To,

The Principal Secretary to Governor,

Governor's Secretariat, Bihar, Patna

Reference: Letter No. BSU (UGC)- 02/2023 – 1457/ (GS) (1) dated 14-09-2023

Subject: Preparation of Syllabus for 4 Year Undergraduate Courses in Universities of Bihar for Physics.

Dear Sir,

This is with reference to your letter no. BSU (UGC) 02/2023 – 1457/ (GS) 1 dated 14-09-2023, we are, herewith submitting one set of prepared Syllabus of Bachelor of Science, **Physics** for 4 Year Undergraduate Courses in University of Bihar for Semester III, IV, V, VI VII, VIII.

Following members were authorized by your esteemed office.

With regards,

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What is B.Sc.?

A B.Sc. (Bachelor of Science) is an undergraduate program for students of science stream. They can pursue this program after completing their 12th grade or Inter in Science (I.Sc.). It is usually a 3 +1 year program.

If you want to make it big in the world of science, this program will lay the foundation for learning and help you explore the various options available in higher education sector, research organizations and industries.

The journey may not always be smooth, but it will be worth the work. It will equip you to become a better human being and also a secure future.

Benefits of a BSc degree in PHYSICS

Name of the Program: B.Sc. Hons in PHYSICS

With a number of subjects available to specialize in, B.Sc. (Hons) in PHYSICS will definitely have a competitive edge. If you have a passion to understand Nature and the Universe then you need to study Physics. Physics will open up a vast world before you and help you understand the behaviour of the biggest bodies like the galaxies, stars, black-holes, planets and satellite to the realm of smallest entities namely nanoparticles, molecules, atoms, nucleus and elementary particles.

There are a number of advantages you may enjoy with the knowledge of Physics. Some of these are:

1. **Personal growth**

Along with increased competitiveness, a B.Sc. degree in Physics also leads to better personal growth including knowledge, analytical ability, reasoning and scientific temper; also equips you with hands on skill to solve or fix instrumental issues in day to day life. A BSc in Physics program helps dealing with the nuances of the workplace too, as you it develops better analytical ability. Thus along with the academic excellence, the youth is better equipped to face challenges in real life as well.

2. Job opportunities in Research and Development fields

A B.Sc. degree can open up a number of job opportunities in the field of science. With a BSc degree, you can opt for the R&D sector, which is the need of the hour.

Expansion of the R&D sector led to the opportunity for internship and more scholarships at industrial and research organization.

The R&D sector has helped students navigate their careers ahead in the field of being a scientist. As the government continues to develop this sector, there are only improvements to be seen on the horizon, with a promising future for BSc Physics students.

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3. Free to expand to other fields

As the economy improves, firms are consistently looking for skilled professionals. Since this field is ever-growing, so does the need to hire such talent. This helps you bag more opportunities and a Physics graduates are higher in demand in the job market.

The high requirement for BSc degrees helps students develop skills that are more in line with what the employers seek.

4. Academic Progression and specialization

The scope for further academic progression and specialization is immense.

A B. Sc. in Physics is eligible to study Master Degree in Physics, Mathematics, Electronics, Computer Science, Data Science, Artificial Intelligence (AI), Library & Information Science, Management, Journalism, B Ed, Law, Cost Accountancy, Chattered Accountancy (CA) and many other programs.

5. Job Profile:

Job profiles for B.Sc. in Physics candidates are quite extensive. A few are mentioned below -

- Science Teacher in Schools
- Lab Instructors
- Scientific Assistant in Science Research organizations namely BARC, ISRO etc.
- Indian Army, Navy and Air Force
- Can appear for State Service Commission Examinations
- Can appear for Union Service Commission Examinations
- Can appear for Indian Forest Service and State Forest Service Examinations
- Banking sector
- Telecom Sector
- Energy Sector particularly Solar Energy and other Green Energies
- Optical & Optometric Industries
- Electrical industries
- Electronics Industries
- Medical, Biomedical and Paramedical Equipment Industries

After obtaining the Master degree in Physics the Job profile further extends to the followings -

- Professor in an Higher academic institutions Researcher
- Scientist
- Research analyst
- Scope to join Foreign Universities

6. Working in close association with renowned Scientists of the world

Good knowledge of Physics will help get jobs in a well-renowned institution/organizations across the world; it helps you work with experts in the field. Hence, networking with peers and world figures can help your personal growth and keep you open to better opportunities.

