State Logic –Pass Transistor Logic
7	**Lecture 13:** Dynamic CMOS Logic- Domino CMOS Logic **Lecture 14:** NORA CMOS Logic, True SingleDual rail logic. Internal Assessment II
8	**VERILOG HDL** **Lecture 15:** Hierarchical modeling concepts – **Lecture 16**: Basic concepts: Lexical conventions – Data types
10	**Lecture 17:** Modules and ports. Gate level modeling **Lecture 18**: Dataflow modeling – Behavioral modeling
11	**Lecture 19:** Design examples of Combinational and Sequential circuits **Lecture 20:** Switch level modeling – **Lecture 21:** Functions – UDP concepts.
12	**VLSI IMPLEMENTATION STRATEGIES Lecture 22:** Introduction – Design of Adders: carry look ahead-carry select **Lecture 23:** Carry save. Design of multipliers **Lecture 24:** Array – Braun array
13	**Lecture 25:** Baugh-Wooley Array. Introduction to FPGA – Full custom and Semi-custom design **Lecture 26:** Standard cell design and cell libraries, FPGA building block architectures.
14	Group Final Presentation
15	Final Exam

Suggested Readings:

- Neil.H.E.Weste & David Harris, "CMOS VLSI Design : A circuits and systems perspective", 4th Edition, 2015.
- R. Jacob Baker "CMOS: Circuit Design, Layout and Simulation", Wiley, 2009
- John P Uyemura Chip Design for Submicron VLSI: CMOS layout and simulation,Thomson India Edition 2010
- Samir Palnitkar, VerilogHDL– Guide to Digital Design and Synthesis-3rd Edition, Pearson Education 2003
- Smith.M.J. S Application Specific integrated circuits Pearson Education, New York 2010
  http://cmosedu.com/

Wireless Ad Hoc and Sensor Networks

Faculty	: Faculty of Engineering
Course Code	: 22IREN020
Department	: Computer Science and Engineering
Day(s) of the Week	: Thursday
Course Time/ Session	: 10:00 AM to 12:00PM (Indian time)
No. of Sessions	: 14
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Instructor	: Dr. R. Dhanapal
E-mail	: dhanapal.r@kahedu.edu.in
Prerequisite	: Students pursuing degree or diploma in computer

science/information technology/electronics and communication can register this course.

Course Objectives:

- To develop and understand the modern network architectures from design and performance perspective and Introduce the student to the major concepts wireless ad hoc and sensor networks.
- To develop the characteristics/features such as ability for infrastructure-less setup, minimal or no reliance on network planning and the ability of the nodes to self-organize and self-configure without the involvement of a centralized network manager, router, access point, or a switch.
- To provide an opportunity to do adhoc and sensor network programming.
- To design and implement a wireless adhoc network protocol.

Course Outcomes:

- To build an understanding of the fundamental concepts of adhoc & wireless sensor networks, UAV Networks, Underwater Sensor Networks and Security in Wireless Sensor Networks.

Weekly Syllabus:

Week	Lecture Topics
1	**Lecture 1:** Introduction: Wireless Ad Hoc Networks
	Lecture 2: Self-organizing Behaviour of Wireless Ad Hoc Networks
	Lecture 3: Cooperation in Mobile Ad Hoc Networks- Part- I
2	**Lecture 4:** Cooperation in Mobile Ad Hoc Networks- Part- II
	Lecture 5: MAC Protocols in MANETs- Part- I
	Lecture 6: MAC Protocols in MANETs- Part- II
3	**Lecture 7:** Routing in MANETs- Part- I
	Lecture 8: Routing in MANETs- Part- II
	Lecture 9: Routing in MANETs- Part- III

4	**Lecture 10:** Multicasting in MANETs **Lecture 11:** Mobility Models for MANETs **Lecture 12:** Transport Protocols for MANETs- Part- I Internal Assessment I
5	**Lecture 13:** Transport Protocols for MANETs- Part- II **Lecture 14:** Opportunistic Mobile Networks- Part- I **Lecture 15:** Opportunistic Mobile Networks- Part- II
6	**Lecture 16:** UAV Networks- Part- I **Lecture 17:** Introduction: Wireless Sensor Networks- Part- I **Lecture 18:** Introduction: Wireless Sensor Networks- Part- II
7	**Lecture 19:** WSN Coverage & Placement- Part-I **Lecture 20:** Topology Management in Wireless Sensor Network **Lecture 21:** Mobile Wireless Sensor Networks
8	**Lecture 22:** Mobile Wireless Sensor Networks **Lecture 23:** Medium Access Control in Wireless Networks- Part-I **Lecture 24:** Medium Access Control in Wireless Networks- Part-II Internal Assessment II
10	**Lecture 25:** Routing in Wireless Sensor Networks **Lecture 26:** Congestion and Flow Control- Part- I **Lecture 27:** Congestion and Flow Control- Part- II
11	**Lecture 28:** Underwater Sensor Networks- Part- I **Lecture 29:** Underwater Sensor Networks- Part- II **Lecture 30:** Underwater Sensor Networks- Part- III
12	**Lecture 31:** Underwater Sensor Networks- Part- IV **Lecture 32:** Security of Wireless Sensor Networks- Part- I **Lecture 33:** Security of Wireless Sensor Networks- Part- II
13	**Lecture 34:** Simulation Design of Adhoc Network, Wireless Network, **Lecture 35:** Simulation design of WSN
14	Group Final Presentation
15	Final Exam

Suggested Readings:

- Ilyas, Mohammad. "The Handbook of Ad hoc Wireless Networks" CRC press, 2017.
- Loo, J., Lloret Mauri, J., & Hamilton Ortiz, J. "Mobile ad hoc networks: current status and future trends (p. 538). Taylor & Francis, 2011.
- Rehmani, Mubashir Husain, and Al-Sakib Khan Pathan, eds. "Emerging communication technologies based on wireless sensor networks: current research and future applications." CRC Press 2016.
- Waltenegus Dargie, Christian Poellabauer "Fundamentals of Wireless Sensor Networks Theory and Practice" Wiley, 2010.
- Al-Sakib Khan Pathan "Security of Self-Organizing Networks MANET, WSN, WMN, VANET" CRC press, 2010.

- Ivan Stojmenovic, Marco Conti, Silvia Giordano, Stefano Basagni "Mobile Ad Hoc Networking Cutting   Edge Directions "Wiley,2013.
- http://www.oldcitypublishing.com/journals/ahswn-home/
- https://www.ietf.org/rfc/rfc3561.txt

Repairs & Rehabilitation of RC Structures

Faculty	: Faculty of Engineering
Department	: Civil Engineering
Course Code	: 22IREN021
Day of the Week	: Thursday
Course Time /Session	: 11.00 to 12.00 (Indian Time)
No. of Sessions	: 14
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Instructor	: Ms. R. Sindhu
E-Mail	: sindhu.r@kahedu.edu.in
Prerequisite	: Students pursuing Bachelor degree in Civil Engineering

or Master degree in Structural Engineering, Infrastructure Systems and Construction technology and Management can register this course.

Course Objectives

- To identify various causes of deterioration or damage in concrete structures in this course.
- To assess the approach as well as the various testing procedures that are used.
- To develop the repair procedures and their application when performing repair work on-site will be addressed.

Course Outcomes

- Maintenance and Repair Strategies, Strength and Durability of Concrete, Special Concretes, Techniques for Repair and Protection Methods, Repair, Rehabilitation and Retrofitting of Structures,
- Concrete assessment and load effects, Non-destructive, partially-destructive tools to assess the condition of the structure, Repair, Rehabilitation and Retrofitting techniques.

Weeks	Lecture Topics
1	**Lecture 1** - Maintenance, Repair and Rehabilitation, Various aspects of Inspection
	Lecture 2 - Assessment procedure for evaluating a damaged structure
	Lecture 3 - Causes of deterioration
2	**Lecture 4** - Quality assurance for concrete
	Lecture 5 - Strength, Durability and Thermal properties, of concrete
	Lecture 6 - Cracks, different types, causes
3	**Lecture 7** - Effects due to climate, temperature
	Lecture 8 - Corrosion
4	**Lecture 9** - Effects of cover thickness.
	Lecture 10 - Non-destructive Testing Techniques,

5	**Lecture 11** - Epoxy injection,
	Lecture 12 - Shoring, Underpinning,
6	**Lecture 13** - Corrosion protection techniques
	Lecture 14 - Strengthening of Structural elements,
7	Internal Assessment 1
	Lecture 16 - Repair of structures distressed due to corrosion
8	**Lecture 17** - fire, Leakage, earthquake
	Lecture 18 - Demolition Techniques
9	**Lecture 19** - Engineered demolition methods –
	Lecture 20 - Case studies.
10	**Lecture 21**- Polymer concrete,
	Lecture 22 - Sulphur infiltrated concrete
11	**Lecture 23** - Fibre reinforced concrete
	Lecture 24 - High strength concrete, High performance concrete
12	**Lecture 25** - Vacuum concrete
	Lecture 26 -Self-compacting concrete
13	**Lecture 27**- Geopolymer concrete, Reactive powder concrete
	Lecture 28 - Concrete made with industrial wastes
14	Internal Assessment II
15	Final Exam

Suggested Readings

- Varghese, P. C. Maintenance, Repair & Rehabilitation and Minor Works of Buildings. PHI Learning Pvt. Ltd., 2014.
- Raupach, Michael, and Till Büttner. *Concrete repair to EN 1504: diagnosis, design, principles and practice*. CRC Press, 2014.
- Woodson, R. Dodge. *Concrete structures: protection, repair and rehabilitation*. Butterworth-Heinemann, 2009.

