DIPLOMA CURRICULUM OF BEAUTY AND CULTURE (THIRD YEAR) (6th Semester)

(To be implemented from 2026-27)

Prepared by;

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PROGRAMME TITLE: BEAUTY CULTURE

SEMESTER - VI

SL. No	Category of Course	Code No	Course Title	Study Scheme				Evaluation Scheme				Total Marks	Credits
				Pre-requisite	Contact Hours/ week			Theory		Practical			
					L	T	P	End Exam	Progressive Assessment	End Exam	Progressive Assessment		
1	Programme core	BCPC302 TH:1	SPA WELLNESS		3	0	0	70	30	-		100	3
2		BCPC304 PR:1	SPA WELNESS LAB		0	0	2	-	-	15	35	50	1
3		BCPC306 TH:2	Saloon Management and Start-ups		4	0	0	70	30	-		100	4
4		BCPC308 PR:2	Saloon Management Lab		0	0	2	-	-	30	70	100	1
5	Open Elective	OE302 TH:3 (Anyone)	Open Elective – II (A) Project Management (B) Disaster Management (C) Artificial Intelligence (D) Soft computing Techniques		3	0	0	70	30	-		100	3
6		OE304 TH:4 (Anyone)	(A) Engineering Economics and Accountancy (B) Internet of Things (C) Sustainable Development (D) Robotics		3	0	0	70	30	-		100	3
7	Mandatory	AU302 TH:5	Indian Constitution		2	0	0	0	0	0		0	0
8	Major Project	PR302 PR:3	Major Project & Seminar		0	0	8	-	-	100	100	200	4
TOTAL					**15**	**0**	**12**	**280**	**120**	**145**	**205**	**750**	**19**

All Audit (mandatory) courses will have assessment, but will have no credit.

***The best of 2 IA conducted in a subject out of 20 marks to be considered. Assignment/ quiz etc. of 10 marks to be treated as part of IA. Besides this, Monthly Test to be conducted for each subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester. Club/Innovation/ Idea Tinkering Activities etc. shall be encouraged to be performed by students beyond the above stipulated hours.**

Annexure - I

OE 301 /302/304 Open Electives (Any three) 3 - 0 - 0 and 3C

Bundle I

- **(A) Soft Computing Techniques**
- **(B) Artificial Intelligence**
- **(C) Artificial Intelligence & Machine Learning**
- **(D) Internet of Things (content available)**
- **(E) Web Designing and Multimedia Technology**
- **(F) Virtual Reality**

Bundle II

- **(A) Project Management**
- **(B) Product Design (content available)**
- **(C) Operations Research**
- **(D) Mechatronics (content available)**
- **(E) Robotic Cosmetics**
- **(F) Industrial Robots (content available)**
- **(G) 3-D Printing**

Bundle III

- **(A) Economic Policies in India**
- **(B) Engineering Economics & Accountancy**
- **(C) Cyber Security Laws, Standards and IPR**
- **(D) Introduction to E-Governance**
- **(E) Disaster Management**
- **(F) Sustainable Development**

Bundle IV

- **(A) Universal Human Values**
- **(B) Leadership and Management Skills**
- **(C) Professional Skills**
- **(D) Foreign language Skills (any one language: German, Japanese, French …)**

Following may be suggested:

Courses under ES category to be included in the 1st year

A. In Semester – I

- Design Thinking 0 0 2 1C

B. In Semester – II

- Programming for Problem Solving 2 0 4 4C

Bridge Courses for Skill enhancement (Essential if MEME implemented)

A. After First Year:

The candidate should pass following two additional Skill Courses (ITI Level) to qualify for Certification.

1. Basic Haircut
2. Hair Spa & Hair Treatments

B. After Second Year:

The candidate should pass following two additional Skill Courses (Diploma Level) to qualify for Diploma.

1. Massage & Spa Therapy
2. Makeup and Hairstyle Artistry

VI SEMESTER

TH:1- SPA WELLNESS

L	T	P		Course Code: BCPC302	
3	0	0			
Total Contact Hours			**Total Marks: 100**	**Theory Assessment**	
Theory		: 45Hrs		End Term Exam	: 70
				Progressive Assessment	: 30
Pre-Requisite		**: Nil**			
Credit		**: 3**		Category of Course: PC	

RATIONALE:

The *Spa Wellness* subject has been developed in response to the growing global emphasis on holistic health and preventive well-being. As modern lifestyles become increasingly fast-paced and stress-driven, individuals are actively seeking integrated approaches that promote physical vitality, mental clarity, and emotional balance. Wellness is no longer viewed as the mere absence of illness, but as a dynamic process of growth, self-care, and sustainable health management.

The spa industry has emerged as a pivotal player in this wellness movement, offering a wide spectrum of therapeutic services that combine ancient healing traditions with modern scientific understanding. From stress relief and detoxification to skin health, rejuvenation, and mind-body therapies, spas are evolving into comprehensive wellness hubs catering to diverse health needs.

This subject is designed to equip students with theoretical knowledge and practical skills in spa therapies, wellness modalities, client care, and industry trends. Emphasis is placed on developing an integrative approach to health that aligns with global best practices and standards. Students will gain an understanding of the physiological, psychological, and environmental factors that influence well-being and learn to implement customized wellness solutions within spa settings.

Ultimately, this course aims to prepare professionals capable of contributing meaningfully to the global wellness economy by delivering evidence-informed, ethically sound, and client-centered spa and wellness services.

LEARNING OUTCOMES: After completion of the course, the students will be able to

1. **Explain** the principles and philosophy of wellness and their application within spa and holistic health services.

2. **Identify** the physiological and psychological benefits of various spa therapies, including hydrotherapy, aromatherapy, and body treatments.

3. **Demonstrate** proficiency in performing basic spa and wellness treatments using appropriate tools, techniques, and safety protocols.

4. **Evaluate** client needs through consultation and health assessment to design personalized wellness programs.

5. **Apply** knowledge of anatomy, skin and body systems to enhance the therapeutic effectiveness of spa services.

6. **Integrate** traditional wellness practices such as Ayurveda, Thai massage, or reflexology with modern spa treatments to address diverse client needs.

7. **Implement** hygiene, sanitation, and ethical standards in compliance with international spa and wellness industry norms.

8. **Analyze** trends, innovations, and sustainability practices within the global spa and wellness industry.

9. **Develop** effective communication and customer service skills to ensure a positive and professional client experience.

10 **Contribute** to the promotion of holistic health and preventive wellness through spa-based interventions and lifestyle guidance.

DETAILED COURSE CONTENTS

Unit No.	Unit Title	Sub-Topics / Key Points	Hours
I	Introduction to Spa Wellness	- Definition and core concept of Spa and Wellness - Historical evolution: ancient to modern spa practices - Classification: Day Spas, Medical Spas, Destination Spas, Resort Spas - Importance of wellness in modern lifestyles - Principles of holistic spa wellness - Role and responsibilities of spa professionals	9
II	Spa Treatments and Techniques	- Basic massage techniques: Swedish, Deep Tissue, Thai, Aromatherapy - Hydrotherapy: saunas, steam baths, hydro baths, Vichy showers, contrast baths - Body treatments: body scrubs, wraps, mud therapy, exfoliation methods - Facial treatments by skin type - Basics of Reflexology - Introduction to Ayurveda & traditional therapies	9
III	Spa Products and Applications	- Types of spa products: oils, creams, gels, scrubs, masks - Properties and therapeutic effects of essential oils (aromatherapy) - Herbal and organic products in spa services - Product selection based on skin/hair type and treatment needs - Product handling, safety, and storage - Client consultation using product knowledge	9
IV	Spa Operations and Management	- Overview of spa management: structure and roles - Customer service principles and client relationship building - Spa promotion and marketing strategies - Staff training, grooming, and SOPs - Inventory, product, and equipment management - Budgeting, pricing strategies, and cost control techniques	9
V	Health, Safety & Hygiene in Spa Settings	- Hygiene and sanitation in spa environments - Therapist safety and client care protocols - Infection control, sterilization of tools and equipment - Client health screening, record-keeping, and risk mitigation - Ethics, professionalism, and legal responsibilities - Emergency	9

first aid procedures in spa setup

Recommended Textbooks & Reference Materials

1. *The Complete Spa Book for Massage Therapists* – **Hanya L. McClintock**
2. *The Spa Management Handbook* – **M. M. Sharma**
3. *The Art of Aromatherapy: A Guide to the Healing Art of Aromatherapy* – **Robert Tisserand**
4. *Spa and Wellness Management* – **D.A. Harris**
5. *Massage and Aromatherapy: A Comprehensive Guide* – **Julia Woodford**
6. *The Healing Power of Water* – **Dr. A.K. Sharma**
7. *Skin Care and Cosmetic Ingredients Dictionary* – **M. M. Shar**