Close communication with superiors can assist juniors clear their doubts and stay on top of any new advances in the sector.

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High lights of Provisions of 3+1 yrs / 08 Semesters Bachelor Degree Program B A (Honours), B Sc (Honours), B Com (Honours) Curriculum, Syllabus & Examination Regulations Academic Session 2023-27 & onwards Duration of the Program: 4 years

Subject: Regarding implementation of Bachelor of Arts/ Science/ Commerce (Honours) 4-Year Programme under Choice Based Credit System (CBCS) and Semester system as per UGC Regulation (curriculum and Credit Framework for Undergraduate Programme)

Reference:

1. **Governor Secretariat, Bihar Letter No. BSU(UGC)-02/2023-962/GS(I) dated 25.06.2023**
2. **Governor Secretariat, Bihar Letter No. BSU(UGC)-02/2023-687/GS(I) dated 15.05.2023**
3. **Curriculum of 42 Subjects – website of Raj Bhawan (www.governor.bih.nic.in)**

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1. Student of B.Sc.(Hons) program has to select one subject from the basket of subjects which will be named as the Major subject.
   a. Basket of **Major subjects** for B Sc. (Hons) program:
      Physics, Chemistry, Mathematics, Statistics, Botany, Zoology, Geology

2. A student after successfully completing the program will be awarded the Bachelor degree in Science with Honours [B. Sc. (Hons)] in the major subject.
   Example: B. Sc. (Hons) in **Physics,** B. Sc. (Hons) in **Mathematics,** B. Sc. (Hons) in **Botany etc.**

3. **Award/ Certificate, Program Duration, Credit, Exit, Entry options etc. :**
   Bachelor Degree program will be of 4-years duration based on credit based scheme with provisions of **multiple entry and exits** at the beginning and end of each academic year if a student so desire. Details regarding credit are available in serial no. 4.

   ✓ **EXIT Options:**
   यदि छात्र ने अपनी प्रथम/द्वितीय/तृतीय वर्षों की अध्ययन पूरा करने के बाद पढाई रोकना या त्यागना चाहते है तो उस स्थिति में उन्हें स्नातक प्रतिष्टा (B.Sc. Honours) की सर्टिफिकेट/ डिप्लोमा/ डिग्री प्रदान की जायेगी वशर्ते उन्होंने प्रथम/ द्वितीय/ तीन वर्षों के सभी सेमेस्टर्स की सभी कोर्सेस /पत्रों सफलतापूर्वक पूरा कर लिया हो।

   ✓ **Lateral ENTRY OPTION:**
   वे अपनी पढाई अगले तीन वर्षों के अन्दर कभी भी पुनः प्रारम्भ कर सकते है. प्रथम सेमेस्टर (Semester I) से अष्टम सेमेस्टर (Semester VIII) तक की पढाई उन्हें अधिकतम सात वर्षों में पूरी करनी होगी, अन्यथा उनका नामांकन समाप्त हो जायेगा।

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S.No.	Name of the Award	Completion of Semesters & Additional Requisite	Total Credit	Duration
I	**U.G. Certificate**	Sem [I+ II] + One Vocational course (4 Credit) To be done during Summer Vacation	40 +4	One Year
II	**U.G. Diploma**	Sem [I+II+III+IV] + One Vocational course (4 Credit)	80+4	2 Year
III	**3 Year U.G. Degree with Major & Minor**	Successful completion of all 6 semesters Sem [I+II+III+IV +V+VI]	120	3 year
IVa	**Bachelor Hons Degree**	Successful completion of all 8 semesters	160	4 year
IVb	**Bachelor Hons Degree with Research***	Successful completion of all 8 semesters with Research in Major	160	4 Year

*स्नातक प्रतिष्ठा शोध के साथ (B.Sc. Honours with Research) पाठ्यक्रम में प्रवेश केवल उन्हीं छात्रों का हो पायेगा, जिन्होंने पिछले 6 सेमेस्टर में न्यूनतम 7.5 CGPA प्राप्त किया हो।
चौथा वर्ष मुख्य रूप से शोध-आधारित शिक्षा के लिए होगा।

4. क्रेडिट (**CREDIT**):

सम्पूर्ण पाठ्यक्रम क्रेडिट (**CREDIT**) आधारित होगा. क्रेडिट (**CREDIT**) की अवधारणा किसी पत्र (course) का सम्पूर्ण पाठ्यक्रम में महत्त्व (weight-age) को दर्शाता है।