Computer Networks

Faculty	: Faculty of Engineering
Course Code	: 22IREN022
Department	: Computer Science and Engineering
Day of the Week	: Wednesday
Course Time / Lecture	: 10:00 AM to 01:00PM (Indian Time)
No. of Sessions	: 10
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Instructor	: Mr. T. Mohanraj
E-mail	: mohanraj.t@kahedu.edu.in
Prerequisite	: To undertake this course, students should have Basic

knowledge of Computer fundaments and networking, Computer Organizations and Systems or Diploma in Computer Science, Diploma in Networking

Course Objectives:

- This course deals with fundamentals of computer network.
- To understand the various network models, types and OSI layers.
- To build an understanding of the fundamental concepts of computer &computer networks, advanced networking concepts, network standards & protocols, mobile phone networks and network security.

Course Outcomes:

- Computer Network Course provides basic and advanced concepts of Data Communication & Networks (DCN).
- Our Computer Networking Course is designed for students at beginner level.
- Our Computer Network Course includes all topics of Computer Network such as introduction, features, types of computer network, architecture, hardware, software, internet, intranet, website, LAN, WAN, etc.

Week	Lecture Topics
1	**Lecture 1:** An Introduction to Computer
	Lecture 2: Computer : History and Development
	Lecture 3: Evolution of Computer
2	**Lecture 4:** Overview of Computer: Input Devices, Part-1
	Lecture 5: Overview of Computer: Input Devices, Part-2
	Lecture 6: Overview of Computer: Input Devices, Pat-3
3	**Lecture 7:** Overview of Computer: Output Devices, Part-1
	Lecture 8: Overview of Computer: Output Devices, Part-2
	Lecture 9: Computer: Audio Input and Output Devices
4	**Lecture 10:** An Introduction to Computer - Operating System

	Lecture 11: Operating System Software
	Lecture 12: Computer: Memory Management
	Lecture 13: Computer: Cabinet, Power Supply & Ups
	Internal Assessment I
5	**Lecture 14:** An Introduction to Computer - Networking
	Lecture 15: Fundamental of Computer Networks
	Lecture 16: Network Hardware
6	**Lecture 17:** Network Hardware - Advanced Devices
	Lecture 18: Network Software
	Lecture 19: OSI Reference Model
7	**Lecture 20:** Computer Network Examples & Network Lab Setup
	Lecture 21: Network Standards & Protocols
	Lecture 22: The Physical Layer
8	**Lecture 23:** Network Communication & Transmission Media
	Lecture 24: Computer Networks: Modulation
	Lecture 25: Multiplexing
	Lecture 26: Public Switched Telephone Network
9	**Lecture 27:** The Mobile Phone Network
	Lecture 28: Data Link Layer
	Lecture 29: Medium Access Control
	Internal Assessment II
10	**Lecture 30:** Wireless LAN
	Lecture 31: Bluetooth
	Lecture 32: Radio Frequency Identification Technology
11	Final Exam

Suggested Readings

- Andrew S. Tanenbaum, Computer Networks, Third Edition, Prentice Hall of India Private Limited, New Delhi.
- Stallings W., Data and Computer Communications, Pearson Education, 7th Edition, 2003.
- Stallings W., Wireless Communication and Networks, Pearson Education, 2nd Edition, 2004.
- Data Communication & Computer Networks (First Edition) by Tanmaya Kumar Das and Dillip Kumar Mahapatra.
- Telecommunications: A Beginner's Guide (Network Professional's Library) by Inc. Hill Associates.
- Cisco Networks: Engineers' Handbook of Routing, Switching, and Security with IOS, NX-OS, and ASA by Christopher Carthern and William Wilson.
- https://www.brainkart.com/subject/Computer-Networks_134/
- https://www.brainkart.com/subject/Computer-Programming_107/

Design of Machine Elements

Faculty   : Faculty of Engineering
Course Code   : 22IREN023
Department   : Mechanical Engineering
Day of the Week   : Tuesday
Course Time/ Session   : 10:00 to 12:00 (Indian Time)
No. of Sessions   : 11
Grades   : Undergraduate
Credits   : 2
Teaching Mode   : Online
Instructor   : Mr. S. Aravind
E-mail   : aravind.s@kahedu.edu.in
Prerequisite   : To undertake this course, students should have knowledge on the courses Engineering Mechanics, Strength of Materials, Theory of Machines.

Course Objectives:

- To make student to understand the various types of stresses induced in different machine members
- To Study and acquire knowledge on design shaft and couplings for effective transmission of power, to study the features of welded joints and fasteners required for various industrial applications
- To design springs and flywheels for various engineering applications, to understand the importance design bearings and levers for engineering applications, to make the students conversant to implement design procedure for designing a machine.

Course Outcome:

- To design components subjected to steady and variable stresses by considering stress concentration and able to apply various theories of failure, design solid and hollow shafts based on strength and ASME code
- To design flange coupling and bush pin type coupling, design bolted joints and welded joints subjected to axial and eccentric loading, will be able to design helical spring, leaf spring subjected to steady and variable loading, able to select ball bearings for the given application and design a journal bearing.

Week	Lecture Topics
1	**Lecture 1:** Introduction to the design process – factors influencing machine design, selection of materials based on mechanical properties – Factor of safety. Direct, Bending and torsional stress equations – **Lecture 2:** Impact and shock loading – calculation of principal stresses for various load combinations, eccentric loading - Problems from Direct, Bending and torsional stress equations.
2	**Lecture 3:** Theories of failure – Problems, Stress concentration – Problems, Design for variable loading – Soderberg, Goodman

	relations, Problems from design for variable loading
3	**Lecture 4:** Design of solid and hollow shafts based on strength, ASME Code, Problems from design of shafts
4	**Lecture 5:** Design of keys and key ways – problems, Design of rigid and flexible couplings, Problems Internal Assessment I
5	**Lecture 6:** Threaded fasteners – Design of bolted joints including eccentric loading, Problems
6	**Lecture 7:** Design of welded joints for pressure vessels and structures, Problems
7	**Lecture 8:** Design of helical spring under constant loads and varying loads, problems Internal Assessment II
8	**Lecture 9:** Design of leaf spring under constant loads and varying loads, problems
9	**Lecture 10:** Selection of bearings –rolling contact types, Problems from selection of ball bearings
10	**Lecture 11:** Sliding contact bearings– Cubic mean load – Selection of journal bearings – McKees equation – **Lecture 12:** Lubrication in journal bearings – calculation of bearing dimensions, Problems from design of Journal bearing
11	Final Exam

Suggested Readings

- Juvinall R.C and Marshek K.M, Machine Component Design, 5th Edition, John Wiley and Sons, New Delhi, 2016
- Bhandari V.B, Design of Machine Elements, 4e, Tata McGraw–Hill Book Co, New Delhi, 2016
- Spotts M.F, Design of Machine Elements, 8th edition, Pearson Education, New Delhi, 2019
- R S Khurmi & J. K. Gupta, A Textbook of Machine Design, 34th edition, S. Chand Publishing, 2019
- Design Data: Data Book of Engineers by PSG College-Kalaikathir Achchagam

Thermodynamics – 2

Faculty	: Faculty of Engineering
Course Code	: 22IREN024
Department	: Mechanical Engineering
Day(s) of the Week	: Thursday
Course Time/ Session	: 10:00-13:00 Hrs (Indian time)
No. of Sessions	: 11
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Dr. Debabrata Barik
E-mail	: debabrata.barik@kahedu.edu.in
Prerequisite	: Students pursuing degree in Mechanical, Automobile or

Energy Science are eligible to register for the course.

Course Objectives:

- To apply the thermodynamic concepts in steam turbines and nozzles.
- To impart the mechanisms of combustion of fuels.
- To introduce concepts of refrigeration and air conditioning in engineering applications

Course Outcomes:

- Evaluate the characteristic of steam turbines and nozzles.
- Calculate the efficiency of various gas power cycles.
- Identify and utilize the concepts of refrigeration and air conditioning in engineering applications

Weekly Syllabus

Week	Lecture Topics
1	**Lecture 1:** Introduction to steam power cycle
	Lecture 2: Rankine cycle
	Lecture 3: Reheated Rankine cycle
2	**Lecture 4:** Tutorial 1: Rankine cycle and Reheated Rankine cycle
	Lecture 5: Regenerated Rankine cycle
	Lecture 6: Tutorial 2: Regenerated Rankine cycle
	Lecture 7: Formation of Steam – PVT behavior of pure substance
3	**Lecture 8:** Steam nozzles, Effect of friction
	Lecture 9: Critical pressure ratio, super saturated flow
	Lecture 10: Tutorial 3: Flow through steam nozzles

4	**Lecture 11:** Otto Cycle- Mean effective pressure and air standard efficiency **Lecture 12:** Tutorial 4: Performance analysis for Otto cycle **Lecture 13:** Diesel Cycle- Mean effective pressure and air standard efficiency **Lecture 14:** Tutorial 5: Performance analysis for Diesel cycle Internal Assessment I
5	**Lecture 15:** Dual Cycle- Mean effective pressure and air standard efficiency **Lecture 16:** Tutorial 6: Performance analysis for Dual cycle **Lecture 17:** Brayton Cycle- Mean effective pressure and air standard efficiency
6	**Lecture 18:** Tutorial 7: Performance analysis for Brayton cycle **Lecture 19:** Actual and theoretical PV and TS diagram **Lecture 20:** Performance comparisons for Otto, Diesel, and Dual cycle considering compression ratio, cutoff ration and pressure ratio.
8	**Lecture 21:** Fundamentals of refrigeration – COP **Lecture 22:** Vapor compression refrigeration system (VCRS), cycle, p–h chart **Lecture 23:** Tutorial 8: Performance analysis for VCRS
9	**Lecture 24:** Vapor absorption refrigeration system (VARS) **Lecture 25:** Comparisons between VCRS and VARS **Lecture 26:** Properties of ideal refrigerants **Lecture 27:** Fundamentals of air conditioning system-Psychrometry
10	**Lecture 28:** Tutorial 9: Conditioned air property calculation **Lecture 29:** Summer and winter air-conditioning systems **Lecture 30:** Air handling and distribution through duct Internal Assessment II
11	Group Final Presentation
12	Final Examination

Suggested Readings

・ Muller Ingo, Fundamentals of Thermodynamics and Applications. Springer-Verlag Berlin and Heidelberg GmbH & Co. KG.; 1st edition, 2021.