PR:1- SPA WELLNESS Lab

L	T	P		Code: BCPC304	
0	0	4			
Total Contact Hours		**: 60Hrs**	**Total Marks: 50**	**Laboratory**	
Practical		: 60Hrs		End Exam	: 15
Credit		**: 2**		Progressive Assessment	: 35

RATIONALE:

The **Spa Wellness** module is developed in response to the global shift toward holistic health and integrative well-being. In today's fast-paced and demanding world, individuals are increasingly prioritizing preventive care, relaxation, and rejuvenation to counterbalance the physical, emotional, and mental challenges of modern living. This growing awareness has significantly expanded the scope of the spa industry from luxury services to essential components of wellness and lifestyle management.

This module aims to equip students with both theoretical understanding and practical skills in spa therapies, wellness rituals, and holistic treatments that support physical vitality and mental clarity. Drawing from traditional healing systems, modern wellness science, and evidence-based practices, learners will engage in hands-on training that emphasizes client care, professional ethics, personalized wellness planning, and sustainable spa practices.

Students will be prepared to:

Understand the interconnectedness of body, mind, and spirit in wellness.

Apply various spa techniques to promote relaxation, detoxification, and rejuvenation.

Address stress-related conditions and lifestyle imbalances through therapeutic spa interventions.

Integrate wellness principles into spa settings to enhance overall client experience and health outcomes.

By fostering a comprehensive understanding of spa wellness, this module prepares graduates to meet the evolving demands of the global wellness industry and contribute meaningfully to the promotion of health and quality of life in diverse populations.

Learning Outcomes: After completion of the Lab the students will be able to

1. **Explain** the core principles of wellness and their relevance to contemporary lifestyle and spa practices.
2. **Demonstrate** proficiency in various spa therapies such as body treatments, hydrotherapy, aromatherapy, and holistic wellness rituals.
3. **Analyze** the physiological and psychological effects of spa treatments on stress reduction, detoxification, and overall well-being.
4. **Apply** appropriate spa and wellness techniques tailored to individual client needs, preferences, and health conditions.

5. **Integrate** traditional healing methods and modern wellness science to deliver evidence-based spa services.

6. **Ensure** high standards of hygiene, safety, and professionalism in spa settings as per international best practices.

7. **Design** customized spa wellness programs that promote relaxation, rejuvenation, and lifestyle balance.

8. **Evaluate** client outcomes and provide aftercare advice to support sustainable health and wellness goals.

9. **Communicate** effectively and empathetically with clients, fostering trust, confidentiality, and a therapeutic relationship.

10. **Demonstrate** ethical responsibility, cultural sensitivity, and sustainability awareness in delivering spa and wellness services.

List of Experiments

Unit No.	Unit Title	Practical Focus Areas / Sub-Topics	Skill Practice & Applications	No. of Practical Classes
I	Introduction to Spa Wellness	- Definition of Spa & Wellness- Evolution of Spa practices (global and Indian context)- Classification of Spa types- Role of Spa in holistic wellness- Spa professional's ethics and responsibilities	- Spa orientation and demo of different types of spas- Observation of spa ambience and setup- Roleplay: spa client handling	3 classes (3 hrs each) = 9 hrs
II	Spa Treatments and Techniques	- Swedish, Deep Tissue, Thai, Aromatherapy massage- Hydrotherapy (sauna, steam bath, Vichy, etc.)- Body wraps, scrubs, and exfoliation- Facial therapy by skin type- Intro to Reflexology- Basics of Ayurveda	- Hands-on practice of basic massage strokes- Hydrotherapy setup and application- Practical demo of body/facial treatments- Peer-to-peer reflexology & scalp massage practice	3 classes (3 hrs each) = 9 hrs
III	Spa Products and Applications	- Types of spa products (oils, gels, creams, masks)- Aromatherapy principles- Herbal/organic product usage- Selection based on skin/hair types- Product safety and storage- Client product consultation	- Product identification and mixing trials- Aromatherapy oil blending and use- Application demo for masks, scrubs, and wraps- Practice consultation forms with mock clients	3 classes (3 hrs each) = 9 hrs
IV	Spa Operations	- Spa team structure and workflow- Client	- Roleplay: receptionist/client check-	3 classes (3 hrs

Unit No.	Unit Title	Practical Focus Areas / Sub-Topics	Skill Practice & Applications	No. of Practical Classes
	and Management	communication and satisfaction- Grooming and professional behavior- SOPs and training routines- Inventory and equipment handling- Marketing and cost control	in/out- Staff grooming and etiquette workshop- Setup & cleaning protocols (SOP demo)- Mock budget planning and menu designing	each) = 9 hrs
V	Health, Safety & Hygiene in Spa Settings	- Spa hygiene standards- Client and therapist safety- Sanitization & sterilization methods- Screening and consultation forms- Legal and ethical guidelines- Emergency protocol and first aid	- Hand sanitization and tool sterilization demo- Simulated client consultation and risk identification- First aid drill (burns, fainting, cuts)- Professional conduct scenario-based training	3 classes (3 hrs each) = 9 hrs

Recommended Practical Reference Books:

1. **The Complete Spa Book for Massage Therapists** – Hanya L. McClintock
Covers: Spa techniques, massage protocols, client care, and international spa therapies.

2. **The Spa Management Handbook** – M.M. Sharma
Covers: Practical aspects of spa operations, staffing, budgeting, and marketing.

3. **The Art of Aromatherapy** – Robert Tisserand
Covers: Essential oil therapy, product formulation, and therapeutic applications.

TH:2- SALON MANAGEMENT AND START UPS

L	T	P		
4	0	0		**Course Code:** BCPC301
Total Contact Hours				**Theory Assessment**
Theory		: 45Hrs	**Total Marks: 100**	End Term Exam : 70
				Progressive Assessment : 30
Pre-Requisite		**: Nil**		
Credit		**: 4**		Category of Course: PC

RATIONALE:

The **Salon Management and Customer Care** subject is essential for providing students with the comprehensive skills needed to succeed in managing a salon or spa business. In the fast-growing beauty and wellness industry, the importance of effective salon management and customer care cannot be overstated. Salon owners and managers must not only be skilled in providing high-quality services but also in managing operations, staff, marketing, finances, and delivering exceptional customer service.

LEARNING OUTCOMES: After completion of the course, the students will be able to

1. **Explain the Basics of Salon Management**
2. Develop Customer Service Skills
3. Explain Technology in Salon Operations
4. Explain the licensing, insurance, and health safety regulations that apply to salon operations.
5. Explain how to track expenses, control costs, and analyze financial performance to maintain profitability.

Learning Outcomes: After completion of the Lab the students will be able to

1. **Explain the evolution, structure, and classification** of salon and spa businesses in the global beauty and wellness industry.
2. **Interpret the importance of wellness economy trends**, including organic salons, express services, and unisex models.
3. **Describe salon operational elements** such as layout planning, staff roles, WHO hygiene protocols, and regulatory compliance (ISO/OSHA).
4. **Demonstrate understanding of branding and marketing principles**, including ATL/BTL strategies, seasonal campaigns, digital engagement, and public relations specific to salon businesses.
5. **Analyze customer behavior and expectations**, and explain techniques for effective communication, service personalization, and feedback handling.
6. **Identify key financial management components** including budgeting, pricing strategy, sales forecasting, payroll systems, and cost control methods in a salon environment.