एक क्रेडिट (**01 Credit**) का अर्थ सैधान्तिक पत्र (**Theory Paper**) में न्युनतम 15 घंटा, टुटोरिअल में 30 घंटा तथा प्रायोगिक पत्र में 30 घंटा का वर्ग प्रति सेमेस्टर है।

क्रेडिट-घंटा (**Credit-hour**) सम्बन्ध को नीचे दिये गए टेबल में दर्शाया गया है।

समय-सारणी (टाइम-टेबल) तैयार करते वक्त इसका ध्यान रखना अत्यन्त आवश्यक है।

Credit	Minimum Number of Teaching Learning Hours (T-L-H) per semester for different type of course			
	Theory	Tutorial	Practical	Total
01	15	20	30	
Example of a 6 Credit course with Tutorial (Tu)/ Practical (P):				
06 = 5 (TH)+ 1(Tu)	5X15=75	1X20=20		95
06 = 4(TH)+ 2(P)	4X15=60		2X30=60	120

5. About Courses: A student has to study various types of courses as mentioned below:
छात्र को नीचे बताए अनुसार विभिन्न प्रकार के पाठ्यक्रमों का अध्ययन करना होगा :

i. Major Course (**MJC**)
ii. Minor Course (**MIC**)
iii. Multidisciplinary Course (**MDC**)
iv. Ability Enhancement Course (**AEC**)
v. Skill Enhancement Course (**SEC**)
v. Value Added Course (**VAC**)

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6. **Table I: Number of courses to be studied in different semester :**
(विभिन्न सेमेस्टर में अध्ययन किए जाने वाले पाठ्यक्रमों की विवरणी)

S. No.	Type of Course	Course Code	Number of Courses per Semester with course code								Total Number of course
			SEM I	SEM II	SEM III	SEM IV	SEM V	SEM VI	SEM VII	SEM VIII	
1.	Major Course	MJC	1 MJC-1	1 MJC-2	2 MJC-3 MJC-4	3 MJC-5 MJC-6 MJC-7	2 MJC-8 MJC-9	3 MJC- 10 MJC- 11 MJC- 12	3 MJC-13 MJC-14 MJC-15	1 MJC-16	**16**
2.	Minor Course	MIC	1 MIC-1	1 MIC-2	1 MIC-3	1 MIC-4	2 MIC-5 MIC-6	2 MIC-7 MIC-8	1 MIC-9	1 MIC-10	**10**
3.	Multidisciplinary Course	MDC	1 MDC-1	1 MDC-2	1 MDC-3						**03**
4.	Ability Enhancement Course	AEC	1 AEC-1	1 AEC-2	1 AEC-3	1 AEC-4					**04**
5.	Skill Enhancement Course	SEC	1 SEC-1	1 SEC-2	1 SEC-3						**03**
6.	Value Added Course	VAC	1 VAC-1	1 VAC-2							**02**
Total number of Courses			**06**	**06**	**06**	**05**	04	05	04	02	**38**

Note:
A student will study and attend the Major course (MJC) classes and associated activities in the parent department; other courses namely MIC, MDC, AEC, SEC. VAC to be selected from the respective basket of courses and pursued with the permission of the Head of the Department/ Principal of the College.
Parent department will assist students to choose right combination of courses for MIC, MDC, AEC, SEC, VAC, maintain records **and direct them to right Department/ University Unit for attending classes.**
एक छात्र अपने मूल विभाग में प्रमुख पाठ्यक्रम (एमजेसी) का अध्ययन करेगा और इससे सम्बन्धित अन्य कार्यक्रमों में भाग लेगा; अन्य पाठ्यक्रम अर्थात् एमआईसी, एमडीसी, एईसी, एसईसी, वीएसी पाठ्यक्रमों को संबंधित श्रेणी से चुनेगा और विभागाध्यक्ष की अनुमति से अध्ययन करेगा। मूल विभाग छात्रों को पाठ्यक्रमों का सही संयोजन चुनने में सहायता करेगा। मूल विभाग अपने विषय में स्नातक करने वाले सभी छात्रों द्वारा चुने गए सभी पाठ्यक्रमों का रिकॉर्ड रखेगा। मूल विभाग छात्रों को एमआईसी, एमडीसी, एईसी, एसईसी, वीएसी के लिए संबंधित विभागों द्वारा आयोजित कक्षाओं में एवं अन्य कार्यक्रमों में भाग लेना के लिया प्रोत्साहित करेगा।
A student may opt from course available on SWYAM/MOOC for SEC and MDC with the permission of the parent Department/ College administration.
एक छात्र मूल विभाग/कॉलेज प्रशासन की अनुमति से SEC और MDC के लिए SWYAM/MOOC पर उपलब्ध पाठ्यक्रम का विकल्प चुन सकता है।

