महाराष्ट्र शासन
सहसंचालक (उच्च शिक्षण)
१७ आंबेडकर रोड, कॅम्प, पुणे – ४११ ००१
Website: www.jdhepune.org E-mail – jdhepune@gmail.com
दूरध्वनी क्रमांक – ०२० - २६१२७८३३, ०२०-२६०५१६३२ फॅक्स क्र. ०२०- २६०५१६३२

क्रमांक - राष्ट्रीय शैक्षणिक धोरण - २०२०/ पुणे विभाग/२५ दि. १२/०६/२०२५.

प्रति,

१. कुलसचिव, सावित्रीबाई फुले पुणे विद्यापीठ, पुणे
२. कुलसचिव, सर्व अकृषी खाजगी विद्यापीठे, पुणे विभाग
३. प्राचार्य / प्राचार्या,
सर्व अशासकीय अनुदानित/कायम विनाअनुदानित
स्वायत्त महाविद्यालये,
पुणे, अहमदनगर व नाशिक जिल्हे.

विषय - **राष्ट्रीय शैक्षणिक धोरण २०२० ची राज्यातील अंमलबजावणीच्या अनुषंगाने गठीत करण्यात आलेल्या सुकाणू समितीच्या दि. २२ व २३ एप्रिल, २०२५ रोजी मुंबई विद्यापीठ, मुंबई येथे झालेल्या बैठकीतील इतिवृत्तानुसारची मार्गदर्शक तत्वे/सूचना संदर्भात कार्यवाही करणेबाबत...**

संदर्भ - १. शासन निर्णय उच्च व तंत्र शिक्षण विभाग क्रमांक एनईपी-२०२२/प्र.क्र.०९/विशि-३ शिकाना दि. ३०.८.२०२४.
२. शासन निर्णय उच्च व तंत्र शिक्षण विभाग क्रमांक एनईपी-२०२२/प्र.क्र.०९/विशि-३ शिकाना दि. १३.०९.२०२४.
३. मा. शिक्षण संचालक, उ.शि. यांचे पत्र क्र. युएनआय/(१३६/२२)/विशि-१/भाग-३ /E-१४७५०३२

कृपया सोबत जोडलेले परिपत्रक अवलोकनी घ्यावे.

उपरोक्त विषयाबाबत संदर्भिय शासन निर्णयान्वये राष्ट्रीय शैक्षणिक धोरण २०२० ची राज्यातील अंमलबबजावणीच्या अनुषंगाने गठीत उपसमितीच्या अहवालातील शिफारशीच्या अंमलबजावणी संदर्भात आढावा घेऊन येणा-या अडचणी निवारणासाठी उपाययोजना सुचविण्यासाठी व मार्गदर्शन करणेसाठी संदर्भिय शासन निर्णयान्वये सुकाणू समिती पुनर्गठीत करण्यात आलेली आहे.

या समितीची बैठक दिनांक २२-२३ एप्रिल, २०२५ रोजी मुंबई विद्यापीठ, मुंबई येथे आयोजित करण्यात आली. या बैठकीचे इतिवृत्तातील मुददा क्रमांक F,J,K,P,R यामध्ये नमूद केलेल्या सुकाणू समितीच्या निर्णयानुसार आवश्यक ती कार्यवाही तात्काळ विद्यापीठ स्तरावरुन करण्याबाबत कळविण्यात आलेले आहे.

या बैठकीत ठरल्यानुसार मा. अध्यक्ष सुकाणू समिती यांनी संदर्भिय क्रमांक १ च्या शासन निर्णयातील मुददा क्रमांक २ (५) अन्वये खालील विषयांबाबत संचालनालयाच्या माध्यमातून अकृषी विद्यापीठांना संबंधित विषयाच्या मार्गदर्शक सूचना / पत्र निर्गमित करणेबाबत कळविले आहे.

अ.क्र.	विषय
१	दोन श्रेयांक आधारित Generic IKS-Curriculum and Guidelines for Implementation in FYUG in all HEI's throughout Maharashtra State.
२	Guidelines for converting PG Diploma into Master's Program in alignment with NEP २०२०
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६	Guidelines for Nomenclature of Certificates and Diplomas for the students exiting from FYUG Program.

सुकाणू समिती अंतर्गत विविध उपसमित्या/उपगट यांनी तयार केलेल्या उपरोक्त विषयाबाबतच्या मार्गदर्शक सूचनांनुसार सुकाणू समितीच्या दिनांक २२ व २३ एप्रिल, २०२५ च्या बैठकीत आवश्यक त्या दुरुस्त्या स्विकारण्यात आल्या व मान्य करण्यात आल्या असून सदर मार्गदर्शक सूचनांची त्वरीत अंमलबजावणी राज्यातील अकृषि विद्यापीठे आणि स्वायत्त महाविद्यालयामध्ये शैक्षणिक वर्ष २०२५-२६ पासून विद्यापीठातील व स्वायत्त महाविद्यालयातील संबंधित प्राधिकरणांच्या मान्यतेने करण्यात यावी.

Signed by
Ashok Uddhav Ubale
Date: 12-06-2025 15:13:59
(डॉ. अशोक उबाळे)
सह संचालक (उच्च शिक्षण)
पुणे विभाग, पुणे.

सोबत - वरीलप्रमाणे दिनांक २२ व २३ एप्रिल २०२५ रोजीच्या बैठकीचे इतिवृत्त.

प्रत - मा. शिक्षण संचालक, उच्च शिक्षण, महाराष्ट्र राज्य, पुणे यांना माहितीसाठी सविनय सादर.

महाराष्ट्र शासन
उच्च शिक्षण संचालनालय,महाराष्ट्र राज्य,
४१२ ई, बहिरट पाटील चौक, मॉडेल कॉलनी, शिवाजीनगर पुणे-४११ ०१६
Web : www.dhepune.gov.in E-mail:vishi.dhepune@nic.in
फोन नं.०२०/२६१२२११९

क्रमांक-युएनआय/(१३६/२२)/विशि-१/भाग-३/E-1475032

प्रति,

१.मा.प्र-कुलगुरू /कुलसचिव,सर्व अकृषी विद्यापीठे
२.सर्व विभागीय सहसंचालक, उच्च शिक्षण

विषय राष्ट्रीय शैक्षणिक धोरण २०२० ची राज्यातील अंमलबजावणीच्या अनुषंगाने गठीत करण्यात आलेल्या सुकाणू समितीच्या दि.२२-२३ एप्रिल, २०२५ रोजी मुंबई विद्यापीठ, मुंबई येथे झालेल्या बैठकीतील इतिवृत्तानुसारची मार्गदर्शक तत्वे/सूचना संदर्भात कार्यवाही करणेबाबत

संदर्भ १.शासन निर्णय उच्च व तंत्र शिक्षण विभाग क्रमांक एनईपी-२०२२/प्र.क्र.०९/विशि-३ शिकाना दि.३० ऑगस्ट, २०२४
२.शासन निर्णय उच्च व तंत्र शिक्षण विभाग क्रमांक एनईपी-२०२२/प्र.क्र.०९/विशि-३ शिकाना दि.१३ सप्टेंबर, २०२४
३.संचालनालयाचे समक्रमांक दि.२३ मे, २०२५

उपरोक्त विषयाबाबत संदर्भिय शासन निर्णयान्वये राष्ट्रीय शैक्षणिक धोरण २०२० ची राज्यातील अंमलबजावणीच्या अनुषंगानेगठीत उपसमितीच्या अहवालातील शिफारसीच्या अंमलबजावणी संदर्भात आढावा घेऊन येणाऱ्या अडचणी निवारणासाठी उपाययोजना सुचविण्यासाठी व मार्गदर्शन करणेसाठी संदर्भिय शासन निर्णयान्वये सुकाणू समिती पुनर्गठीत करण्यात आलेली आहे.

या समितीची बैठक दि.२२-२३ एप्रिल, २०२५ रोजी मुंबई विद्यापीठ, मुंबई येथे आयोजित करण्यात आली. या बैठकीचे इतिवृत्तातील मुद्दा क्रमांक F, J, K, P, R यामध्ये नमूद केलेल्या सुकाणू समितीच्या निर्णयानुसार आवश्यक ती कार्यवाही तात्काळ विद्यापीठ स्तरावरून करण्याबाबत कळविण्यात आलेले आहे.

या बैठकीत ठरल्यानुसार मा.अध्यक्ष, सूकाणू समिती यांनी संदर्भिय क्रमांक १ च्या शासन निर्णयातील मुद्दा क्रमांक २(५) अन्वये खालील विषयांबाबत संचालनालयाच्या माध्यमातून अकृषी विद्यापीठांना संबंधित विषयाच्या मार्गदर्शकसूचना/पत्र निर्गमित करणेबाबत कळविले आहे.

अ.क्र.	विषय
१	दोन श्रेयांक आधारित Generic IKS-Curriculum and Guidelines for Implementation in FYUG in all HEI's throughout Maharashtra State.
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अ.क्र.	विषय
५	Incorporation of MSBTE courses in UG Program in alignment with NEP २०२०
६	Guidelines for Nomenclature of Certificates and Diplomas for the students exiting from FYUG Program.

सुकाणू समितीअंतर्गत विविध उपसमित्या/उपगट यांनीतयार केलेल्या उपरोक्त विषयाबाबतच्या मार्गदर्शक सूचनांना सूकाणू समितीच्या दि.२२-२३ एप्रिल, २०२५ च्या बैठकीत आवश्यक त्या दुरूस्त्या स्वीकारण्यात आल्या व मान्य करण्यात आल्या असून सदर मार्गदर्शक सूचनांची त्वरीत अंमलबजावणी राज्यातील अकृषी विद्यापीठे आणि स्वायत्त महाविद्यालयांमध्ये शैक्षणिक वर्ष २०२५-२६ पासून विद्यापीठातील व स्वायत्त महाविद्यालयातील संबंधित प्राधिकरणांच्या मान्यतेने करण्यात यावी.

सर्व विभागीय सहसंचालक, उच्च शिक्षण यांनी आपल्या विभागांतर्गत असलेल्या सर्व स्वायत्त महाविद्यालयांना आपल्या स्तरावरून अवगत करण्यात यावे.

Signed by
Shailendra Kamlakar Deolankar
Date: 02-06-2025 12:57:59

(डॉ.शैलेंद्र देवळाणकर)
प्र.शिक्षण संचालक (उच्च शिक्षण)
महाराष्ट्र राज्य, पुणे-१६.

प्रत- माहितीस्तव सादर
१.मा.मंत्री महोदय, उच्च व तंत्र शिक्षण विभाग, मंत्रालय, मुंबई यांचे स्वीय सहाय्यक
२.मा.अपर मुख्य सचिव, उच्च व तंत्र शिक्षण विभाग, मंत्रालय, विस्तार भवन, मुंबई.
३.मा.अध्यक्ष, सूकाणू समिती, राष्ट्रीय शैक्षणिक धोरण, २०२०

To
Dr Shailendra Deolankar
Director, Higher Education
Govt. of Maharashtra

Subject: NEP2020 based 2 credit course for generic IKS- curriculum and guidelines – for implementation in FYUG in all HEI's throughout Maharashtra State

Dear Sir,

The Steering committee constituted for effective implementation of NEP2020 in the State of Maharashtra has been working successfully towards its objective. The revised curricula for regular UG degrees and engineering programs have been implemented in all University departments and autonomous colleges and PG degrees an all HEI's across Maharashtra State since the AY 2023_24.

It was brought to the notice of the committee that the 2-credit generic course for IKS included in the first year curriculum was being taught with great variations. A subcommittee was established to study the variations in the IKS syllabi under the chairmanship of Prof Murlidhar Chandekar. Following an in-depth analysis of various syllabi, the subcommittee emphasized the necessity for uniformity across the state in its interim report.

The IKS subcommittee has prepared a syllabus for the generic 2 credit course in IKS and guidelines for implementation. The report was discussed in the Steering Committee meeting held on 22nd and 23rd April, 2025 and the finalised.

The curriculum for the 2 credit IKS generic course and the guidelines have been approved by the Steering Committee and are attached herewith

You are requested to direct implementation of the same in all affiliated colleges, autonomous colleges and all Universities in the State of Maharashtra in the AY 2025-26, through the appropriate channels.

Thanking you
Sincerely

Prof. Dr Nitin R. Karmalkar
Chairman
NEP2020 Steering Committee

IKS Subcommittee

Final Report

After the implementation of NEP 2020 in autonomous colleges, it is brought to the notice of the Steering Committee that the interpretation of the Indian Knowledge System (IKS) which is introduced in the UG program, varied from college to college and hence there is no uniformity in implementation of IKS across the colleges. Hence the Steering Committee for implementation of NEP 2020, appointed by Government of Maharashtra (GoM) formed the IKS sub-committee to study and analyse the syllabi prepared by the autonomous arts, science and commerce colleges as well as autonomous engineering colleges. GR of 20/04/2023 issued by the Government of Maharashtra provided curriculum framework for the First Year (FY) UG program (level 4.5), which includes 02 credit, generic course on IKS in the FY and 02 credits course in IKS which is major specific to be conducted by higher education institutions (HEIs) in the subsequent semesters of the semester in which generic IKS course is set to be conducted. It was suggested that the sub-committee appointed for the subject of IKS goes through the syllabi of different colleges where NEP 2020 is implemented and suggest general guidelines for implementation of IKS in various colleges.

The members of the sub-committee: Prof. Murlidhar Chandekar (Chairman), Members - Prof. N. R. Karmalkar, Prof. Jogendra Singh Bisen, Prof. Madhav Rajwade, Prof. Kala Acharya, Prof. Mandar Bhanushe, Prof. Parag Joshi, Prof. C. Dethe, Dr. Anurag Deshpande and Prof. S. Patil.

The first meeting of the subcommittee was conducted in Sathaye College, Mumbai on 1st and 2nd November 2023. An interim reports prepared by this sub-committee and submitted to the Steering Committee are attached herewith.

A subsequent meeting held on March 25th and 26th, 2025 in YCMOU was attended by the following members:-

(1) Prof. Murlidhar Chandekar
(2) Prof. Jogendra Singh Bisen
(3) Prof. Kala Acharya
(4) Prof. Supriya Patil
(5) Prof. Parag Joshi
(6) Prof. C. G. Dethe
(7) Dr. Anurag Deshpande

After due deliberations the committee has proposed a curricular framework for the generic 2 credit IKS course.
A list of subjects to be considered in preparing the syllabus by the Universities and guidelines for implementation have been finalised through detailed discussions and deliberations. The list is suggestive and it is proposed that Universities and autonomous colleges will prepare their syllabus using the areas of studies suggested, so that there is some uniformity across the programs. This will also help in managing the workload efficiently.

To bring uniformity in execution of this course across the state, the committee has also proposed guidelines.

The final report of the committee contains:

1. Curricular framework prepared for the 2 credits generic IKS course
2. List of subjects
3. Guidelines for IKS implementation

1. Curricular Framework for the 2-Credit Generic IKS course

Name of the Course: INDIAN KNOWLEDGE SYSTEM

Sr. No.	Course Details	Particulars
1	Description	Introduction, Relevance, Usefulness, Application, Interest, Connection with other Courses, Demand in the Industry, Job prospects, etc.
2	Type	Theory/Theory + Practical
3	Credits	2 Credits (1 credit is 15 hours Theory; 1 credit is equal to 30 hours of practical in a semester)
4	Marks Allotted	50
5	Course Objectives (CO)	CO-1. To sensitize and instil interest in the students about Indian culture and civilisation including its Knowledge System and Tradition. CO-2. To help student to understand the knowledge, art, creativity, skills, values and other practices, of people living in ancient India. CO-3. To help learner study the rich Indian heritage. CO-4. To introduce the contribution of Ancient Indian system & tradition to human life.
6	Course Outcomes (CO)	COO-1. Learner will understand and appreciate the rich Indian Knowledge Tradition. COO-2. Learner will understand the contribution of Indians in various fields. COO-3. Learner will increase subject-awareness and self-esteem.
7	Assessment	Continuous Assessment + End Semester Examination (As per University Guidelines)
8	Continous Assessment	Class Tests, MCQ's, Projects, Seminars, Practical, Quizzes, Presentations, Role Play, Creative Writing, Assignment, Field Visit etc. (Use of more than one method is recommended)
9	Modules to be taught	Module Table given below Contents of IKS are provided in a separate annexure
10	Books/Online Study Material	List be prepared by the respective university based on the topics selected.
11	QP Format	QP format to be prepared by the respective university approved by its competent authorities.

Modules Proposed

Sr. No	Topics	Hours Recommended
Module 1	Introduction to Indian Knowledge Systems	5 - 7
Module 2	Relevance of IKS (Objective, why learn about IKS)	5 - 7
Module 3	Course Contents in IKS (to be prepared by the University)	16 - 20

2. List of Subjects

The list of subjects given below maybe used by the University and Autonomous colleges to prepare syllabus in Module 3 of the 2 Credit Generic IKS course

Sr. No	Subject Title (English)	Subject Title (Marathi)
1	Agricultural Practices	कृषी पद्धती
2	Anthropology	
3	Architecture	
4	Astronomy	
5	Ayurved	
6	Banking Institutions	
7	Botany	
8	Chemistry	
9	Communication Systems	
10	Currency	
11	Dance	
12	Economics	
13	Education and Learning	
14	Environment Studies	
15	Financial Systems	
16	Folk Art	
17	Food Technology - Preparation Preservation of Food	
18	Gems and Gemmology	
19	Geography	
20	Geology	
21	Gold and Silver	
22	Governance and Public Administration	
23	Handicrafts	
24	History	
25	Jewellery	
26	Legal Systems	
27	People Management	
26	Marketing	
27	Metals, Metallurgy and Mining	

28	Music	
29	Ocean Sciences	
30	Painting	
31	Philosophy	
32	Poets and poetry	
33	Political Sciences	
34	Polity (Niti)	
35	Psychology	
36	Saints Literature	
37	Sanskrit, Pali, and Prakrit	
38	Sculpture	
39	Social Systems, Society Structure and Beliefs	
40	Social Sciences	
41	Sports	
42	Status of Women	
43	Supply Chain and Logistics	
44	Tax Planning	
45	Textile Industry	
46	Drama and Theatre	
47	Town Planning	
48	Trade and Commerce – Trade routes barter systems	
49	Transport Development	
50	Ved and Science	
51	Warfare	
52	Water Management	
53	Yoga	
54	Zoology	

Note:

- Unit 1 and 2 of the syllabi shall be common to all disciplines.
- Refer UGC guidelines on IKS
- The third unit provides flexibility in choice of IKS topics;
- Unit-3 topics may be chosen by the competent authority

3. Guidelines

The IKS committee proposes following guidelines to ensure smooth implementation of the IKS generic course.

Generic Two Credit Course for FYUG

a. All Universities and Autonomous Colleges must establish an IKS cell.
b. This IKS cell shall appoint a Nodal Officer.
c. This IKS cell will be responsible for curriculum development, preparation of the syllabi, approval through all the statutory bodies and its implementation.
d. Each FYUG curriculum must have
   i) 2 - Credit IKS Generic paper in Semester 1 or 2.
   ii) 2 - Credit IKS Major Subject Specific paper in Semester 3 or 4
e. Every University and Autonomous College shall arrange for district-wise teachers training in IKS
f. Such trained teachers will further train teachers in their own HEI's.
g. Exams of IKS will be conducted according to the regulations of the respective University
h. The suggested curricular framework will be used for drafting / improvising syllabi
i. The IKS cell may select courses (at least 4-5) from the list.
j. The IKS cell may develop study material - audio, videos or books or use what is already available

The details of the IKS cell, Nodal officer and the syllabi prepared by the University and Autonomous colleges to be sent to the DHE office.

(1) Prof. Murlidhar Chandekar, Chairman, IKS Subcommittee of NEP 2020 Steering Committee
(2) Prof. N. R. Karmalkar
(3) Prof. Jogendra Singh Bisen
(4) Prof. Madhav Rajwade
(5) Prof. Kala Acharya
(6) Prof. Mandar Bhamushe
(7) Prof. Parag Joshi
(8) Prof. C. G. Dethe
(9) Dr. Anurag Deshpande
(10) Prof. Supriya Patil

To
Dr Shailendra Deolankar
Director, Higher Education
Govt. of Maharashtra

Subject: Guidelines for converting PG diploma into Master program in alignment with NEP-2020

Dear Sir,

The Steering committee constituted for effective implementation of NEP2020 in the State of Maharashtra has been working successfully towards its objective.

A subcommittee constituted under the Chairmanship of Prof D. T. Shirke, for preparation of guidelines to convert the existing PG diploma into Master program in alignment with NEP-2020, submitted its final report in the Steering Committee meeting held on 22nd and 23rd April, 2025.

You are requested to direct implementation of the same in all affiliated colleges, autonomous colleges and all Universities in the State of Maharashtra in the AY 2025-26, through the appropriate channels.

The guidelines for converting PG diploma into Master program in alignment with NEP-2020 as approved by the Steering Committee are attached herewith

Thanking you
Sincerely

Prof. Dr Nitin R. Karmalkar
Chairman
NEP2020 Steering Committee

Sub – Committee Report

The Sub-Committee was Appointed by Steering Committee on 9th Oct 2024, to prepare guidelines for Converting PG Diploma in to Master Program.

The Sub-Committee members are as given below

1) Prof. D.T. Shirke : Chairman
2) Dr. V.B. Gaikwad: Member
3) Dr. Walmik Sarvade : Member

GUIDELINES FOR CONVERTING PG DIPLOMA INTO MASTER PROGRAM

TABLE OF CONTENTS

GUIDELINES FOR CONVERTING PG DIPLOMA INTO MASTER PROGRAM

1. Preamble:

In the rapidly changing educational landscape, the demand of higher educational degrees that comply with industry requirements and academic excellence has become increasingly significant. To address this need HEI's are committed to offering flexible and inclusive programs for learners.

The Multiple Entry and Multiple Exit (MEME) framework represents a paradigm shift in higher education empowering learners to enter and exit educational programs at various stages, depending on their personal, academic, and professional affairs.

Hence converting a Postgraduate Diploma (PG Diploma) into a Master's program has emerged as a vital initiative.

2. Main Features of the NEP 2020 curriculum framework:

a) The flexibility to move from one discipline of study to another;
b) The opportunity for learners to choose the courses of their interest in all disciplines;
c) The multiple entry and exit options with the award of UG certificate/ UG diploma/ or three-year degree depending upon the number of credits secured;
d) The flexibility for learners to move from one institution to another to enable them to have multi and/or interdisciplinary learning;
e) The Mobility and flexibility to switch to alternative modes of learning (offline, ODL, and Online learning, and hybrid modes of learning).

3. MEME Framework:

The Multiple Entry and Multiple Exit (MEME) framework represents a revolutionary approach to education designed to accommodate the diverse needs of present learners. This learner-centric model introduces a flexible structure that empowers students to access education on their terms, aligning their learning paths with personal, professional, and societal goals.

Key Features of the MEME Framework:

a) Flexibility in Entry Points
   Students can join programs at different levels, such as certificate, diploma, or degree stages, based on their prior qualifications and aspirations.
b) Seamless Progression

The framework ensures a clear pathway for learners to progress from one level to another, for instance, transitioning from a certificate to a diploma, and eventually to a degree program.

c) Exit with Recognition
Learners can exit the program at defined stages and receive appropriate credentials for the level completed, such as a certificate or diploma, ensuring their time and effort are recognized.

d) Re-entry Opportunities
Students who exit a program can re-enter later, resuming their education from the point they left, without losing credit for their previous accomplishments.

e) Focus on Lifelong Learning
The framework supports continuous education, enabling individuals to upskill or reskill at any stage of their careers.