7. **Describe the role of modern technologies** such as POS systems, salon CRMs, AI diagnostic tools, digital booking apps, and analytics dashboards in improving business performance.

8. **Evaluate entrepreneurial and start-up strategies**, including market analysis, competition stu0dy, investor communication, and intellectual property protection for salon start-ups.

9. **Understand legal, ethical, and professional frameworks** applicable to salon ownership, including licensing, hygiene laws, employee rights, and customer service standards.

DETAILED COURSE CONTENTS

Unit No.	Title	Detailed Topics/Subtopics	Industry-Oriented Skills Developed	Allotted Hours
I	**Introduction to Salon Management**	• Overview of the Salon Industry - History & global evolution of salons - Role of salons in wellness economy - Emerging trends: organic salons, express services, unisex salons • Salon Operations - Classification: Hair, Skin, Nail, Spa salons - Salon design, zoning & equipment - WHO-standard hygiene practices & sanitation protocols • Human Resource Management - Job roles, salon hierarchy - Training & upskilling - Roster management & performance monitoring • Salon Licensing & Regulations - International compliance, ISO & OSHA standards - Certifications & local/state regulations	✔ Knowledge of setting up and managing salon infrastructure ✔ Efficient staff management and hygiene control ✔ Understanding of legal and regulatory framework	9
II	**Salon Marketing & Promotion**	• Salon Branding & Positioning - Brand development: Name, logo, service USP - Market research and segmentation • Advertising & Promotions - ATL/BTL marketing tools - Seasonal campaign design - Loyalty & referral programs • Online Presence & Social Media - Social media strategy and content creation - SEO, influencer marketing, reviews • Public Relations - Client engagement strategies - Hosting promotional events, open houses - Salon visibility through partnerships and expos	✔ Build and manage salon brand identity ✔ Develop digital marketing skills tailored to salon businesses ✔ Apply PR strategies for brand loyalty and reach	9
III	**Customer Care & Service Excellence**	• Understanding Customer Expectations - Personalized service concepts - Handling client feedback & dissatisfaction • Communication	✔ Professional communication and interpersonal skills ✔ Client retention	9

Unit No.	Title	Detailed Topics/Subtopics	Industry-Oriented Skills Developed	Allotted Hours
		Skills - Verbal, non-verbal and visual cues - Building long-term relationships with clients • Handling Difficult Clients - Empathy, de-escalation techniques - Resolving complaints professionally • Customer Relationship Management Tools - CRM platforms & data management - Client retention via tech (reminders, follow-ups)	techniques through CRM ✔ Complaint resolution and service personalization	
IV	**Salon Financial Management**	• Budgeting & Financial Planning - Creating cost-effective operational plans - Forecasting expenses & revenue • Pricing Strategies - Competitor analysis & price fixing - Calculating service cost and margins • Revenue Management - Upselling & cross-selling skills - Sales reporting & analytics • Payroll & Compensation - Salary structures, commissions, and bonuses - Compliance in employee payments and tax deductions	✔ Competence in financial decision-making ✔ Pricing optimization and profitability planning ✔ Payroll and revenue stream management	9
V	**Salon Technology & Innovations**	• Salon Software & Tools - POS systems, inventory & appointment scheduling tools - Integration with digital payment gateways • Technological Innovations in Beauty - Devices: Laser, hydrofacial, AI hair mapping - Smart skin diagnostic machines • Online Booking & Scheduling - Mobile-friendly booking platforms - Reducing no-shows with reminders and confirmation tools • Digital Marketing Tools - Email automation, analytics dashboards - Paid ad campaigns and conversion tracking	✔ Use of cutting-edge technology in service delivery ✔ Streamline operations using digital tools ✔ Enhance online presence and lead generation via digital platforms	9
VI	**Startups & Entrepreneurship in Salon Industry**	• Idea to Start-Up - Market analysis, identifying target audience - Competition evaluation & strategy development - Marketing, accounting & risk analysis • Financing & Protection of Ideas - Financing options for Indian start-ups - Communication of ideas to investors (pitching) - Patenting and licensing procedures	✔ Entrepreneurial thinking and market analysis ✔ Fundraising and investor pitching skills ✔ Legal and financial groundwork for startups	9

Reference Books:

1. *Salon Management* by A. P. Sharma
2. *Beauty Business: Salon and Spa Management* by Gina P. St. John
3. *Marketing for the Beauty Industry* by C. S. Pillai
4. *The Beauty Industry: A Global Perspective* by N. D. Tiwari
5. *The Art and Science of Beauty Therapy* by L. C. Mathew

PR:2- SALON MANAGEMENT LAB

L	T	P		**Code:** BCPC304	
0	0	2			
Total Contact Hours		**: 30Hrs**	**Total Marks: 100**	**Laboratory**	
Practical		: 30Hrs		End Exam	: 30
Credit		**: 2**		Progressive Assessment	: 70

RATIONALE :

In the globalized beauty and wellness industry, the role of a salon professional has evolved beyond technical expertise. Today's salon managers are expected to integrate customer-centric service, digital tools, financial acumen, brand strategy, and innovation into daily operations. The *Salon Management and Customer Care* practical curriculum is specifically designed to empower students with hands-on experience, aligning with international standards and NSQF guidelines.

This practical component bridges the gap between theoretical understanding and real-world application, enabling learners to perform tasks essential for running a modern, professional salon or spa business. Through structured simulation, digital exposure, customer interaction role-plays, software use, and start-up pitching, learners will build competencies that meet both Indian and global wellness industry benchmarks.

The curriculum addresses key skill categories like:

Professional Core Skills (planning, problem-solving, resource handling)

Workplace Skills (communication, client engagement, hygiene)

Entrepreneurial Skills (pitching, branding, finance, market research)

Digital Literacy (CRM, POS, appointment apps, social media tools)

Learning Outcomes: After completion of the Lab the students will be able to

1. **Design and organize a model salon layout** including zoning of reception, service, backroom, sanitation, and retail display areas following hygiene and ergonomic standards

.**2.Demonstrate effective customer service techniques**, including client greeting, consultation, scheduling, service explanation, handling complaints, and aftercare advice.

3.Prepare and maintain professional salon documents such as service menus, client cards, daily appointment logs, sales records, feedback forms, and expense sheets.

4.Create marketing collaterals like brochures, social media posts, WhatsApp catalogs, and loyalty cards to promote services and build clientele.

5.Operate basic digital tools and salon software including billing POS systems, online booking platforms, CRM dashboards, and inventory control systems.

6.Apply hygiene and safety protocols including equipment sterilization, waste disposal, workstation cleaning, staff grooming standards, and emergency response.

7.Role-play front desk and reception management tasks including welcoming clients, handling payments, maintaining waiting area aesthetics, and telephone etiquette.

8.Simulate staff coordination through mock interviews, duty roster preparation, staff meetings, team motivation practices, and training plan creation.

9.Prepare a mini project report on a salon business plan, including SWOT analysis, service selection, branding, costing, target customer profile, and profit projections.

10. Demonstrate start-up readiness by creating a pitch deck for a small salon/spa start-up covering name, vision, services, USP, investment required, and break-even analysis.

11. Understand and simulate basic legal documentation like license application forms, health permits, vendor agreements, staff appointment letters, and insurance papers.

These practical outcomes are designed to ensure students gain **hands-on experience**, develop **real-time problem-solving ability**, and become **start-up-ready professionals**—equipped not just to work but to **launch and manage their own salons or wellness enterprises** with confidence.