・ Claus Borgnakke and Richard E. Sonntag. Fundamentals of Thermodynamics. Wiley publication; 1st edition, April 2022.

・ Takahiro Sagawa, Entropy, Divergence, and Majorization in Classical and Quantum Thermodynamics. Springer; 1st edition, March 2022.

・ Detlef Klimm. Thermal Analysis and Thermodynamics: In Materials Science. De Gruyter; 1st edition, April 2022.

Human Anatomy and Physiology

Faculty   : Faculty of Engineering
Course Code   : 22IREN025
Department   : Biomedical Engineering
Day(s) of the Week   : Tuesday
Course Time/ Session : 10:00-01:00 (Indian time)
No. of Sessions   : 12
Grades   : Undergraduate
Credits   : 2
Teaching Mode   : Online
Course Instructor   : Dr. K. Yamini Yasoda
E-mail   : yaminiyasoda.karunanandham@kahedu.edu.in
Prerequisite   : Students pursuing degree or diploma in biological sciences, zoology, microbiology, biotechnology, pharmacy, genomics can register this course

Course Objectives:

• Perceive the structure and functioning of the numerous types of human bodily systems.
• To provide an overview of the human eye, ear, and endocrine glands.
• To learn about the organs and structures that plays a role in the creation and function of a system.
• To get a fundamental knowledge of the connectivity of diverse organ systems in the human body.

Course Outcomes:

• Explain the fundamental structure and activities of cells and their organelles after completing this course.
• Show anatomy and physiology of various organ systems.
• Explain the interconnection of various organ systems in the human body.
• Enlighten organs and structures involved in system development and functioning and explain particular senses in the human body.

Weekly Syllabus

Week	Lecture Topics
1	Lecture 1 Structure of Cell– Organelles and description Lecture 2 Function of each component of the cell Lecture 3 Membrane and Action potential
2	Lecture 4 Generation and Conduction –Electrical Stimulation Lecture 5 Blood Cell Lecture 6 Composition
3	Lecture 7 Origin of RBC–Blood Groups Lecture 8 Estimation of RBC, WBC and Lecture 9 Platelet-Tissues and its functions

4	**Lecture 10** Homeostasis **Lecture 11** Tissue: Types – Specialized tissues – functions **Lecture 12** Heart, Major blood vessels– Cardiac Cycle Internal Assessment I
5	**Lecture 13** ECG–Conducting system of heart-importance of blood groups – identification of blood groups **Lecture 14** Nervous Control of Heart- Cardiac output–Coronary **Lecture 15** Peripheral Circulation – Structure and function of Nervous tissue–Neuron -Synapse
6	**Lecture 16** Reflexes -Receptors -Brain- Brainstem -Spinal cord– Reflex action **Lecture 17** Physiological aspects of respiration –Trachea and lungs -Exchange of gases **Lecture 18** Regulation of Respiration -Disturbance of respiration function -Pulmonary function test
7	**Lecture 19** Types of respiration - Oxygen and carbon dioxide transport and acid base regulation. **Lecture 20** Muscles-tissue-types- structure of skeletal muscle-types of muscle and joints **Lecture 21** Organisation of GI System, Digestion and absorption –Movements of GI tract–Intestine
8	**Lecture 22** Liver- Pancreas **Lecture 23** Structure of Nephron–Mechanism of Urine formation **Lecture 24** Urine Reflex–Skin and Sweat Gland–Temperature regulation Internal Assessment II
9	**Lecture 25** Lymphatic: Parts and Functions of Lymphatic systems **Lecture 26** Types of Lymphatic organs and vessels **Lecture 27** Optics of Eye–Retina
10	**Lecture 28** Photochemistry of Vision **Lecture 29** Accommodation -Neurophysiology of vision **Lecture 30** EOG, Physiology of internal ear
11	**Lecture 31** Mechanism of Hearing–Auditory Pathway **Lecture 32** Hearing Tests– Endocrine **Lecture 33** Pituitary and thyroid glands
12	Group Final Presentation
13	Final Exam

Suggested Readings

- Ross and Willson Anatomy and Physiology in Health and Illness, Anne Waugh and Allison Grant, last update: November 29, 2021, Publishers: ELSEVIER
- Christine Miller, Human Biology: Human Anatomy and Physiology, 2020
- Ganongs review of medical physiology, 26th edition, Kim E. Brette, 2019
- Anatomy & Physiology-I, OpenStax College, Anatomy & Physiology. OpenStax College, 25 April 2013
- Guyton and Hall, Textbook of Medical Physiology, 2011.
- Tortora's Principles of Anatomy & Physiology, Global Editions, Fifteenth, Wiley Publishers

Instrumental Methods of Analysis (Spectroscopy)

Faculty   : Faculty of Pharmacy

Course Code   : 22IREN026

Department   : Pharmacy

Day(s) of the Week   : Thursday

Course Time/ Session   : 12:10 – 14.00 (Indian Time)

No. of Sessions   : 17

Grades   : Undergraduate

Credits   : 2

Teaching Mode   : Online

Course Instructor   : Dr. S.Sathianarayanan

E-mail   : sathianarayanan.sankara@kahedu.edu.in

Prerequisite   : Students pursuing Degree or Diploma in Pharmacy, Bachelor of Pharmacy, and Master of pharmacy having specialization in Pharmaceutical Analysis can register this course.

Course Objectives:

- Analytical chemistry of organic substances, basic principles, instrumentation, and applications in pharmaceutical/analytical chemistry are all covered in this course.
- To strengthen the fundamental ideas of spectroscopic analysis.

Course Outcomes:

- To remember the theory of spectroscopy, spectrophotometer instrumentation,
- To understand the qualitative and quantitative determination of organic molecules

Weekly Syllabus

Week	Lecture Topics
1	**UV Visible spectroscopy Lecture 1:** Introduction about Spectroscopy. **Lecture 2:** Absorption spectroscopy, Electronic transitions
2	**Lecture 3:** Beer and Lambert's law, Derivation and deviations. **Lecture 4:** General Introduction about UV and Vis spectroscopy.
3	**Lecture 5:** Instrumentation - Sources of radiation, wavelength selectors **Lecture 6:** Detectors, Single Channel and Multi-channel detectors.
4	**Lecture 7:** Factors affecting UV/ Vis Spectroscopy **Lecture 8:** Application of UV/ Vis Spectroscopy
5	**Flourimetry**: **Lecture 9:** Theory of Flouremetry, Factors Affecting Fluorescence Intensity. **Lecture 10:** Instrumentation. Quenching, Application of Flourimetry
6	**IR Spectroscopy Lecture 11:** Introduction, Theory of IR Spectroscopy **Lecture 12:** Fundamental modes of vibrations in poly atomic molecules, Vibrational Frequency Internal Assessment I

7	**Lecture 13:** Factors affecting vibrations
	Lecture 14: Instrumentation - Sources of radiation, wavelength selectors, Sample Cell
8	**Lecture 15:** Sample Handling, Detectors, Read out Device
	Lecture 16: Basics of FTIR. Application of IRS Spectroscopy.
10	**NMR Spectroscopy:** **Lecture 17:** Principles of H-NMR, Shielding and De Shielding.
	Lecture 18: Reference Standard Chemical shift, , Factors affecting chemical shift,
11	**Lecture 19:** Spin - spin coupling, coupling constant,
	Lecture 20: , Instrumentation of NMR
12	**Lecture 21:** Application of NMR spectroscopy
	Lecture 22: Basic Concepts of Spectral Interpretation.
	Internal Assessment II
13	**Lecture 23:** Introduction, Principle, Different types of Ions formed in Mass spectroscopy
	Lecture 24: Ionization process.
14	**Lecture 25:** Ionization process.
	Lecture 26: Instrumentations: Electron Impact Mass analyzer, Quadrupole and Time of flight Mass analyzer
15	**Lecture 27:** Application of Mass Spectra.
	Lecture 28: Flame Photometry-Principle, , instrumentation and applications
16	**Lecture 29:** Atomic absorption spectroscopy- Principle,instrumentation and applications
	Lecture 30: Nepheloturbidometry Principle, instrumentation and
17	Group Final Presentation
18	Final Exam

Suggested Readings:

- Instrumental Methods of Chemical Analysis by B.K Sharma Publisher, Krishna Prakashan Media, 1981. ISBN, 8182830192, 9788182830196.
- Organic spectroscopy by Y.R Sharma S. Chand Publishing, 2007 - Science
- Text book of Pharmaceutical Analysis by Kenneth A. Connors. John Wiley & Sons, Inc., 605 Third Edition., New York
- Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel, 5th edition, 1989.
- Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
- Organic Chemistry by I. L. Finar
- Organic spectroscopy by William Kemp 1975. 3rd Edition.
- Quantitative Analysis of Drugs by D. C. Garrett
- Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
- Spectrophotometric identification of Organic Compounds by Silverstein
- Nuclear Magnetic Resonance Spectroscopy, Teresa Lehman 2021. published in Magneto chemistry.