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7. **Examination & Evaluation of Performance Under Semester System**

सेमेस्टर प्रणाली के तहत परीक्षायें और मूल्यांकन :

The performance of a student in each paper will be assessed on the basis of a **Continuous Internal Assessment (CIA)** of **30 marks** and the **End of Semester Examination (ESE)** consisting of **70 marks.**

प्रत्येक पेपर में एक छात्र के प्रदर्शन का मूल्यांकन 30 अंकों के सतत आंतरिक मूल्यांकन (सीआईए) और 70 अंकों की सेमेस्टर परीक्षा (ईएसई) के आधार पर किया जाएगा।

a. The **components of C.I.A.** will be as mentioned below (सी.आई.ए. के घटक नीचे बताए अनुसार होगा) :

(i)	One written tests of 90 minutes duration each; 1X15	= 15 Marks
(ii)	Seminar/Quiz/ Presentation	= 05 Marks
(iii)	Assignment	= 05 Marks
(iv)	Attendance and conduct	= 05 Marks
	Total	= 30 Marks

The CIA component shall be conducted and evaluated by the concerned course-teacher.

सीआईए घटक का संचालन और मूल्यांकन संबंधित पाठ्यक्रम-शिक्षक द्वारा किया जाएगा।

b. The **End Semester Examination (ESE)** :

End semester Examination (ESE) will be written test of 3- hour duration and be conducted by the University.

अंतिम सेमेस्टर परीक्षा (ईएसई):

अंतिम सेमेस्टर परीक्षा (ईएसई) 3 घंटे की अवधि की लिखित परीक्षा होगी और विश्वविद्यालय

द्वारा आयोजित की जाएगी।

c. The **Question Paper Pattern of Theory papers in ESE:**

Part A:	10 Compulsory Multiple Choice Questions (MCQ):	2X10 =20 marks
Part B:	06 Short Answer Type Questions- 04 to be answered	5X04 =20 marks
Part C:	05 Long answered type questions- 03 to be answered	10X3 =30 marks
	Total	= 70 Marks

d. The evaluation of laboratory paper and field work, wherever applicable will also be based on CIA and an end-semester practical examination. प्रयोगशाला पेपर और फील्ड कार्य का मूल्यांकन, जहां भी लागू हो, सीआईए और अंतिम सेमेस्टर की व्यावहारिक परीक्षा पर आधारित होगा।

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e. All such examination shall be as per the provisions of examination board and moderation board of the ~~L N Mithila~~ respective University. ऐसी सभी परीक्षाएं ~~एलएन~~ ~~मिथिला~~ विश्वविद्यालय के परीक्षा बोर्ड और मॉडरेशन बोर्ड के प्रावधानों के अनुसार होंगी।

f. **Only those students who have 75% attendance and secured minimum qualifying marks in of 45% in the CIA shall be allowed to fill up the End Semester Examination form.**
केवल उन्हीं छात्रों को अंतिम सेमेस्टर परीक्षा फॉर्म भरने की अनुमति दी जाएगी जिनकी उपस्थिति 75% है और सीआईए में 45% में न्यूनतम योग्यता अंक प्राप्त किए हैं।

g. **The marks of CIA in each paper be submitted on line by the Department/ College to the L N M U Examination portal before the examination form filing date, failing which the student may not be issued examination admit card.**
प्रत्येक पेपर में सीआईए के अंक परीक्षा फॉर्म भरने की तारीख से पहले विभाग/कॉलेज द्वारा एल एन एम यू परीक्षा पोर्टल पर ऑनलाइन जमा किए जाने चाहिए, ऐसा न करने पर छात्र को परीक्षा प्रवेश पत्र जारी नहीं किया जा सकता है।

h. It is mandatory for a student to pass in the both CIA and ESE. The pass marks for CIA as well as ESE is 45%.
छात्र को आंतरिक (CIA) एवं विश्वविद्यालय स्तरीय परीक्षा (ESE) में अलग-अलग उतीर्ण होना आवश्यक होगा। किसी पत्र में उतीर्ण होने के लिए परीक्षार्थि को न्यूनतम 45 प्रतिशत अंक प्राप्त करना आवश्यक होगा।