List of Experiments

No.	Unit Title	Practical Sub-Units / Activities	Skills Developed / Industry Outcome	Hours
I	**Salon Setup & Hygiene Operations**	1.1 Design a mini salon layout (Hair/Skin/Nail zones)1.2 Demonstrate zoning and equipment placement1.3 Practice sanitation protocols (WHO standards)1.4 Perform hand hygiene audit checklist1.5 Simulate staff roster for a week	✔ Salon layout planning ✔ Hygiene and sanitation compliance ✔ Staff scheduling and zone management	5
II	**Branding & Marketing Execution**	2.1 Create brand logo and tagline for a new salon2.2 Develop a seasonal promotion poster2.3 Record a client testimonial video2.4 Draft an Instagram marketing plan2.5	✔ Branding and visual identity creation ✔ Content development for social	5

No.	Unit Title	Practical Sub-Units / Activities	Skills Developed / Industry Outcome	Hours
		Conduct a mock loyalty program rollout	media ✔ Real-world campaign planning	
III	**Customer Handling & CRM Practice**	3.1 Perform mock client consultations (skin/hair)3.2 Handle a complaint scenario via roleplay3.3 Design a CRM template3.4 Practice communication skills (verbal & non-verbal)3.5 Create client follow-up reminder system	✔ Client service delivery ✔ CRM tool familiarity ✔ Complaint handling and professional communication	5
IV	**Salon Financial Tools & Strategy**	4.1 Create a weekly salon budget using Excel4.2 Calculate service cost and profit margins4.3 Simulate upselling/cross-selling with mock clients4.4 Prepare a payroll sheet with incentives4.5 Practice GST billing methods	✔ Budgeting & pricing decisions ✔ Upselling strategies ✔ Payroll and billing system accuracy	5
V	**Tech-enabled Salon Operations**	5.1 Use POS/inventory management software (demo tools)5.2 Schedule appointments using online tools5.3 Test AI skin/hair diagnostic apps (demo)5.4 Run paid ad simulation using Google/Facebook tools5.5 Track analytics	✔ Tech integration in salon operations ✔ Digital booking and reporting ✔ Basic use of marketing dashboards	5
VI	**Start-up Planning & Pitching Lab**	6.1 Conduct target market research for a salon start-up6.2 Prepare a pitch deck for investors6.3 Role-play pitching to investors6.4 Draft patent/license forms for an idea6.5 Evaluate salon start-up risks	✔ Entrepreneurial thinking ✔ Pitching and presentation skills ✔ Legal documentation awareness	5

TH 3(a)- PROJECT MANAGEMENT

L	T	P		**Course Code: OE302A**
3	0	0		
Total Contact Hours				**Theory Assessment**
Theory	: 45 Hrs.			End Term Exam 70

Tutorial 0	**Total Marks: 100**	Progressive Assessment 30
Pre Requisite : Nil		
Credit : 3		Category of Course : OE

RATIONALE

The aim of this course is to develop the idea of project plan, from defining and confirming the project goals and objectives, identifying tasks and how to achieve the goals. The students will develop an understanding of key project management skills and strategies.

LEARNING OUTCOMES

On successful completion of the course, students will be able to:

- List out the importance of projects and its phases.
- Define projects from marketing, operational and financial perspectives.
- Analyze projects based on discount and non-discount methods.
- Construct network diagrams for planning and execution of a given project.
- Apply crashing procedures for time and cost optimization.

DETAILED COURSE CONTENT

UNIT	TOPIC/SUB-TOPIC	HRS.
I.	**CONCEPT OF A PROJECT**: Classification of projects- importance of project management- The project life cycle-establishing project priorities (scope-cost-time) project priority matrix- work break down structure.	**9**
II.	**CAPITAL BUDGETING PROCESS:** Planning- Analysis-Selection-Financing-Implementation-Review. Generation and screening of project ideas- market and demand analysis- Demand forecasting techniques. Market planning and marketing research process- Technical analysis	**9**
III.	**FINANCIAL ESTIMATES AND PROJECTIONS:** Cost of projects-means of financing-estimates of sales and production-cost of production-working capital requirement and its financing-profitability projected cash flow statement and balance sheet. Break-even analysis.	**9**
IV.	**BASIC TECHNIQUES IN CAPITAL BUDGETING**: Non discounting and discounting methods- payback period- Accounting rate of returnnet present value-Benefit cost ratio-internal rate of return. Project risk. Social cost benefit analysis and economic rate of return. Non-financial	**9**

	justification of projects**.**	
V.	**PROJECT ADMINISTRATION**: Progress payments, expenditure planning, project scheduling and network planning, use of Critical Path Method (CPM), schedule of payments and physical progress, time-cost trade off. Concepts and uses of PERT cost as a function of time, Project Evaluation and Review Techniques/cost mechanisms. Determination of least cost duration. Post project evaluation. Introduction to various Project management soft wares.	**9**

REFERENCES:

- Project planning, analysis, selection, implementation and review – Prasannachandra – Tata McGraw Hill
- Project Management – the Managerial Process – Clifford F. Gray & Erik W. Larson - McGraw Hill
- Project management - David I Cleland - Mcgraw Hill International Edition, 1999 Project Management – Gopala krishnan – Mcmillan India Ltd.
- Project Management-Harry-Maylor-Peason Publication

TH 3(b)- DISASTER MANAGEMENT

L	T	P		
3	0	0		**Course Code: OE302B**
Total Contact Hours				**Theory Assessment**
Theory	: 45 Hrs.		**Total Marks: 100**	End Term Exam 70
Tutorial	0			Progressive Assessment 30
Pre Requisite : Nil				
Credit : 3				Category of Course : OE

RATIONALE

Disasters can be caused by both natural and man-made factors. They cannot be anticipated, and once they do, they must be handled with maturity, subtlety, and responsibility. Numerous immediate decisions must be made, and relief efforts must be planned and managed. Thus this course provides to the civil engineers, a proper knowledge regarding the disasters along with how they affect the environment and living things.

LEARNING OUTCOMES

After completion of the course, the students will be able to

- Use of basic information on various types of disasters to control the disaster
- Take the precautions during various disasters
- Decide first action to be taken under various disasters
- Communicate with others in India which are dealing with disasters
- Select IT tools to help in disaster management

DETAILED COURSE CONTENT

UNIT NO.	CONTENT	TIME ALLOTTED (HOURS)
UNIT-I	**Understanding Disaster** • Understanding the Concepts and definitions of Disaster, Hazard, • Vulnerability, Risk, Capacity • Disaster and Development, and disaster management	**05**
UNIT-II	**Types, Trends, Causes, Consequences and Control of Disasters** • Geological Disasters (earthquakes, landslides, tsunami, • mining); Hydro-Meteorological Disasters (floods, • cyclones, lightning, thunder-storms, hail storms, • Avalanches, droughts, cold and heat waves) Biological (3rd yr)/First Draft/May, 2023. Disasters (epidemics, pest attacks, forest fire); • Technological Disasters (chemical, industrial, radiological, nuclear) and Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters) Global Disaster Trends – Emerging Risks of Disasters – Climate Change and Urban Disasters.	**10**
UNIT-III	**Disaster Management Cycle and Framework**	**10**
	• Disaster Management Cycle – Paradigm Shift in Disaster Management. • Pre-Disaster – Risk Assessment and Analysis, Risk Mapping, zonation and Microzonation, Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development; Awareness. • During Disaster – Evacuation – Disaster Communication – Search and Rescue – Emergency Operation Centre – Incident Command System – Relief and Rehabilitation – • Post-disaster – Damage and Needs Assessment, Restoration of Critical Infrastructure – Early Recovery – Reconstruction and Redevelopment; IDNDR, Yokohama Strategy, Hyogo Framework of Action	
UNIT-VI	**Disaster Management in India** • Disaster Profile of India – Mega Disasters of India and Lessons Learnt. • Disaster Management Act 2005 – Institutional and Financial Mechanism, • National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national),Non- Government and Inter Governmental Agencies	**10**
	Applications of Science and Technology for Disaster Management Geo-informatics in Disaster Management (RS, GIS, GPS and RS).	