- NMR Spectroscopy: Basic Principles, Concepts and Applications in Chemistry, Harald Günther 3rd Edition, 2020,
- IR and Raman Spectroscopy, 2021. Wartewig Siegfried, Wiley Publishers.

- NMR Spectroscopy: Basic Principles, Concepts and Applications in Chemistry, Harald Günther 3rd Edition, 2020,
- IR and Raman Spectroscopy, 2021. Wartewig Siegfried, Wiley Publishers.

Industrial Pharmacy-I

Faculty	: Faculty of Pharmacy
Course Code	: 22IREN027
Day(s) of the Week	: Monday
Course Time/ Session	: 14:10 – 16.00 .P.M
No. of Sessions	: 15
Department	: Pharmacy
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Mrs.K.Gayathri
E-mail	: gayathri.k@kahedu.edu.in
Prerequisite	: Students pursuing Degree or Diploma in Pharmacy,

Bachelor of Pharmacy, and Master of pharmacy having specialization in Pharmaceutics can register this course.

Course Objectives:

- It enables the student to understand and appreciate the influence of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.
- To discover various formulation considerations in development of pharmaceutical dosage forms like tablets, capsules, etc., and it evaluation tests.

Course Outcomes:

- To understand and appreciate the influence of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.
- To discover various formulation considerations in development of pharmaceutical dosage forms like tablets, capsules, and it evaluation tests.

Week	Lecture Topics
1	**Lecture 1:** Preformulation Studies: Introduction to preformulation, goals and objectives, study of physicochemical characteristics of drug substances
	Lecture 2: Physical properties: Physical form (crystal & amorphous), particle size, shape, flow properties, solubility profile (pKa, pH, partition coefficient), polymorphism
2	**Lecture 3:** Chemical Properties: Hydrolysis, oxidation, reduction, racemisation, polymerization
	Lecture 4: BCS classification of drugs & its significant
3	**Lecture 5:** Application of preformulation considerations in the development of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.
	Lecture 6: Introduction, ideal characteristics of tablets, classification of

	tablets. Excipients, Formulation of tablets, granulation methods, compression and processing problems. Equipments and tablet tooling.
4	**Lecture 7:** Tablet coating: Types of coating, coating materials, formulation of coating composition, methods of coating, equipment employed and defects in coating.
	Lecture 8: Quality control tests: In process and finished product tests
5	**Lecture 9:** Liquid orals: Formulation and manufacturing consideration of syrups and elixirs suspensions and emulsions; Filling and packaging; evaluation of liquid orals official in pharmacopoeia
	Lecture 10: Hard gelatin capsules: Introduction, Production of hard gelatin capsule shells. Size of capsules, Filling, finishing and special techniques of formulation of hard gelatin capsules, manufacturing defects.
6	**Lecture 11:** In process and final product quality control tests for capsules.
	Lecture 12: Soft gelatin capsules: Nature of shell and capsule content, size of capsules, importance of base adsorption and minim/gram factors, production, in process and final product quality control tests.
7	**Lecture 13:** Packing, storage and stability testing of soft gelatin capsules and their applications.
	Lecture 14: Pellets: Introduction, formulation requirements, pelletization process, equipments for manufacture of pellets
8	Internal Assessment 1
9	**Lecture 16:** Parenteral Products: a. Definition, types, advantages and limitations. Preformulation factors and essential requirements, vehicles, additives, importance of isotonicity.
	Lecture 17: Production procedure, production facilities and controls, aseptic processing
10	**Lecture 18:** Formulation of injections, sterile powders, large volume parenteral and lyophilized products.
	Lecture 19: Containers and closures selection, filling and sealing of ampoules, vials and infusion fluids. Quality control tests of parenteral products.
11	**Lecture 20:** Ophthalmic Preparations: Introduction, formulation considerations; formulation of eye drops, eye ointments and eye lotions; methods of preparation; labeling, containers; evaluation of ophthalmic preparations
	Lecture 21: Cosmetics: Formulation and preparation of the following cosmetic preparations: lipsticks, shampoos, cold cream

12	**Lecture 22:** Formulation and preparation of vanishing cream, tooth pastes, hair dyes and sunscreens
	Lecture 23: Pharmaceutical Aerosols: Definition, propellants, containers, valves, types of aerosol systems
13	**Lecture 24:** Formulation and manufacture of aerosols;
	Lecture 25: Evaluation of aerosols; Quality control and stability studies
14	**Lecture 26:** Packaging Materials Science: Materials used for packaging of pharmaceutical products, factors influencing choice of containers
	Lecture 27: Legal and official requirements for containers **Internal assessment II**
15	**Lecture 28:** stability aspects of packaging materials
	Lecture 29: Quality control tests.
16	**Final exam**

Suggested Readings:

- Remington: The Science and Practice of Pharmacy, 22nd edition Pharmaceutical Science (RPS).2013.
- Theory and Practice of Industrial Pharmacy by Liberman & Lachman.2021,4th Edition.
- Pharmaceutics-The science of dosage form design b y M.E.Aulton, Churchill livingstone,2013,4th Edition.
- Introduction to Pharmaceutical Dosage Forms by H.C.Ansel, Lea &Febiger, Philadelphia, 2015, 9th
  Edition.
- Drug stability - Principles and practice by Cartensen & C.J. Rhodes, 3rd Edition, Marcel Dekker Series, Vol 107,2021.

Physical Pharmaceutics - I

Faculty   : Faculty of Pharmacy
Course Code   : 22IREN028
Day(s) of the Week   : Monday
Course Time/ Session : 11:10 -13:00 (Indian time)
No. of Sessions   : 15
Department   : Pharmacy
Grades   : Undergraduate
Credits   : 2
Teaching Mode   : Online
Course Instructor   : Dr. G.Saravanan,
E-mail   : drsaravanan.g@kahedu.edu.in
Prerequisite   : Students pursuing Degree or Diploma in Pharmacy, Bachelor of Pharmacy, and Master of pharmacy having specialization in Pharmaceutics can register this course.

Course Objectives:

- This course covers the physicochemical properties, and principles involved in dosage forms/formulations.
- The course provides better insight into various areas of formulation research and development.

Course Outcomes:

- To understand the clear idea about solubilization and techniques for identifying the phenomenon, Physical principles of states of matter,
- To remember the principles and concepts of surface tension and its measurement, complexation and protein binding
- To analyse the effect in the formulation of new dosage forms and the importance of pH and buffers in pharmaceutical systems.

Weekly Syllabus

Week	Lecture Topics
1	**Lecture 1:** Solubility of drugs: Solubility expressions, mechanisms of solute solvent interactions. **Lecture 2:** Solubility of drugs: Solubility of gas in liquids, solubility of liquids in liquids.
2	**Lecture 3:** Solubility of drugs: Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. **Lecture 4:** Solubility of drugs: Distribution law, its limitations and
3	**Lecture 5:** Solubility of drugs: Solubility of solid in liquids. **Lecture 6:** Solubility of drugs: Diffusion principles in biological systems.

4	**Lecture 7:** States of Matter: State of matter, changes in the state of matter. **Lecture 8:** States of Matter: Latent heats, vapor pressure, sublimation critical point, eutectic mixtures.
5	**Lecture 9:** States of Matter: Gases, aerosols- inhalers, relative humidity, liquid complexes, and liquid crystals. **Lecture 10:** States of Matter: Glassy states, solid- crystalline, amorphous & polymorphism.
6	**Lecture 11:** Physicochemical properties of drug molecules: Refractive index, optical rotation, Optical Rotatory Rotation. **Lecture 12:** Physicochemical properties of drug molecules: Dielectric constant, dipole moment, dissociation constant. Internal Assessment I
7	**Lecture 13:** Surface and interfacial phenomenon: Liquid interface, surface & interfacial tensions, surface free energy. **Lecture 14:** Surface and interfacial phenomenon: Measurement of surface & interfacial tensions.
8	**Lecture 15:** Surface and interfacial phenomenon: spreading coefficient, adsorption at liquid interfaces. **Lecture 16:** Surface and interfacial phenomenon: Adsorption Isotherms.
9	**Lecture 17:** Surface and interfacial phenomenon: Surface active agents, HLB Scale **Lecture 18:** Surface and interfacial phenomenon: Solubilization, detergency, adsorption at solid interface.
10	**Lecture 19:** Complexation: Introduction, Applications, Classification of Complexation.
11	**Lecture 21:** Complexation: Methods of analysis. **Lecture 22:** Protein binding.
12	**Lecture 23:** Protein binding. **Lecture 24:** pH: Introduction, Sorensen's pH scales.
13	**Lecture 25:** pH: pH determination (electrometric and calorimetric). **Lecture 26:** Buffers: Applications of buffers, buffer equation.
14	**Lecture 27:** Buffers: Buffer capacity, buffers in pharmaceutical and biological systems. **Lecture 28:** Isotonic solutions: Buffered isotonic solution Internal Assessment II
15	**Lecture 29:** Isotonic solutions: Methods to adjust tonicity. **Lecture 30:** Isotonic solutions: Methods to adjust tonicity.
16	**Group Final Presentation** **Final Exam**

Suggested Readings:

- Physical Pharmacy by Alfred Martin: 7th edition, 2021.