4. Program Overview:

- Duration: One year full-time (Semester wise)
- Medium of Instruction: English &/OR Marathi

5. Eligibility:

a) A 3-year/6-semester bachelor's degree with a minimum of 120 (132) credits
b) A student is eligible for a PG Diploma in a discipline corresponding to either major or minor(s) discipline in UG programme. In this case, the University can admit the students in the PG programme based on the student's performance in the UG programme or through an entrance examination. However, irrespective of the major or minor disciplines chosen by a student in a UG programme, a student is eligible for admission in any discipline of PG Diploma if the student qualifies the National level or University level entrance examination in the discipline of the PG Diploma.

6. Credit Requirement PG Diploma:

In accordance with the NHEQF, the levels for the PG programme are given in the Table

S.No.	Qualifications	Level	Credits	Credits Points
1	PG. Diploma	6	40 (44)	240 (264)

a) Credits offered per Semester will be a Minimum 20 and a Maximum 22. While minimum credits are mandatory as per National Credit Framework, the Universities can evolve the mechanism for providing Semester/ Level wise credit attainment flexibility within the broad framework
b) Total credits offered for one-year PG Diploma Program: 44 (22 +22), which includes Core Courses, Electives courses, Research Methodology, Project and Internship

7. Equivalence:

A candidate who complete the PG diploma will be considered as equivalent with first year of master program.

8. Lateral Entry:

A candidate who successfully complete the PG Diploma will be eligible for admission to second year of Master Program

9. University Policy for Converting a Postgraduate Programme into a Master's Degree:

a) Purpose: To ensure that Postgraduate Programmes (PGP) offered by the university meet the academic, research, and professional standards required for a Master's degree.

b) Scope: This policy applies to all academic departments offering Postgraduate Programmes that are seeking to upgrade to a master's degree.

c) Procedures:

Step 1: The department submits a proposal to the Academic Council, outlining the rationale for the conversion, proposed curriculum changes, and a detailed implementation plan.

Step 2: The Academic Council, along with the Curriculum Review Committee, assesses the proposal based on academic standards, faculty resources, and industry alignment.

Step 3: Upon approval, the program is submitted to the accreditation body (e.g., national higher education commission) for reclassification and accreditation as a Master's program.

Step 4: Update the program's curriculum, learning outcomes, research components, and admission criteria to reflect the expectations of a Master's degree.

d) Responsibilities:

i. Department Heads / chairman Board of Studies: Ensure that the program content and structure align with Master's-level academic standards.

ii. Faculty / BOS Members: Assist in revising the curriculum and providing input on program structure.

iii. Academic Council: Manage the approval and accreditation process for the converted program.

10. Fees and Financial Support:

a) Tuition Fees: Transparency about costs, including hidden fees.

b) Scholarships: Availability of merit-based or need-based scholarships.

c) Payment Plans: Options for instalment payments or loans.

11. Learning Outcomes:

a) Knowledge: Advanced understanding of subject-specific and interdisciplinary concepts.
b) Skill Development: Critical thinking, problem-solving, technical and professional skills.
c) Research Competency: Ability to conduct independent research or contribute to scholarly work.

12. Assessment:

The NEP 2020 emphasizes upon formative and continuous assessment rather than summative assessment. Therefore, the scheme of assessment should have components of these two types of assessments. Assessment have to have correlations with the learning outcomes that are to be achieved by a student after completion of the course

a) Continuous Assessment: Assignments, projects, presentations, seminars and quizzes.
b) Examinations: Midterm, finals, or comprehensive exams.
c) Research Projects / Dissertation/Thesis: Evaluated through submission and viva-voce
d) Grading System: Standardized letter grades, percentages, or CGPA

13. Letter Grades and Grade Points:

The Semester Grade Point Average (SGPA) is computed from the grades as a measure of the student's performance in a given semester. The SGPA is based on the grades of the current term, while the Cumulative GPA (CGPA) is based on the grades in all courses taken after joining the programme of study. The HEIs may also mention marks obtained in each course and a weighted average of marks based on marks obtained in all the semesters taken together for the benefit of students.

Computation of SGPA and CGPA: UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

Letter Grade	Grade Point
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B+ (Good)	7
B (Above Average)	6
C (Average)	5
P (Pass)	4
F (Fail)	0
Ab (Absent)	0

The SGPA is the ratio of the sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the

number of credits of all the courses undergone by a student, i.e.

$$SGPA\ (Si) = \sum(Ci \times Gi) / \sum Ci$$

Where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

The Cumulative Grade Point Average (CGPA) is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$$CGPA = \sum(Ci \times Si) / \sum Ci$$

where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester. Example for Computation of SGPA

Example for Computation of SGPA

Semester	Course	Credit	Letter Grade	Grade point	(Credit x Grade)
I	Course 1	3	A	8	3 x 8 = 24
I	Course 1	4	B+	7	4 x 7 = 28
I	Course 1	3	B	6	3 x 6 = 18
I	Course 1	3	O	10	3 x 10 = 30
I	Course 1	3	C	5	3 x 5 = 15
I	Course 1	4	B	6	4 x 6 = 24
		20			139
SGPA					139/20=6.95

Example for Computation of CGPA

Semester 1	Semester 2	Semester 3	Semester 4
Credit 20 SGPA 6.9	Credit 20 SGPA 7.8	Credit 20 SGPA 5.6	Credit 20 SGPA 6.0
CGPA= (20 x 6.9 + 20 x 7.8 + 20 x 5.6 + 20 x 6.0)/80 = 6.6			

The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

To
Dr Shailendra Deolankar
Director, Higher Education
Govt. of Maharashtra

Subject: Guidelines for Assessment and Evaluation in the State Universities

Dear Sir,

The Steering committee constituted for effective implementation of NEP2020 in the State of Maharashtra has been working successfully towards its objective.

The committee has been monitoring the implementation since AY 2023. A common observation that has been brought to the notice is the lack of consistency in the Assessment and Evaluation patterns implemented by various universities. This variation is likely to impact the smooth execution of the multiple entry-multiple exits process and also hamper the progress of students belonging to various universities.

This matter was discussed in great details in the Steering Committee meeting held on 22nd and 23rd April, 2025 guidelines were prepared immediately.

You are requested to direct implementation of the same in all affiliated colleges, autonomous colleges and all Universities in the State of Maharashtra in the AY 2025-26, through the appropriate channels.

The guidelines for evaluation and assessment in alignment with NEP-2020 as approved by the Steering Committee are attached herewith

Thanking you
Sincerely

Prof. Dr Nitin R. Karmalkar
Chairman
NEP2020 Steering Committee

Assessment Guidelines

NEP2020 Curricular Framework

The assessment guidelines recommended by the Steering Committee for all the State Universities of Maharashtra are as follows.

They are applicable to University Departments, Autonomous Colleges and all Affiliated Colleges and Institutes of the University.

Assessment Guidelines for UG Programs

The assessment of various courses under the Four Year Under Graduate (FYUG) Curricular Framework shall be conducted as given below.

1. Grades to be given as in the 6th December 2022 circular.
2. One Credit shall be 25 marks.
3. The assessment for all courses in the Vertical 1 to Vertical 5 (as per curricular framework given in the 20th April 2023, GR) shall be conducted as Internal assessment and External Assessment (final / end semester assessment).

Sr. No	Vertical in Curricular Framework	Assessment
A	Vertical 1 – Major Subjects	Internal + External
B	Vertical 2 – Minor Subjects	Internal + External
C	Vertical 3 – Open Elective Courses (OE)	Internal + External
D	Vertical 4 – Vocational and Skill Education Courses (VSEC)	Internal + External
E	Vertical 5 – Ability Enhancement Course, Value Education Courses, Indian Knowledge Systems	Internal + External

4. Assessment for Vertical 6 will be done as follows

Sr. No.	Vertical 6	Assessment
A	On-the –Job Training & Research Projects (OJT and RP)	Internal + External
B	Research Projects (OJT and RP)	Internal + External
C	Community Engagement Programs (CEP)	Internal Only
D	Co-Curricular Courses (CC)	Internal Only
E	Field Projects (FP)	Internal Only

5. One of the following pattern shall be selected by the University for its **Internal and External assessment**
   1. 50% - 50% Pattern
   2. 40% – 60% Pattern

   The University may adopt any of the options given above.
6. Minimum Overall Combined Passing Percentage shall be 40% in all course in all verticals.
7. Minimum Separate head of passing in Internal and External Assessment should be 40% in all course in all verticals (Independent passing).
8. ATKT rules shall be decided by the University.

Assessment Guidelines for PG Programs

The assessment of various courses under the Post Graduate Curricular Framework shall be conducted as given below.

1. Grades to be given as in the 6th December 2022 circular.
2. One Credit shall be 25 marks.
3. The assessment for all courses in all Verticals (as per curricular framework given in the 16th May 2023 GR) shall be conducted as Internal assessment and External Assessment (final / end semester assessment).
4. The assessment shall be conducted as internal and external assessments in the Major subject (Mandatory and Electives) and Research Methodology.
5. The assessment of On-the-Job Training (OJT) and Research Project (RP) shall encompass both Internal and External Evaluations.
   a. The Internal Evaluation will be conducted as a continuous, ongoing assessment throughout the OJT/RP period. This evaluation will be carried out by the assigned guide or mentor from the department or workplace, who will monitor the trainee's progress, performance, and adherence to the training objectives. Regular feedback sessions and documentation, through progress reports, will be utilized to ensure consistent monitoring and support.

b. The External Evaluation will be conducted at the conclusion of the OJT/RP period. This evaluation will involve an assessment by an external examiner or panel, who will review the trainee's final report or presentation and overall performance. The external evaluation is expected to provide an assessment of the trainee's learning outcomes.

6. One of the following pattern should be selected by the University for its Internal and External assessment
   50% - 50% Pattern
   40% - 60% Pattern
   The University may adopt any of the options given above.
7. The minimum overall combined passing percentage required across all courses in all verticals is 40%. This encompasses both internal assessments and end-semester examinations.
8. Minimum Separate head of passing in Internal and External Assessment shall be 40% in all course in all verticals, independently.
9. ATKT rules may be decided by the University.

These guidelines shall be implemented in AY 2025-26, to minimize the variations in the assessment patterns observed. This will also enable smooth execution of the multiple entry and multiple exit process across colleges and universities.

To
Dr Shailendra Deolankar
Director, Higher Education
Govt. of Maharashtra

Subject: Guidelines for under graduate level B. Voc. program in alignment with NEP-2020

Dear Sir,

The Steering committee constituted for effective implementation of NEP2020 in the State of Maharashtra has been working successfully towards its objective.

A subcommittee was constituted under the Chairmanship of Prof V. B. Gaikwad, for aligning the B. Voc programs with the NEP2020 framework and developing guidelines for the same to enable uniform conduct across the state universities.

The report was discussed in the Steering Committee meeting held on 22nd and 23rd April, 2025 and the finalised.

You are requested to direct implementation of the same in all affiliated colleges, autonomous colleges and all Universities in the State of Maharashtra in the AY 2025-26, through the appropriate channels.

The guidelines for B.Voc. program approved by the Steering Committee are attached herewith

Thanking you
Sincerely

Prof. Dr Nitin R. Karmalkar
Chairman
NEP2020 Steering Committee

To,
Hon'ble Director,
Higher and Technical Education,
Government of Maharashtra
Pune : 411016

Respected Sir,

I am submitting herewith the Sub-Committee report for your kind perusal & needful action

Thank You.
With Regards

(Dr. V. B. Gaikwad)

☛ Forwarded through: Prof. N R. Karmalkar
Hon'ble Chairman,
Steering Committee NEP-2020
State Of Maharashtra

Sub Committee Report

The Sub Committee was appointed by steering committee on 9th October 2024 to prepare guidelines for under graduate level B. Voc. program in align with NEP-2020

The Sub Committee members are as given below:

1. Dr. V. B. Gaikwad	:	**Chairman**
2. Dr. F. C. Raghuvanshi	:	**Member**
3. Dr. Krantikumar Patil	:	**Member**
4. Dr. Ajay Bhamre	:	**Member**
5. Dr. Medha Tapiawala	:	**Member**

Part A

Draft Guidelines for UG Level B. Voc. Program in align with NEP-2020

TABLE OF CONTENTS

Draft Guidelines for UG Level B. Voc. Program in align with NEP-2020

1. Preamble

It has been a long-felt necessity to align higher education with the emerging needs of the economy so as to ensure that the graduates of higher education system have adequate knowledge and skills for employment and entrepreneurship. The higher education system has to incorporate the requirements of various industries in its curriculum, in an innovative and flexible manner to produce holistic and well-groomed graduates. The B.Voc. program is focused on universities and colleges providing undergraduate studies which would also incorporate specific job roles and their National Occupational Standards along with broad base general education. This would enable the accelerating India's economy by gaining appropriate employment, becoming entrepreneurs and creating appropriate knowledge.

The Multiple Entry and Multiple Exit (MEME) framework represents a paradigm shift in higher education impowering learners to enter and exit educational programs at various stages depending on their personal, academic and professional affairs.

The current structure of B.Voc. program to be converted into multiple entry and admission path at different levels for multi-disciplinary 4-year degree program in line with NEP 2020.

2. Main features of the NEP 2020 curriculum frame work.

a) There is no hard separation between arts and sciences, between curricular and extra-curricular activities, between vocational and academic streams.
b) The opportunity for learners to choose the courses of their interest in all disciplines;
c) The multiple entry and exit options with the award of UG certificate/ UG diploma/ or three-year degree depending upon the number of credits secured.
d) The flexibility for learners to move from one institution to another to enable them to have multi and/or interdisciplinary learning
e) The Mobility and flexibility to switch to alternative modes of learning (offline, ODL, and Online learning, and hybrid modes of learning) are provided.
f) The Academic Bank of Credits is established.

3. MEME Framework:

The Multiple Entry and Multiple Exit (MEME) framework represents a revolutionary approach to education designed to accommodate the diverse needs of present learners. This learner-centric model introduces a flexible structure that empowers students to access education on their terms, aligning their learning paths with personal, professional, and societal goals.

Key Features of the MEME Framework:

a) Flexibility in Entry Points:
Students can join programs at different levels, such as certificate, diploma, or degree stages, based on their prior qualifications and aspirations.

Credit Framework for B. Voc. Undergraduate (UG) Program

Level / Difficulty	Sem	Subject-1	Subject-2	Subject-3	GE/OE	SEC	IKS	AEC	VEC	CC	Total
4.5 / 100	I	2 (T) + 2 (P)	2(T)+2(P)	2(T)+2 (P)	2 (T)	2 (T/P)	2 (T) (Generic)	2 (T)	2	--	22
	II	2 (T) + 2 (P)	2(T)+2(P)	2(T)+2 (P)	2 (P)	2 (T/P)	--	2 (T)	2	2	22
Exit option: Award of UG Certificate in Major with 44 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major and Minor **Continue option**: Student will select one subject among the (subject 1, subject 2 and subject 3) as major and another as minor and third subject will be dropped.											
Level / Difficulty	**Sem**	**Credits Related to Major**				**Minor**		**GE/OE**	**SEC**	**IKS**	**AEC**	**VEC**	**CC**	**Total**
		Major Core	**Major Elective**	**VSC**	**FP / OJT/ CEP**									
5.0 / 200	III	4 (T) + 2 (P)	--	2 (P)	2 (OJT)	2(T)+2(P)	--	2 (T)	--	2 (T) (Major Subject Specific)	2 (T)	--	2	22
	IV	4 (T) + 2 (P)	--	2 (P)	2 (OJT)	2(T)+2(P)	--	2 (P)	2 (T/P)	--	2 (T)	--	2	22
Exit option: Award of UG Diploma in Major and Minor with 88 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major and Minor														
5.5 /300	V	8(T) + 4(P)	2 (T) + 2 (P)	2 (P)	2 (OJT)	2(T)	--	--	--	--	--	--	--	22
	VI	8(T) + 4(P)	2 (T) + 2 (P)	2 (P)	4 (OJT)	--	--	--	--	--	--	--	--	22
Total 3 Years		**44**	**8**	**8**	**10**	**18**	**8**	**8**	**6**	**4**	**8**	**4**	**6**	**132**
Exit option: Award of UG Degree in Major with 132 credits OR Continue with Major and Minor														
6.0 /400	VII	6 (T) + 4 (P)	2 (T) + 2 (T/P)	--	4 (OJT)	4(RM)(T)		--	--	--	--	--	--	22
	VIII	6 (T) + 4 (P)	2 (T) + 2 (T/P)	--	8 (OJT)	0			0	0	0	0	0	22
Total 4 Years		**64**	**16**	**8**	**22**	**22**	**8**	**8**	**6**	**4**	**8**	**4**	**6**	**176**
Four Year UG Honours with Research Degree in Major and Minor with 176 credits **OR**														
6.0 /400	VII	10(T) + 4(P)	2 (T) + 2 (T/P)	0	0	4 (RM) (T)			0	0	0	0	0	22
	VIII	10(T) + 4(P)	2 (T) + 2 (T/P)	0	4 (OJT)	0			0	0	0	0	0	22
Total 4 Years		**72**	**16**	**8**	**14**	**22**	**8**	**8**	**6**	**4**	**8**	**4**	**6**	**176**
Four Year UG Honours Degree in Major and Minor with 176 credits														

Notes:

Abbreviation: VSC: Vocational Skill Course, IKS: Indian Knowledge System, FP: Field Project, OJT: On Job Training, CEP: Community Engagement and Service, GE/OE: Generic Elective / Open Elective, SEC: Skill Enhancement Course, AEC: Ability Enhancement Course, VEC: Value Education Course, CC: Cocurricular Courses, T – Theory, P – Practical

1. VSC, FP/OJT/CEP should be related to the Major subject
2. OE is to be chosen compulsorily from faculty other than that of the Major.
3. SEC to be selected from the basket of Skill Courses approved by college.
4. Student has to choose three subjects from the same faculty in First Year and at the start of Second year he has to opt one subject as Major subject and one another subject as Minor subject and the last one subject will be dropped by the student. Therefore, the student after completion of three year will be awarded degree in Major and Minor subject.
5. Student cannot select a subject as major or minor other than the subjects taken in first year
6. Frame each course having even number of credits such as 2 or 4 credit.
7. This UG credit structure is applicable for all the programme across all faculties, except the programmes required approval from apex bodies like AICTE, PCI, BCI, COA, NCTE, etc.

6. Learning Outcomes:

a) **Knowledge:** Advanced understanding of subject-specific and interdisciplinary concepts.
b) **Skill Development:** Critical thinking, problem-solving, technical and professional skills.
c) **Research Competency:** Ability to conduct independent research or contribute to scholarly work.

7. Assessment:

The NEP 2020 emphasizes upon formative and continuous assessment rather than summative assessment. Therefore, the scheme of assessment should have components of these two types of assessments. Assessment have to have correlations with the learning outcomes that are to be achieved by a student after completion of the course.

a) **Continuous Assessment:** Assignments, projects, presentations, seminars and quizzes.
b) **Examinations:** Midterm, finals, or comprehensive exams.
c) **Research Projects / Dissertation/Thesis:** Evaluated through submission and viva-voce
d) **Grading System:** Standardized letter grades, percentages, or CGPA

8. Letter Grades and Grade Points:

The Semester Grade Point Average (SGPA) is computed from the grades as a measure of the student's performance in a given semester. The SGPA is based on the grades of the current term, while the Cumulative GPA (CGPA) is based on the grades in all courses taken after joining the program of study. The HEIs may also mention marks obtained in each course and a weighted average of marks based on marks obtained in all the semesters taken together for the benefit of students.

Computation of SGPA and CGPA: UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

Letter Grade	Grade Point
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B+ (Good)	7
B (Above Average)	6
C (Average)	5
P (Pass)	4
F (Fail)	0
Ab (Absent)	0

The SGPA is the ratio of the sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

$$SGPA(S_i) = \frac{\sum(C_{ix}G_i)}{\sum C_i}$$

Where C_i is the number of credits of the i^{th} course and $G_i$is the grade point scored by the student in the i^{th} course.

The Cumulative Grade Point Average (CGPA) is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$$CGPA = \frac{\sum(C_{ix}S_i)}{\sum C_i}$$

where $S_i$is the SGPA of the i^{th} semester and C_i is the total number of credits in that.

(Dr. V. B. Gaikwad)

Part B

New nomenclature for Certificate and Diploma courses

All the conventional universities have started a certificate, diploma, professional certificate program and short term certificate program on the campus, affiliated colleges and recognized institutes. As All universities already implemented NEP-2020 for PG and UG programs from the academic year 2023-24 and 2024-25 respectively. According to one of the main feature of NEP-2020 curriculum framework, students can avail the facility of the multiple entry and exit options with the award of UG certificate / UG Diploma / or 3 year degree depending upon the number of credits secured.

Considering the above mentioned situation, it isn't easy to run a certificate or diploma course with the same nomenclature. The committee would like to suggest a new nomenclature for the same.

Sr. no	Old nomenclature	New nomenclature	Eligibility	No. of credits	tenure	No of hours	marks
1	Certificate course	Foundation course	12th pass	Up to 22	Up to 6 months	15 hours for credits	25 marks for 1 credits
2	Certificate/ Diploma	Value added course	12th pass	20 to 44	1 year		
3	Professional certificate program	Professional course	12th pass	45 to 66	1.5 year		
4	Short term certificate program	Short term course	12th pass	67 to 88	2 year		

(Program with practical will have 30 hours for 1 credits)

Note : it will be mandatory to mention the credits and duration of the course on the student's certificate.

Nomenclature Suggestions for Educational Programs

1. Certificate Course
- Foundational Certification Program
- Essentials Training Certificate
- Core Competency Certificate
- Basic Skill Development Course
- Introductory Certification Program
- Knowledge Enrichment Certificate
- Skill-Building Certificate Program

2. Certificate Diploma
- Advanced Certification Program
- Specialized Diploma Certification
- Proficiency Diploma
- Mastery Certification Course
- Comprehensive Diploma Program
- Expertise Development Diploma
- Enhanced Skill Diploma

3. Professional Certificate Program
- Professional Development Certification
- Career Excellence Program
- Advanced Professional Training
- Industry-Focused Certification
- Professional Mastery Program
- Executive Certification Program
- Work-Ready Training Program

4. Short-Term Certificate Program
- Accelerated Certification Program
- Intensive Skills Certificate
- Fast-Track Training Certification
- Quick Learning Program
- Express Certification Course
- Focused Skill Development Certificate
- Short-Term Excellence Program

Part C

Conversion of one year Certificate/ Diploma (Value Added Course) into under graduate program

TABLE OF CONTENTS

GUIDELINES FOR CONVERTING ONE YEAR CERTIFICATE/DIPLOMA (VALUE ADDED COURSE) INTO UNDER GRADUATE PROGRAM

1. Preamble:

The demand for higher educational degrees that comply with industry requirements and academic excellence has become increasingly significant in the rapidly changing educational landscape. HEIs are committed to offering flexible and inclusive programs for learners to address this need. The Multiple Entry and Multiple Exit (MEME) framework represents a paradigm shift in higher education, empowering learners to enter and exit educational programs at various stages, depending on their personal, academic, and professional affairs.

Hence converting a one year Certificate /Diploma (Value added course) into under graduate program has emerged as a vital initiative.