UNIT-V	• Disaster Communication System (Early Warning and Its Dissemination). • Land Use Planning and Development Regulations, Disaster Safe Designs and Constructions, Structural and Non Structural Mitigation of Disasters • Institutions for Disaster Management in India	**10**
	TOTAL	**45**

REFERENCES:

- Publications of National Disaster Management Authority (NDMA) on Various Templates and Guidelines for Disaster Management
- Bhandani, R. K., An overview on natural & man-made disasters and their reduction, CSIR, New Delhi
- Srivastava, H. N., and Gupta G. D., Management of Natural Disasters in developing countries, Daya Publishers, Delhi
- 4. Alexander, David, Natural Disasters, Kluwer Academic London
- Ghosh, G. K., Disaster Management, A P H Publishing Corporation
- Murthy, D. B. N., Disaster Management: Text & Case Studies, Deep & Deep Pvt. Ltd.

TH 3(c)- ARTIFICIAL INTELLIGENCE

<table>
<tr><td>L</td><td>T</td><td>P</td><td rowspan="7">Total Marks: 100</td><td colspan="2">Course Code: OE302C</td></tr>
<tr><td>3</td><td>0</td><td>0</td><td colspan="2">Theory Assessment</td></tr>
<tr><td colspan="3">Total Contact Hours</td><td>End Term Exam</td><td>70</td></tr>
<tr><td colspan="3">Theory : 45 Hrs.</td><td>Progressive Assessment</td><td>30</td></tr>
<tr><td colspan="3">Tutorial 0</td><td colspan="2"></td></tr>
<tr><td colspan="3">Pre Requisite : Nil</td><td colspan="2"></td></tr>
<tr><td colspan="3">Credit : 3</td><td colspan="2">Category of Course : OE</td></tr>
</table>

RATIONALE:

Artificial Intelligence (AI) empowers machines to mimic human intelligence, enabling tasks such as decision-making, problem-solving, and learning. It drives innovation across industries, from healthcare to robotics, by automating complex processes and uncovering insights from data. Learning AI equips students with cutting-edge skills to build intelligent systems and shape the future of technology.

LEARNING OUTCOMES:

After completion of the course, the students will be able to

- Explain key concepts in Artificial Intelligence such as intelligent agents, search algorithms (uninformed, informed, local), and neural network architectures.
- Explain the principles of decision-making models, including Markov Decision Processes and reinforcement learning, and their applications in AI.
- Implement search algorithms, logic-based agents, and neural network architectures (feedforward, CNN, RNN) to solve AI-related problems.
- Analyze the performance of different neural network architectures and optimization techniques (e.g., gradient descent, Adam) to improve model accuracy and efficiency.
- Develop intelligent agents and neural network models for real-world applications, applying advanced learning techniques and optimization methods.

DETAILED COURSE CONTENT:

Unit No.	Topic/Sub-Topic	Allotted Time (Hours)
I	**Fundamentals of Artificial Intelligence:** Introduction: History and foundations of AI Intelligent Agents, Uninformed Search; informed Search; Local Search; Adversarial Search, Constraint Satisfaction Problems	6
II	**AI:** Logic, Planning, and Knowledge Representation, Logical Agents, First Order Logic and its Inference, Classical Planning, Knowledge Representation	6
III	**Bayesian Network:** Introduction to Probability, Conditional Probability, Conditional Independence, Bayesian Network, Representation Approximate Inference in Bayesian Networks, Learning in Bayesian Network.	6
IV	**Decision Making:** Decision Theory, Markov Decision Processes, Reinforcement Learning	6
V	**Neural Networks:** Neural Networks: Biological neurons vs. artificial neurons; History and development of neural networks, Neurons, weights, biases, Activation functions (Sigmoid, ReLU, Tanh, Softmax).	7
VI	**Neural Network Architectures:** Feedforward Neural Networks (Single-layer and multilayer architectures), Convolutional Neural Networks (CNNs, Filters, pooling, and feature maps), Recurrent Neural Networks (RNNs, Long Short-Term Memory (LSTM)), Learning and Training - Perceptron and its limitations; Multilayer perceptron (MLP) and Backpropagation; Overfitting and regularization	7
VII	**Optimization Techniques:** Gradient Descent and its Variants (Stochastic Gradient Descent (SGD), Momentum-based optimization, Adam optimizer), Learning Rate and Convergence - Impact of learning rate on training.	7

REFERENCES:

1.	Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 2nd Edition, Pearson/Prentice Hall, New Jersey, 2003.
2.	M.C. Trivedi, A Classical Approach to Artificial Intelligence, 1st Edition, Khanna Publishing House, New Delhi, 2018.
3.	V.K. Jain, Machine Learning, 1st Edition, Khanna Publishing House, New Delhi, 2018.
4.	Ethem Alpaydin, Introduction to Machine Learning, 2nd Edition, MIT Press, Cambridge, 2014.
5.	Vinod Chandra S.S. and Anand Hareendran S., Artificial Intelligence and Machine Learning, PHI Learning, New Delhi, 2014.

TH 3(d)- SOFT COMPUTING TECHNIQUES

L	T	P		
3	0	0		**Course Code: OE302D**
Total Contact Hours				**Theory Assessment**
Theory	: 45 Hrs.		**Total Marks: 100**	End Term Exam 70
Tutorial	0			Progressive Assessment 30
Pre Requisite : Nil				
Credit : 3				Category of Course : OE

RATIONALE:

The Soft Computing Techniques course is designed to equip with the knowledge and skills required to solve complex real-world problems using intelligent, flexible, and approximate reasoning methods. In contrast to traditional "hard computing" approaches that demand exact solutions, soft computing embraces uncertainty, imprecision, and partial truth-making it ideal for solving practical problems in engineering, data science, and decision-making.

LEARNING OUTCOMES:

After completion of the course, the students will be able to

- Explain the Core Concepts of soft computing, including its need, scope, and its difference from traditional hard computing.
- Design Basic Neural Networks for classification, prediction, and pattern recognition tasks.
- Design Fuzzy Inference Systems using fuzzy sets, membership functions, and fuzzy rules.
- Apply Defuzzification Methods to convert fuzzy outputs into actionable results.
- Apply Genetic Operators like selection, crossover, and mutation to solve optimization and search problems.
- Apply Hybrid Models in fields like control systems, image processing, and decision-making.

DETAILED COURSE CONTENT:

Unit No.	Topic/Sub-Topic	Allotted Time (Hours)
I	**Introduction to Soft Computing -** Overview of Soft Computing - Definition and importance of soft computing, Comparison between hard computing and soft computing, Applications of soft computing in various engineering fields, Components of Soft Computing - Introduction to Artificial Neural Networks (ANNs), Basics of Fuzzy Logic Systems (FLS), Overview of Genetic Algorithms (GAs).	8
II	**Artificial Neural Networks (ANNs) -** Fundamentals of ANNs, Biological inspiration and neural models, Types of activation functions, Architecture of neural networks: single-layer and multi-layer perceptrons, Learning Processes in ANNs - Supervised, unsupervised, and reinforcement learning, Backpropagation algorithm and its applications, Training, validation, and testing of neural networks, Applications of ANNs - Pattern recognition and classification, Function approximation and prediction, Case studies in engineering applications.	10
III	**Fuzzy Logic Systems (FLS) -** Introduction to Fuzzy Logic, Classical sets vs. fuzzy sets, Membership functions and their types, Fuzzy set operations, Fuzzy Rule-Based Systems - Linguistic variables and hedges, Formation of fuzzy if-then rules, Inference mechanisms and defuzzification techniques, Applications of Fuzzy Logic, Fuzzy control systems, Decision-making in uncertain environments, Engineering case studies utilizing fuzzy logic.	10
IV	**Genetic Algorithms (GAs) -** Basics of Genetic Algorithms - Evolutionary principles and natural selection, Chromosome representation and initialization, Fitness functions and selection mechanisms, Genetic Operators - Crossover techniques and their significance, Mutation operations and rates, Elitism and generational replacement strategies, Applications of Genetic Algorithms**,** Optimization problems in engineering, Scheduling and routing problems, Real-world case studies employing GAs.	10
V	**Hybrid Systems and Applications -** Integration of Soft Computing Techniques**,** Concept of hybrid systems combining ANNs, FLS, and Gas, Neuro-fuzzy systems: architecture and learning, Genetic-fuzzy systems and their applications, Practical Implementations - Designing hybrid models for complex problem-solving, Simulation and analysis of hybrid systems, Case studies demonstrating the effectiveness of hybrid approaches.	7