i. A student who fails in any course and promoted to the next semester has to clear backlog course/s in the subsequent ESE or whenever University conducts the examination of such course/s.
एक छात्र जो किसी भी पाठ्यक्रम में असफल हो जाता है और अगले सेमेस्टर में पदोन्नत हो जाता है, उसे बाद के ईएसई में या जब भी विश्वविद्यालय ऐसे पाठ्यक्रम की परीक्षा आयोजित करता है, बैकलॉग पाठ्यक्रम को पास करना होगा।

j. A student shall be awarded Semester Grade Point (SGPA) at the End of each Semester till Semester V.
एक छात्र को सेमेस्टर V तक प्रत्येक सेमेस्टर के अंत में सेमेस्टर ग्रेड प्वाइंट (एसजीपीए) प्रदान किया जाएगा।

k. Finally after successfully completing the Semester VI, the result will be awarded based on Cumulative Grade Point (CGPA).
अंततः सेमेस्टर VI को सफलतापूर्वक पूरा करने के बाद परिणाम, संचयी ग्रेड प्वाइंट (सीजीपीए) के आधार पर प्रदान किया जाएगा।

l. Students who will study Semester VII & VIII will get final result and degree after the VIIIth semester.

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Bachelor of Science Honours Degree B.Sc. (Hons)
Program Outcome (PO)

After the completion of the program, student will attain the ability to the followings:

PO1: Acquire a systematic and coherent understanding of a number of courses of academic core subject, minor subject along with multidisciplinary subjects, skill enhancement in chosen area and training on various vocational courses.
PO2: Enable the graduate to peruse academic progression in different fields including Master degree in the Major subject, B. Ed. MBA, Master in Information & Library Science, Master in Journalism etc.
PO3: A B.Sc. degree leads to better personal growth including knowledge, analytical ability, reasoning and scientific temper
PO4: Equips with hands on skill to solve or fix instrumental issues in day to day life
PO5: Employ scientific knowledge to pursue Research
PO6: Improves employability index
PO7: Eligible for State Public Services Competitive Examinations, Union Public Services Competitive Examinations, Indian Forest Services, Banking Sector, Insurance Sector
PO8: Teaching in schools
PO9: Self Employment - teaching School students, NGO, Start Ups,
Using the training in SEC & VAC enable livelihood generation

B. Sc. Honours in Physics
Program Specific Outcome {PSO}

PSO1: Develop strong competencies in Physics and its applications in technology rich interactive environment.
PSO2: Enable further academic progression to Master degree in a number of streams
PSO3: Enable to join Research directly and work in theoretical as well as experimental problems
PSO4: Enable to study and work in the area of Computer Science, Data science, Artificial Intelligence (AI), Machine Learning etc.
PSO5: Applying conceptual knowledge of Physics to real world situations
PSO6: Improves general employability index compared to other subjects
PSO7: Evolve as a better Human being with logical reasoning, scientific temperament and analytical ability
PSO8: Acquire Global Competencies

SEMESTER- III

MJCPHY03: Thermal Physics &Thermodynamics

Course Title	Credit	Credit Distribution	
		Theory	Practical
Thermal Physics &Thermodynamics	5	3	2

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Comprehended the basic concepts of thermodynamics, the first and the second law of thermodynamics.

CO2: Understand the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations.

CO3: Learn about Maxwell's relations and use them for solving many problems in Thermodynamics.

CO4: Learn the basic aspects of kinetic theory of gases, Maxwell-Boltzmann distribution law, equipartition of energy, mean free path of molecular collisions transport phenomenon like: viscosity, thermal conductivity, diffusion and Brownian motion.

CO5: Get background for further studies and research in different subject areas namely condensed matter physics, chemistry , material science and life sciences.