2. Main Features of the NEP 2020 curriculum framework:

a) There is no hard separation between arts and sciences, between curricular and extra-curricular activities, between vocational and academic streams

b) The opportunity for learners to choose the courses of their interest in all disciplines;

c) The multiple entry and exit options with the award of UG certificate/ UG diploma/ or three-year degree depending upon the number of credits secured;

d) The flexibility for learners to move from one institution to another to enable them to have multi and/or interdisciplinary learning;

e) The Mobility and flexibility to switch to alternative modes of learning (offline, ODL, Online learning, and hybrid modes of learning) are provided.

f) The Academic Bank of Credits is established.

3. MEME Framework:

Key Features of the MEME Framework:

a) **Flexibility in Entry Points**:
Students can join programs at different levels, such as certificate, diploma, or degree stages, based on their prior qualifications and aspirations.

b) **Seamless Progression**:
The framework ensures a clear pathway for learners to progress from one level to another, for instance, transitioning from a certificate to a diploma and eventually to a degree program.

c) **Exit with Recognition**:
Learners can exit the program at defined stages and receive appropriate credentials for the level completed, such as a certificate or diploma, ensuring their time and effort are recognized.

d) **Re-entry Opportunities**:
Students who exit a program can re-enter later, resuming their education from the point they left, without losing credit for their previous accomplishments.

e) **Focus on Lifelong Learning**:
The framework supports continuous education, enabling individuals to up skill or reskill at any stage of their careers.

4. Program Overview:

- Duration: One year full-time (Semester wise)
- Medium of Instruction: English &/OR Marathi

5. Eligibility:

Students who have passed 10+2 examination (Regular or Vocational) from a recognised board.

6. Credit Requirement for One year Certificate or Diploma (Value added course):

In accordance with the NHEQF, the levels for the One year Certificate or Diploma (Value added course) will be 4.5.

b.	ualifications	evel	Credits	edits Points
	year Certificate or Diploma (Value added course)		)	64)

a) Minimum 20 and Maximum 22 Credits will be offered per Semester. While minimum credits are mandatory as per the National Credit Framework, the universities can evolve the mechanism to provide semester/level-wise credit attainment flexibility within the broad framework.

b) The total credits offered for A one-year Certificate or Diploma (Value added course) is 44 (22 +22), which includes Core Courses, elective courses, Research Methodology, Projects and Internships.

7. Equivalence:

A candidate who complete the One year Certificate or Diploma (Value added course) will be considered as equivalent with first year of undergraduate program.

8. Lateral Entry:

A candidate who successfully complete the One year Certificate or Diploma (Value added course) will be eligible for admission to second year of under graduate Program

9. University Policy for Converting a One year Certificate or Diploma (Value added course) into a under graduate program :

a) Purpose:

To ensure that Value added course offered by the university meet the academic, research, and professional standards required for a under graduate degree.

b) Scope:

This policy applies to all academic departments/ affiliated colleges and recognised institutes offering Value added courses that are seeking to upgrade to a under graduate degree.

c) Procedures:

Step 1: The department/ Board of studies submits a proposal to the Academic Council, outlining the rationale for the conversion, proposed curriculum changes, and a detailed implementation plan.

Step 2: The Academic Council, along with the Curriculum Review Committee, assesses the proposal based on academic standards, faculty resources, and industry alignment.

Step 3: Upon approval, the program is submitted to the accreditation body (e.g., national higher education commission) for reclassification and accreditation as a UG program.

Step 4: Update the program's curriculum, learning outcomes, research components, and admission criteria to reflect the expectations of a UG program.

d) Responsibilities:

i. **Department Heads / chairman Board of Studies:** Ensure that the program content and structure align with UG level academic standards.

ii. **Faculty / BOS Members:** Assist in revising the curriculum and providing input on program structure.

iii. **Academic Council:** Manage the approval and accreditation process for the converted program.

10.Learning Outcomes:

a) **Knowledge:** Advanced understanding of subject-specific and interdisciplinary concepts.

b) **Skill Development:** Critical thinking, problem-solving, technical and professional skills.

c) **Research Competency:** Ability to conduct independent research or contribute to scholarly work.

11.Assessment:

The NEP 2020 emphasizes upon formative and continuous assessment rather than summative assessment. Therefore, the scheme of assessment should have components of these two types of assessments. Assessment have to have correlations with the learning outcomes that are to be achieved by a student after completion of the course

A. **Continuous Assessment**: Assignments, projects, presentations, seminars and quizzes.

B. **Examinations**: Midterm, finals, or comprehensive exams.

C. **Research Projects / Dissertation/Thesis**: Evaluated through submission and viva-voce

D. **Grading System**: Standardized letter grades, percentages, or CGPA.

12. Letter Grades and Grade Points:

The Semester Grade Point Average (SGPA) is computed from the grades as a measure of the student's performance in a given semester. The SGPA is based on the grades of the current term, while the Cumulative GPA (CGPA) is based on the grades in all courses taken after joining the program of study. The HEIs may also mention marks obtained in each course and a weighted average of marks based on marks obtained in all the semesters taken together for the benefit of students.

Computation of SGPA and CGPA: UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

Letter Grade	Grade Point
O(Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B+ (Good)	7
B (Above Average)	6
C (Average)	5
P (Pass)	4
F(Fail)	0
Ab (Absent)	0

The SGPA is the ratio of the sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

$$SGPA(S_i) = \frac{\sum(C_{ix}G_i)}{\sum C_i}$$

Where C_i is the number of credits of the i^{th} course and G_i is the grade point scored by the student in the i^{th} course.

The Cumulative Grade Point Average (CGPA) is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$$CGPA = \frac{\sum(C_{ix}\, S_i)}{\sum C_i}$$

where S_i is the SGPA of the i^{th} semester and C_i is the total number of credits in that.

Example for Computation of SGPA

Semester	Course	Credit	Letter Grade	Grade point	(Credit x Grade)
1	Course 1	3	A	8	3 x 8 = 24
1	Course 1	4	B +	7	4 x 7 = 28
1	Course 1	3	B	6	3 x 6 = 18
1	Course 1	3	O	10	3 x 10 = 30
1	Course 1	3	C	5	3 x 5 = 15
1	Course 1	4	B	6	4 x 6 = 24
		20			139
SGPA					$\frac{139}{20} = 6.95$

Example for Computation of CGPA

Semester 1	Semester 2	Semester 3	Semester 4
Credit 20 SGPA 6.9	Credit 20 SGPA 7.8	Credit 20 SGPA 5.6	Credit 20 SGPA 6.0
CGPA= (20 x 6.9 + 20 x 7.8 + 20 x 5.6 + 20 x 6.0)/80 = 6.6			

The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

To
Dr Shailendra Deolankar
Director, Higher Education
Govt. of Maharashtra

Subject: Incorporation of MSBTE courses in the under graduate program in alignment with NEP-2020

Dear Sir,

The Steering committee constituted for effective implementation of NEP2020 in the State of Maharashtra has been working successfully towards its objective.

During the Steering Committee meeting held on 22nd and 23rd April, 2025, the director of MSBTE, Dr Pramod Naik and his team presented the courses that have been developed by their institute for the FYUG curriculum. After much deliberation it was decided that the courses prepared by the MSBTE be incorporated in the Verticals 3 or 4 of the FYUG curriculum.

You are requested to direct implementation of the same in all affiliated colleges, autonomous colleges and all Universities in the State of Maharashtra in the AY 2025-26, through the appropriate channels.

The details of the MSBTE programs are attached herewith.

Thanking you
Sincerely

Prof. Dr Nitin R. Karmalkar
Chairman
NEP2020 Steering Committee

Maharashtra State Board of Technical Education, Mumbai

Guidelines
for
Conduction of Technical Courses (Open Electives) at Polytechnics/Institutes
to be offered to
Students of Arts, Science and Commerce Degree Colleges

Address : 4th floor, Govt. Polytechnic Mumbai Building, 49, Kherwadi, Bandra (E),
Mumbai- 400 051 Tel : 022 62542100
Email: secretary@msbte.com Website: msbte.org.in

Preamble

National Education Policy 2020 (NEP 2020) is being implemented in the State of Maharashtra. To ensure the comprehensive and systematic approach for implementation of NEP 2020 Government of Maharashtra has established various task forces, working groups and committees. A 'National Education Policy 2020 Technical Education Task Force Group' has been constituted with the mandate to look in to the implementation of NEP 2020 in the Technical Education, to work with Directorate of Technical Education and All India Council for Technical Education, to link the Conventional Progammes and Technical Programmes with each other and their Credit Transfer.

The 'National Education Policy 2020 Technical Education Task Force Group' directed Maharashtra State Board of Technical Education, Mumbai (MSBTE) to develop the curricula of Technical Subjects (each of 4 credit) to be offered to the students of Conventional Programmes at Degree Level (B.A./B.Sc./B.Com) and to conduct these courses through the institutes affiliated to MSBTE.

In pursuance of the directives of Task Force Group, a committee was constituted by MSBTE to decide upon offering the open electives to the students of Arts, Science and Commerce colleges for skill enhancements. Under the guidance of the above-mentioned committee, the curricula of 13 technical courses as Open Electives (OE) for the students of Arts, Science and Commerce Degree colleges have been developed by MSBTE with the help of expert faculties. The Academic Committee approved curricula for implementation through institutes affiliated to MSBTE.

In the view of the above, MSBTE has formulated Guidelines for Conduction of Technical Courses (Open Electives) at Polytechnics/institutes to be offered to the Students of Arts, Science and Commerce Degree Colleges which are approved by Governing Board and Governing Council of MSBTE. These guidelines comprises of implementation aspects and procedures for various stakeholders.

List of Technical Courses to be offered as Open Electives:

The objective of offering the technical courses to the students pursuing their education in the field of Arts, Science and commerce is to enable them to acquire technical skills and enhance their employability. Hence, these courses are designed on the basis of more practical and skill-based approach. To achieve this objective and ensure the quality education, it is imperative that the Polytechnic/Institute affiliated to MSBTE and interested to conduct these courses shall have the infrastructure, expert faculties and other required resources.

List of Courses

Sr. No.	Course Title	Credits
1.	Fundamentals of ICT	4
2.	Medicinal Plant Cultivation and Marketing	4
3.	Maintenance of Mobile Phones	4
4.	Fundamentals of Design and Fashion Illustration	4
5.	Hair Dressing And Designing	4
6.	Basic Webpage Designing	4
7.	Solar and its Applications	4
8.	Construction Materials	4
9.	Installation & Repair of Consumer Electronics Products	4
10.	Electrical Installation for Residential Complex	4
11.	Python Programming	4
12.	Transport Management and Motor Vehicle Act	4
13.	Energy Conservation and Green Building	4

Eligibility

The courses are offered to the bonafide students of bachelor degree in Arts, Science and Commerce Colleges in the state of Maharashtra.

Role of Polytechnic/Institute affiliated to MSBTE offering the Open Electives

- MSBTE affiliated institute interested to conduct these courses shall apply for affiliation of the technical courses/ Open Elective to MSBTE.
- The institute shall offer these courses in self-financed mode.
- Institute shall select the courses depending on availability of Programme Laboratories and other Resources.
- The admission of these interested students shall be done at institute level. The admissions are done on first come first served basis.
- The candidate must be a bonafide student of Degree College affiliated to University or Autonomous degree colleges.
- Institute shall appoint the co-ordinator for smooth conduct of the courses.
- It is responsibility of the institute for enrolment of admitted students.
- Institutes shall conduct lectures and practicals for the students.

- Institute shall provide required learning material to the student.
- Institute shall internally monitor the effectiveness of teaching learning process.
- Institute shall provide required faculty/staff for conduction of these courses.
- Institute should provide required infrastructure such as classroom, laboratory, equipments etc. for conduction of the courses.

Role of Maharashtra State Board of Technical Education, Mumbai

- MSBTE will provide online support for registration for Polytechnics/institutes interested to conduct these courses.
- MSBTE shall provide online support for affiliation and enrolment of students.
- Examination of the enrolled students will be conducted by MSBTE at the end of semester as per Examination rules.
- MSBTE shall provide online support for Mark sheet and Marks Entry generations.
- MSBTE shall process and declare the result of the students who appeared for examination.
- The marksheet shall be given by MSBTE to all students appeared in the examination.
- Certificate will be awarded to the students who have passed the examination.

Role of Degree College in which the student is pursuing his/her Bachelor Degree

- The degree college shall appoint the SPOC (Single Point of Contact) for coordination with the Polytechnics with respect to the technical courses to be undertaken, providing course-wise listings, results sharing etc.
- The degree college shall transfer Marks/Credits/Certificates to Academic Bank of Credit (ABC) of the student.

Role of university

- Considering the NEP2020 envisions from the Maharashtra State G.R. dated 20th April 2023, the elective courses can be considered under OE/GE/SEC/VEC baskets for vertical 3 &/or vertical 4 and the appropriate level alignment/mapping is to be decided by respective universities.
- The Universities are responsible for transferring the acquired credits to the Academic Bank of Credit (ABC), in concurrence with the Degree College affiliated to the respective colleges.
- The Universities will be responsible for mapping the courses to appropriate NCrF level considering the Course Outcomes, Competencies and Learning outcomes of the specific course.

Tuition Fees

Tuition Fees of maximum upto Rs. 1500/- per student per course students will be charged by the affiliated Polytechnic/Institute offering the course. Fees shall be displayed to the students while registering the course.

Enrollment and Examination fees

The student shall pay Enrollment fee and Examination fee per course as per prevailing norms of MSBTE. MSBTE shall conduct Examination biannually, preferably during the month of November/December and April/May of every year.

Affiliation

The institute shall apply for affiliation of MSBTE, Mumbai for conduction of these Open Elective courses every year. The affiliation fees is Rs.5000/- upto three courses and thereafter Rs. 2000/- per course for each additional course.

Batch Size

To run the technical course, minimum number of students shall be 20 and maximum to be 120 per course with the batch size of 20 to 30 students.

Teaching-Learning Process

- Theory may be conducted in online/offline/hybrid mode but practical shall be conducted physically in the laboratories.
- The lectures for theory and practicals will be conducted by the regular/Ad-hoc/Visiting faculty of the institute. The institute shall appoint qualified and experienced faculty for conduction of theory and practicals. Theory lectures and practicals shall be conducted without affecting the regular activities of the institute.

Attendance

Attendance/Detention criteria will be applicable as per MSBTE prevailing norms.

Passing criteria

Student should secure minimum 40% marks in the course for passing. Passing heads shall be as per the approved scheme for the course.

Schedule of Admission

The institute can register students to these courses in every semester.

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Tentative dates for implementation of 13 Technical courses in Polytechnic Institutes for students studying B.A.,B.Sc and B.Com across the state of Maharashtra

Activity	Dates
Submission of Online application by willing Diploma Institutes.	30/04/2025
Selection of eligible institutes for offering the technical courses to students studying B.A.,B.Sc and B.Com.	15/05/2025
Completion of Affiliation process by selected Polytechnics	20/05/2025
Inform Universities about the affiliated Polytechnics and corresponding courses .	25/05/2025
Enrollment of students studying B.A.,B.Sc and B.Com for technical courses through the affiliated Polytechnics.	01/06/2025

Maharashtra State Board of Technical Education, Mumbai

राष्ट्रीय शैक्षणिक धोरण 2020 तंत्रशिक्षण कार्यबल गटाच्या निर्देशांनुसार बी. ए., बी. कॉम., बी.एस्सी पदवी या पारंपारिक अभ्याक्रमांच्या विद्यांर्थ्यांकरिता व्यावसायिक व कौशल्यावर आधारित तांत्रिक विषयांचा पर्याय उपलब्ध करुन देण्याकरिता महाराष्ट्र राज्य तंत्र शिक्षण मंडळ, मुंबई यांच्याकडून करण्यात आलेल्या कार्यवाहीचा संक्षिप्त तपशिल

पारंपारिक अभ्याक्रमांमध्ये तांत्रिक विषयांचा पर्याय देण्याबाबत कार्यवाहीचा संक्षिप्त तपशिल

- उच्च व तंत्रशिक्षण शासन निर्णयानुसार नेमलेल्या सुकाणु समिती व संचालक, महाराष्ट्र राज्य तंत्र शिक्षण मंडळ, मुंबई यांच्या वेळोवेळी झालेल्या बैठकीतील निर्देशानुसार महाराष्ट्र राज्य तंत्र शिक्षण मंडळाने बी. ए., बी. कॉम., बी.एस्सी या पारंपारिक अभ्यासक्रमांकरिता ओपन इलेक्टीव्हज (Open Electives) अंतर्गत १३ तांत्रिक विषयांचे पर्याय उपलब्ध करुन दिले आहेत.
- विकसित करण्यात आलेले 13 अभ्यासक्रम पुढील प्रमाणे आहेत:-

List of 13 Courses

1.	Fundamentals of ICT	6.	Basic Webpage Designing	11.	Python Programming
2.	Medicinal Plant Cultivation and Marketing	7.	Solar and its Applications	12.	Transport Management and Motor Vehicle Act
3.	Maintenance of Mobile Phones	8.	Construction Materials	13.	Energy Conservation and Green Building
4.	Fundamentals of Design and Fashion Illustration	9.	Installation and Repairs of Consumer Electronics Products		
5.	Hair Dressing and Designing	10.	Electrical Installations for Residential complex		

विकसित केलेल्या विषयांच्या अभ्यासक्रमाबाबतची संक्षिप्त माहिती

- विषयाचे क्रेडीट : 4 क्रेडीट
- विषय शिकविण्याची भाषा : मराठी-इंग्रजी
- संपर्क तास : 6-7 तास / आठवडा
- परिक्षा
  - परिक्षा पद्धती : Internal Assessment व External assessment of ESE of Practical
  - वेळापत्रक: मंडळाद्वारे वर्षातून दोन वेळा परिक्षा घेण्यात येईल. (Preferably during the months of November and May)
- स्कील बेस्ड कोर्सेस : सैद्धांतिक ज्ञानाच्या व्यावहारिक वापरास प्रोत्साहन
- अभ्यासक्रमात लवचिकता : पूर्वापेक्षित (Prerequisite) ची आवश्यकता नाही.
- अध्यापन प्रक्रिया : अध्यापन प्रक्रिया online/offline mode मध्ये राबविण्यात येईल, तर प्रात्यक्षिके प्रत्यक्ष संस्थामध्ये किंवा संबंधित उद्योगधंद्यांच्या ठिकाणी पूर्ण करणे आवश्यक

तांत्रिक विषयांचे अभ्यासक्रम मंडळाशी संलग्नित संस्थांमधून राबविण्याकरिताची कार्यप्रणाली

- सदर विषय राबविण्याकरिता मंडळामार्फ़त तज्ञांद्वरे कार्यपद्धती विकसित करण्यात आली.
- व्यावसायिक व कौशल्यावर आधारित 13 तांत्रिक विषयांचे स्किम व पाठ्यक्रम, राबविण्याकरिताच्या कार्यपद्धती व मार्गदर्शक तत्वे यांना विद्वत समिती, नियामक मंडळ व नियामक परिषद यांच्याकडून मान्यता प्राप्त झाली आहे.
- सदर मार्गदर्शक तत्वे (Guideline Document) राज्यातील विद्यापीठांना उपलब्ध करुन देण्यात आलेले आहे.
- Guideline वैशिष्ट्ये - ..\Guidelines for Open Electives.pdf.

नियामक मंडळ व नियामक परिषद मान्यता

- नियामक परिषदेच्या 41 व्या बैठकित **मा. प्रधान सचिव** यांनी सदरचे पदविका स्तरावरिल विषय हे विद्यापीठातील अभ्यासक्रमात शिकत असलेल्या विद्यार्थ्यांसाठी मंडाळाकडून तयार करण्यात आले असून NCrF level नुसार Level 4.5 अंतर्गत येत असल्याने याबाबत विद्यापीठांच्या स्विकृतीबाबत खात्री करुन घेणे आवश्यक असल्याचे नमूद केले आहे.

- विद्यापीठांकडून सहमती मिळविणेबाबत विद्यापीठांना पत्राव्दारे विचारणा करण्यात आली, व विद्यापीठांना स्किम, पाठ्यक्रम, राबविण्याकरिताच्या कार्यपद्धती व मार्गदर्शक तत्वे विद्यापीठांना email द्वारे पाठविण्यात आले.

नियामक मंडळ व नियामक परिषद मान्यता

- नियामक परिषदेच्या धोरणानुसार बी. ए., बी. कॉम., बी.एस्सी पदवी या पारंपारिक अभ्याक्रमांत शिक्षण घेणा-या विद्यांर्थ्यांकरिता व्यावसायिक व कौशल्यावर आधारित तांत्रिक विषयांचा पर्याय उपलब्ध करुन देण्याकरिताच्या **अंमलबजावणीसाठी मा.**संचालक, तंत्रशिक्षण संचालनालय यांच्या अध्यक्षतेखाली गठीत समितीच्या दि. २१/०३/२०२५ रोजीच्या मार्गदर्शनानुसार 13 तांत्रिक विषयांमधिल पाठ्यक्रम राबविणे बाबत राज्यातील इच्छुक पदविका संस्थांकडून दि. ३०/०४/२०२५ पर्यंत सहमती घेण्याकरीता, मंडळाच्या पोर्टलवर सुविधा तयार करण्यात आली व दि. २१/०४/२०२५ रोजी मंडळाद्वारे परिपत्रक निर्गमित करण्यात आले.
- इच्छुक पदविका संस्थांकडून १३ विषयांपैकी मार्गदर्शक तत्वांना अनुसरून कोण-कोणते पाठ्यक्रम संस्थेत राबविणे शक्य आहे त्याबाबत संस्थेकडून माहिती मागवण्यात आली.
- सदर माहितीवरून मंडळाद्वारे योग्य संस्थांची निवड करण्यात येऊन, संस्था व संस्थेचे समन्वयक याबाबत माहिती विद्यापिठांना कळविणेत येईल.
- मंडळाद्वारे संस्था संलग्निकरण ,परिक्षेकरिता विद्यार्थ्यांची नोंदणी, शुल्क घेणे, मार्क भरणे व संस्थेमार्फत विद्यार्थ्यांना प्रमाणपत्र उपलब्ध करून देण्याची प्रणाली उपलब्ध करून देण्यात येईल.

13 तांत्रिक विषयांच्या अंमलबजावणी चा आराखडा

कार्य	नियोजित तारीख
बी. ए., बी. कॉम., बी.एस्सी या पदवी अभ्याक्रमांच्या विद्यार्थ्यां करीता तांत्रिक विषय राबविणेसाठी पदविका संस्थांनी इच्छुक असल्याबाबत मंडळाकडे Online पद्ध्तीने अर्ज सादर करणे.	दि. ३०/०४/२०२५
प्राप्त अर्जामधून मंडळाद्वारे पात्र पदविका संस्थांची निवड करणे.	दि. १५/०५/२०२५
निवडलेल्या पदविका संस्थांनी मंडळाकडून संलग्नता घेणे.	दि. २०/०५/२०२५
सदर संलग्नित संस्थांची यादी व तत्सम विषय विद्यापिठांना कळविणे.	दि. २५/०५/२०२५
पदविका संस्थांमध्ये, बी. ए., बी. कॉम., बी.एस्सी या पदवी अभ्याक्रमांच्या विद्यार्थ्यांची तांत्रिक विषयांकरीता नोंदणी करून घेणे	दि. ०१/०६/२०२५

धन्यवाद ...