REFERENCES:

1.	Soft Computing: Fundamentals and Applications by D. K. Pratihar
2.	Soft Computing and Its Applications by Rafik Aziz Aliev and Rashad Rafik Aliev
3.	Soft Computing: Integrating Evolutionary, Neural, and Fuzzy Systems by Tettamanzi Andrea G. B. and Tomassini Marco
4.	Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence by Jyh-Shing Roger Jang et al.
5.	Neural Network, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications by S. Rajasekaran and G. A. Vijayalakshmi Pai

TH 4(a)- ENGINEERING ECONOMICS AND ACCOUNTANCY

L	T	P		
3	0	0		**Course Code: OE304A**
Total Contact Hours				**Theory Assessment**
Theory	: 45 Hrs.		**Total Marks: 100**	End Term Exam 70
Tutorial	0			Progressive Assessment 30
Pre Requisite : Nil				
Credit : 3				Category of Course : OE

RATIONALE

Engineering Economics and Accountancy plays crucial role in the economic aspects of engineering. This course ensures that the budding engineers to facilitate the process of economic decision making and also to acquaint knowledge on basic financial management aspects. Also, they will be able to develop the skills to analyze financial statements.

LEARNING OUTCOMES

On successful completion of the course, students will be able to:

- Identify various aspects of managerial economics
- Describe the mechanism of demand and supply
- Interpret various concepts of production and cost analysis
- Explain the different components of pricing
- Distinguish the details of financial accounting

DETAILED COURSE CONTENT

UNIT	TOPIC/SUB-TOPIC	ALLOTTED TIME (HRS.)
I.	**INTRODUCTION:** Managerial Economics; Relationship with other disciplines; Firms: Types, objectives and goals; Managerial decisions; Decision analysis.	**8**
II.	**DEMAND & SUPPLY ANALYSIS:** Demand; Types of demand; Determinants of demand; Demand function; Demand elasticity; Demand forecasting; Supply; Determinants of supply; Supply function; Supply elasticity.	**12**
III.	**PRODUCTION AND COST ANALYSIS:** Production function; Returns to scale; Production optimization; Least cost input; Isoquants; Managerial uses of production function; Cost Concepts; Cost function; Types of Cost; Determinants of cost; Short run and Long run cost curves; Cost Output Decision; Estimation of Cost.	**10**
IV.	**PRICING:** Determinants of Price; Pricing under different objectives and different market structures; Price discrimination; Pricing methods in practice; Role of Government in pricing control.	**7**
V.	**FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT):** Balance sheet and related concepts; Profit & Loss Statement and related concepts; Financial Ratio Analysis; Cash flow analysis; Funds flow analysis; Comparative financial statements; Analysis & Interpretation of financial statements; Investments; Risks and return evaluation of investment decision; Average rate of return; Payback Period; Net Present Value; Internal rate of return,	**8**

REFERENCES:

1. Premvir Kapoor, Sociology & Economics for Engineers, Khanna Publishing House, New Delhi, 2018
2. McGuigan, Moyer and Harris, 'Managerial Economics; Applications, Strategy and Tactics', Thomson South Western, 10th Edition, 2005.
3. Prasanna Chandra. 'Fundamentals of Financial Management', Tata Mcgraw Hill Publishing Ltd., 4th edition, 2005.
4. Samuelson. Paul A and Nordhaus W.D., 'Economics', Tata Mcgraw Hill Publishing Company Limited, New Delhi, 2004.
5. Paresh Shah, 'Basic Financial Accounting for Management', Oxford University Press, New Delhi, 2007.
6. Salvatore Dominick, 'Managerial Economics in a global economy'. Thomson South Western, 4th Edition, 2001.

TH 4(b)- INTERNET OF THINGS

L	T	P		Course Code: OE304B
3	0	0		
Total Contact Hours				**Theory Assessment**
Theory	: 45 Hrs.		**Total Marks: 100**	End Term Exam 70
Tutorial	0			Progressive Assessment 30
Pre Requisite : Nil				
Credit : 3				Category of Course : OE

RATIONALE:

The Internet of Things (IoT) is revolutionizing the way devices communicate, interact, and function, creating a connected world that bridges physical and digital spaces. With industries embracing smart solutions in areas like healthcare, agriculture, manufacturing, transportation, and home automation, there is a growing demand for skilled professionals who can design, implement, and manage IoT systems.

LEARNING OUTCOMES:

After the completion of this course, the students will be able to

- Explain Core IoT Concepts, including architecture, components, and communication models.
- Identify IoT Ecosystem Elements, such as sensors, actuators, microcontrollers, communication protocols, and cloud platforms.
- Integrate identified Hardware Components like Arduino, Raspberry Pi, sensors, and actuators for IoT projects.
- Analyze Sensor Data from IoT devices.
- Identify Common Security Threats in IoT ecosystems, including data breaches, device hijacking, and network vulnerabilities.

DETAILED COURSE CONTENT:

Unit No.	Topic/Sub-Topic	Allotted Time (Hours)
I	**Introduction to Internet of Things (IoT) -** Overview of IoT - Definition and significance of IoT, Historical evolution and future prospects, Applications across various industries, IoT Architecture and Components, Basic architecture - sensors, actuators, connectivity, and data processing, Hardware components: microcontrollers (e.g., Arduino, Raspberry Pi), Software components: operating systems and middleware.	8
II	**Sensors, Actuators, and Data Acquisition:** Sensors and Actuators, Types of sensors: temperature, humidity, motion, etc., Actuators: motors, relays, and control	10
	mechanisms, Interfacing sensors and actuators with microcontrollers, Data Acquisition and Processing - Analog and digital data acquisition methods, Signal conditioning and filtering techniques, Introduction to data processing and storage.	
III	**Communication Protocols and Networking -** IoT Communication Protocols, Overview of protocols: MQTT, CoAP, HTTP, etc., Wireless communication: WiFi, Bluetooth, Zigbee, LoRaWAN., Wired communication: Ethernet, Serial communication, Networking Fundamentals - IP addressing and subnetting, Network topologies and architectures, Introduction to IPv6 and its relevance to IoT.	10
IV	**IoT Platforms and Cloud Integration -** IoT Platforms, Overview of popular IoT platforms (e.g., AWS IoT, Google Cloud IoT), Data analytics and visualization tools, Edge computing concepts, Cloud Computing for IoT, Introduction to cloud services: IaaS, PaaS, SaaS, Integration of IoT devices with cloud platforms, Data storage, processing, and management in the cloud.	10
V	**IoT Security and Privacy -** Security Challenges in IoT, Common vulnerabilities and threats, Authentication and authorization mechanisms, Data encryption and secure communication, Privacy Considerations - Data privacy laws and regulations, User consent and data ownership, Best practices for ensuring privacy in IoT applications.	7

REFERENCES:

1.	Internet of Things by Jeeva Jose
2.	Internet of Things by Raj Kamal
3.	Internet of Things (IoT) by Dr. Kamlesh Lakhwani, Dr. Hemant Kumar Gainey, Joseph Kofi Wireko, and Kamal Kant Hiran
4.	Internet of Things: From research and innovation to market deployment by Dr. Ovidiu Vermesan and Dr. Peter Friess
5.	The Internet of Things in the Cloud: A Middleware Perspective by Honbo Zhou
6.	Internet of Things: Architectures, Protocols and Standards by Simone Cirani, Gianluigi Ferrari, Marco Picone, and Luca Veltri
7.	Internet of Things (IoT): Concepts and Applications edited by Dr. Jamil Y. Khan and Dr. Mehmet R. Yuce

TH 4(c)- SUSTAINABLE DEVELOPMENT

L	T	P		
3	0	0		**Course Code: OE304C**
Total Contact Hours				**Theory Assessment**
Theory	: 45 Hrs.		**Total Marks: 100**	End Term Exam 70
Tutorial	0			Progressive Assessment 30
Pre Requisite : Nil				
Credit : 3				Category of Course : OE

RATIONALE:

The aim of this course is to develop an action mindset for sustainable development by imparting knowledge on environmental, social and economic dimensions of sustainability and related principles.