- Physical Pharmaceutics by Ramasamy C and ManavalanR, 11th edition, 2020.
- Physical Pharmaceutics by C.V.S. Subramanyam, 1st edition, 2019.
- Test book of Physical Pharmacy, by Gaurav Jain & Roop K. Khar, 8th edition, 2021.
- anong's Review of Medical Physiology Paperback – 1 January 2019 by Barrett

Pharmacology-II

Faculty	: Faculty of Pharmacy
Course Code	: 22IREN029
Department	: Pharmacy
Day(s) of the Week	: Tuesday
Course Time/ Session	: 14:10 -16:00 (Indian time)
No. of Sessions	: 15
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Mr. M. Kannan
E-mail	: m.kannan@kahedu.edu.in
Prerequisite	: Students pursuing Degree or Diploma in Pharmacy,

Bachelor of Pharmacy, and Master of pharmacy having specialization in Pharmacology can register this course.

Course Objectives:

- This course covers the Pharmacology of drugs acting on cardio vascular system, urinary system and endocrine system .The course covers Autocoids and its related drugs and also Bioassay.
- The course provides understanding of classification of drugs, mechanism of action, therapeutic effects, side effects and contraindications

Course Outcomes:

- To understand the classification of drugs, mechanism of action, therapeutic effects, side effects and contraindication on cardio vascular system, urinary system, endocrine system, Autocoids.
- To describe the Principles and applications of bioassay

Weekly Syllabus

Week	Lecture Topics
1	**Lecture 1:** Introduction to hemodynamic and electrophysiology of heart
	Lecture 2: Drugs used in congestive heart failure
2	**Lecture 3:** Anti-hypertensive drugs
	Lecture 4: Anti-anginal drug
3	**Lecture 5:** Anti-arrhythmic drugs
	Lecture 6: Anti-hyperlipidemic drugs
4	**Lecture 7:** Drug used in the therapy of shock ,Hematinics
	Lecture 8: Coagulants and anticoagulants
5	**Lecture 9:** Fibrinolytics ,Anti-platelet drugs
	Lecture 10: Plasma volume expanders, Diuretics
6	**Lecture 11:** Anti-diuretics, Introduction to autacoids and classification
	Lecture 12: Histamine, 5-HT and their antagonists

7		**Lecture 13:** Prostaglandins, Thromboxanes and Leukotrienes
		Lecture 14: Angiotensin, Bradykinin and Substance P.
8		**Lecture 15:** Non-steroidal anti-inflammatory agents
		Lecture 16: Anti-gout drugs, Anti rheumatic drugs
9		**Lecture 17:** Basic concepts in endocrine pharmacology
		Lecture 18: Anterior Pituitary hormones- analogues and their inhibitors
10		**Lecture 19:** Thyroid hormones- analogues and their inhibitors
		Lecture 20: Hormones regulating plasma calcium level- Parathormone, Calcitonin and Vitamin-D
11		**Lecture 21:** Insulin, Oral Hypoglycemic agents and glucagon
		Lecture 22: ACTH and corticosteroids
		Internal Assessment II
12		**Lecture 23:** Androgens and Anabolic steroids
		Lecture 24: Estrogens, progesterone
13		**Lecture 25:** oral contraceptives and Drugs acting on the uterus
		Lecture 26: Bioassay, Principles and applications of bioassay
14		**Lecture 27:** Types of bioassay
		Lecture 28: Bioassay of insulin, oxytocin, vasopressin
15		**Lecture 29:** Bioassay of ACTH,d-tubocurarine,digitalis
		Lecture 30: Bioassay of histamine and 5-HT
16		**Group Final Presentation**
		Final Exam

Suggested Readings:

- Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's harmacology, Churchil Livingstone Elsevier.9th Edition,year of Publication 2021.
- Goodman and Gilman's, The Pharmacological Basis of Therapeutics.10th edition, year of Publication 2001
- Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology, year of Publication 2020.
- K.D.Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi, Edition 8th,year of Publication 2019.
- Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata. Edition 7th,year of Publication 2019
- Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan. Edition 4th,year of Publication 2019.

Etiopathogenisis of Diseases

Faculty	: Faculty of Pharmacy
Course Code	: 22IREN030
Department	: Pharmacology
Day(s) of the Week	: Tuesday
Course Time/ Session	: 10 am -12 pm (IST)
No. of Sessions	: 17
Grades	: Undergraduate
Credits	: 2
Teaching Mode	: Online
Course Instructor	: Dr.K.Elango
E-mail	: elango.kannan@kahedu.edu.in
Prerequisite	: Students pursuing Degree or Diploma in Pharmacy,

Bachelor of Pharmacy, and Master of pharmacy having specialization in Pharmaceutics can register this course.

Course Objectives:

- To impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, Understanding of basic pathophysiological mechanisms.
- To get baseline knowledge required to practice medicine safely, confidently, rationally and effectively.
- To understanding the etiology and pathogenesis of diseases.

Course Outcomes:

- To understand the etiology and pathogenesis of the selected disease states; and also the signs, symptoms, complications and including mechanism of the diseases and also about the Sexually transmitted diseases

WEEKLY SYLLABUS

Week	Lecture Topics
1	**Basic principles of cell injury and Adaptation** **Lecture 1:** Causes, Pathogenesis and morphology of cell injury **Lecture 2:** Abnormalities in lipoproteinaemia, glycogen infiltration and glycogen storage diseases
2	**Inflammation** **Lecture 3:**Pathogenesis of acute inflammation, Chemical mediators in in flammation, Types of chronic inflammation **Lecture 4:**Repairs of wounds in the skin, factors influencing healing of wounds
	Diseases of Immunity **Lecture 5:** Introduction to T and B cells

3	**Lecture 6:** MHC proteins or transplantation antigens **Lecture 7:** Immune tolerance
4	Hypersensitivity **Lecture 8:** Hypersensitivity type I, II, III, IV, Biological significance, Allergy due to food, chemicals and drugs **Lecture 9:** Autoimmunity Criteria for autoimmunity, Classifications of auto immune diseases in man, mechanism of autoimmunity
5	**Lecture 10:** Transplantation and immunologic tolerance, allograft rejections, transplantation antigens, mechanism of rejection of allograft. **Lecture 11:** Acquired immune deficiency syndrome (AIDS) **Lecture 12:** Amylodosis
6	**Lecture 13: Cancer:** Differences between benign and malignant tumors, Histological diagnosis of malignancy, invasions and metastasis, patterns of spread Internal Assessment I
7	**Lecture 14:** Disturbances of growth of cells, classification of tumors, general biology of tumors, spread of malignant tumors **Lecture 15:** Etiology and pathogenesis of cancer.
8	Environmental and nutritional diseases **Lecture 16:** Air pollution and smoking- SO_2, NO, NO_2, and CO **Lecture 17:** Protein calorie malnutrition, vitamins, obesity, pathogenesis of starvation
9	Pathophysiology of common diseases **Lecture 18:** Parkinsonism **Lecture 19:** Schizophrenia **Lecture 20:** Depression and mania
10	Pathophysiology of common diseases **Lecture 21:** Hypertension, **Lecture 22:** Stroke (ischaemic and hemorrhage) **Lecture 23:** Angina, CCF, Atherosclerosis, Myocardial infarction
11	Pathophysiology of common diseases **Lecture 24:** Diabetes Mellitus **Lecture 25:** Peptic ulcer and inflammatory bowel diseases
12	Pathophysiology of common diseases **Lecture 26:** Cirrhosis and Alcoholic liver diseases **Lecture 27:** Acute and chronic renal failure **Lecture 28 :** Asthma and chronic obstructive airway diseases
13	Infectious diseases : **Lecture 29:** Sexually transmitted diseases (HIV,Syphilis,Gonorrhea) **Lecture 30:** Urinary tract infections

14	Infectious diseases : **Lecture 31:** Pneumonia **Lecture 32:**Typhoid
15	Infectious diseases : **Lecture 33:** Tuberculosis, Leprosy, **Lecture 34:** Malaria Dysentery (bacterial and amoebic) **Lecture 35:** Hepatitis- infective hepatitis. Internal Assessment II
16	Group Final Presentation
17	Final Exam

Suggested Readings:

- Pathologic basis of disease by- Cotran, Kumar, Robbins- 10th Edition - May 18, 2020
- Text book of Pathology- Harsh Mohan- 8th Edition, 1 January 2019.
- Text book of Pathology- Y.M. Bhinde - 8th Edition 1 December 2008
- Clinical Pharmacy and Therapeutics; Second edition; Roger Walker; Churchill Livingstone publication-5th Edition, 2012.