Maharashtra State Board of Technical Education, Mumbai

Teaching and Examination Scheme for B.A./B.Com/B.Sc. Courses

Program Name : Open Electives — **With Effect From Academic Year: 2024-25**

Program Code : OE-1/2/3 — **Duration : 16 Weeks**

Scheme - OE — **Credit : 4**

S.N.	Level	Course Title	Course Abbreviation	Course Code	Teaching Scheme			Examination Scheme					Grand Total
								Practical					
								PA		ESE			
					L (Hrs)	P (Hrs)	SL (Hrs)	Max Marks	Min Marks	Max Marks	Min Marks	Total Max Marks	
Scheme – OE-1													
1	Basic	Fundamentals of ICT	ICT	371001	2	4	2	50@	20	50#	20	100	100
2	Basic	Medicinal Plant Cultivation and Marketing	MPC	371002	2	4	2	50@	20	50#	20	100	100
3	Basic	Maintenance of Mobile Phones	MMP	371003	2	4	2	50@	20	50#	20	100	100
4	Basic	Fundamentals of Design and Fashion Illustration	FDF	371004	1	6	1	50@	20	50#	20	100	100
5	Basic	Hair Dressing And Designing	HDD	371005	1	6	1	50@	20	50#	20	100	100
Scheme – OE-2													
6	Medium	Basic Webpage Designing	BWD	371006	2	4	2	50@	20	50#	20	100	100
7	Medium	Solar and Its Applications	SOP	371007	2	4	2	50@	20	50#	20	100	100
8	Medium	Construction Materials	COM	371008	2	4	2	50@	20	50#	20	100	100
9	Medium	Installation & Repair of Consumer Electronics Products	IRP	371009	2	4	2	50@	20	50#	20	100	100
10	Medium	Electrical Installation for Residential Complex	EIR	371010	2	4	2	50@	20	50#	20	100	100
					1								
11	Advance	Python Programming	PYP	371011	2	4	2	50@	20	50#	20	100	100
12	Advance	Transport Management and Motor Vehicle Act	TMM	371012	2	4	2	50@	20	50#	20	100	100
13	Advance	Energy Conservation and Green Building	ECG	371013	2	4	2	50@	20	50#	20	100	100

Student Contact Hours Per Week: 6 / 7 Hrs. **Medium of Instruction: Bilingual (English + Marathi)** **Total Marks 1300**

Theory & Practical periods of 60 minutes each

Abbreviations: ESE- End Semester Exam, PA- Progressive Assessment, L – Lectures, P-Practical , @-Internal Assessment, # External Assessment, SL- Self Learning

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION MUMBAI

Program Name : **Open Electives**

Level : **Basic**

Couse Title : **Fundamentals of ICT**

Couse Code : **371001**

1. RATIONALE

In any typical business setup in order to carry out routine tasks related to create business documents, perform data analysis and its graphical representations and making electronic slide show presentations, the student need to learn various software as office automation tools like word processing applications, spreadsheets and presentation tools. They also need to use these tools for making their project reports and presentations. The objective of this course is to develop the basic competency in students for using these office automation tools to accomplish the job.

2. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- **Use computers for internet services, electronic documentation, data analysis and slide presentation.**

3. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following ***industry oriented*** COs associated with the above mentioned competency:

a. Use computer system and its peripherals.
b. Prepare business document using word processing tool.
c. Interpret data and represent it graphically using spreadsheet.
d. Prepare professional presentations.
e. Use different types of web browsers.

4. TEACHING AND EXAMINATION SCHEME

Hrs.			Contact hour per week (L+P+SL)	Credits	Practical					Grand Total
					ESE		PA			
L	P	SL			Max Marks	Min Marks	Max Marks	Min Marks	Total Max Marks	Max
2	4	2	8		50#	20	50@	20	100	100

*(~[1]): For the courses having **ONLY practical** examination, the PA has two components under practical marks i.e. the assessment of practicals (seen in section 6) has a weightage of 60% (i.e.15 marks) and micro-project assessment (seen in section 12) has a weightage of 40% (i.e.10 marks). This is designed to facilitate attainment of COs holistically, as there is no theory ESE.*

***Legends: L**-Lecture; **P** - Practical; **C** – Credit, SL – Self Learning; **ESE** - End Semester Examination; **PA** - Progressive Assessment; @ Internal Assessment, # External Assessment.*

5. COURSE MAP (with sample COs, PrOs, UOs, ADOs and topics)

This course map illustrates an overview of the flow and linkages of the topics at various levels of outcomes (details in subsequent sections) to be attained by the student by the end of the course, in all domains of learning in terms of the industry/employer identified competency depicted at the centre of this map.

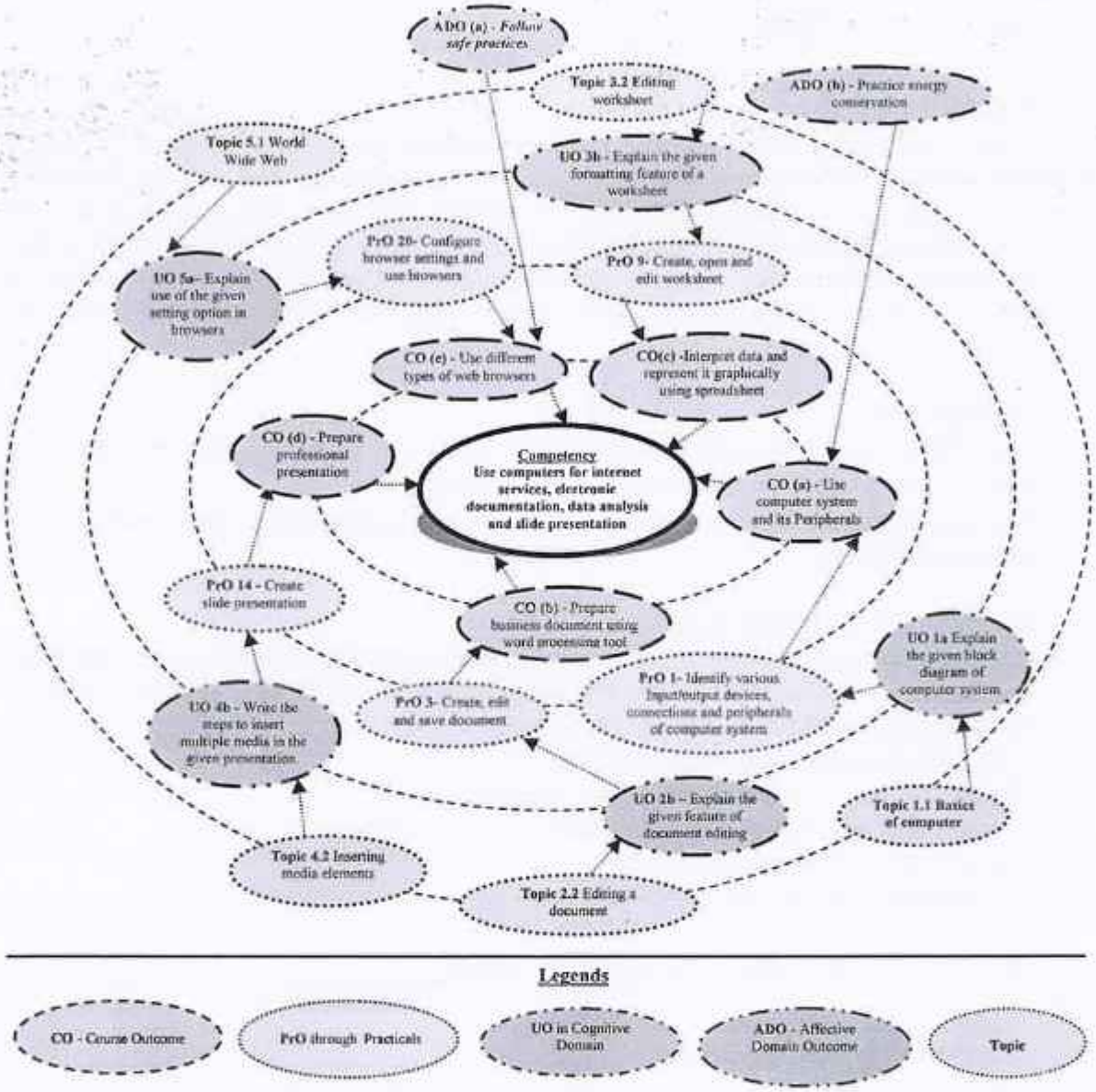

Figure 1 - Course Map

6. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
	Computer system and Operating system:		
1	Identify various Input/output devices, connections and peripherals of computer system	I	1*
2	Manage files and folders : Create, copy, rename, delete, move files	I	1

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
	and folder		
	Word Processing		
3	Create, edit and save document : apply formatting features on the text - line, paragraph	II	2*
4	Use bullets, numbering, page formatting	II	2
5	Insert and edit images and shapes, sizing, cropping, colour, background, group/ungroup	II	2
6	Insert and apply various table formatting features on it.	II	2
7	Apply page layout features i. Themes, page background, paragraph, page setup ii. Create multicolumn page iii. Use different options to print the documents	II	2*
8	Use mail merge with options.	II	1
	Spreadsheets		
9	Create, open and edit worksheet i. Enter data and format it, adjust row height and column width ii. Insert and delete cells, rows and columns iii. Apply wrap text, orientation feature on cell.	III	2*
10	Insert formulas, "IF" conditions, functions and named ranges in worksheet.	III	2
11	Apply data Sort, Filter and Data Validation features.	III	2*
12	Create charts to apply various chart options.	III	2
13	Apply Page setup and print options for worksheet to print the worksheet.	III	1
	Presentation Tool		
14	Create slide presentation i. Apply design themes to the given presentation ii. Add new slides and insert pictures/images, shapes	IV	2*
15	i. Add tables and charts in the slides. ii. Run slide presentation in different modes iii. Print slide presentation as handouts	IV	2
16	Apply animation effects to the text and slides.	IV	1
17	Add audio and video files in the given presentation	IV	1
	Internet Basics		
18	Configure Internet connection	V	1
19	Use internet for different web services.	V	2*
20	Configure browser settings and use browsers.	V	1*
	Total		**32**

'': compulsory practicals to be performed.*

Note

i. A suggestive list of practical UOs is given in the above table, more such PrOs can be added to attain the COs and competency.

ii. Hence, the 'Process' and 'Product' related skills associated with each PrOs of the laboratory/workshop/field work are to be assessed according to a suggested sample given below:

S. No.	Performance Indicators	Weightage in %
a.	Use of Appropriate tool to solve the problem (Process)	40
b.	Quality of output achieved (Product)	30
c.	Complete the practical in stipulated time	10
d.	Answer to sample questions	10
e.	Submit report in time	10
	Total	**100**

The above PrOs also comprise of the following social skills/attitudes which are Affective Domain Outcomes (ADOs) that are best developed through the laboratory/field based experiences:

a. Follow safety practices.
b. Practice good housekeeping.
c. Demonstrate working as a leader/a team member.
d. Maintain tools and equipment.
e. Follow ethical practices.

The ADOs are not specific to any one PrO, but are embedded in many PrOs. Hence, the acquisition of the ADOs takes place gradually in the student when s/he undertakes a series of practical experiences over a period of time. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

- 'Valuing Level' in 1st year
- 'Organising Level' in 2nd year
- 'Characterising Level' in 3rd year.

7. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity in conduct of PrOs, as well as aid to procure equipment by authorities concerned.

S. No.	Equipment Name with Broad Specifications	Exp. S.No.
1	Computer system with all necessary components like; motherboard, random access memory (RAM), read-only memory (ROM), Graphics cards, sound cards, internal hard disk drives, DVD drive, network interface card.	1
2	Double side printing laser printer.	1,6,12,13
3	Hubs, Switches, Modems.	1, 16,17
4	Any operating system.	2 to18
5	Any Office Software.	2 to 15
6	Any browser.	16,17,18

Note: *There are no specifications fixed for the above listed systems, devices and instruments. Depending on the availability in the institute they can be utilized for the purpose.*

8. UNDERPINNING THEORY COMPONENTS

The following topics/subtopics are to be taught and assessed in order to develop UOs for achieving the COs to attain the identified competency.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I Introduction to Computer System	1a. Explain the given block diagram of computer system. 1b. Classify the given type of software 1c. Explain characteristics of the specified type of network. 1d. Describe procedure to manage a file /folder in the given way. 1e. Describe application of the specified type of network connecting device	1.1 **Basics of Computer System:** Overview of Hardware and Software: block diagram of Computer System, Input/Output unit CPU, Control Unit, Arithmetic logic Unit (ALU), Memory Unit 1.2 **Internal components:** processor, motherboards, random access memory (RAM), read-only memory (ROM), video cards, sound cards and internal hard disk drives) 1.3 **External Devices:** Types of input/output devices, types of monitors, keyboards, mouse, printers: Dot matrix, Inkjet and LaserJet, plotter and scanner, external storage devices CD/DVD, Hard disk and pen drive 1.4 **Application Software:** word processing, spreadsheet, database management systems, control software, measuring software, photo-editing software, video-editing software, graphics manipulation software System Software compilers, linkers, device drivers, operating systems and utilities 1.5 **Network environments**: network interface cards, hubs, switches, routers and modems, concept of LAN, MAN, WAN, WLAN, Wi-Fi and Bluetooth 1.6 **Working with Operating Systems**: Create and manage file and folders, Copy a file, renaming and deleting of files and folders, Searching files and folders, application installation, creating shortcut of application on the desktop.
Unit– II Word Processing	2a. Write steps to create the given text document. 2b. Explain the specified feature for document editing. 2c. Explain the given page setup features of a document. 2d. Write the specified table formatting feature.	2.1. **Word Processing:** Overview of Word processor Basics of Font type, size, colour, Effects like Bold, italic, underline, Subscript and superscript, Case changing options, Previewing a document, Saving a document, Closing a document and exiting application. 2.2. **Editing a Document:** Navigate through a document, Scroll through text, Insert and delete text, Select text, Undo and redo commands, Use drag and drop to move text, Copy, cut and paste, Use the clipboard, Clear formatting, Format and align text, Formatting Paragraphs, Line and paragraph spacing, using FIND and REPLACE, Setting line

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
		spacing, add bullet and numbers in lists, add borders and shading, document views, Page settings and margins, Spelling and Grammatical checks 2.3. **Changing the Layout of a Document:** Adjust page margins, Change page orientation, Create headers and footers, Set and change indentations, Insert and clear tabs. 2.4. **Inserting Elements to Word Documents:** Insert and delete a page break, Insert page numbers, Insert the date and time, Insert special characters (symbols), Insert a picture from a file, Resize and reposition a picture 2.5. **Working with Tables:** Insert a table, Convert a table to text, Navigate and select text in a table, Resize table cells, Align text in a table, Format a table, Insert and delete columns and rows, Borders and shading, Repeat table headings on subsequent pages, Merge and split cells. 2.6. **Working with Columned Layouts and Section Breaks:** a Columns, Section breaks, Creating columns, Newsletter style columns, Changing part of a document layout or formatting, Remove section break, Add columns to remainder of a document, Column widths, Adjust column spacing, Insert manual column breaks.
Unit– III Spreadsheets	3a. Write steps to create the given spreadsheet. 3b. Explain the specified formatting feature of a worksheet. 3c. Write steps to insert formula and functions in the given worksheet. 3d. Write steps to create charts for the specified data set. 3e. Explain steps to perform advance operation on the given data set.	3.1. **Working with Spreadsheets:** Overview of workbook and worksheet, Create Worksheet Entering sample data, Save, Copy Worksheet, Delete Worksheet, Close and open Workbook. 3.2. **Editing Worksheet:** Insert and select data, adjust row height and column width, delete, move data, insert rows and columns, Copy and Paste, Find and Replace, Spell Check, Zoom In-Out, Special Symbols, Insert Comments, Add Text Box, Undo Changes, - Freeze Panes, hiding/unhiding rows and columns. 3.3. **Formatting Cells and sheet:** Setting Cell Type, Setting Fonts, Text options, Rotate Cells, Setting Colors, Text Alignments, Merge and Wrap, apply Borders and Shades, Sheet Options, Adjust Margins, Page

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
		Orientation, Header and Footer, Insert Page Breaks, Set Background. 3.4. **Working with Formula:** Creating Formulas, Copying Formulas, Common spreadsheet Functions such as sum, average, min, max, date, In, And, or, mathematical functions such as sqrt, power, applying conditions using IF. 3.5. **Working with Charts:** Introduction to charts, overview of different types of charts, Bar, Pie, Line charts, creating and editing charts. Using chart options: chart title, axis title, legend, data labels, Axes, grid lines, moving chart in a separate sheet. 3.6. **Advanced Operations:** Conditional Formatting, Data Filtering, Data Sorting, Using Ranges, Data Validation, Adding Graphics, Printing Worksheets, print area, margins, header, footer and other page setup options.
Unit– IV Presentation Tool	4a. Write the steps to create the specified slide presentation. 4b. Write the steps to insert multiple media in the given presentation. 4c. Write steps to apply table features in the given presentation 4d. Write steps to manage charts in the given presentation	4.1 **Creating a Presentation:** Outline of an effective presentation, Identify the elements of the User Interface, Starting a New Presentation Files, Creating a Basic Presentation, Working with textboxes, Apply Character Formats, Format Paragraphs, View a Presentation, Saving work, creating new Slides, Changing a slide Layout, Applying a theme, Changing Colours, fonts and effects, apply custom Colour and font theme, changing the background, Arrange Slide sequence, 4.2 **Inserting Media elements:** Adding and Modifying Graphical Objects to a Presentation - Insert Images into a Presentation, insert audio clips, video/animation, Add Shapes, Add Visual Styles to Text in a Presentation, Edit Graphical Objects on a Slide, Format Graphical Objects on a Slide, Group Graphical Objects on a Slide, Apply an Animation Effect to a Graphical Object, Add Transitions, Add Speaker Notes, Print a Presentation. 4.3 **Working with Tables:** Insert a Table in a Slide, Format Tables, and Import Tables from Other Office Applications.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
		4.4 **Working with Charts:** Insert Charts in a Slide, Modify a Chart, Import Charts from Other Office Applications.
Unit– V Basics of Internet	5a. Explain use of the given setting option in browsers. 5b. Explain features of the specified web service. 5c. Describe the given characteristic of cloud. 5d. Explain the specified option used for effective searching in search engine.	5.1 **World Wide Web**: Introduction, Internet, Intranet, Cloud, Web Sites, web pages, URL, web servers, basic settings of web browsers-history, extension, default page, default search engine, creating and retrieving bookmarks, use search engines effectively for searching the content. 5.2 **Web Services**: e-Mail, Chat, Video Conferencing, e-learning, e-shopping, e-Reservation, e-Groups, Social Networking.

***Note**: To attain the COs and competency, above listed UOs need to be undertaken to achieve the 'Application Level' and above of Bloom's 'Cognitive Domain Taxonomy'*

9. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related ***co-curricular*** activities which can be undertaken to accelerate the attainment of the various outcomes in this course:

a. Prepare journal of practicals.
b. Prepare a sample document with all word processing features.(Course teacher shall allot appropriate document type to each students)
c. Undertake micro projects

10. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

a. Massive open online courses (***MOOCs***) may be used to teach various topics/sub topics.
b. ***'L' in item No. 4*** does not mean only the traditional lecture method, but different types of teaching methods and media that are to be employed to develop the outcomes.
c. About ***15-20% of the topics/sub-topics*** which is relatively simpler or descriptive in nature is to be given to the students for ***self-directed learning*** and assess the development of the COs through classroom presentations (see implementation guideline for details).
d. With respect to item No.10, teachers need to ensure to create opportunities and provisions for ***co-curricular activities***.
e. Guide student(s) in undertaking micro-projects.
f. Guide student(s) in undertaking various activities in the lab/workshop.
g. Demonstrate students thoroughly before they start doing the practice.
h. Show video/animation films for handling/functioning of instruments.
i. Observe continuously and monitor the performance of students in Lab.

11. SUGGESTED MICRO-PROJECTS

Only one micro-project is planned to be undertaken by a student assigned to him/her in the beginning of the semester. S/he ought to submit it by the end of the semester to develop the

industry oriented COs. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The total duration of the micro-project should not be less than ***16 (sixteen) student engagement hours*** during the course.

In the first four semesters, the micro-project could be group-based. However, in higher semesters, it should be individually undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. A suggestive list is given here. Similar micro-projects could be added by the concerned faculty:

a. **Word documents**: Prepare Time Table, Application, Notes, Reports .(Subject teacher shall assign a document to be prepared by the each students)
b. **Slide Presentations:** Prepare slides with all Presentation features such as: classroom presentation, presentation about department, presentation of report. (Subject teacher shall assign a presentation to be prepared by the each student).
c. **Spreadsheets:** Prepare Pay bills, tax statement, student's assessment record using spreadsheet. (Teacher shall assign a spreadsheet to be prepared by each student).

12. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Computer Fundamentals	Goel, Anita	Pearson Education, New Delhi, 2014, ISBN: 978-8131733097
2	Computer Basics Absolute Beginner's Guide, Windows 10	Miller, Michael	QUE Publishing; 8th edition August 2015, ISBN: 978-0789754516
3	Linux: Easy Linux for Beginners	Alvaro, Felix	CreatevSpace Independent Publishing Platform- 2016, ISBN: 978-1533683731
4	Microsoft Office 2010: On Demand	Johnson, Steve	Pearson Education, New Delhi India, 2010; ISBN: 9788131770641
5	Microsoft Office 2010 for Windows: Visual Quick Start	Schwartz, Steve	Pearson Education, New Delhi India, 2012, ISBN:9788131766613
6	OpenOffice.org for Dummies	Leete, Gurdy, Finkelstein Ellen, Mary Leete	Wiley Publishing, New Delhi, 2003 ISBN: 978-0764542220
7	Computer Fundamentals	Dr. Rajendra Kawale	Devraj Publications, Dist Solapur, Maharashtra

13. SOFTWARE/LEARNING WEBSITES

a. https://www.microsoft.com/en-in/learning/office-training.aspx
b. http://www.tutorialsforopenoffice.org/
c. https://s3-ap-southeast-1.amazonaws.com/r4ltue295xy0d/Special_Edition_Using_StarOffice_6_0.pdf

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION MUMBAI

Program Name : **Open Electives**

Level : **Basic**

Course Title : **Medicinal Plant Cultivation and Marketing**

Course Code : **371002**

1. RATIONALE:

The Basic Certificate Course in Cultivation of Medicinal Plants and Marketing is designed to meet the growing demand for skilled professionals in the field of medicinal plant cultivation. Medicinal plants play a crucial role in healthcare, herbal medicine, and various other industries. However, the sustainable cultivation of medicinal plants requires specialized knowledge and skills to ensure quality, quantity, and conservation.

The rationale for this course is as follows:

- Industry Demand: There is an increasing demand for medicinal plants due to the rising popularity of herbal and alternative medicine. The course aims to bridge the skill gap by providing individuals with the necessary knowledge and expertise to cultivate medicinal plants efficiently.
- Conservation and Sustainable Practices: Medicinal plants are often sourced from natural habitats, leading to over exploitation and threat to biodiversity. By educating individuals on cultivation techniques, the course promotes sustainable practices and the conservation of medicinal plant species.
- Quality Assurance: Medicinal plants contain active compounds responsible for their therapeutic properties. Proper cultivation practices are essential to maintain the quality and potency of these plants. The course equips learners with the skills to ensure the production of high-quality medicinal plants.
- Entrepreneurship Opportunities: Cultivation of medicinal plants can be a viable business opportunity. The course provides learners with an understanding of marketing strategies, value chains, and business aspects, enabling them to explore entrepreneurship opportunities in the field.
- Ethical Considerations: The course emphasizes ethical practices in medicinal plant cultivation, including fair trade, biodiversity conservation, and adherence to legal and regulatory requirements. It instills a sense of responsibility and ethics among learners in the cultivation and trade of medicinal plants.
- Practical Experience: The course includes field visits, hands-on training, and interactions with industry experts, allowing learners to gain practical experience and exposure to real-world scenarios in medicinal plant cultivation.