LEARNING OUTCOMES:

After Completion of the course, student will be able to

- Explain current challenges to sustainability, including modern world social, environmental, and economic structures and crises.
- Identify the social environmental, and economic dimensions of sustainability in terms of UN Sustainable development goals
- Explain understanding of the social, economic and ecological linkage of Human well-being, production and consumption
- Discuss sustainability issues and solutions using a holistic approach that focuses on connections between complex human and natural systems.
- Integrate knowledge from multiple sources and perspectives to understand environmental limits governing human societies and economies and social justice dimensions of sustainability.

DETAILED COURSE CONTENT:

UNIT NO.	CONTENT	TIME ALLOTTED (HRS.)
I	**SUSTAINABILITY AND DEVELOPMENT CHALLEGES** Definition of sustainability – environmental, economical and social dimensions of sustainability – sustainable development models – strong and weak sustainability – defining development- millennium development goals – mindsets for sustainability: earthly, analytical, precautionary, action and collaborative– syndromes of global change: utilisation syndromes, development syndromes, and sink syndromes – core problems and cross cutting Issues of the 21 century – global, regional and local environmental issues – social insecurity – resource degradation –climate change – desertification.	**9**
II	**PRINCIPLES AND FRAME WORK** History and emergence of the concept of sustainable development – our common future – Stockholm to Rio plus 20– Rio Principles of sustainable development – Agenda 21 natural step- peoples earth charter – business charter for sustainable	**9**
	development –UN Global Compact – Role of civil society, business and government – United Nations' 2030 Agenda for sustainable development – 17 sustainable development goals and targets, indicators and intervention areas.	
III	**SUSTAINABLE DEVELOPMENT AND WELLBEING** The Unjust World and inequities – Quality of Life – Poverty, Population and Pollution – Combating Poverty – – Demographic dynamics of sustainability – Strategies to end Rural and Urban Poverty and Hunger – Sustainable Livelihood Framework- Health, Education and Empowerment of Women, Children, Youth, Indigenous People, Non-Governmental Organizations, Local Authorities and Industry for Prevention, Precaution , Preservation and Public participation.	**9**
IV	**SUSTAINABLE SOCIO-ECONOMIC SYSTEMS** Sustainable Development Goals and Linkage to Sustainable Consumption and Production – Investing in Natural Capital- Agriculture, Forests, Fisheries – Food security and nutrition and sustainable agriculture- Water and sanitation – Biodiversity conservation and Ecosystem integrity –Ecotourism – Sustainable Cities – Sustainable Habitats- Green Buildings – Sustainable Transportation — Sustainable Mining – Sustainable Energy– Climate Change –Mitigation and Adaptation – Safeguarding Marine Resources – Financial Resources and Mechanisms	**9**

V	**ASSESSING PROGRESS AND WAY FORWARD** Nature of sustainable development strategies and current practice- Sustainability in global, regional and national context –Approaches to measuring and analysing sustainability– limitations of GDP Ecological Footprint- Human Development Index- Human Development Report – National initiatives for Sustainable Development – Hurdles to Sustainability – Science and Technology for sustainable development – Performance indicators of sustainability and Assessment mechanism – Inclusive Green Growth and Green Economy – National Sustainable Development Strategy Planning and National Status of Sustainable Development Goals	**9**
		Total : 45

REFERENCE:

- Tom Theis and Jonathan Tomkin, Sustainability: A Comprehensive Foundation, Rice University, Houston, Texas, 2012
- A guide to SDG interactions: from science to implementation, International Council for Science, Paris,2017
- Karel Mulder, Sustainable Development for Engineers – A Handbook and Resource Guide, Rouledge Taylor and Francis, 2017.
- The New Global Frontier – Urbanization, Poverty and Environment in the 21st Century – George Martine, Gordon McGranahan,Mark Montgomery and Rogelio Fernández-Castilla, IIED and UNFPA, Earthscan, UK, 2008
- Nolberto Munier, Introduction to Sustainability: Road to a Better Future, Springer, 2006
- Barry Dalal Clayton and Stephen Bass, Sustainable Development Strategies- a resource book", Earthscan Publications Ltd, London, 2002.

TH 4(d)- ROBOTICS

L	T	P		Course Code: OE304D	
3	0	0			
Total Contact Hours				**Theory Assessment**	
Theory		: 45 Hrs.	**Total Marks: 100**	End Term Exam	: 70
Tutorial		: 0		Progressive Assessment	: 30
Pre Requisite		**: Nil**			
Credit		**: 3**		Category of Course : OE	

RATIONALE:

Robotics boosts skills that are the foundation of success, such as critical-thinking and problem-solving skills. When working on a robot, students are encouraged to use logic, engineering intuition, and critical thinking. Students can come up with problems in their everyday life that they think robots can fix. Allowing students to develop theories that can be tested in robotics projects will strengthen their ability to form hypotheses.

LEARNING OUTCOMES:

After the completion of the course, the students will be able to

- Explain basic concepts, parts of robots and types of robots.
- Describe drive systems for robot, sensors and programming of robots.
- Select the robots according to its usage.
- Apply robots with justification and implementation of project.
- Design automation applications of robots in various industries.

DETAILED COURSE CONTENT

Unit	Topic/Sub Topic	Hours
I	**Fundamentals of Robotics:** Introduction; Definition; Robot anatomy (parts) and its working; Robot Components: Manipulator, End effectors; Construction of links, Types of joints; Classification of robots; Cartesian, Cylindrical, Spherical, SCARA, Vertical articulated; Structural Characteristics of robots; Mechanical rigidity; Effects of structure on control work envelope and work Volume; Robot work Volumes, comparison; Advantages and disadvantages of robots.	**9**
II	**Robotic Drive System and Controller:** Actuators; Hydraulic, Pneumatic and Electrical drives; Linear actuator; Rotary drives; AC servo motor; DC servo motors and Stepper motors; Conversion between linear and rotary motion; Feedback devices; Potentiometers; Optical encoders; DC tachometers; Robot controller; Level of Controller; Open loop and Closed loop controller; Microprocessor based control system; Robot path control: Point to point, Continuous path control and Sensor based path control; Controller programming.	**9**
III	**Sensors:** Requirements of a sensor; Principles and Applications of the following types of sensors: Position sensors (Encoders, Resolvers, Piezo Electric); Range	**9**

	sensors (Triangulation Principle, Structured lighting approach); Proximity sensing; Force and torque sensing. Introduction to Machine Vision: Robot vision system (scanning and digitizing image data); Image processing and analysis; Cameras (Acquisition of images); Videocon camera (Working principle & construction); Applications of Robot vision system: Inspection, Identification, Navigation & serving	
IV	**Robot kinematics and Robot Programming:** Forward Kinematics; Inverse Kinematics and Differences; Forward Kinematics and Reverse Kinematics of Manipulators with Two Degrees of Freedom (In 2 Dimensional); Deviations and Problems. Robot programming Languages; VAL Programming; Motion Commands; Sensor Commands; End effecter commands; and Simple programs	**9**
V	**Automation:** Basic elements of automated system, advanced automation functions, levels of automation. Industrial Applications: Application of robots in machining; welding; assembly and material handling	**9**

REFERENCES:

- Introduction to Robotics: Analysis, Systems, Applications – Saeed B. Niku
- Industrial Robotics: Technology, Programming and Applications – M.P. Groover
- Robotics Control, Sensing, Vision and Intelligence – Fu.K.S. Gonzalz.R.C and Lee C.S.G,
- Robotics for Engineers – Yoram Koren
- A Text book on Industrial Robotics – Ganesh S. Hedge
- Robotics Technology and Flexible Automation – S.R. Deb & Sankha Deb
- Elements of Robotics Process Automation, Mukherjee

TH 5- INDIAN CONSTITUTION

L	T	P		Course Code: AU302	
2	0	0			
Total Contact Hours				**Theory Assessment**	
Theory		: 30Hrs		End Term Exam	0
			Total Marks: 0	Progressive Assessment	0
Pre Requisite		**: Nil**			
Credit		**0**		Category of Course : Mandatory	

RATIONALE:

This course will focus on the basic structure and operative dimensions of Indian Constitution. It will explore various aspects of the Indian political and legal system from a historical perspective highlighting the various events that led to the making of the Indian Constitution. The document lays down the framework demarcating the fundamental political code, structure, procedures, powers, and sets out fundamental rights, directive principles, and the duties of citizens. In this course, student will make an effort to understand the history of our constitution, the Constituent Assembly, the drafting of the constitution, the preamble of the constitution that defines the destination that we want to reach through our constitution, the fundamental right constitution guarantees through the great rights revolution, the relationship between fundamental rights and fundamental duties, the futurist goals of the constitution as incorporated in directive principles and the relationship between fundamental rights and directive principles.