Norms for Exchange Program- Projects at KAHE

- Supervision will be provided by the faculty from the KAHE on the project title in the brochure.

- It is recommended that students propose shall at least three Project titles according to their preferences. The title will be assigned based on the supervisor's availability.

- The students shall adhere to the directions given by the supervisor for successful completion of the projects.

- There will be three interim reviews following viva voce examinations for the completion of Project work.

- KAHE Protocols must be followed for the submission of Project report to the supervisors on time.

Karpagam Academy of Higher Education
Project Details for Outbound Students

Project Number	Project Title/ Research Domain	Name of the Faculty	Designation	Department
Faculty of Engineering				
1.	Corrosion Protection Of Metals By Novel Bionano composites	Dr.T.Brindha	Assistant Professor	S&H(Chemistry)
2.	Electronic Products Disposal Process For Greenet World.	Dr. A.Sivanantham	Assistant Professor	Automobile Engineering
3.	Fuzzy Implicative Filter	Dr.V.Nirmala	Assistant Professor	Science And Humanities (Mathematics)
4.	Fluid Dynamics	Dr. M. Deivanayaki	Associate Professor	Science And Humanities
5.	Bio Fluids	Dr. M. Deivanayaki	Associate Professor	Science And Humanities
6.	Casson Nanofluids	Dr. M. Deivanayaki	Associate Professor	Science And Humanities
7.	Crop Yield Prediction In Precision Agriculture	Dr S.P.Sasirekha	Assistant Professor	Computer Science Engineering
8.	Object Detection In Vanet	Dr S.P.Sasirekha	Assistant Professor	Computer Science Engineering
9.	An Efficient Trust Mechanism To Increase The Network Lifetime And Minimize The Coverage Overlapping Problem Large Scale Mobile Adhoc Network	Dr.R.Dhanapal	Assistant Professor	Computer Science And Engineering
10.	Diagnosis Of Diabetic Retinopathy Using Deep Learning	Dr Kamalraj Subramaniam	Professor And Head	Biomedical Engineering
11.	Development Of Phototherapy For Treating Diabetic Foot Ulcer	Dr Kamalraj Subramaniam	Professor And Head	Biomedical Engineering
12.	A Qos Based Smart City Traffic Monitoring And Controlling Using Internet Of Vehicle(Iov) For Vanet	Dr.R.Dhanpal	Assistant Professor	Computer Science And Engineering

13.	An Efficient Voice Based Pill Assistant System For Alzheimer Patients	Dr.R.Dhanpal	Assistant Professor	Computer Science And Engineering
14.	Iot-Based Smart Health Monitoring System For Covid-19 Patients	M. Arun Kumar	Assistant Professor	Biomedical Engineering
15.	Automated Plant Diseases Analysis Using Image Processing And Artificial Intelligence	Dr. Lanitha.B	Associate Professor	Computer Science And Engineering
16.	Vision Based Weed Control System	Dr .Lanitha.B	Associate Professor	Computer Science And Engineering
17.	A Self-Powered, Quasi-Solid-State Biosupercapacitor Based On Flexible Nanoporous Nanoparticle Powering A Heart on the Edge	Dr. K. Yamini Yasoda	Assistant Professor	Biomedical Engineering
18.	Biocompatible Supercapacitors For Medical Devices	Dr. K. Yamini Yasoda	Assistant Professor	Biomedical Engineering
19.	Biosupercapacitors To Replace The Battery In Pacemakers- A Novel Approach	Dr. K. Yamini Yasoda	Assistant Professor	Biomedical Engineering
20.	Workflow Task Execution-Based Prediction In Cloud Using Multi-Tier Machine Learning Approach	Dr.R.Santhosh	Professor & HoD	Computer Science And Engineering
21.	A Security Evaluation Model To Establish Cloud Trust Over The Complex Network Architecture	Dr.R.Santhosh	Professor & HoD	Computer Science And Engineering
22.	Investigation On Carbon Footprint Reduction In Construction Sectors	Dr. V. Johnpaul	Assistant Professor	Civil Engineering
23.	Durability Enhancement In Concrete Structures Through Corrosion Monitoring	Dr. V. Johnpaul	Assistant Professor	Civil Engineering
24.	Study On Construction Waste Demolition	Dr. V. Johnpaul	Assistant Professor	Civil Engineering

	Materials In Concrete			
25.	Synthesis of Nano Composites and Its Application In Water Treatment	Dr. Laxmi Deepak Bhatlu	Associate Professor and Head	Chemical Engineering
26.	Value Addition To Citurs Fruit Waste	Dr. Laxmi Deepak Bhatlu	Associate Professor and Head	Chemical Engineering
27.	Nano Membrane Filters	Dr. Laxmi Deepak Bhatlu	Associate Professor and Head	Chemical Engineering
28.	Development of Novel Formulation for The Treatment of Psoriasis	Dr. R. Thilagavathi	Professor and Head	Biotechnology
29.	Structure Based Virtual Screening	Dr. R. Thilagavathi	Professor and Head	Biotechnology
30.	Computer Aided Drug Discovery	Dr. R. Thilagavathi	Professor and Head	Biotechnology
31.	Ecotoxicology Analysis of Environment Matrix Contaminated with Pollutants	Dr Abiram K. R.	Assistant Professor	Biotechnology
32.	Wood Assistant Fungal System for the Simultaneous Remediation and Production of Value Added Products	Dr Abiram K. R.	Assistant Professor	Biotechnology
33.	Application of Immobilised Biocatalyst for the Production of Value Added Esters	Dr Abiram K. R.	Assistant Professor	Biotechnology
34.	Lot Streaming In Flow Shop Scheduling	Dr.S.Marimuthu	Professor and Head	Mechanical Engineering
35.	Heuristic Algorithm	Dr.S.Marimuthu	Professor and Head	Mechanical Engineering
36.	Aluminium Mmc	Dr.S.Marimuthu	Professor and Head	Mechanical Engineering
37.	Mg Surface Composites With E Waste As Reinforcement For Wear Resistant Applications	P. M. Gopal	Assistant Professor	Mechanical Engineering
38.	Feasibility Studies On Using Mea As Reinforcement In Mg Composites	P. M. Gopal	Assistant Professor	Mechanical Engineering
39.	Characterization Of Bnt Reinforced Mg Alloy	Dr.R.Karuppasamy	Assistant Professor	Mechanical Engineering

	Composite Produced Using Friction Stir Processing			
40.	Investigation Of Mechanical Properties Of Open Cell Aluminium Foam Sandwich Panel.	Dr.R.Karuppasamy	Assistant Professor	Mechanical Engineering
41.	Investigation On The Corrosion Behaviour Of Magnesium Alloy Surface Composites With Hafnium Carbide Fabricated By Fsp	Dr.R.Karuppasamy	Assistant Professor	Mechanical Engineering
42.	Effective Cooling For Lithium Ion Batteries Using Nano Particles	Dr. Debabrata Barik	Professor	Mechanical Engineering
43.	Performance Improvement For Solar Water Heater Using Dimple-Texturing And Twisted Tube Heat Exchanger.	Dr. Debabrata Barik	Professor	Mechanical Engineering
44.	Energy Generation From Waste Heat Using Thermo-Electric Generators	Dr. Debabrata Barik	Professor	Mechanical Engineering
45.	Students Emotion Recognition System For Evaluating Online Classes.	Dr A. Mohanarathinam	Assistant Professor	Biomedical Engineering
46.	Deep Learning Based Fall Detection System Using Gait Analysis	Dr A. Mohanarathinam	Assistant Professor	Biomedical Engineering
47.	Human Posture Detection System For Preventing Musculoskeletal Disorder In Work At Home Environment	Dr A. Mohanarathinam	Assistant Professor	Biomedical Engineering
Faculty of Pharmacy				
48.	Review of Artificial Intelligence In Drug Discovery Process	Dr Hemnath Elango	Associate Professor	Faculty Of Pharmacy
49.	Bioanalytical Method Development And Validation of Allopathic Drug By Rp Hplc	Dr Hemnath Elango	Associate Professor	Faculty Of Pharmacy
50.	Evaluation and Isolation of Phytoconstituents From Vitex Negundo To Treat Rheumatoid Arthritis	Dr Hemnath Elango	Associate Professor	Faculty Of Pharmacy