2. COMPETENCY

This Certificate Course in Cultivation of Medicinal Plants aims to equip individuals with the necessary knowledge, skills, and ethical awareness to contribute to the sustainable cultivation, conservation, and quality assurance of medicinal plants. It serves to meet the industry demand, promote entrepreneurship, and address the need for skilled professionals in this specialized field. The aim of this course is to help the student to attain the following objectives :

- **To understand various herbal medicinal and cosmetic products.**
- **To identify the medicinally important plants.**
- **To promote cultivation of medicinal plants of Indian origin.**
- **To understand medicinal plant economy**
- **To develop marketing skills / entrepreneurship skills/start ups.**

3. COURSE OUTCOMES (COs)

The theory, practical experiences, and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following COs associated with the above mentioned competency:

After completion of this course graduates will be able to:

1. Understand the importance of medicinal plants and their applications in various fields such as healthcare, herbal medicine, and cosmetics.
2. Apply appropriate cultivation techniques, including seed selection, germination, nursery management, and transplanting, to establish and maintain healthy medicinal plant crops.
3. Develop a basic understanding of marketing strategies, value chains, and business aspects related to the cultivation of medicinal plants.
4. Understand the legal and regulatory requirements in medicinal plant cultivation.
5. Gain practical experience through field visits, hands-on training, and interactions with experienced cultivators and industry experts, enhancing their overall understanding and skills in medicinal plant cultivation
6. Carryout work at medicinal and aromatic plants farms, governmental and non-governmental organizations.
7. Become self-employed in related sectors.

4. TEACHING AND EXAMINATION SCHEME

Hrs.			Contact hour per week (L+P+SL)	Credits	Practical					Grand Total
					ESE		PA			
L	P	SL			Max Marks	Min Marks	Max Marks	Min Marks	Total Max Marks	Max
2	4	2	8	4	50#	20	50@	20	100	100

Legends: ***L****-Lecture,* ***P*** *- Practical;* ***C*** *– Credit, SL – Self Learning;* ***ESE*** *- End Semester Examination;* ***PA*** *- Progressive Assessment, @ Internal Assessment, # External Assessment.*

5. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed for the attainment of the competencies.

Sr. No.	Competencies (Practical Outcomes (PrOs)
1*	Collection of Plant Material and Preparation of Herbarium.
2*	Identification of Medicinal Plant.
3*	Processing of herbal raw material.
4	Packaging of herbal raw material.
5	Storage and labeling of the herbal raw material.
6	Study of different containers used for herbal raw material.
7*	Survey of any five medicinal plants available in local region and their demand/cost analysis.
8*	Survey of Herbal Cosmetic Products in Local market.
9*	Visit to Ayurvedic Pharmacy and preparation of report.
10	Visit to Ayurvedic / Herbal Industry and preparation of report.
11*	Visit to Medicinal Garden and preparation of report.
12	Survey of Ayurvedic / Herbal Product.

13	Visit to Food Industry and preparation of report.
14	Preparation of protocol for cultivation of any one medicinal plant.
15*	Survey of nutraceutical preparations available in the market.
16	Study of any one patent related to herbal product.

Note

i. A suggestive list of **PrOs** *is given in the above table. More such PrOs can be added to attain the COs and competencies. Out of total 20 numbers of Practicals a judicial mix of minimum 16 or more practical need to be performed which include 8 number compulsory practicals (The practicals marked as '*' are compulsory).*

6. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit– I	**Students will be able to:** 1a.Know various traditional systems of medicine. 1b.Understand the terms like□Herbal Medicines, Herbal and Ayurvedic formulations, Herbal cosmetics and Personal care products. 1c.Compare and contrast the terms like Nutraceuticals, Functional Foods and Dietary Supplements.	**Overview of Indian System of Medicines** • Different traditional systems of Medicines in India. • Overview of Herbal Medicines, Herbal and Ayurvedic formulations, Herbal cosmetics and Personal care products. • Introduction to Nutraceuticals, Functional Foods and Dietary Supplements.
Unit– II	2a. Understand the need and importance of cultivation of medicinal plants. 2b.Explain the different methods of cultivation of plants. 2c. Discuss collection and processing of plant material.	**Basics of Cultivation, Collection and Processing** • Need and Importance of Cultivation. • Methods of Cultivation • Collection and processing of plant material. • Study of various cultivation practices, post-harvest management and uses of any five medicinal plants of high demand (*Asparagus racemosus, Andrographis paniculata, Ocimum tenuiflorum / sanctum, Piper longum, Bacopa monnieri.)*
Unit– III	3a. Know demand and supply of medicinal plants within and outside India. 3b. Perform cost analysis of plant material / products.	**Marketing of Medicinal Plants and their Products** • Demand and supply of medicinal plants. • Global Herbal medicine market. • Costing of medicinal plants and products, packing type, material costing, packing, processing, and transportation. • Marketing channel for medicinal plants, grading, handling herbal raw material, quality and maintenance, marketing research.

Unit– V	4a. Explain conservation of medicinal plants. 4b. Understand IPR issues related to medicinal plants.	**Conservation of medicinal plants** • Need for conservation of medicinal plants, • Worldwide trade of medicinal plants • TRIPS agreement, Intellectual property rights, Indian patent law, Case studies of Turmeric and Neem.
Unit-V	2a. Understand various regulations related to cultivation, import and export of medicinal plants. 2b. Know Government and private institutes / organizations involved in cultivation of medicinal plants.	**Legal and regulatory considerations for commercial cultivation** • Overview of the regulatory framework governing the cultivation of medicinal plants in India. • Import and export of medicinal plant material and their products. • Institutes, National and state agencies for promoting cultivation of medicinal plants (CIMAP, NMPB and SMPBs). Ayurvedic & Herbal drug industries in India.

7. SUGGESTED LEARNING RESOURCES:

S. No.	Title of Book	Author	Publication
1	Herbal Drug Technology	Dr. Harshal Ashok Pawar, Dr. C. V. Acchra	Everest Publishing House, India.
2	Medicinal Plants Cultivation: A Scientific Approach	Dr. Purohit SS , Vyas SP	M/s Agrobios, India
3	Agro Techniques of Selected Medicinal Plants	Govt. of India	National Medicinal Plants Board, India

4	Cultivation of Medicinal Plants in India	Dr. Ramesh Chandra Uniyal, Dr. Maya Ram Uniyal, Pushp Jain	Traffic India
5	Cultivation of medicinal plants	Dr.A. S. Gokhale, C K Kokate, Mr.S.B.Gokhale	Nirali Publications, Pune
6	Indian Medicinal Plants	Mr. Kirtikar , K. R. Basu	M/s Bishen Singh Mahendra Pal Singh, India.
7	Vanspati Baad	Prakash Kale	Generic Publisher, India
8	Cultivation of Medicinal and Aromatic Crops Plants	B.S.Sreeramu and Azer Ali Farooqi	Universities Press, India
9	A Hand Book of Medicinal Plants: A Complete Source Book	Narayan Das Prajapati	Agrobios publications, India

8. SUGGESTED SOFTWARE/LEARNING WEBSITES:

1. National Medicinal Plant Board www.nmpb.nic.in
2. National Horticulture Board www.nhb.gov.in
3. India council of agriculture research www.icar.org.in
4. Department of AYUSH www.ayush.gov.in

Program Name : **Open Electives**

Level : **Basic**

Course Title : **Maintenance of Mobile Phones**

Course Code : **371003**

1. RATIONALE:

The rationale behind a mobile repair and servicing course is to meet the growing demand for skilled professionals in the mobile device industry. Mobile devices, such as smart phones and tablets, have become an integral part of our lives, and as a result, there is a significant need for individuals who can repair and service these devices effectively. Mobile repair and servicing courses provide students with valuable technical skills. These skills include troubleshooting hardware and software issues, repairing and replacing components, and performing maintenance tasks. By acquiring these skills, students become capable of handling a wide range of mobile device-related problems.

2. COMPETENCY

The aim of this course is to help the student to attain the following :

- **Repair the mobile phones.**

3. COURSE OUTCOMES (COs)

The theory, practical experiences, and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following COs associated with the above-mentioned competency:

1.Compare different mobile operating systems based on various parameters.

2. Perform basic measurements to troubleshoot mobile phone.

3. Disassembling and assembling mobile phones for mobile repair.

4. Practise safety protocols while handling mobile.

5. Safe handling of customer support and services.

4. TEACHING AND EXAMINATION SCHEME

Hrs.			Contact hour per week (L+P+SL)	Credits	Practical					Grand Total
					ESE		PA			
L	P	SL			Max Marks	Min Marks	Max Marks	Min Marks	Total Max Marks	Max
2	4	2	8	4	50#	20	50@	20	100	100

Legends: ***L****-Lecture;* ***P*** *- Practical;* ***C*** *– Credit, SL – Self Learning;* ***ESE*** *- End Semester Examination;* ***PA*** *- Progressive Assessment, @ Internal Assessment, # External Assessment.*

5. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed for the attainment of the competencies.

Sr. No.	Competencies (Practical Outcomes (PrOs)
1*	Mobile Phone Disassembly and Assembly: • Practice disassembling and assembling different models of mobile phones. • Learn proper handling and organization of small components. • Follow step-by-step guides and manuals for disassembly and assembly.
2	Screen Replacement: Learn the process of replacing damaged screens on mobile phones.
3	Practice removing broken screens and installing new ones. Ensure proper alignment and connection of screen cables.
4*	Component Testing and Diagnosis: • Use multimeters and other testing equipment to diagnose common hardware issues. • Identify faulty components such as screens, batteries, charging ports, or speakers.
5	Practice testing and troubleshooting techniques for different hardware components.
6*	Battery Replacement and Testing: • Practice replacing batteries in mobile phones. • Learn techniques for safely removing and installing batteries. • Test battery performance using battery testing tools and meters.
7*	• Soldering techniques for repairing connections • Micro soldering for advanced repairs
8*	Charging Port Repair and Replacement: • Identify common charging port issues and symptoms. • Practice repairing or replacing faulty charging ports. • Test the charging functionality after the repair.
9	Camera Repair and Calibration: • Diagnose camera issues such as blurry images or focus problems. • Repair or replace faulty camera modules.
10	Practice calibration of camera settings for optimal performance.
11*	Software Troubleshooting and Updates: • Use tools to troubleshoot and diagnose common software issues.
12	Practice software updates on various brands of mobile phones.
13	Practice firmware installations on various brands of mobile phones.
14	Perform software resets and data wipe procedures.
15*	Water Damage Assessment and Repair: • Simulate water-damaged mobile phones. • Assess the extent of water damage and identify affected components.
16	Practice drying techniques and cleaning methods for water-damaged phones.
17	Case study on network issues requiring SIM replacement.
18*	Data Backup and Recovery: • Practice backing up and restoring data on mobile phones.
19	• Use software tools to recover data from damaged or corrupted devices. • Handle customer data with care and ensure privacy and security
20	Practice estimating repair costs and providing quotes to customers.

Note

i. A suggestive list of **PrOs** *is given in the above table. More such PrOs can be added to attain the COs and competencies. Out of total 20 numbers of Practicals a judicial mix of minimum 16 or more practical need to be performed which include 8 number compulsory practicals (The practicals marked as '*' are compulsory).*

6. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I Introduction to Mobile Phones	1a. Overview of mobile phone technology and evolution 1b. Different types of mobile phones and their components. 1c. Safety precautions and guidelines for working with mobile phones.	1.1 Explain the historical development and evolution of mobile phones, including the key milestones and technological advancements. 1.2 Identify and describe the components and features of a mobile phone, such as the display, processor, memory, operating system, and connectivity options. 1.3 Demonstrate proficiency in using the basic functions and features of a mobile phone, including making calls, sending messages, using the camera, installing apps, and connecting to Wi-Fi or mobile networks. 1.4 Compare and contrast different mobile operating systems (e.g., iOS, Android) and their respective user interfaces, functionalities, and app ecosystems.
Unit– II Basic Electronics in Mobile Phones	2a Introduction to basic electronic components and their functions. 2b Understanding circuits and circuit boards in mobiles. 2c. Use of basic electronic testing equipment in mobile repairing	2.1 Demonstrate knowledge of common electronic components used in mobile phones, such as resistors, capacitors, diodes, transistors, and integrated circuits. 2.2 Identify and explain the purpose and operation of basic electronic testing equipment used in mobile phone repair and troubleshooting, including multimeters, oscilloscopes, signal generators, and power supplies. 2.3 Perform basic measurements using a multimeter, including voltage, current, and resistance measurements, to diagnose and troubleshoot mobile phone circuitry.

Unit– III Mobile Phone Hardware	3a. Understanding the hardware components of mobile phones (e.g., motherboard, display, battery, camera) 3b. Identification and functions of different parts. 3c. Tools and techniques for disassembling and assembling mobile phones.	3.1 Identify and describe the major hardware components of a mobile phone, including the processor, memory, display, battery, camera, sensors, and connectivity modules. 3.2 Explain the function and operation of each hardware component within a mobile phone, including how they interact with each other to enable the device's functionality. 3.3 Demonstrate proficiency in disassembling and assembling mobile phones, including the proper handling of tools and components to prevent damage.
Unit– IV Repairing Mobile Phone Components:	4a. Identify and describe the common components in mobile phones, including integrated circuits (ICs), connectors, buttons, speakers, microphones, cameras, and antennas. 4b Demonstrate proficiency in disassembling and assembling mobile phones, including the proper handling of tools, screws, and delicate components to prevent damage. 4c Understand and follow safety protocols and best practices when working with mobile phone components, including ESD (electrostatic discharge) protection and safe handling of hazardous materials.	4.1 Repairing or replacing components such as screens, batteries, charging ports, speakers, and cameras. 4.2 Water Damage Assessment and Repair: Assessing water damage in mobile phones 4.3 Techniques for drying and cleaning water-damaged phones,
Unit-V Data Backup, Recovery and Customer Service Skills	5a. Apply data recovery techniques and tools to restore lost or corrupted data from backup sources. 5b Demonstrate proficiency in configuring and performing data backups using various backup software or tools. 5c Acquire skills for customer support and services.	5.1 Data Backup and Recovery: Methods for backing up and restoring data on mobile phones, Tools and software for data recovery, safely handling customer data and privacy considerations. 5.2 Business and Customer Service Skills: Customer service and communication skills 5.3 Setting up and managing a mobile phone repair business

7. SUGGESTED LEARNING RESOURCES:

S. No.	Title of Book	Author	Publication
1	Cell phone Repair Guide for Beginners	Hössne Mamun	--
2	Mobile Phone Repairing PDF Book Free Tutorial & Guide	--	--
3	Learn Cell Phone Repairing	Muhammad Asif Azeemi	--

8. SUGGESTED SOFTWARE/LEARNING WEBSITES:

a. https:// http://www.mobilecellphonerepairing.com

b. https:// https://www.prizminstitute.com/courses/cell-phone-repair-book

Program Name : Open Electives

Level : Basic

Course Title : Fundamentals of Design and Fashion Illustration

Course Code : 371004

1. RATIONALE

The course provides the basic practical knowledge fundamentals of design. It is helpful for a basic understanding of design and also as a foundation for other design-oriented subjects. This subject makes the students work on different aspects of designing & illustrations. It enables them to present their abstract ideas in visual form. It makes them work on their illustration skills and enhances their creative ability to explain design in depth.

2. COMPETENCY

The aim of this course is to help the student to attain the following :

Facilitating students to understand of the concept of design. It will help them pick a field of their choice. And acquire professional acumen in the design industries such as Fashion & Textile design, Applied arts or Interior Design. It introduces them to various aspects of design skills such as design development, design concepts, perspective design, motif development, & modification. It enhances their knowledge about various streams of design.

3. COURSE OUTCOMES (COs)

The theory, practical experiences, and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following COs associated with the above mentioned competency:

1. To understand elements of design & apply them in art & Design.
2. Learn perspective drawing & importance of perspective in the art form.
3. To understand elements of design & apply them in art & design.
4. Understand colour wheel & all colour schemes & apply them to drawing.
5. To draw & understand detailed drawings of an object & how to modify & develop the design & Drawing garments with detailing and application.

4. TEACHING AND EXAMINATION SCHEME

Hrs.			Contact hour per week (L+P+SL)	Credits.	Practical					Grand Total
					ESE		PA			
L	P	SL			Max Marks	Min Marks	Max Marks	Min Marks	Total Max Marks	Max
1	6	1	8	4	50#	20	50@	20	100	100

Legends: ***L****-Lecture;* ***P*** *- Practical;* ***C*** *– Credit, SL- Self Learning;* ***ESE*** *- End Semester Examination;* ***PA*** *- Progressive Assessment, @ Internal Assessment, # External Assessment.*

5. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed for the attainment of the competencies.

Sr. No.	Competencies (Practical Outcomes (PrOs))
1	**Elements of Design** Lines: Types and Characteristics, Shapes: Categories of shapes, Forms: Categories, Space: Sub – topic wise composition of Design based upon the aforementioned elements. Perspective drawing: Nature, Object and building structures (One point & Two Point)
2	**Principles of Design** Balance, Proportion, Rhythm, Contrast, Harmony, Unity, Repetition, Emphasis Topic wise composition of designing and coloring with concept development.
3	**Human Anatomy** Foundation of human body shape: Male /female/kids Drawing of Figure (8 Head), Postures, Movements, walking, running.
4	**Introduction to Fashion Illustration** Drawing Face and Body Details, Drawing Face with Measurements, Drawing Features, Shading Face, Hairstyles
5	**Croqui and Body Details** (male/female/kid), Sketching Ten head croqui, Mechanical croquis, fleshed out croquis and postures, Body movements poses, Hands & legs movements in reference to Fashion Model Drawing.
6	**Terminology of colours and colour harmonies** Introduction to colors theory: Hue, Chrome, Value, Scale, Intensity Assignment on color harmony
7	**Colours and colour Scheme: Explanation of Color schemes** Colours wheel, Primary colours, Secondary colour, Tertiary colour, Tints, Tones, Shades Warm & Cool colours, Complementary colour, Split Complementary colour, Quaternary colours, Triadic colours, Analogous colours, Monochromatic colours, Grey scale. Assignments on color schemes: collecting images with various colour schemes depicted in them. Implementation of color schemes in design development.
8	**Psychology and Symbolism of colour** Studying and understanding the psychology of colors in relevance with design fields. Impact of colours emotional and psychological levels Collection of images depicting the symbolism of colors.
9	**Drawing & Draping Garments on Croquis** Different types of silhouettes Drawing Garment Outlines on Croquis Understanding Fall of Garments & Draping It on Croquis Draping falls, cowls, gathers, pleats & cascade Understanding Body Movement & Doing Placement of Garment Accordingly Different types of prints & textures Sketching and coloring 3 garments based on draping with details.

Sr. No.	Competencies (Practical Outcomes (PrOs))
10	**Fashion garment details** Different types of necklines, collars, skirts, sleeves, jackets, Pocket detailing, Learning about Garment lengths and sketching them on A3 size paper.
11	**Drawing & Design** Realistic Sketching of Object, modification of object and design development Motif drawing from objects and nature, Motif development for design project.

Note

i. A suggestive list of **PrOs** *is given in the above table. More such PrOs can be added to attain the COs and competencies. The total number of Practicals shall be 20.*

6. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I	1a. Students will understand elements of design & apply in art 1b. Students will Learn perspective drawing & importance of perspective in an art form 1c. Students will understand what is the meaning of EOD & POD, their importance in design & how to use them effectively for creating designs	1a. Elements of design - line, shapes, form & space 1b. Perspective - one point & two point 1c. Principles of designs - balance, proportion, rhythm, contrast, harmony, unity, repetition, emphasis
Unit– II	2a. Understanding human anatomy & learn how important is anatomy in figure drawing 2b. Students will be able to understand everything about human body poses and dimension 2c. Students will be able to understand and draw different human poses and achieve & develop good drawing skill 2d. Students will be able to draw & understand features and hairstyle & draw them freehand	2a. Human anatomy - male female kid 2b. Croqui (male/female/kid) - mechanical croqui, flesh out croqui, hands & legs poses 2c. Face details - eyes, lips, nose, hairstyles
Unit–III	3a. Students will be able to understand various colour scheme and will achieve knowledge in developing design & print by using colours. 3b. Students will be able to understand everything about colours & create prints. 3c. Students will be able to understand the impact & knowledge of colour	3a. Terminology of colours & colour harmony - hue, chrome, value, scale & intensity 3b. Colour & colour scheme - colour wheel & different types of colour schemes 3c. Psychology and symbolism of colour

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	psychology.	
Unit– IV	4a. students will understand the falls of drapes and will learn how to draw and shade on croqui. 4b. students will be able to learn different textures and develop print & implement on garment drawing. 4c. students will learn garment details drawing & how important it is as part of garment designing.	4a. Draping technique/textures - gathers, drapes, falls, cascade, pleats, cowls, print , textures 4b. Garment details -necklines, collars, skirts, Sleeves, jackets, pockets, garment length
Unit-V	5a. students will learn to create different motif & develop prints out of it. 5b. students will learn how to draw the design & modify the object and create motif out of it	5a. Drawing & design - object drawing, object modification & motif development

7. SUGGESTED LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1	Image of colour	Leatric Eiserman	--
2	Fashion rendering with color	Bina Abling	--
3	Introduction to Fashion Design	Ireland, Patrick John	British Ford, London.
4	Encyclopedia of Fashion Design.	Ireland, Patrick John	British Ford, London
5	Illustrated Fashion	Mekdvey, k.	Blackwel, Paris.
6	Fashion Design Illustration Women.-I	Ireland, Patrick John.	Batsford, London
7	Fashion Illustration Today.-I	Fashion Illustration Today.-I Drake, Nicholas.	Thames & Hudson, London
8	Colour harmony	Hideaki Chijiwa	--
9	Colour harmony	Bride M. Whelan	--
10	Fashion Illustration	Fashion Illustration Kathryn Hegan	Pearsons

8. SUGGESTED SOFTWARE/LEARNING WEBSITES

a. https://www.youtube.com/watch?v=2QTHs7QSR9o
b. https://www.youtube.com/watch?v=x0smq5ljlf4
c. https://www.youtube.com/watch?v=UmHMVU6dceA
d. https://www.youtube.com/watch?v=9EPTM91TBDU&t=902s
e. https://www.youtube.com/watch?v=nCjMJc_mw0c
f. https://www.youtube.com/watch?v=X9uoyOtGlHs
g. https://www.youtube.com/watch?v=_uUNMHFSsBk

h. https://www.youtube.com/watch?v=Xn_0wEwZNEU
i. https://www.youtube.com/watch?v=SZ_bF7KnWQg
j. https://www.youtube.com/watch?v=qpqEE9yU474
k. https://www.youtube.com/watch?v=Xh-LKm9cgqk

Program Name : **Open Electives**

Level : **Basic**

Course Title : **Hair Dressing And Designing**

Course Code : **371005**

1. RATIONALE

Hair Dressing & Designing is the foundation for professional processes to be followed involving principles, techniques, and practices for Hair stylist development. The course provides a framework for hair dresser & hair styling professionals for building quality-assured basics of hair services. It enables students to explore current hair fashions and trends and gives students practical experience of the professional services offered in salons.