LEARNING OUTCOMES:

After the completion of the course, the student shall be able to

- Explain the emergence and evolution of Indian Constitution.
- Define the structure and composition of Indian Constitution
- Describe and analyze federalism in the Indian context.
- Analyze the Panchayati Raj institutions as a medium of decentralization
- Evaluate the Indian Political scenario amidst the emerging challenges.

DETAILED COURSE CONTENTS

Unit	Topic/Subtopic	Hours
I	The Constitution – Introduction: The History of the Making of the Indian Constitution, Preamble and the Basic Structure, and its interpretation, Fundamental Rights and Duties and their interpretation, State Policy Principles.	08
II	Union Government: Structure of the Indian Union, President – Role and Power, Prime Minister and Council of Ministers, Lok Sabha and Rajya Sabha.	07
III	State Government: Governor – Role and Power, Chief Minister and Council of Ministers, State Secretariat.	05
IV	Local Administration: District Administration, Municipal Corporation, Zila Panchayat.	05
V	Election Commission: Role and Functioning, Chief Election Commissioner, State Election	05
	Commission	

REFERENCES:

1. Ethics and Politics of the Indian Constitution, Rajeev Bhargava, Oxford University Press, New Delhi, 2008.
2. The Constitution of India, B.L. Fadia, Sahitya Bhawan; New edition (2017).
3. Introduction to the Constitution of India, DD Basu, Lexis Nexis; Twenty-Third 2018

edition. Websites:

1. https://www.constitution.org/cons/india/const.html
2. http://www.legislative.gov.in/constitution-of-india
3. https://www.sci.gov.in/constitution
4. https://www.toppr.com/guides/civics/the-indian-constitution/the-constitution-of-india/

PR:3- MAJOR PROJECT & SEMINAR

L	T	P		Course Code: ARPC301	
0	0	8			
Total Contact Hours				**Theory Assessment**	
Theory		: 120Hrs	**Total Marks: 100**	End Term Exam	100
				Progressive Assessment	100
Pre Requisite		**: Nil**			
Credit		**4**		Category of Course : Project	

RATIONALE:

Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of Beauty culture and practices in real life situations, so as to participate and manage a large organization and projects, in future.

The entire Project shall spread over 5th and 6th Semesters. Part of the Project covered in 5th Semester shall be named as Project Dissertation-I and the balance portion to be covered in 6th Semester shall be named as Project Dissertation- II.Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of Beauty Culture and practices in real life situations, so as to participate and manage a large organization and projects, in future. The work must be presented in front of the examiner's panel consisting of an approved external examiner, an internal examiner and a guide, co-guide etc. as decided by the Head of the Department. It is a continuation of Project work started in semester

V. The project work has to be presented at the seminar.

LEARNING OUTCOMES:

After the completion of the course, the student shall be able to

- Implement the theoretical and practical knowledge and skills gained through various subjects/courses into an application suitable for a real practical working environment, preferably in an industrial environment.
- Develop software packages or applications and implement these for the actual needs of the community/industry.
- Identify and contrast gaps between the technological knowledge acquired through curriculum and the actual industry need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key areas and asynchronous document sharing and discussions, as well as prepare collaborative edition of the final project report.
- Achieve real life experience in Project design.
- Develop the skill of writing a Project Represent project work as a seminar in front of the examiners and beauty & wellness community
- Develop presentation skills
- Create interaction among listeners
- Display experimental set up/ équipement.
- Learn to appreciate peers and give positive feedback.

STUDENTS' ACTIVITY

Students will do their project work as guidance from their guide (faculty member)

Guidelines:

The individual students have different aptitudes and strengths and also areas of interest. Project work, therefore, should match the strengths and interest of the students. For this purpose, students should be asked to identify the type of project work they would like to execute. The activity of problem identification should begin well in advance (right from beginning of 5th semester). Students should be allotted a problem of interest to him/her as a project work. It is also essential that the faculty of the respective departments may have a brainstorming session to identify suitable project assignments for their students. The project assignment can be an individual assignment or a group assignment.

Preferably there should not be more than 5 students if the project work is given to a group. The project work identified in collaboration with industry/organization should be preferred.

The dissertation should be presented in the standard format as provided by the department. The candidate has to prepare a detailed project report consisting of the introduction of the problem, problem statement, literature review, objectives of the work, methodology (experimental set up or numerical details as the case may be) of solution and results and discussion. The report must bring out the conclusions of the work and future scope for the study. The work has to be presented in front of the examiner's panel consisting of an approved external examiner, an internal examiner and a guide, co-guide etc. as decided by the Head of the Department. The candidate has to be in regular contact with his/her guide.

Project Phase-I and Phase-II

The Project work duration shall cover 2 semesters (5th and 6th semester). The Grouping of students, selection of Project, assignment of Project Guide to the Group shall be done in the beginning of 5th semester under Project Phase-

I. The students may be allowed to study literature, any existing system and then define the Problem/objective of the Project. Requirements specification and Preliminary work of the project have to be completed in Phase-I. Project Milestones are to be set so that progress can be tracked. In Phase-II Detailed work, Documentation has to be complete. Project Report have to be prepared and completed in Phase-II. All Project reports should be organized uniformly in proper order, irrespective of group. Teacher Guides can make suitable alterations in the components of Task and schedule.

At the end of Project Phase-I in the 5th semester there shall be one presentation by each group to mark to progress and also to judge whether the Project is moving in the right direction as per the objective of the Project.

A suggestive criterion for assessing student performance by the external (preferably person from industry) and internal (teacher) examiner is given in the table below:

Sl. No.	Performance Criteria
1.	Selection of project assignment
2.	Planning and execution of considerations
3.	Quality of performance
4.	Providing solution of the problems or production of final product
5.	Sense of responsibility

6.	Self-expression/ communication/ Presentation skills
7.	Interpersonal skills/human relations
8.	Report writing skills
9	Viva voce

The teachers are free to evolve other criteria of assessment, depending upon the type of project work.

It is proposed that the institute should organize an annual exhibition of the project work done by the students and invite leading Industrial organizations of area of subject to such an exhibition.

ORGANIZATION OF PROJECT REPORT

1. Cover page:

It should contain the following (in order)

I. Title of the Project
II. "Submitted in partial fulfillment of the requirements for the Diploma in <Branch Name>"
III. By Name of the Student(s)
IV. Logo of the Institution
V. Branch Name/Depart Name and Institution Name with Address VI. Academic Year

2. 1st Inner page
Certificate:

It should contain he is following

"This is to certify that the work in this Project Report entitled <Project Title> by <Name of student(s)> has been carried out under my supervision in partial fulfillment of the requirements for the Diploma in <Branch Name>" during session
<session > in <Branch /Department Name> of
<Institute name> and this work is the original work of the above student(s). Seal and signature of the Supervisor/Guide with date

3. 2nd Inner Page Acknowledgement by the Student(s)

4. Contents.

5. Chapter wise arrangement of Reports

6. Last Chapter: Conclusion
It should contain

I. Conclusion
II. Limitations
III. Scope for further Improvement

7. References