51.	Enhancing Oral Efficacy Of Selected Drug By Encapsulating In Bilosomes	Dr. G. Saravanan	Professor	Pharmacy
52.	Design, Synthesis and Characterization of Novel Inhibitors For Shikimate Kinase As Antituberculars	Dr. P. Senthil Kumar	Professor	Pharmacy
53.	Nano formulation, Development and Characterization By Using Anticancer Drugs	Dr.M.Raja	Associate Professor	Faculty Of Pharmacy-Pharmaceutics
54.	"Multi-Target Bioactive Compounds As Potential Candidates The Treatment Of Alzheimer's Disease	Dr.D.Kumudha	Professor	Pharmacy
55.	Development of Plumbagin Based Nano Formulation Against Mrsa	Dr S.Sathianarayanan	Professor	Faculty Of Pharmacy
56.	Deployment Of Chitosin Based Nano Particles Against Skin Infections.	Dr S.Sathianarayanan	Professor	Faculty Of Pharmacy
57.	Development of Effective Formulations for Wound Healing Activity -Pre-Clinical Studies	Dr. Elango	Professor	Faculty Of Pharmacy
58.	Neuroprotective Effect of Various Plant Extracts And Combinations Of Different Drugs [Used In The Treatment of Parkinsonism] In Various Drug Induced	Dr. Elango	Professor	Faculty Of Pharmacy
59.	Development of Effective Formulations For Wound Healing Activity -Pre-Clinical Studies	Dr. Elango	Professor	Faculty Of Pharmacy
Faculty of Arts, Science, Commerce and Management				
60.	Endocrinology and targeting the growth factor signalling compounds for cervical cancer treatment	Dr. M Sridhar Muthusami	Associate Professor	Biochemistry
61.	Endocrinology and targeting the growth factor signalling compounds for pancreatic cancer treatment	Dr. M Sridhar Muthusami	Associate Professor	Biochemistry
62.	Characterization and analysis of	Dr.P.Suganyadevi	Assistant Professor	Biochemistry

	pharmacological/nutraceutical properties of pigments isolated from plant source.			
63.	To explore the isolation and Characterization of Anthocyanin from Sea weeds.	Dr.P.Suganyadevi	Assistant Professor	Biochemistry
64.	Engineering of enzymes for environmental applications for wastewater treatment	Dr.Kongkona Saikia	Assistant Professor	Biochemistry
65.	Engineering of enzymes for environmental applications for green chemistry	Dr.Kongkona Saikia	Assistant Professor	Biochemistry
66.	Green Synthesis of Nanomaterials / bioactive compounds to improve the medical applications of indigenous herbs in medical / allied health science sector.	Dr.Rathi M A	Assistant Professor	Biochemistry
67.	Anticancer Property of isolated bioactive principles from various biological sources-in vivo and in vitro study.	Dr.Rathi M A	Assistant Professor	Biochemistry
68.	Isolation of active fraction /principle (s) from medicinal plants, characterization and exploring their applications in cardiovascular diseases and diabetes.	Dr. K. Poornima	Professor	Biochemistry
69.	Isolation of active fraction /principle (s) from medicinal plants, characterization and exploring their applications in colon cancer.	Dr. K. Poornima	Professor	Biochemistry
70.	Toxicology Research in Ammonium Chloride induced Hyperammonemic rats: A Molecular Approach.	Dr.Ramakrishnan	Assistant Professor	Biochemistry
71.	Isolation of plant compounds and treatment of environmental toxic	Dr.Ramakrishnan	Assistant Professor	Biochemistry

	substances in animal model: A molecular approach			
72.	Study of gene expressions and metabolic pathway analysis during the treatment of induced myocardial infarcted rats.	Dr.E. Brindha	Assistant Professor	Biochemistry
73.	Isolation of biological components from Marine organisms /from weed plants and application on chronological diseases/ Neurotoxicity and hepatotoxicity study by inducing ammonium chloride in Albino wistar Rats.	Dr.E. Brindha	Assistant Professor	Biochemistry
74.	Nanomaterials in crop improvement, Nano fertilizer, Environmental Biotechnology	Dr. Rajiv Periakaruppan	Assistant Professor	Biotechnology
75.	Unrevealing the molecular & DNA damage repair pathway mechanism in microbes under extreme environmental conditions	Mr. Anand Raj D	Assistant Professor	Biotechnology
76.	Microbial Biotechnology & Cancer Therapeutics	Mr. Anand Raj D	Assistant Professor	Biotechnology
77.	Marine Biotechnology, Aquaculture Biotechnology, Marine Natural Products	Dr. M. Sivagnana velmurugan	Assistant Professor	Biotechnology
78.	Phytochemistry and Phytomedicine	Dr.Devanesan Arul Ananth	Associate Professor	Biotechnology
79.	Characterization of Abiotic stress tolerance genes / Stress tolerant Transgenic plants production	Dr.Barathkumar S	Assistant Professor	Biotechnology
80.	Plant tissue culture	Dr.Barathkumar S	Assistant Professor	Biotechnology
81.	Antimicrobial activity of bamboo and cotton fabric coated with prodigiosin pigment extracted from Serratia marcescens	Mrs.John Britto Paulin A	Assistant Professor	Microbiology
82.	Fermentation technology	Dr.M.Kalpana Devi	Assistant Professor	Microbiology

No.	Title	Name	Designation	Department
83.	Fermentation technology	Ms.Suba Sri.M	Assistant Professor	Microbiology
84.	Antibiotics from actinomycetes against infectious agents and Exploring Microbes for waste management	Dr.R. Usha	Professor	Microbiology
85.	Phytoformulation Studies against the pyogens	Dr.M.Kulandhaivel	Associate Professor	Microbiology
86.	Synthesis of hole transporting materials for perovskite solar cells	Dr. E. Yamuna	Assistant Professor	Chemistry
87.	Development of AIE active heterocyclic compounds	Dr. E. Yamuna	Assistant Professor	Chemistry
88.	Synthesis and characterization of bimetal oxides, nano composites	Dr. M. Makeswari	Assistant Professor	Chemistry
89.	Photo catalytic degradation of methyl orange from aqueous solution using solar light onto chitosan bi-metal oxide composite	Dr. M. Makeswari	Assistant Professor	Chemistry
90.	Design, synthesis, characterization, in-silico and in-vitro studies of heterocyclic compounds	Dr. B. Prabha	Assistant Professor	Chemistry
91.	Molecular docking and Anticancer studies of some novel heterocyclic compounds	Dr. B. Prabha	Assistant Professor	Chemistry
92.	Synthetic Organic chemistry and Medical chemistry	Dr. M.R. Ezhilarasi	Associate Professor	Chemistry
93.	Synthesis, Spectral Characterization, Anticancer and Insilco studies of novel heterocyclic compounds.	Dr. M.R. Ezhilarasi	Associate Professor	Chemistry
94.	Synthesis of Bioactive and biophysical leading molecules towards bio-applications	Dr. Kailasam Saravana Mani	Assistant Professor	Chemistry
95.	Synthesis of novel small molecules towards biophysical and biomed zonal applications.	Dr. Kailasam Saravana Mani	Assistant Professor	Chemistry

96.	Green synthesis and biological evaluation of anticancer drugs	Dr. R. Kumar	Assistant Professor	Chemistry
97.	Synthesis, Characterization, Molecular Docking and Anticancer Activity of Novel Hetero compounds	Dr. R. Kumar	Assistant Professor	Chemistry
98.	Synthesis, Characterization, Biological Evaluation and Molecular Docking Analysis of Novel Heterocyclic Molecules	Dr. K. Sundaram	Assistant Professor	Chemistry
99.	Ultrasonic synthesis of novel Dispiro pyrroline containing Rhodanine nucleus	Dr. K. Sundaram	Assistant Professor	Chemistry
100.	Green synthesis of metal oxide Nano particles and their biological applications	Dr. M. Kalaimathi	Assistant Professor	Chemistry
101.	Green synthesis of Nickel oxide Nano particles and their corrosion inhibition capacity.	Dr. M. Kalaimathi	Assistant Professor	Chemistry
102.	Medicinal Chemistry and Phytochemistry	Dr. S. Ravi	Professor	Chemistry
103.	Phytochemistry of medicinal plants	Dr. S. Ravi	Professor	Chemistry
104.	Synthesis, Characterization, Molecular Docking, ADME and Anticancer Activity of Novel Spiro compounds	Dr. A. Thangamani	Associate Professor	Chemistry
105.	Synthesis and anticancer activity of novel heterocyclic compounds via multicomponent 1,3 dipolar cyclo addition reactions.	Dr. A. Thangamani	Associate Professor	Chemistry
106.	Polymer nanocomposites	Dr. N. Kannapiran	Assistant Professor	Chemistry
107.	Synthesis of magnetic nanoparticles	Dr. N. Kannapiran	Assistant Professor	Chemistry
108.	Water soluble Ruthenium (II) arene complexes as Anticancer agents	Dr. G. Kalaiarasi	Assistant Professor	Chemistry
109.	Dye sensitized solar cell with natural dyes as photosensitizers	Dr.Janarthanan Balasundaram	Professor	Physics
97.				