2. COMPETENCY

The aim of this course is to help the student to attain the following industry-identified competency through various teaching-learning experiences

Use hands-on practical practices for developing the foundation of hair design.

3. COURSE OUTCOMES (COs)

The theory, practical experiences, and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following COs associated with the above mentioned competency:

1. Select suitable tools of hair cutting & hair styling to develop fundamentals of hair styling.
2. Understand & Prepare basics of professional conduct in the salon
3. Acquire skills and abilities required for performing thermal hair styling.
4. Identify contra-indications that may restrict or limit the provision of services.
5. Use tools and products that are safe and fit for purpose.

4. TEACHING AND EXAMINATION SCHEME

Hrs.			Contact hour per week (L+P+SL)	Credits	Practical					Grand Total
					ESE		PA			
L	P	SL			Max Marks	Min Marks	Max Marks	Min Marks	Total Max Marks	Max
1	6	1	8	4	50#	20	50@	20	100	100

Legends: ***L****-Lecture;* ***P*** *- Practical;* ***C*** *– Credit, SL – Self Learning;* ***ESE*** *- End Semester Examination;* ***PA*** *- Progressive Assessment, @ Internal Assessment, # External Assessment.*

5. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed for the attainment of the competencies.

1

Sr. No.	Competencies (Practical Outcomes (PrOs)
1	Demonstration of identification & Analysis of Hair
2	Demonstration of identification & Analysis of Scalp
3	Demonstration & Practice of hair fall treatment
4	Demonstration & Practice of Dandruff treatment with HI frequency
5	Demonstration & Practice of hair shampooing & conditioners
6	Demonstration & Practice of blast blow dry of hair
7	Demonstration & Practice of Simple and cover bun
8	Demonstration & Practice of French roll with brooch placement
9	Demonstration & Practice of Low bun with flower placement
10	Demonstration & Practice of waterfall with hair accessories placement
11	Demonstration & Practice of open hairstyle with ironing machine
12	Demonstration & Practice of Front hair braiding
13	Demonstration & Practice of full hair braiding
14	Demonstration & Practice of front Buffon with crimping
15	Demonstration & Practice of front Buffon with Curls switch fixing
16	Demonstration & Practice of front Buffon with low bun
17	Demonstration & Practice of front Buffon with messy bun
18	Demonstration & Practice of front Buffon with messy braids with tong
19	Demonstration & Practice of scissor holding
20	Demonstration & Practice of Section & partition of Straight cut
21	Demonstration & Practice of Straight cut with blow dry setting and styling
22	Demonstration & Practice of Section & partition of U cut
23	Demonstration & Practice of U cut with blow dry setting and styling
24	Demonstration & Practice of Section & partition of Layer cut
25	Demonstration & Practice of Layer cut with blow dry setting and styling
26	Demonstration & Practice of Section & partition of blunt cut

Note

i. A suggestive list of **PrOs** *is given in the above table. More such PrOs can be added to attain the COs and competencies. The total number of Practicals shall be 20.*

6. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I General Care of Scalp & Hair	1a. Analyze hair & scalp type 1b. Identify hair & scalp problem 1c. Suggest correct treatment 1d. Perform treatment effectively	1.1 Analysis of Hair and scalp 1.2 General care of hair and scalp 1.3 Hair fall treatment 1.4 Dandruff treatment
Unit– II Hair Shampoo & Conditioning	2a. Analyze hair type 2b.Identify pH and porosity of hair 2c.Understand the porosity of hair 2d. Select correct shampoo 2e. Select correct conditioner 2f. Suggest homecare routine for hair & scalp care	2.1 pH level of shampoo. 2.2 Types of shampoo 2.3 Normal shampoo, Color & 2.4 Straightening shampoo 2.5 Materials, Draping 2.6 Procedure of shampooing Conditioning 2.7 Types of Conditioning 2.8 Surface conditioners 2.9 Penetrating conditioners 2.10 Procedure of conditioning 2.11 Home Care Routine
Unit– III Elements of Hair Designing	3a. Identification of facial shapes for different hair styles 3b. Understand elements of hair design. 3c. Develop the art of hair designing.	3.1 Elements of Hair designing 3.2 Factors to be considered before hair styling. 3.3. Different face shapes 3.4 Different types of Hair Styles 3.5 Simple Knot 3.6 Cover Style 3.7 French Roll 3.8 Water fall 3.9 Front hair Braiding 3.10 Full hair braiding 3.11 Fishtail Braid 3.12 Bridal puff with different buns 3.13 Open hairstyles
Unit– IV Hair Cutting	4a. Learn the basic techniques of hair Cutting 4b. Understand the various methods of Hair Setting. 4c. Choose the relevant hair cutting tools and technique 4d. Understand the client's hair styling requirement	4.1 Tools used in Hair Cutting 4.2 Safety precautions while using sharp tools 4.3 Basic fundamentals of hair cutting 4.5 Holding Scissor and comb 4.6 Procedure of Straight Cut, 'U' Cut, 'V' Cut, Layer cut 4.7 Hair setting with blow dryer 4.8 In & Out turn Setting 4.9 Straight Setting. 4.10 To give volume to the hair

3

Unit-V Thermal Hair Designing	5a. Learn the use of equipment of thermal hair styling 5b Understand the various methods of Hair styling with thermal equipment. 5c Performing thermal hair styling with preventive measures and precautions	5.1 Elements of Temporary Hair Styling 5.2 Different types of Thermal equipment Ironing, Crimper, Tong 5.3 Testing Thermal Iron. 5.4 Care of Thermal Iron. 5.5 Holding Thermal Iron. 5.6 Hair styling with curls 5.7 Contraindications and precautions

7. SUGGESTED LEARNING RESOURCES:

S. No.	Title of Book	Author	Publication
1	A Professional guide to Hair Dressing and Beauty Therapy	Dr Veena Pitre	Mrs Veena Pitre 1221, W. Paranjpe Road, Pune-04.
2	Standard Textbook of Cosmetology	Coustane V Kibbe	Milady Publication

8. SUGGESTED SOFTWARE/LEARNING WEBSITES:

a. https://www.butlertec.us/site/handlers/filedownload.ashx?moduleinstanceid=635&dataid=1202&FileName=Cos-%20Chapter%2019%20Wigs%20and%20Hair%20Additions.pdf
b. https://www.butlertec.us/site/handlers/filedownload.ashx?moduleinstanceid=635&dataid=1194&FileName=Cos-%20Chapter%2011%20Properties%20of%20the%20Hair%20and%20Scalp.pdf
c. https://youtu.be/mCV2a7dvoSQ
d. https://youtu.be/1qubi0EXVs8
e. https://youtu.be/IRYOU5Nx10chttps
f. https://youtu.be/3ley385ybr4
g. https://youtu.be/NMMetwPHjUc

Program Name : **Open Electives**
Level : **Medium**
Course Title : **Basic Webpage Designing**
Course Code : **371006**

1. RATIONALE:

Website design is a broad term that encompasses a wide variety of tasks, all involved in the formation of web pages. It is essential for students to learn HTML since the task of static website design is performed by using HTML coding. Even in dynamic websites, the task of presentation of content is handled through HTML coding. Cascading Style Sheets (CSS) which is a style sheet language used for describing the presentation of a document written in markup language for formatting and styling of content. JavaScript is widely used by web developers to do things such as dynamic web pages, respond to events, create interactive forms, validate data that visitors enter into a form, control the browser etc. This course helps students to create interactive web pages using Technologies HTML, CSS and JavaScript and host it on Internet/Intranet.

2. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- **Develop static and dynamic web-sites.**

3. COURSE OUTCOMES (COs)

The theory, practical experiences, and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following COs associated with the above mentioned competency:

1. Use block and text level formatting tags to present contents on web page.
2. Apply hyper linking on web page and organize the content using tables.
3. Apply presentation schemes on content using CSS.
4. Create event based web forms using JavaScript.
5. Publish websites on Internet or Intranet.

4. TEACHING AND EXAMINATION SCHEME

Hrs.			Contact hour per week (L+P+SL)	Credits	Practical					Grand Total
					ESE		PA			
L	P	SL			Max Marks	Min Marks	Max Marks	Min Marks	Total Max Marks	Max
2	4	2	8	4	50#	20	50@	20	100	100

Legends: ***L****-Lecture;* ***P*** *-Practical;* ***C*** *– Credit, SL- Self Learning;* ***ESE*** *-End Semester Examination;* ***PA*** *- Progressive Assessment, @ Internal Assessment, # External Assessment.*

5. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed for the attainment of the competencies.

Sr. No.	Competencies (Practical Outcomes (PrOs)
1*	Create web page using structure tags to display sample message.
2	Create a web page for displaying a paragraph using block level tags.
3	Create a web page for displaying a paragraph using HR tags.
4*	Create a web page using text level tags.
5	Create a web page using special characters.
6*	Create a web page using for implementing different types of lists.
7	Create a web page to link different web pages of same site.
8*	Create a web page to link an external page of different web site.
9	Create a web page to insert images using various attributes.
10	Create a web page to implement image as a button and set image as background.
11*	Create a web page to implement Table tags.
12	Create a web page to implement Frame tags.
13*	Create a web page for demonstration of CSS by applying internal style.
14	Create a web page for demonstration of CSS by applying external style.
15	Create a web page for demonstration of CSS by applying inline style.
16*	Develop JavaScript using decision making and looping statements.
17	Develop JavaScript to implement Array functionalities.
18	Create a webpage using JavaScript function.
19	Publish a website on internet space by acquiring space on free hosting site.
20*	Create sample website with minimum ten web pages containing text, images, colors and background, frames, tables and CSS with suitable hyper linking.

Note

i. A suggestive list of **PrOs***is given in the above table. More such PrOs can be added to attain the COs and competencies. Out of total 20 numbers of Practicals a judicial mix of minimum 16 or more practical need to be performed which include 8 number compulsory practicals (The practicals marked as '*' are compulsory).*

6. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I Basics of HTML	1a. Describe basic web structure. 1b. Apply block level tags. 1c. Apply Text level tags and special characters. 1d. Use lists in web pages.	1.1 **Web page structure:** DOCTYPE, head, body, title and other meta tags with attributes. 1.2 **Block Level Tags and Horizontal Rules:** Headings, Paragraphs, Breaks, Divisions, Centered Text, Block Quotes, Preformatted text, types of Address, HR tag. 1.3 **Text Level Tags and Special Characters:** Bold, Italic, Underline, Strikethrough, Superscript, Subscript. 1.4 **Lists:** Ordered List, Unordered List, Definition List, Nested Lists
Unit– II URL, Images, Forms and Tables in HTML	2a. State features of URL and Anchor tag. 2b. Use image tag in webpage. 2c. Use colors / images as background in webpage. 2d. Use table tag and frame tag attributes to organize data on webpage.	2.1 **URL and Anchor Tag:** URL Types of URLs, Absolute URLs. Relative URLs, Anchor Tag. 2.2 **Images, Colors and Backgrounds:** Inserting Images, formatting image, inserting image to background. 2.3 **HTML forms:** Form attributes input type. 2.4 **Table tag with attributes:** TABLE, TR, TH, TD tags. Border, cell spacing, cell padding, width, align, bgcolor attributes. 2.5 **Frames:** Types of Frames with their attributes.
Unit– III Cascading Style Sheets	3a. Write CSS code for the given type of formatting on a web page. 3b.Use the given style sheet properties. 3c. Apply the given property of CSS.	3.1 **Cascading Style Sheets:** Different types of Style Sheets, Benefits of using CSS. 3.2 **Adding style to the document:** Linking to style sheets, embedding style sheets, Using inline style, Selectors: CLASS rules, ID rules. 3.3 **Style sheet properties:** Font, text, box, color and background properties.

Unit– IV Basics of JavaScript	4a. State the basic concept of JavaScript. 4b. Use JavaScript to implement decision making statement for the given problem. 4c. Develop JavaScript to implement loop for the given iterative problem. 4d. Create Array to solve given problem. 4e. Develop JavaScript to develop given function.	4.1 **JavaScript** Features of JavaScript, Client-Side JavaScript, Server-Side JavaScript. 4.2 **Terminologies** Object Name, Property, method, Dot syntax, main event. 4.3 Values, Variables, Operators and Expressions. 4.4 **Decision making statements** If Statement, if…else, if. elseif, nested if, Switch…case statement 4.5 **Loop statement** for loop, for...in loop, while loop, do…while loop, and continue statement. 4.6 **Array** Declaration and Initialization of Array, Looping an Array, Adding an Array element, sorting an Array element. 4.7 **Function** Defining a function, adding an argument, calling a function with or without an argument, returning value from a function.
Unit-V Website Hosting	6a. Describe the procedure to configure a web server. 6b. Differentiate hosting requirement on Internet and Intranet. 6c. Describe the procedure for hosting a given website.	5.1 Concept of Internet and Intranet. 5.2 Publishing website on Intranet, Installing and configuring web server, uploading files on intranet site, access intranet-based website 5.3 Publishing website site on Internet, hiring Web space, uploading files using FTP, Virtual Hosting, access internet-based website.

7. SUGGESTED LEARNING RESOURCES:

Sr. No.	Title of Book	Author	Publication
1	HTML and XHTML-The complete reference	Powell. Thomas	Tata McGraw Hill, New Delhi 2014 ISBN9780010701946
2	HTML5 Black Book (Second addition)	DT Editorial service	Dream Tech Publication, New Delhi
3	Sams Teach Yourself HTML and CSS in 24 Hours, Eighth Edition	Michael Morrison,JulieMeloni	Sams Publishing ISBN978-0-672-33097-1.
4	Learning Web Design	Jennifer N. Robbins	O'Reilly 2018ISBN: 978-1-491-96020-2
5	JavaScript Demystified	Keogh, Jim	McGraw-Hill,2015,New Delhi ISBN:0-07-060347-2
6	Sams Teach Yourself HTML, CSS & JavaScript Web Publishing in One Hour a Day	Laura Lemay Rafe Coburn Jennifer Kyrnin	Sams ISBN: 9780133132397

8. SUGGESTED SOFTWARE/LEARNING WEBSITES:

a. https://www.w3schools.com/html
b. https://html.net/
c. https://www.htmldog.com/guides/
d. https://www.javatpoint.com/html-tutorial
e. https://www.tutorialspoint.com/codingground.html
f. https://html.com
g. http://webdesign.com

Program Name : Open Elective

Level : Medium

Course Title : Solar and Its Applications

Course Code : 371007

1. RATIONALE:

The course aims for a better understanding of solar energy including Solar Photovoltaic technologies, Solar Thermal technologies, solar storage system & solar Heating application & solar energy application.

2. COMPETENCY

The aim of this course is to help the student to attain the following :

- **Use & Maintain Solar Equipment's.**

3. COURSE OUTCOMES (COs)

The theory, practical experiences, and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following CO's associated with the above mentioned competency:

1. Understand the concept of solar energy.
2. Select suitable type of solar Energy collector.
3. Understand PV System & selection of solar system components.
4. Use of Solar system for heating application.
5. Use of Solar system for Energy application.

4. TEACHING AND EXAMINATION SCHEME

Hrs.			Contact hour per week (L+P+SL)	Credits	Practical					Grand Total
					ESE		PA			
L	P	SL			Max Marks	Min Marks	Max Marks	Min Marks	Total Max Marks	Max
			8	4	50#	20	50@	20	100	100

Legends: ***L****-Lecture;* ***P*** *- Practical;* ***C*** *– Credit, SL – Self Learning;* ***ESE*** *- End Semester Examination;* ***PA*** *- Progressive Assessment, @ Internal Assessment, # External Assessment,.*

5. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed for the attainment of the competencies.

Sr. No.	Competencies (Practical Outcomes (PrOs)
1*	Measurement of solar radiation by solar measurement kit
2	To plot the V-I Characteristics of the solar cell and hence determine the fill factor.
3	Draw the schematic of the parabolic dish concentrated solar power plant.
4*	Draw the schematic of the parabolic trough concentrated solar power plant.
5	Draw the schematic of the evacuated tube collector solar power plant.
6*	Draw the schematic of the Flat plate collector solar power plant.
7*	Draw the schematic of the solar PV plant.
8*	Prepare maintenance schedule activities required for complete solar PV system
9	Collect information about PV cell available in market & compare on the basis of rating ,cost , application & life etc.
10	Measure voltage available across given solar cell, PV module, Array for various combination.
11*	Collect information about different types of solar panels and study cost, efficiency and power of solar panels.
12	Demonstrate the best angle and Position of Solar panel.
13	Observe the components of given various types of solar water heater & prepare report on it.
14	Observe the components of given various types of solar cooker & prepare report on it.
15*	Observe video clips and calculate solar system for home.
16	Visit & collect information about solar street Light.
17	Observe the components of given solar lantern & prepare report on it.
18*	Visit a solar installation system and make a report on it.
19	Observe video clips on Solar based vehicle Charging system & write report on it.
20	Visit site for Net Metering & write brief report on it.

Note

i. *A suggestive list of* **PrOs** *is given in the above table. More such PrOs can be added to attain the COs and competencies. Out of total 20 numbers of Practicals a judicial mix of minimum 16 or more practical need to be performed which include 8 number compulsory practicals (The practicals marked as '*' are compulsory).*

6. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I Basics of Solar Energy	1a. Describe Non-conventional Energy sources. 1b. Illustrate the Solar System. 1c. Explain the Solar radiation measurement. 1d. Define Solar energy with its types and draw schematic diagram. 1e. Describe solar map of India in different regions.	1.1 Non-conventional Energy sources. 1.2 Solar System 1.3 Solar radiation measurement-Solar radiation at the earth's surface: Spectral Distribution of Extra-Terrestrial Solar Radiation 1.4 Solar energy –Definition, Types of solar energy, Applications. Schematic representation of Distribution of Solar energy 1.5 Solar map of India.
Unit– II Solar Thermal System	2a.Explain with Sketch the working of Solar thermal power plant & define its types. 2b. Explain with diagram the construction & working of different types of solar collector for electricity generation. 2c. Explain with diagram the construction & working of different types of solar collector for heat. 2d. Differentiate between Flat plate collector and evacuated tube collector.	2.1 Solar thermal power plant or concentrating solar power plant, Types of concentrating solar power plant. 2.2 Types of solar collector for electricity generation- Parabolic trough, liner Fresnel reflectors, solar power towers, solar parabolic dish. 2.3 Types of solar collector for heat- Flat plate collector, evacuated tube collector, comparison of Flat plate collector and evacuated tube collectors.
Unit– III Solar PV System	3a. Define Photovoltaic effect 3b. Explain the construction, working, various types of solar cell. 3c. Draw & describe Solar photovoltaic system layout. 3d. Differentiate between solar thermal and solar PV. 3e. Write function of each component of Solar system. 3f. Explain the Solar Storage system.	3.1 Solar photovoltaic system- Photovoltaic effect 3.2 Solar cell construction, working, various types of solar cell materials available in market, solar cell efficiency. 3.3 Solar photovoltaic system layout. 3.4 Comparison of solar thermal and solar PV. 3.5 Solar system components- solar thermal panels, solar PV panels, inverters, solar battery, solar charge controller, solar tracker. 3.6 Solar Storage system
Unit– IV Solar Heating Applications	4a. With the help of Diagram explain Solar water heating. 4b. Explain the Working Principle of Solar Furnace with the help of Diagram. 4c. Draw Diagram of Solar Cooker & explain its working. 4d. Explain the different types of solar cooker with neat diagram.	4.1 Solar water heating -Natural circulation solar water heater - pressurized , non-pressurized, forced circulation solar water heater 4.2 Solar Furnace -working principle, uses, limitation & advantages 4.3 Solar cooker -working principle & components of box , Dish type , scheffler type

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit-V Solar Energy Applications	5a. Explain the Solar Street light with its components. 5b. Describe the concept of Solar Green House. 5c. Explain the Solar vehicle with neat block diagram. 5d. Describe the concept of Satellite solar power station. 5e. Illustrate Net Metering.	5.1 Solar Street light - basic concept & components. 5.2 Solar Green House-summer green house & winter green house. 5.3 Solar vehicle. 5.4 Satellite solar power station concept. 5.5 Net Metering.

7. SUGGESTED LEARNING RESOURCES:

S. No.	Title of Book	Author	Publication
1	Solar Energy	S. P. Sukhatme	Tata McGraw-Hill Publishing co. ltd
2	Energy Management	Dr. Sanjeev Singh Dr. Umesh Rathore	S.K. Kataria & sons
3	Generation of Electrical Energy	Dr. B. R. Gupta	Eurasia Publishing house (pvt.)Ltd
4	Renewable Energy	Godfrey Boyle	Oxford university press
5	Handbook of Solar Energy: Theory, Analysis and Applications	G. N. Tiwari, Arvind Tiwari, Shyam	Springer

8. SUGGESTED SOFTWARE/LEARNING WEBSITES:

a. https://www.e-education.psu.edu/eme812/node/644

b. https://www.slideshare.net/saranraj107/principles-of-solar-radiations

c. https://www.energy.gov/energysaver/water-heating/solar-water-heaters

d. http://www.ews-solarpower.co.uk/24-how-does-the-system-work

e. https://youtu.be/iqFFAd0MBRk

Program Name : **Open Elective**
Level : **Medium**
Course Title : **Construction Materials**
Course Code : **371008**

1. RATIONALE:

Construction material is the key element in the construction project. A civil engineer has to constantly deal with selection of materials for various engineering projects of construction such as residential/commercial buildings, roads, metro/railways, bridges, dams, tunnels, and fly-over. The development of advance technology generates the necessity of new engineering materials. It is a challenging job for the civil engineer to select relevant material which is durable, economical and eco-friendly. New materials are introduced every day in the market. Modern techniques are developed to handle and use materials for economical and safer designs of engineering structure. In this course, students are expected to study about all these aspects so as to develop their understanding in order to apply their knowledge in construction industry.

2. COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:
"Select relevant building material to fulfill construction requirements".

3. COURSE OUTCOMES (COs)

The theory, practical experiences, and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following COs associated with the above-mentioned competency:

a) Select relevant natural construction materials.
b) Select relevant artificial construction materials.
c) Select relevant special type of construction materials.
d) Select relevant finishing materials for construction.
e) Identify processed construction materials.

4. TEACHING AND EXAMINATION SCHEME

Hrs.			Contact hour per week (L+P+SL)	Credits	Practical					Grand Total
					ESE		PA			
L	P	SL			Max Marks	Min Marks	Max Marks	Min Marks	Total Max Marks	Max
2	4	2	8	4	50#	20	50@	20	100	100

Legends: ***L****-Lecture;* ***P*** *- Practical; SL – Self Learning;* ***C*** *– Credit,* ***ESE*** *- End Semester Examination;* ***PA*** *- Progressive Assessment, @ Internal Assessment, # External Assessment.*

5. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed for the attainment of the competencies.