MJCPHY03: Thermal Physics &Thermodynamics (T)- 03 Credit		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Kinetic Theory of Gases** Maxwell-Boltzmann Molecular Speed distribution Law for an Ideal Gas. Mean, RMS and Most Probable Speeds. Degrees of Freedom. Law of Equipartition of Energy (no derivation). Molecular Collisions: Mean Free Path. Estimation of Mean Free Path. Transport Phenomenon in Ideal Gases: (1) Viscosity, (2) Thermal Conductivity and (3) Diffusion. Brownian motion, Langevin and Einstein's theories and experimental determination of Avogadro's no., Rectilinear flow of heat in a metal rod, Relation between thermal & electrical conductivities.	15
2	**Real Gases** Behavior of Real Gases. Van der Waal's Equation of State for Real Gases. Values of Critical Constants. Law of Corresponding States. Joule-Thomson Porous Plug Experiment. Joule-Thomson Effect for Real Gases. Joule-Thomson Cooling.	09

3	**Zeroth and First Law of Thermodynamics** Extensive and intensive Thermodynamic Variables, Thermodynamic Equilibrium, Zeroth Law of Thermodynamics and Concept of Temperature, Work, Heat, State Functions and path functions, First Law of Thermodynamics, Internal Energy for ideal and real gases, Applications of First Law of thermodynamics in case of thin film, stretched wire, hydrostatics, and specific Molar Heat Capacity for gases, Relation between C_P and C_V.	09
4	**Second Law of Thermodynamics** Cyclic ,reversible and irreversible process, Carnot engine, Carnot cycle, Second Law of thermodynamics. Principle of heat engine and refrigerator Kelvin-Planck and Clausius Statements. Concept of Entropy, Clausius Inequality, Second Law in terms of Entropy, Temperature–Entropy diagrams. Third Law of thermodynamics, Thermodynamic Potentials: Internal Energy, Enthalpy, Helmholtz & Gibb's Functions, Maxwell's Relations, Co-efficient of performance, Clausius-Clapeyron equation and phase transition (1^{st} and 2^{nd} order)	15
	TOTAL	**48**

MJCPHY03: Thermal Physics &Thermodynamics (P)- 02 Credit	
1.	To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method.
2.	To determine the Coefficient of Thermal Conductivity of good conductor (Cu) by Searle's Apparatus.
3.	To determine the Coefficient of Thermal Conductivity of good conductor (Cu) by Angstrom's Method.
4.	To determine the Coefficient of Thermal Conductivity of a bad conductor by Lee and Charlto's disc method.
5.	To determine the Temperature Coefficient of Resistance by Platinum Resistance Thermometer (PRT).
6.	To study the variation of Thermo-emf of a Thermocouple with difference of Temperature of its two Junctions using a null method.
7.	To determine Mechanical Equivalent of Heat (J) with the help of Joule's calorimeter.
8.	To plot a graph between temperature and pressure at constant volume using Joly's apparatus and to find the coefficient of increase of pressure at constant volume.
9.	To study the adiabatic expansion of a gas and hence to find the value of the ratio of specific heat at constant pressure to specific heat at constant volume for air using Clement and Desorme's apparatus.

Suggested Readings :

1. Thermal Physics - S. Garg, R. Bansal and C. Gosh (Tata McGraw-Hill.)
2. Heat and Thermodynamics - M.W. Zemansky, Richard Dittman (McGraw-Hill.)
3. A Treatise on Heat – Meghnad Saha, and B.N. Srivastava (Indian Press)
4. Classical and Quantum Thermal Physics - R. Prasad (Cambridge University Press)
5. Modern Thermodynamics with Statistical Mechanics - Carl S. Helrich (Springer)
6. Thermodynamics, Kinetic Theory & Statistical Thermodynamics - Sears & Salinger (Narosa)
7. Concepts in Thermal Physics - S.J. Blundell and K.M. Blundell (University Press)

SEMESTER- III

MJCPHY- 04: Electricity & Magnetism

Course Title	Credit	Credit Distribution	
		Theory	Practical
Electricity and Magnetism	4	3	1

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Understand the basic concepts of electrostatics.

CO2: Understand the dielectric and magnetic properties of matter.

CO3: Understand the electromagnetic induction and electric circuits.

CO4: Provides background for further studies and research in different subject areas .