110.	Magnetic and thermoelectric materials	Dr.S.Esakki Muthu	Assistant Professor	Physics
111.	International Business	Dr.M.Arul Kumar	Assistant Professor	BBA
112.	Finance - Capital Structure, Cost Of Capital And Financial Performance	Dr.M.Nandhini	Professor	Management
113.	Financial performance	Dr. S. Venkatachalam	Professor	MBA
114.	Molecular plant biology	Dr.Nandakumar M.	Assistant Professor	Biotechnology
115.	Banking and Marketing	Dr.Padmaavathy.Pa	Assistant Professor	MBA
116.	Retail Management - Retail patronage behavior	Dr.Ramadevi. V	Assistant Professor	MBA
117.	Stock Market Anomalies, Financial performance analysis and working capital management	Dr.J. Sudarvel	Assistant Professor	MBA
118.	Retail Marketing, Digital Marketing, Training and Development	Dr.A. Martin Jayaraj	Associate Professor	MBA
119.	Grievance Redressal System	Dr.N.Nagalakshmi	Assistant Professor	MBA
120.	Human Resources Management - Training	Dr.K. C. Praveen	Assistant Professor	MBA
121.	Finance and systems	Dr.Meena Suguanthi.G	Assistant Professor	MBA
122.	Finance	Dr.M.S.Sibi	Assistant Professor	MBA
123.	Development Economics, Human Resource Management - Employee retention and Work Life Balance	Dr.C.Sagunthala	Assistant Professor	MBA
124.	Industrial Economics ,sustainability ,international trade.	Dr. Geetha Bai B.	Professor	Economics
125.	Talent Management, Corporate Social Responsibility, Consumer Confidence	Dr.R Velmurugan	Associate Professor	Commerce
126.	Classification of chronic kidney disease data using machine learning	Ms.S. S. Senthil Priya	Assistant Professor	Cognitive System / AIDS
127.	Role of Krishibhavan	Ms.Udisha O	Assistant	Commerce

			Professor	
128.	Consumers Perception Towards Digital Payments	Dr.Mathan Kumar V	Assistant Professor	Commerce
129.	A study on Investment pattern of salaried individuals	Ms.Nimisha P L	Assistant Professor	Commerce
130.	Privacy-preserving Data Mining Techniques	Dr.S.Hemalatha	Associate Professor	Computer Science
131.	Speaker recognition through deep learning algorithms	Ms.Banuroopa K	Assistant Professor	Cognitive System / AIDS
132.	Data Classification	Mr.Vasanthakumar S	Assistant Professor	Cognitive System / AIDS
133.	Early Prediction of Diseases using AI Techniques	Dr.Manju Priya S	Professor	Cognitive System / AIDS
134.	Data security, Data Recovery, Disaster Recovery in computer networks	Ms.Narmadha S	Assistant Professor	Computer Science
135.	Security issues in Data mining	Dr.V.Sangeetha	Associate Professor	Computer Science
136.	On MANET Routing Protocols for Mobility and Scalability	Ms.Thenmozhi R	Assistant Professor	Computer Science
137.	Social Implications and Technological Focus for Smart Environments using IoT	Dr.S.Sheeja	Professor	Computer Science
138.	Health care Detection in Artificial Intelligence	Dr.Saravana Kumar S	Assistant Professor	Computer Science
139.	Cyber Security, Cyber forensic, Digital image processing, Software engineering	Dr.Mohankumar	Associate Professor	Computer Science
140.	Face mask detection	Dr.Revathi.R	Assistant Professor	Computer Science
141.	Software based fault isolation	Mr.K. Yuvaraj	Assistant Professor	Computer Science
142.	Weather Monitoring using Machine learning.	Dr.Revathi.R	Assistant Professor	Computer Science
143.	Development of 3D radiological image compression methods using deep learning models	Dr.S.Boopathiraja	Assistant Professor	Cognitive System / AIDS

144.	Image processing-Biometric based Research	Dr.Kanimozhi K	Assistant Professor	Computer Science
145.	Design and Development of Classifications Algorithm - Web Documents	Dr.R.L.Raheemaa Khan	Assistant Professor	Computer Science
146.	Datamining: Development of tools in Image Mining	Mrs manimekalai.K	Assistant Professor	Computer Science
147.	AI and Blockchain for Cyber Security	Ms.R.Sri Devi	Assistant Professor	Computer Science
148.	Rerouting in Network for Link Failures	Dr.S Veni	Professor	Computer Science
149.	Software Engineering and Testing	Dr.R.Nithya	Assistant Professor	Computer Application
150.	Finance	Ms.M.Sathana Priya	Assistant Professor	Commerce,
151.	Role of Microfinance in Financial Inclusion and Empowerment of Marginalized people.	Ms.Aiswarya S	Assistant Professor	Commerce,
152.	A study on role of MSME sector on Indian Economy	Dr.M. Pavithra	Assistant Professor	Commerce,
153.	Data mining, to predict the age of the Tiger using Data Mining and Image Processing.	Dr. M. Ramaraj	Assistant Professor	Computer Science
154.	A Framework for IoT Sensor Data Analytics and Visualisation in Cloud Computing Environments	Dr.Elavarasan Ganesan	Assistant Professor	Computer Science
155.	Accounts	Ms. Swathinewashini S	Assistant Professor	Commerce, Commerce
156.	Adoption and Usage of innovative techniques: A study on mobile banking	Dr.M.Mirsath Begum	Assistant Professor	Commerce
157.	HRM Practices	Dr.S.Jegadeeswari	Assistant Professor	Commerce
158.	Marketing - Consumer Behaviour	Mr.P. Easwaran	Assistant Professor	Commerce
159.	Marketing - Advertising	Mr.P. Easwaran	Assistant Professor	Commerce
160.	Marketing - Green Purchasing Behaviour	Dr.Krishnaveni.V	Professor	Commerce
161.	Stress management of IT sector employees	Dr.Krishnaveni.V	Professor	Commerce

No.	Title	Name	Designation	Department
162.	Marketing - Consumer buying behaviour	Ms.Smruthymol J	Assistant Professor	Commerce
163.	A Study on financial literacy and attitude of women toward investment	Ms.Smruthymol J	Assistant Professor	Commerce
164.	Marketing- A study on Women Entrepreneurs and their challenges	Dr.M.P.Prathiba	Assistant Professor	Commerce
165.	A study on Passenger's attitude towards call taxi services	Dr.M.P.Prathiba	Assistant Professor	Commerce
166.	Finance-Climate insurance	Ms.Pavithra G	Assistant Professor	Commerce
167.	Green Finance	Ms.Pavithra G	Assistant Professor	Commerce
168.	A study on volatility behaviour of stock market	Ms.Arsha Shaju	Assistant Professor	Commerce
169.	A study on financial planning in an emerging economy	Ms.Arsha Shaju	Assistant Professor	Commerce
170.	Coping of entrepreneurial skill among graduation students	Dr.N. Sathiyendran	Assistant Professor	Commerce
171.	Impact of Human Resources Management in Performance Improvement	Dr.N. Sathiyendran	Assistant Professor	Commerce
172.	Marketing - Digital Marketing	Ms.Naveena. R	Assistant Professor	Commerce
173.	Services Marketing	Ms.Naveena. R	Assistant Professor	Commerce
174.	Finance - Behavioural Finance	Ms.Jayalakshmi R	Assistant Professor	Commerce
175.	A study on Behavioural Finance on investment Decisions	Ms.Jayalakshmi R	Assistant Professor	Commerce
176.	Panniru Thirumurai Vazhviyal	Dr.Madhan Kumar	Professor	Tamil
177.	Religious Literature & Religion philosophy	Dr.R.Suresh	Assistant Professor	Tamil
178.	Origin and development of medieval literature	Dr.R. Veerapathiran	Assistant Professor	Tamil
179.	Folklore	Dr.Aruchamy.S	Assistant Professor	Tamil
180.	Sangam literature	Dr.R.Ravikumar	Assistant	Tamil

			Professor	
181.	African Literature	Mr.Udhayakumar.M	Assistant Professor	English
182.	African Literature, Literary Criticism and Theories	Ms.D. Lourdhu Mary	Assistant Professor	English
183.	Enhancing Soft Skills through Literature	Dr.Selvalakshmi.S	Professor	English

Programmes Offered in Karpagam Academy of Higher Education:

Faculty of Arts, Science, Commerce and Management

Undergraduate:

- B.Com
- B.Com Computer Application
- B.Com Professional Accounting
- B.Com Business Process Services (In Association with TCS)
- B.Com International Accounting and Finance
- B.Com Financial Analysis (In association with National Stock Exchange (NSE), Mumbai
- BBA
- BCA
- B.Sc. Computer Science
- B.Sc. Computer Technology
- B.Sc. Information Technology
- B.Sc. Computer Science (Cognitive Systems) (In association with TCS)
- B.Sc. Computer Science (Artificial Intelligence and Data Science)
- B.Sc. Chemistry
- B.Sc. Physics
- B.Sc. Mathematics
- B.Sc. Biotechnology
- B.Sc. Microbiology

Post graduate Programmes:

- MBA
- MCA
- M.Com
- M.Sc. Computer Science
- M.Sc . Chemistry
- M.Sc. Physics
- M.Sc . Mathematics
- M.Sc. Biochemistry
- M.Sc . Biotechnology
- M.Sc. Microbiology

Faculty of Engineering

Undergraduate Programmes

- B.E. Biomedical Engineering
- B.E. Civil Engineering
- B.E. Computer Science & Engineering
- B.E. Computer Science & Design
- B.E. Electronics & Communication Engineering
- B.E. Electrical & Electronics Engineering
- B.E. Mechanical Engineering
- B.Tech. Artificial Intelligence & Data Science
- B.Tech. Biotechnology
- B.Tech. Food Technology

Postgraduate Programmes

M.E. Structural Engineering	M.E. Power Systems Engineering
M.E. Water Resources & Environmental Engineering	

Faculty of Architecture, Design and Planning

B.Arch	M.Arch Advance Design
M.Plan Town and Country Planning	B.Des. Interior Design

Faculty of Pharmacy

B.Pharm

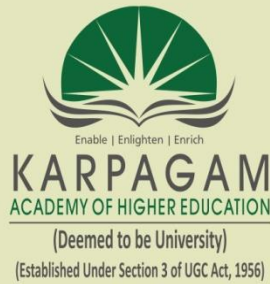M.Pharm (Pharmaceutical Analysis)

Pharm.D.

Research Programmes

Ph.D in all Arts, Science , Commerce and Management Programs

Ph.D. in all Engineering Programs

Ph.D in Pharmacy Program

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