Sr. No.	Competencies Practical Outcomes (PrOs)
1*	Identify the available natural construction materials in the laboratory and prepare report
2	Identify the various sizes of available coarse aggregates in laboratory and prepare report
3*	Identify the grain distribution pattern in given sample of teak wood in the laboratory and draw the various patterns. (along and perpendicular to the grains)
4*	Select 1st class, 2nd class and 3rd class bricks from the stack of bricks and prepare report
5*	Measure dimensions of 10 bricks and find average dimension and weight. Perform field tests - dropping, striking and scratching by nail and correlate the results obtained.
6*	Identify different types of flooring tiles such as vitrified tiles, ceramic tiles, glazed tiles. mosaic tiles. anti-skid tiles, chequerred tiles, paving blocks and prepare report about the specifications
7*	Apply the relevant termite chemical on given damaged sample of timber.
8*	Apply two or more coats of selected paint on the prepared base of a given wall suffice for the area of 1 m x 1 m using suitable brush/rollers adopting safe practices
9	Prepare cement mortar of proportion 1:3 or 1:6 using artificial sand as a special processed construction material
10	Prepare mortar using cement and fly ash or Granite/marble polishing waste in the proportion I:6 or I:3
11	Prepare lime putty using appropriate proportions
12	Collect the average market rates for bricks, teak wood, OPC, PoP, aggregates, sand, oil paints, cement paint & plastic paint
13*	Undertake a market survey for the cost and technical specification of different brands of cement, tiles, glass and paints

Note

i. A suggestive list of **PrOs** *is given in the above table. More such PrOs can be added to attain the COs and competencies. Out of total 13 numbers of practicals, a judicious mix of minimum 10 or more practical need to be performed which include 8 number compulsory practicals (The practicals marked as '*' are compulsory).*

6. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics

Unit-I Natural Construction Materials	1a. Describe the properties and structure of the given natural construction materials. 1b. Explain the given type of defect(s) in timber. 1c. Explain the procedure of preservation of timber in the given situation. 1d. Select the natural construction material for the given situation with justification.	1.1 Requirements of good building stone, general characteristics of stone, quarrying and dressing methods and tools for stone. 1.2 Structure of timber, general properties of good timber, seasoning, preservation and defects in timber 1.3 Properties of lime and sand and their uses. 1.4 Classification of coarse aggregate according to sizes and its uses. 1.5 Asphalt, bitumen and tar used in construction, properties and their uses.
Unit–II Artificial Construction Materials	2a. Describe the properties, of given type of bricks. 2b. Describe manufacturing process of bricks 2c. Classify the different artificial construction materials 2d. Select relevant type of artificial material for the given type of construction work with justification	2.1 Constituents of brick earth. Conventional or traditional bricks, modular & standard bricks. Classification of burnt clay bricks. Field tests on bricks, manufacturing process of clay bricks. 2.2 Types of flooring tiles and their uses 2.3 Manufacturing of pre-cast concrete blocks and their uses 2.4 Properties & uses of plywood, particle boards, veneers and laminated boards 2.5 Properties of ferrous and non-ferrous metals and their uses in construction
Unit– III Special Construction Materials	3a. Describe the method used for water proofing, termite proofing, thermal and sound insulation in the given situation 3b. Select the relevant material required for the given operations with justification 3c. Describe the fibers as a construction material	3.1 Types of water proofing, termite proofing, thermal and sound insulating materials & their suitability in construction work 3.2 Fiber types: Jute, Glass, Plastic & Asbestos fibers. Use of fiber in construction.
Unit– IV Finishing Materials	4a.Choose the relevant proportion adopted in mortars for the given type of construction 4b.Select relevant type of PoP board for the given type of work with justification 4c.Describe the properties of given type of paint 4d.Select the relevant type of paint to be used in given situation 4e.Choose the relevant type of finishing material for the given situation	4.1 Types of mortars- lime, cement and special mortars, their uses as plastering material 4.2 Constituents and uses of PoP, finishing boards-sizes and uses 4.3 Types of paints- oil paint, distempers and varnishes, properties and situations where used

Unit-V Processed Construction Materials	5a.Describe the properties of the given industrial or agro-waste products used for the given type of work 5b.Describe the salient properties of the given modern construction materials 5c.Select the relevant processed construction material for the given situation	5.1 Industrial waste materials: Fly ash, blast furnace slag, granite and marble polishing waste and their uses 5.2 Agro waste materials- Rice husk, Bagasses, coir fibers and their uses 5.3 Special processed construction materials: Geosynthetic, ferrocrete, artificial timber, artificial sand and their uses

7. SUGGESTED LEARNING RESOURCES:

S. No.	Title of Book	Author	Publication
1	Engineering Materials	S. C. Rangwala	Charotar Publishing House Pvt. Ltd. – Anand, 2019 edition
2	Building Materials	Varghese P.C	PHI Learning Pvt. Ltd, Delhi, 2015 edition
3	Building Materials	S.K. Duggal	New Age Publication, New Delhi, 2019 edition
4	Engineering Materials	Rajput, R. K.	S. Chand and Co., New Delhi, 2015 edition
5	Civil Engineering Materials	Somayaji, Shan	Pearson education, New Delhi, 2015 edition

8. SUGGESTED SOFTWARE/LEARNING WEBSITES:

a. https://www.aboutcivil.org/engineering-materials.html

b. https://civiltoday.com/civil-engineering-materials

Program Name : **Open Electives**

Level : **Medium**

Course Title : **Installation & Repair of Consumer Electronics Products**

Course Code : **371009**

1. RATIONALE:

To give knowledge and competencies in Installation, Servicing, Repair, Fault Diagnosis and Error Removal for Consumer Electronics Products like LCD-LED TV and Monitor, Cable TV and DTH Services, Induction Stove etc. The objective of this course is to enable the students to get acquaintance with the Consumer Electronics Products

2. COMPETENCY

The aim of this course is to help the student to attain the following :

- **Maintain Consumer Electronics Products**

3. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following COs associated with the above mentioned competency:

1.Install LED/LCD TVs using appropriate tool set.

2.Install and maintain cable TV and DTH.

3. Install and maintain Home Theatre System.

4.Install and maintain FM Radio and Cordless Phones-

5.Install and maintain Induction Stove and Microwave Oven

4. TEACHING AND EXAMINATION SCHEME

Hrs.			Contact hour per week (L+P+SL)	Credits	Practical					Grand Total
					ESE		PA			
L	P	SL			Max Marks	Min Marks	Max Marks	Min Marks	Total Max Marks	Max
2	4	2	8	4	50#	20	50@	20	100	100

Legends: ***L****-Lecture;* ***P*** *- Practical;* ***C*** *– Credit, SL – Self Learning;* ***ESE*** *- End Semester Examination;* ***PA*** *- Progressive Assessment, @ Internal Assessment, # External Assessment.*

5. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed for the attainment of the competencies.

Sr. No.	Competencies (Practical Outcomes (PrOs)
1*	To study and test the various parameters of a cordless phone transmitter
2	To study and test the various parameters of a cordless phone receiver-selectivity, sensitivity, fidelity etc
3	Installation and wiring of cable TV
4*	Fault finding and troubleshooting in LCD-LED TVs
5	Installation and maintenance of DTH System
6*	Fault finding and troubleshooting in VCD-DVD Player and Home Theatre System
7*	Installation, Repair, and Servicing of Induction stove
8*	Installation, Repair, and Servicing of Microwave Oven
9	Layout study and fault finding in FM transmitter kit
10	Layout study and fault finding in FM receiver kit
11*	To study and test the various parameters of a cordless phone receiver-selectivity, sensitivity, fidelity etc
12	Hands on training on soldering PCBs used in TVs
13	Demonstrate the step-by-step process of setting up a home theater system, including connecting the speakers, TV, audio/video receiver, and other components.
14	Troubleshoot common issues in a home theater system, such as incorrect connections or audio/video signal problems.
15*	Identify common issues with televisions, such as no power, distorted picture, or audio problems.
16	Install a security camera system, including mounting the cameras, running cables, and connecting them to a DVR (Digital Video Recorder).
17	Configure the DVR settings, including camera assignments, recording modes, and remote access options.
18*	Use appropriate testing equipment, such as a multimeter or oscilloscope, to diagnose faults in the power supply, video processing circuitry, or audio amplifier section of a TV set. Repair or replace faulty components, such as capacitors, transistors, or integrated circuits.
19	Install and configure a smart home automation system, including connecting smart devices, such as smart lights, thermostats, and voice assistants, to a central hub or controller.
20	Prepare a report on safety protocols, including proper handling of tools and equipment, adherence to electrical safety guidelines, and appropriate disposal of waste materials.

Note

i. A suggestive list of **PrOs** *is given in the above table. More such PrOs can be added to attain the COs and competencies. Out of total 20 numbers of Practicals a judicial mix of minimum 16 or more practical need to be performed which include 8 number compulsory practicals (The practicals marked as '*' are compulsory).*

6. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I Introduction to consumer electronics LCD-LED TV and Monitor	1a. Demonstrate knowledge of LED/LCD TV technology, including the principles of operation and key components. 1b.Perform proper installation procedures for LED/LCD TVs, including mounting on a wall, connecting cables, and configuring settings. 1c. Apply appropriate tools and techniques to repair LED/LCD TVs, including disassembling and reassembling the TV, replacing faulty components, and conducting basic soldering. 1d. Interpret and utilize technical documentation, such as service manuals and schematics, to aid in the diagnosis and repair of LED/LCD TVs.	1.1 Basic Principle, Working and Operation of LCD/LED TV and Monitor. 1.2 Installation, Repair, Maintenance and Servicing. 1.3 Fault Diagnosis and Error Removal Techniques and Practices.
Unit– II Cable TV and DTH Services:	2a. Explain the concepts and technologies behind cable TV and DTH services, including signal transmission, encoding, and decoding. 2b Demonstrate knowledge of different types of cable TV and DTH systems, their components, and their respective functionalities. 2c. Install and configure cable TV and DTH systems, including setting up satellite dishes, connecting cables, and configuring receivers or set-top boxes.	2.1 Basic Principle, Working and Operation of Cable TV and DTH Services. 2.2 Installation and Checking, Repair, Maintenance, Servicing and Practice. 2.3 Fault Diagnosis and Error Removal Techniques and Practices.

Unit– III Home Theatre System:	3a. Identify and describe the components of a home theatre system, including the audio/video receiver, speakers, subwoofer, television or projection system, and media sources. 3b Demonstrate proficiency in setting up a home theatre system, including connecting and configuring audio and video devices, managing cables, and optimizing speaker placement. 3c Troubleshoot and resolve common issues in home theatre systems, including audio/video synchronization problems, connectivity issues, and equipment compatibility.	3.1 Basic Principle, Working and Operation. 3.2 Installation, Repair, Maintenance, Servicing and Practice. 3.3 Fault Diagnosis and Error Removal Techniques and Practices.
Unit– IV FM Radio and Cordless Phones-	4a. Identify the components of an FM radio receiver, such as the antenna, tuner, demodulator, and audio amplifier. 4b. Identify the components of a cordless phone system, such as the base unit, handset, charger, and antenna. 4c. Perform troubleshooting procedures for common issues in cordless phone systems, such as poor signal quality, range limitations, or interference problems.	4.1 Basic Principle, Working and Operation of FM Radio and Cordless Phone 4.2 Installation, Repair, Maintenance, Serving and Practice. 4.3 Fault Diagnosis and Error Removal Techniques and Practices.
Unit-V Induction Stove and Microwave Oven:	5a. Identify and describe the components of an induction stove, such as the induction coil, power control circuitry, and cooking surface. 5b. Troubleshoot common issues with induction stoves, such as power supply problems, malfunctioning controls, or cooking zone irregularities. 5c. Identify and explain the components of a microwave oven, such as the magnetron, waveguide, control panel, and turntable. 5d. Troubleshoot common issues with microwave ovens, such as uneven heating, malfunctioning controls, or door sealing problems.	5.1 Basic Principle, Working and Operation. 5.2 Installation, Repair, Maintenance, Servicing and Practice. 5.3 Fault Diagnosis and Error Removal Techniques and Practices.

7. SUGGESTED LEARNING RESOURCES:

S. No.	Title of Book	Author	Publication
1	Handbook of Repair and Maintenance Of Domestic Electronics Appliances handbook	Sinha Shashi Bhushan	BPB Publications
2	A Beginners Guide to Consumer Electronics Repair: Hand Book and Tutorial	Douglas Kinney	iUniverse Publications
3	User Manual as provided by Consumer Electronics Product Manufacturer.	--	--

8. SUGGESTED SOFTWARE/LEARNING WEBSITES:

a. https://www.electronicrepairguide.com

b. https://www.fastrepairguide.com

Program Name : **Open Electives**

Level : **Medium**

Course Title : **Electrical Installation for Residential Complex**

Course Code : **371010**

1. RATIONALE

The wiring installations are important aspects of any electrical installation work. This course will help the students to execute different electrical installation work. They should be able to select relevant electrical materials and accessories for different applications while doing original work or maintenance works. They should have knowledge about the specifications of the materials as per the applications. This course will also enable the students with the necessary elements of estimation, electrical bylaws, wiring skills, design considerations for residential electrical installations.

2. COMPETENCY

The aim of this course is to help the student to attain the following :

- **Plan the Residential electrical installation with the cost estimates.**

3. COURSE OUTCOMES (COs)

The theory, practical experiences, and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following COs associated with the above mentioned competency:

1. Follow safety practices, IE rules when undertaking electrical works.
2. Interpret various electrical diagrams.
3. Select relevant type of wiring, wiring material for a particular installation.
4. Prepare estimate of residential electrical installation.
5. Prepare elements of estimation.

4. TEACHING AND EXAMINATION SCHEME

Hrs.			Contact hour per week (L+P+SL)	Credits	Practical					Grand Total
					ESE		PA			
L	P	SL			Max Marks	Min Marks	Max Marks	Min Marks	Total Max Marks	Max
2	4	2	8	4	50#	20	50@	20	100	100

Legends: ***L****-Lecture;* ***P*** *- Practical; SL – Self Learning;* ***C*** *– Credit,* ***ESE*** *- End Semester Examination;* ***PA*** *- Progressive Assessment,@ Internal Assessment, # External Assessment.*

5. SUGGESTED PRACTICALS/ EXERCISES

The practical's in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed for the attainment of the competencies.

Sr. No.	Competencies (Practical Outcomes (PrOs)

1*	Use different electrical safety accessories and practices.
2	Use different electrical/electronic tools.
3*	Prepare the list of electrical accessories with specifications required for different types of electrical wiring.
4	Prepare the list of Protective devices with specifications for residential electrical installation.
5*	Test working condition of the following components Single Pole One way and Two way switches, Fuse, MCB.
6	Test the working of given components i. ELCB ii. RCB using relevant tools and instruments.
7	Prepare and test the electrical diagram for: a. One lamp and One fan b. Two Lamp and Two Fans and One Socket.
8	Perform Staircase Wiring.
9	Select and place relevant fuses in different lighting circuits.
10*	Prepare a switch board containing Four Lamp, Two Fan and Two Socket with fuse and indicator.
11*	Prepare a Fluorescent Tube Light Fixture wiring and test it.
12	Compare different types of wiring.
13	Prepare given electrical diagram using casing-capping wiring.
14	Select insulating material for specific application from given samples.
15	Insulation resistance measurement using Meggar.
16	Understand construction of Plate Earthing and Pipe Earthing.
17	Earth resistance measurement using Earth Tester.
18*	Residential Electrical Installation Plan a. Draw Electrical Installation Plan indicating location of installation components using their symbols for a given residential plan. b. Draw wiring route diagram for the plan.
19*	Draw wiring diagram and single line diagram of a given electrical installation plan and estimate the quantity of material.
20*	Estimate the cost of electrical installation of a given residential plan.

Note

i. *A suggestive list of* **PrOs** *is given in the above table. More such PrOs can be added to attain the COs and competencies. Out of total 20 numbers of Practical's a judicial mix of minimum 16 or more practical need to be performed which include 8 number compulsory practical's (The practical's marked as '*' are compulsory).*

6. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I Wiring components, tools and safety devices	1a. Explain safety rules and standards in the given electrical systems 1b. Describe the use of electrical tools and safety accessories in the given electrical engineering situation. 1c. Specify the function and specifications of electrical wiring materials and appliances. 1d. Specify need of Earthing and it's types 1e. Explain the criteria for recommending the Earthing system for a given electrical installation.	1.1 General IE Rules for electrical installation. 1.2 Safety tools and accessories used in the wiring: Pliers, Nose Pliers, Cutter, stripper, Screw driver, Tester, Test Lamp, Crimping tool, Continuity Tester, Wire gauge, Knife, Safety hand Gloves, Safety Boots, Safety Goggles, Rubber Mats. 1.3 Function and specification of components used in wiring system: Iron clad switches, DB's, Switch, Fuse, MCB, RCB, ELCB, Lamp Holder, Ceiling Rose, Socket Outlet, wires and cables. 1.4 Specify need of Earthing, Factors affecting earth resistance, Different systems of Earthing, adverse effects of improper Earthing.
Unit– II Electrical Wiring Diagram	2a. Identify the conventional symbols of components used in electrical installation. 2b. Draw Electrical wiring diagram of specified electrical installation. 2c. Convert wiring diagram into single line diagram and vice-versa. 2d. Draw Staircase wring, Godown wiring	2.1 Conventional Symbols of electrical components used in installation as per Indian standard. 2.2 Classification of electrical wiring diagram and their definition. 2.3 Representation of electrical diagram using multiline, single line and schematic, Conversion of multiline into single line and vice versa. 2.4 Staircase wiring, Godown wiring.
Unit– III Types of wiring	3a. List the point to be considered for the selection of a wiring system. 3b.Discuss Different types of wiring, their advantages, disadvantages and applications. 3c. Determine the size of cable for a given load and voltage in a wiring circuit. 3d. State the types of wires for internal wiring	3.1Factors to be considered while selecting type of wiring for a specific installation. 3.2 Different types of House wiring. 3.3 Advantages, Disadvantages and applications of different types of wiring. 3.4Conductor material, insulating material, factors to be considered while selecting size of conductor. 3.5 Types of wire used for internal Wiring.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit– IV Domestic or Residential installation	4a.State general rules and requirement for electrical installation. 4b State design consideration for residential installation. 4c Draw electrical installation plan and single line diagram for given residential building electrification. 4d. Prepare the list of material and estimate the cost for residential plan. 4e.Describe various Testing of installation (Insulation resistance, Polarity test, Earth resistance)	4.1 Classify Electrical Installation, Need of reading of Civil Engineering building drawing, Residential building and its classification. 4.2 Interpretation of Electrical installation plan and electrical drawing. 4.3 General rules and requirements for electrical installation. 4.4 Design, drawing, estimating and costing of residential electrical installation. 4.5 Testing of installation (insulation resistance testing, earth resistance testing).
Unit-V Concept of estimation and costing.	5a.Define estimation and costing 5b.State the Purpose of estimating and costing 5c List out Qualities of a good estimator 5d.Describe essential elements of estimating and costing	5.1 Purpose of Estimating and costing. 5.2 Qualities of a good Estimator 5.3 Elements of estimating and costing: specification of material, Latest market cost of material, Price list and net prices, calculation of material and Labour cost, knowledge of purchase system, Labour cost.

7. SUGGESTED LEARNING RESOURCES:

Sr. No.	Title of Book	Author	Publication
1	Electrical wiring, Estimating and costing	S. L. Uppal	Khanna Publishers
2	Electrical Estimating and Costing	Surjit Singh	Dhanpat Rai & CO.
3	Electrical Estimating and Costing	J. B. Gupta	S. K .Kataria & Sons
4	Electrical design estimating and costing	Dr. Bhattacharya, Raina	New Age International Publisher

8. SUGGESTED SOFTWARE/LEARNING WEBSITES:

a. https://www.nsc.org.in/

b. https://www.esfi.in/

c. http://www.nfpa.org/safety

d. http://www.neca-neis.org/the-standards

e. http://howstuffworks.com/search.php?terms=electrical%20installatio

Program Name : **Open Electives**

Level : **Advance**

Course Title : **Python Programming**

Course Code : **371011**

1. RATIONALE:

Python is powerful programming language. It has efficient high-level data structures and a simple but effective approach to object-oriented programming. Python code is simple, short, readable, intuitive, and powerful, and thus it is effective for introducing computing and problem solving to beginners. It's elegant syntax and dynamic typing, together with its interpreted nature, make it an ideal language for scripting and rapid application development. The objective of this course is to enable the students to use the free open-source language and develop the applications using the concepts of Python.

2. COMPETENCY

The aim of this course is to help the student to attain the following:

- **Develop a program using Python to solve problems**

3. COURSE OUTCOMES (COs)

The theory, practical experiences, and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following COs associated with the above mentioned competency:

1. Use basic Python programming concepts.
2. Perform Data Structure operations.
3. Develop a function and module for given problem.
4. Apply concepts of OOPs, file and exception handling.
5. Develop database application using python

4. TEACHING AND EXAMINATION SCHEME

Hrs.			Contact hour per week (L+P+SL)	Credits	Practical					Grand Total
					ESE		PA			
L	P	SL			Max Marks	Min Marks	Max Marks	Min Marks	Total Max Marks	Max
2	4	2	8	4	50#	20	50@	20	100	100

Legends: ***L****-Lecture;* ***P*** *- Practical;* ***C*** *– Credit, SL – Self Learning;* ***ESE*** *- End Semester Examination;* ***PA*** *- Progressive Assessment,@ Internal Assessment, # External Assessment.*

5. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed for the attainment of the competencies.

Sr. No.	Competencies (Practical Outcomes (PrOs)
1*	Download latest version of python, install and configure Python IDE.
2	Write simple Python program to display message on screen using script mode and interactive mode.
3	Write simple Python program using operators: a) Arithmetic Operators b) Logical Operators c) Bitwise Operators
4*	Write simple Python program to demonstrate use of conditional statements: a) 'if' statement b) 'if ... else' statement c) Nested 'if statement
5	Write python program to demonstrate use of looping statements: a) 'while' loop b) 'for' loop
6*	Write python program to perform following operations on Lists: a) Create list b) Access list c) Update list (Add item, Remove item) d) Delete list
7	Write python program to perform following operations on Tuples: a) Create Tuple b) Access Tuple c) Update Tuple d) Delete Tuple
8	Write python program to perform following operations on sets: a) Create Set b) Access Set elements c) Update Set c) Delete Set
9*	Write python program to perform following operations on Dictionaries: Create Dictionary Access Dictionary elements Update Dictionary Delete
10	Write a python program to perform math and string built in functions.
11*	Develop a program to demonstrate user defined function.
12	Develop a program to demonstrate built in module
13	Write a python program to demonstrate built in packages (Numpy, pandas, matplotlib) and user defined packages.
14	Write a python program to demonstrate method overloading and overriding.
15*	Write a python program to demonstrate single and multilevel inheritance.
16	Write a python program to perform file operations.
17	Write a python program to handle exception.
18	Design student registration form using Python Tkinter widgets.

19*	Write python program to create Employee table, insert one row and display the table information.
20*	Develop a Mini Project in python with minimum 4 concepts mentioned in curriculum.