MJCPHY03: Thermal Physics &Thermodynamics (T) - 03 Credit

Unit	Topics to be covered	No. of Lectures
1	**Electrostatics:**Electric Field and potential, Field due to a uniformly charged sphere, Gauss Law and its applications: The Field of a conductor. Electric dipole, Field and potential due to an electric dipole, Dipole approximation for an arbitrary charged distribution, Electric quadruple, Field due to a quadrupole, Electrostatic Energy of a uniformly charged sphere, Poisson and Laplace Equations, applications of Laplace equation.	10
2	**Dielectric Properties of Matter:**Electric field in matter and Electrical susceptibility and Dielectric polarization, Dielectric constant, Polarisation vector, Surface Charge and bound charge, Displacement Vector **D**, Relations between **E**, **P** and **D**.	08
3	**Magnetism:**Magnetic field , Magnetic force and Torque on a current carrying conductor, and loop placed in a magnetic field, Biot – Savart's Law and its simple applications: straight wire and circular loop, Magnetic Dipole, Magnetomotive force and Ampere's Circuital theorem and its applications to calculate magnetic field due to current carrying wire and solenoid and toroid. Gauss's law of magnetism (Integral and Differential Forms). Relative Permeability of a Material. Magnetic Susceptibility. Magnetization Vector (I),or intensity of magnetisation. Magnetic Intensity (H). Relation between B, I and H. Magnetic Energy stored in Matter. Magnetic Circuit. Potential Energy of a Current Loop placed in a magnetic field.Ballistic Galvanometer:. Electromagnetic Damping, Logarithmic Damping, Critical Damping Resistance(CDR)	12

4	**Electromagnetic Induction:** Faraday's and Lenz's Laws. Mutual and Self Induction,self and Mutual inductances of a solenoid and system of current carrying loop, Energy stored in a Magnetic Field, Electric field induced due to time varying Magnetic field, magnetic field induced due to Time varying electric field. Introduction to Maxwell's Equations	05
5	**Electrical Circuits:** AC Circuits: Kirchhoff's laws for AC circuits. Reactance and Complex Impedance. Series and parallel LCR Circuit: Resonance, Quality Factor, and Band Width, Power in AC Circuits	10
	Total	**45**

MJCPHY- 04: Electricity & Magnetism (P) - 02 Credit

1. Use of Multimeter for measuring (a) Resistance, (b) AC and DC Voltages, (c) DC Current, (d) Capacitance, and (e) Checking electrical fuses.
2. To calibrate the ammeter and voltmeter by potentiometer.
3. To find the low resistance by Carey Foster's bridge after calibrating the bridge wire.
4. Measurement of low resistance using Potentiometer.
5. To determine the high resistance by leakage method.
6. Figure of merit of moving coil galvanometer.
7. To determine the angle of dip in the laboratory using an earth inductor.
8. Compare the capacities of capacitors by De Sauty' bridge.
9. To study the characteristics of a series RC Circuit.
10. To verify the Thevenin and Norton theorems.
11. To verify the Superposition, and Maximum power transfer theorems.
12. To determine self inductance of a coil by Anderson□s bridge.
13. To study the response curve of a Series LCR circuit and determine its (a) Resonant frequency, (b) Impedance at resonance, (c) Quality factor Q, and (d) Band width.
14. To study the response curve of a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q.

Suggested Books :

1. Electricity and Magnetism, Basudev Ghosh (Books And Allied (P) Ltd
2. Introduction to Electrodynamics, D.J. Griffiths, 3rd Edn (Benjamin Cummings)
3. Electricity ad Magnetism
4. Fundamentals of Electricity and Magnetism, Arthur F. Kip (McGraw-Hill)
5. Electricity, Magnetism & Electromagnetic Theory, S. Mahajan and Choudhury (Tata McGraw-Hill)
6. Fundamentals of Electricity and Magnetism D.N Vasudev (S. Chand & Co)
7. Electricity and Magnetism- R. Murugeshan (S. Chand)
8. Electricity and Magnetism-K.K. Tiwary (S. Chand)
9. Advanced Practical Physics for students, B. L. Flint and H. T. Worsnop, (Asia Publishing House)
10. A Text Book of Practical Physics, I. Prakash & Ramakrishna, (Kitab Mahal)
11. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, (Heinemann Educational Publishers)
12. Engineering Practical Physics, S. Panigrahi and B.Mallick, Cengage Learning
13. B. Sc. Practical Physics, C. L. Arora, S. Chand and Co.

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SEMESTER – IV

MJCPHY05: Mathematical Physics-II and Introduction to Computational Methods

Course Title	Credit	Credit Distribution	
		Theory	Practical
Mathematical Physics-II and Introduction to Computational Methods	5	3	2

Course Outcomes

After the completion of the course, the student will be able to:

- **CO1:** Master the basic elements of complex mathematical analysis.
- **CO2:** Solve differential equations that are common in physical sciences.
- **CO3:** Apply group theory and integral transforms to solve mathematical problems of interest in Physics.
- **CO4:** Understanding how to use special functions in various physics problems
- **CO5:** Provides background for further studies and research in different subject areas .