Note

*i. A suggestive list of **PrOs** is given in the above table. More such PrOs can be added to attain the COs and competencies. Out of total 20 numbers of Practicals a judicial mix of minimum 16 or more practical need to be performed which include 8 number compulsory practicals (The practicals marked as '*' are compulsory).*

6. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I Basics of Python	1a. State features of python. 1b. Identify the given Variables, Keywords and constants in Python. 1c. Use indentation, comments in the given program. 1d. Use different types of operators for writing arithmetic expressions. 1e. Write a python program using conditional and looping statements.	1.1 Python Features, Installation 1.2 **Python building blocks:-** Identifier, keywords, Indentation, variables, comments. 1.3 **Python Data Types:** - Number, String, Tuple, List, Sets, Dictionaries. 1.4 **Python Operators:** - Assignment, Relational, Logical, Bitwise, Membership, Identity. 1.5 **Conditional statement:** - if, if else, nested if. 1.6 **Looping:** - while, for, nested loop.
Unit– II Data Structures in Python	2a. Write python programs to use and manipulate lists for the given problem 2b. Write python program to use and manipulate Tuples for the given problem 2c. Write python program to use and manipulate Sets for the given problem 2d. Write python program to use and manipulate Dictionaries for the given problem	2.1 **List:** - Defining list, accessing values from list, deleting values, updating list, Basic List operations, Built in list functions. 2.2 **Tuples:** - Defining tuple, accessing values from tuple, deleting tuple. Basic tuple operation, built in functions. 2.3 **Sets:** - Defining set, accessing values from set, deleting set, updating set. Basic set operation, Built in functions. 2.4 **Dictionaries:** - Defining, accessing values, deleting values, updating dictionaries. Basic operations, Built in functions.
Unit– III Python functions, module and packages	3a. Use the Python standard functions for the given problem. 3b. Develop user defined function for given problem. 3c. Write Python module for the given problem 3d. Write Python package for the given problem	3.1 Built in functions (math, string) 3.2 **User defined function:** - function definition, function calling, function arguments and parameter passing, Return statement, scope of variables (Global and Local) 3.3 **Modules:** Writing modules, importing module, python built in modules; 3.4 **Python packages:** writing packages, using standard packages (Numpy, matplotlib, pandas) and user defined packages.

S. No.	Title of Book	Author	Publication
1	Python Programming	Rao, K. Nageswara Shaikh Akbar	Scitech Publications(Jndia) Pvt, Ltd. ISBN:9789385983450
2	Learning Python	Lutz, Mark	5th Edition, O'Reilly Publication ISBN-13: 978-1449355739
3	Python Essential Reference	Beazley, David	4th Edition, Addison-Wesley Professional, ISBN: 9780672329784
4	Core Python Programming	Wesley J. Chun	Prentice Hall PTR Second Edition
5	Python for Everybody: Exploring Data Using Python 3	Charles R. Severance	First Edition, Shroff Publishers, 2017. ISBN: 978-9352136278

Unit– IV OOPs, File and Exception handling in Python	4a. Create class and object for given problem. 4b. Write a python program to use inheritance. 4c. Read and write data on file using python. 4d. Handle the given exception in python.	4.1 **OOPs:** Creating classes and objects. Method overloading and overriding, Inheritance-Single, Multilevel. 4.2 **File Handling:** Opening file in different modes, accessing file content, reading and writing file, closing file. 4.3 **Exception Handling:** Introduction, try: except, statement, raise. User defined exception
Unit-V GUI Programming and Database Access	5a. Design GUI interface using Tkinter in python 5b Implement database connectivity using SQLite in python.	5.1 **Python GUI Programming (Tkinter):** Tkinter widgets, standard attributes, geometry management. 5.2 **Python database connectivity through SQLite:** Establishing connection, insert, retrieve, delete, rollback and commit operations.

7. SUGGESTED LEARNING RESOURCES:

8. SUGGESTED SOFTWARE/LEARNING WEBSITES:

a. https://www.javatpoint.com/python-tutorial
b. https://www.tutorialspoint.com/python/index.htm
c. https://www.w3schools.com/python/default.asp
d. https://spoken-tutorial.org/
e. https://likegeeks.com/python-gui-examples-tkinter-tutorial/
f. https://www.programiz.com/python-programming

Program Name : **Open Elective**

Level : **Advance**

Course Title : **Transport Management and Motor Vehicle Act**

Course Code : **371012**

1. RATIONALE

The growth of any country mainly depends on transportation of the passengers as well as Goods. The students can play key role in management of various transport organization. The transport industry provides good employment opportunities for students as RTO Consultants, fleet manager etc. The students requires in-depth knowledge of Motor vehicle act, rules, record keeping, estimation and valuation of vehicle, standard operating procedures and effective driving skills for deciding various transportation related policies, fulfilling legal compliances, providing quality service, economic feasibility while working in transport industry.

2. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- **Use relevant management principles in Motor Transport industry.**

3. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

1. Interpret the Motor Vehicle Act and Traffic Rules.
2. Implement concept of Taxation and Insurance in vehicle registration.
3. Implement the business of buying and selling of vehicles.
4. Select suitable mode of transportation and vehicle as per requirement.
5. Identify role of various research organizations in Motor Industry.

4. TEACHING AND EXAMINATION SCHEME

Hrs.			Contact hour per week (L+P+SL)	Credit	Practical					Grand Total
					ESE		PA			
L	P	SL			Max Marks	Min Marks	Max Marks	Min Marks	Total Max Marks	Max
2	4	2	8	4	50#	20	50@	20	100	100

Legends: ***L****-Lecture;* ***P*** *- Practical;* ***C*** *– Credit, SL – Self Learning;* ***ESE*** *- End Semester Examination;* ***PA*** *- Progressive Assessment, @ Internal Assessment, # External Assessment.*

5. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency:

S. No.	Practical Outcomes (PrOs)

S. No.	Practical Outcomes (PrOs)
1	Prepare document for obtaining Learning Driving License
2	Prepare application for obtaining conductor's License
3 *	Collect different forms and documents required for registration of Vehicle
4 *	Calculate tax for newly purchased vehicle using different forms by authority
5	Prepare motor accident claim compensation documents of any vehicle
6	Prepare documents for Tax exemption or refund of tax of a given vehicle
7	Prepare Third party insurance for given vehicle
8 *	Prepare application for surveyor's License
9	Estimate on road price of New Vehicle(one for two wheeler and one for 4 wheeler)
10	Prepare documents for selling of used vehicle
11 *	Draw layout of any Bus depot
12	Prepare history card and log book of passenger vehicle
13 *	Draw structure of MSRTC defining all elements
14 *	Collect information about CIRT/ARAI/VRDE/CRRI/PCRA

Note

i. A suggestive list of **PrOs** *is given in the above table. More such PrOs can be added to attain the COs and competencies. Out of total 12 numbers of Practical's a judicial mix of minimum 8 or more practical need to be performed which include 6 number compulsory practical's (The practical's marked as '*' are compulsory).*

6. UNDERPINNING THEORY COMPONENTS

The following topics/subtopics should be taught and assessed in order to develop UOs for achieving the COs to attain the identified competency.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit I Introduction to Motor Vehicle Acts and Rules	1 a. Interpret the given terms used in Motor Vehicle Act. 1 b. Describe procedure to obtain the given type of license according to Motor Vehicle Act. 1 c. Describe procedure for registration of the given type of motor vehicle according to Motor Vehicle Act. 1 d. State the offences, penalties and procedures for violation of the given traffic rule.	**1.1 Motor Vehicle Act:** Brief description, short titles and Definitions of terms used. **1.2 Licensing of Drivers and conductors of Motor Vehicle:** **Driver's License** - Necessity, Eligibility criteria, Documents required, Procedure to obtain Learner's License and Permanent Driving License, Driving Test, Validity and Renewal of driving license, Restriction on use of learner's license as a driving license, Addition of class to the driving license, Suspension or cancellation of driving license. **Conductor's License** - Necessity, Eligibility criteria, Application for grant of conductor's license,

		Revocation of Conductor's License, Power to disqualify conductor's license, Renewal of conductor's license.Duties and responsibilities of driver and conductor. **1.3 Registration of Vehicles:** Necessity of registration, Exemption from registration, Procedure of registration of motor vehicles, Display of Registration mark, Validity of certificate of registration, Renewal of registration, Temporary registration, Transfer of Ownership of Motor Vehicle, Suspension and cancellation of registration. **1.4 Offences, Penalties:-** Regarding driving of vehicle and violation of law. **1.5 Transport Authorities and Control of Transport:** Transport authorities and their functions. Necessity of Permits, Types of Permits -Stage Carriage Permit, Contract Carriage Permit, Private Service Vehicle Permit, Goods Carriage Permit, Tourist permit
Unit– II Constructi on of Motor Vehicle, Taxation and Insurance	2 a. List general provisions regarding construction and maintenance of the given class of motor vehicle. 2 b. List method of levying tax for the given class of motor vehicle. 2 c. Describe significance of the given type of motor vehicle insurance. 2 d. Write the procedure for claiming compensation in the given situation.	2.1 **Construction of Motor Vehicle:** Overall dimensions, General provision regarding construction and maintenance of motor vehicle, Power of state and central government to make rules. 2.2 **Taxation:** Objectives, Basis of taxation, Methods of levying tax to motor vehicle, Tax structure for motor vehicles in Maharashtra, Modes of payment of the tax, Tax exemption, Refund of tax. 2.3 **Insurance:** Types of Motor Vehicle insurance - Comprehensive and Third-Party insurance, Procedure to claim compensation, Motor Accident Claim Tribunal, Liability without fault in ce1iain cases. Provision of compensation in Hit and Run case.
Unit – III Estimation and Valuation of Vehicle	3 a. List duties and responsibilities of a surveyor in the given condition. 3 b. Prepare accident survey report in the	3.1 **Role of surveyor:** Eligibility for surveyor, Procedure to obtain surveyor's license. Duties and responsibilities of Surveyor. 3.2 Procedure of accident survey and valuation of vehicle. Accident survey

	given situation. 3 c. State significance of warranty for the given vehicle. 3 d. List factors to be considered for buying the given type of vehicle in the given condition. 3 e. Write procedure for selling the given type of vehicle.	report. 3.3 Importance of warranty system and protection of law. 3.4 **Buying a new vehicle:** Factors to be considered -Ex-showroom price and on road price, use of vehicle, when and where to buy. 3.5 **Buying used vehicles:** When and where to buy: Dealers. used car firms. Private sellers. Garages. Auctions. 3.6 **Sale of used vehicles:** Procedures - Before, During and after sales of vehicle, Auctions. Private sale, preparing the vehicle documents, selling price
Unit-IV Passenger and Goods transport operation.	4 a. Interpret the given terms used in transport operation. 4 b. Compare different modes of transportation for the given conditions. 4 c. State the criteria used for vehicle selection for the given transport operation. 4 d. Name different services provided by transport organization to the given stakeholders. 4 e. List factors considered in Bus scheduling for the given requirement.	4 1. **Terms used in transportation:** Transport vehicle, public service vehicle, Goods vehicle, Public place, Depot, Route, Trip, crew, Time table, Vehicle schedule, Fare. 4 2. Modes of transportation and their comparison. 4 3. **Basic elements in Transport Management** - Market Potential, Selection of vehicle, Organization setup, Legal compliance, Policies of transport organization towards Passenger and employee service. 4 4. **Bus and Crew scheduling:** Basic factors in bus, crew (staff) scheduling. 4 5. **Bus depot layout:** Site selection for depot, Layout, Passenger amenities and infrastructural facilities required. 4 6. **Record Keeping:** Log book, Trip operational sheet, Vehicle ledger, Truck history card, Monthly operational sheet, Goods consignment note, various types of bookings.
Unit-V Motor Transport and Research organizations	5 a. Draw organizational structure of the given transport organization. 5 b. Describe role of the research organization in relation to road transport	5 1. **Structure and working of Transport Organizations** - MSRTC, BEST. 5 2. **Functions and Role of Research Organizations:** Central Institute of Road Transport (CIRT), Automotive Research Association of India (ARAI), Vehicle Research Development and Establishment (VRDE), Central Road Research Institute (CRRI), Petroleum Conservation and Research Association (PCRA)

7. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Passengers Amenities in STU	Sudarshanam P.	Manual of CIRT,Pune
2	Bus Station Management	Sudarshanam P.	Manual of CIRT,Pune
3	Bus and Crew Scheduling	Sudarshanam P.	Manual of CIRT,Pune
4	Central M. V. Rules 1989	Ministry of Transport, Central Government.	Govt. of India
5	Motor Vehicle act and Transport Management	Dr.SatpalSharama	ESHAN Publication, ISBN 9789381551950
6	Motor Vehicle act and Transport Management	Mr. D.M.Kupade	ISBN, 9789389108200

8. SUGGESTED SOFTWARE/LEARNING WEBSITES

1. https://transport.maharashtra.gov.in/I 035/Home
2. https://pari vahan.gov.in/sarathiservice7/state Selection
3. https://parivahan.gov.in/sarathiservice7/sarathiHomePublic
4. https://parivalrnn.gov.in/vahanservice/vahan/ui/statevalidation/homepage.html


MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION

Program Name : **Open Elective**

Level : **Advance**

Course Title : **Energy Conservation and Green Building**

Course Code : **371013**

1. RATIONALE:

Today's homebuyers are increasingly interested in green building as it improve the way homes use energy, water, and materials, to reduce negative impacts on human health and the overall environment-both during construction and over its lifetime. Building heating and cooling are the most energy-intensive activities, followed by electricity use for lighting and appliances. Rising standards of living result in more energy services required for heating, cooling, lighting and communicating. Energy being in limited quantum as on date is a very scarce resource nowadays and need to be used optimally. Higher levels of energy efficiency reduce carbon emissions from the home's own energy systems. Therefore, it becomes necessary to be energy-conscious and make every effort for the conservation of energy. The environmental management and audit is necessary to study the impact of various industries on natural resources. Green building use the resources optimally, reduce waste and reduce the cost of life cycle and provide healthy indoor environment for its occupants through restoring/improving the natural environment. Therefore this course will enable the students to face these challenges of today's era in most effective way to build the structures as green one to improve the quality of environment significantly.

2. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

"Implement concept of energy conservation in construction practices and adopt/construct green buildings"

3. COURSE OUTCOMES (COs)

The theory, practical experiences, and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following COs associated with the above-mentioned competency:

a) Identify various sources of environmental pollution.
b) Implement the different steps in Environmental Audit and Environmental Impact Assessment (EIA).
c) Relate the construction of green building with the prevailing energy conservation policy and regulations.
d) Construct the building using the principles of Green building and the relevant materials.
e) Select the relevant rating system for assessment of given Green building

4. TEACHING AND EXAMINATION SCHEME

Hrs.			Contact hour per week (L+P+SL)	Credits	Practical					Grand Total
					ESE		PA			
L	P	SL			Max Marks	Min Marks	Max Marks	Min Marks	Total Max Marks	Max
2	4	2	8	4	50#	20	50@	20	100	100

Legends: ***L****-Lecture;* ***P*** *- Practical; SL – Self Learning;* ***C*** *– Credit,* ***ESE*** *- End Semester Examination;* ***PA*** *- Progressive Assessment, @ Internal Assessment, # External Assessment,*

5. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed for the attainment of the competencies.

Sr. No.	Competencies Practical Outcomes (PrOs)
1*	Visit any building in your locality to identify the relevant legal provisions followed for control of pollution and submit your observations-cum-findings in the form of a report.
2	Inspect your institute building and submit an action plan for improving the indoor and outdoor environmental quality
3*	Estimate the capacity of the solar plant required for your institute building on the basis of the total electricity consumption data available from concern department.
4*	Prepare an action plan for energy conservation by inspecting an existing structure to explore its potential in it.
5*	Conduct the energy audit of your institute building using any rating system.
6*	Visit to the nearby Hydroelectric power plant and prepare a report on your observations w.r.t. generation of energy with relevant sketches wherever required.
7	Visit to the nearby solar energy plant and prepare a report on your observations w.r.t. generation of energy with relevant sketches wherever required.
8	Inspect any conventional building in your area to suggest the action plan for converting it into green building with necessary legal provisions to be followed.
9	Visit the site of green building to identify the components of HVAC unit with space calculation and submit the visit report.
10*	Visit the site for assessment of green building with relevant rating system and submit your findings in the form of a report.
11	Visit a site for suggesting necessary modifications required for improving green rating and energy conservation in the given building in Local area

Note

i. A suggestive list of **PrOs** *is given in the above table. Out of total 11 numbers of practicals, a judicious mix of minimum 08 or more practical need to be performed which include 06 number compulsory practicals (The practicals marked as '*' are compulsory).*

6. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics

Unit-I Environmental Pollution	1a. Categorize types of pollution in the given situation. 1b.Explain the term, "air pollution" in the given context. 1c.Justify the need to control environmental pollution of the given area. 1d.Describe the relevant process of reducing noise pollution in the given situation. 1e. Use the different legal provisions pertaining to environmental and pollution in the given situation.	1. **Introduction:** Definition of Environment and environmental pollution, Ecology, control of environmental pollution. 1.2 **Classification** of pollution: Air pollution, Water pollution, Soil pollution, Noise pollution, Environmental laws for controlling pollution.
Unit- II Environmental Audit and Environmental Impact Assessment (EIA)	2a.Justify the necessity of Environmental audit for the given purposes. 2b.Set the norms for Environmental audit of the given building. 2c.Describes various steps in EIA of the given civil engineering projects. 2d.Relate the findings of EIA for reducing the Pollution in the given situation.	2.1 **Environmental Audit** : Meaning, Necessity, Norms 2.2 **Types:** Objective-based types: Liabilities audit, Management audit, Activities audit Client-driven types: Regulatory external audit, Independent external audit, Internal environmental audit, Third party audit 2.3 **Environmental Impact Assessment(EIA):**Introduction, EIA regulations, Steps in environmental impact assessment process, Benefits of EIA, Limitations of EIA, Environmental clearance for the civil engineering projects

Unit- III Energy and Energy conservation	3a.Use the given source of renewable and Non-renewable energy for energy conservation. 3b.Justify the need of energy conservation in the given civil project. 3c.Describe present practices adopted in energy conservation in the country. 3d.Justify the role of MEDA in energy conservation in the given city/town. 3e. Implement the relevant provisions of Energy conservation act 2001 for the purpose of energy conservation in the given project.	3.1 **Renewable Energy Resources:** Solar Energy, Wind Energy, Ocean Energy, Hydro Energy, Biomass Energy **3.2 Non-renewable Energy Resources:** Coal, Petroleum, Natural Gas, Nuclear Energy, Chemical Sources of Energy, Fuel Cells, Hydrogen, Biofuels **3.3 Energy conservation:** Introduction, Specific objectives, present scenario, Need of energy conservation, LEED India Rating System and Energy Efficiency. **3.4 Functions** of Government organization working for Energy conservation and Audit(ECA)- •National Productivity Council (NPC) •Ministry of Nee and Renewable Energy (MNRE) • Bureau of Energy efficiency (BEE) • Maharashtra Energy Development Agency (MEDA) **3.5 Salient features of Energy Conservation Act - 2001**
Unit-IV Green Building	4a.Identify- the components of the given green building. 4b. Explain the principles of green building used in the given building. 4c.Improve the quality of environment in the given civil structure. 4d. Suggest the strategies for design of the given building to have green building construction. 4e.Identify the relevant Materials required for the given building to have green building construction.	**4.1 Introduction:** Definition of Green building, Benefits of Green building **4.2 Principles:** Principles of Green building- planning concept of Green Building **4.3 Features**: Salient features of Green Building, Environmental design (ED) strategies for building construction **4.4 Process**: Improvement in environmental quality in civil structure **4.5 Materials**: Green building materials and products- Bamboo, Rice husk ash concrete, plastic bricks, Bagasse particle board, Insulated concrete forms. reuse of waste material-Plastic, rubber, Newspaper wood, Non toxic paint, Green roofing,

Unit- V Rating System for Green Building	5a. Select the relevant rating system for assessment of given green building 5b. Compare the different rating systems such as GRIHA, IGBC, EDGE, BEE adopted in the country. Sc. Explain salient provisions used in IGBC green rating system for the given building. 5d. Explain the role of HVAC unit in the given type of green building.	5.1 Leadership in Energy and Environmental Design (LEED) criteria, 5.2 Indian Green Building council (IGBC) Green rating, 5.3 Green Rating for Integrated Habitat Assessment. (GRIHA) criteria, 5.4 HVAC unit in green Building

7. SUGGESTED LEARNING RESOURCES:

S. No.	Title of Book	Author	Publication
1	Sustainable construction: Green Building design and Delivery.	Kibert, C.J.	John Wiley Hoboken, New Jersey, Nov. 2007
2	Non-conventional Energy Resources	Chauhan, D S Sreevasthava, S K	New Age International Publishers, New Delhi 2014
3	Alternative Building Materials and Technologies	Jagadeesh, K S, Reddy Venkatta Rama Nanjunda Rao, KS	New Age International Publishers, Delhi, 2008
4	Handbook of Green Building Design and Construction	Sam Kubba	Butterworth-Heinemann,2012

8. SUGGESTED SOFTWARE/LEARNING WEBSITES:

a. www.moef.nic.in/ environmental_clearancegeneralhttp://www.sustainable. doe.gov
b. https://www.mahaurja.com/
c. https://mnre.gov.in/
d. https://www.mahaurja.com/meda/energy_conservation/energy_conservation_program
e. http://web.ccsu.edu/faculty/kyem/GEOG473/10TheWeek/IMPACT%20ASSESSMEN T.htm

To
Dr Shailendra Deolankar
Director, Higher Education
Govt. of Maharashtra

Subject: Guidelines for Nomenclature of Certificates and diplomas for the students exiting from the FYUG program.

Dear Sir,

The Steering committee constituted for effective implementation of NEP2020 in the State of Maharashtra has been working successfully towards its objective.

The Steering Committee deliberated in detail regarding the Nomenclature of Certificates and diplomas for the students exiting from the FYUG program. The following nomenclature has been approved by the committee

Nomenclature on Exit Certificate / Diploma to be issued as follows

A. For UG program

Sr. No	Exit	Nomenclature on the Exit document	Example
1	Exit at the end of first year of FYUG	UG Certificate in the faculty of (Arts / Science / Commerce.) [Level 4.5]	• *UG Certificate in the Faculty of Commerce (Level 4.5)* • *UG Certificate in the Faculty of Science (Level 4.5)* • *UG Certificate in the Faculty of Arts (Level 4.5)*
2	Exit at the end of second year of FYUG	UG Diploma in the faculty of (Arts / Science / Commerce.) – in (Subject) [Level 5.0]	• *UG Diploma in the Faculty of Commerce – Accountancy (Level 5.0)* • *UG Diploma in the Faculty of Science – Chemistry (Level 5.0)* • *UG Diploma in the Faculty of Arts - Philosophy (Level 5.0)*

This is to be implemented in all UG degree programs of all faculties

B. For PG Programs

Similarly, for the PG programs, if a student exits after completion of 1 year of the PG program (after 3 years of the UG degree program), the diploma will be awarded as follows

Sr. No	Exit	Nomenclature on the Exit document	Example
1	Exit at the end of first year of PG	PG Diploma – in (Subject) [Level 6.0]	• *PG Diploma in Banking (Level 6.0)* • *PG Diploma in Nuclear Physics (Level 6.0)* • *PG Diploma in International Relations (Level 6.0)*

This is to be implemented in all PG degree programs of all faculties

Award of such Certificates and Diplomas after exiting UG or PG programs will not be given in Convocation. It may be awarded by the exam section of the college or University at the earliest possible time after the result.

C. For Non-NEP Certificates and Diplomas

There are several certificate programs conducted by a variety of agencies – non-NEP certificates and diplomas. To differentiate between such courses and the certificate / diploma issued for students opting for exits, the university shall instruct the organization / institutes to mention the duration of the course on the certificate. For example - '3- day certificate program in Excel'

You are requested to direct implementation of the same in all affiliated colleges, autonomous colleges and all Universities in the State of Maharashtra in the AY 2025-26, through the appropriate channels.

Thanking you
Sincerely

Prof. Dr Nitin R. Karmalkar
Chairman
NEP2020 Steering Committee