MJCPHY05	Mathematical Physics and Introduction to Computational Methods (T) -03 Credit	
Unit	**Topics to be covered**	**No. of Lectures**
1	**Curvilinear Coordinates, Tensors and special functions:** Spherical and Cylindrical Coordinate Systems. Ordinary Integrals of Vectors, Line, surface and volume integrals of Vector fields. Tensors : Elementary properties, Contra variant and covariant tensors, Symmetric and Anti-symmetric tensors. Singular Points of Second Order Linear Differential Equations and their importance , Frobenius method and its applications to differential equations Legendre, Bessel, Hermite and Laguerre Differential Equations.	09
2	**Partial Differential Equations and Complex Analysis :** Solutions to partial differential equations using separation of variables: Laplace's Equation in problems of rectangular, cylindrical and spherical symmetry. Complex Numbers Graphical Representation Euler's formula, De Moivre's theorem, Roots of Complex Numbers. Functions of Complex Variables. Analyticity and Cauchy-Riemann Conditions Cauchy's Inequality. Cauchy's Integral formula. Simply and multiply connected region. Integration of function of a complex variable.	10
3	Introduction : Importance of Computers in Physics , Algorithms and Flow Charts : Algorithm Definition, properties and development. Flowchart: concept of flowchart , symbols , guidelines, types. Sum of two matrices, sum & Products of a finite series , calculations of Sin (x) as a series.	06
4	Scientific Programming : Usage of Linux an Editor, some fundamental Linux commands (Internal & External commands) Development of FORTRAN, Basic elements of FORTRAN : Character set, constants and their types, variables and their types , Keywords , variable Decleration and concept of instruction and program. Operators : Arithmatic, Relational , Logical and Assignment operators. Expressions : Arithmatic Relational, Logical , Character and Assignment Expressions. FORTRAN Statements: I/O statements	06

	(unformatted/formatted), Executable and Non-Executable statements, Layout of FORTRAN program, Format of writing program and concept of coding.	
5	Control statements : Types of Logic (sequential, selection, Repetition), Branching statements (Logical IF, Arithmatic IF, Block IF , Nested Block IF, SELEC CASE and ELSE IF Ladder Statements), Looping statements (DO-CONTINUE, DO-ENDDO, DO-WHILE, Implied and Nested DO Loops), Jumping statements (Unconditional GO TO , computed GO TO, Assigned GO TO), Subscripted variables, Functions and Subroutines (Arithmetic statements, Function, Function subprogram and subroutine), Examples from physics Problems.	09
	Total	**40**

MJCPHY05	**Mathematical Physics and Introduction to Computational Methods (P) -02 Credit**
1.	Errors & error Analysis: Truncation & rounding of errors, absolute & relative errors.
2.	Differential equations: Solutions of ordinary differential equation, solution of first order differential equation, solution of quadratic equation.
3.	Computer Architecture and Organization, Memory and Input/Output devices.
4.	Basics of Scientific computing : Binary and decimal arithmetic, Floating point numbers, Algorithms, Single & Double precision arithmetic, underflow & overflow.
5.	**Programs :** Sum & average of a list of numbers, Largest of a given list of numbers and its location in the list, Sorting of numbers in ascending descending order, Familiarity with DOS commands, Linux Commands and FORTRAN commands.

Suggested Readings :

1. An Introduction to Computational Physics : T. Pang (Cambridge University Press)
2. Elementary Numerical Analysis : K.E Atkinson (Wiley India Edition)
3. Numerical Recipes in C : The Art of Scientific Computing, W.H. Pressetal (Cambridge University)
4. Introduction to Numerical Analysis : S. S Sastry
5. Mathematical Methods for Physicists : Arfken, Weber (Pub. Elsevier)
6. Mathematics for Physicists : Susan M. Lea (Pub. Thomson Books)

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Semester IV

MJCPHY06: Electrodynamics and Electromagnetism

Course Title	Credit	Credit Distribution	
		Theory	Practical
Electrodynamics and Electromagnetism	5	5	0

Course Outcomes

After completing the course, the students will be able to:

CO1: Establish and analyse four Maxwell's equations of electromagnetism.

CO2: Uunderstand the propagation of electromagnetic waves in vacuum, dielectrics, conductors and also in guided media and the phenomenon of reflection and refraction of plane waves at different boundaries.

CO3: Understand the importance of energy flow (Poynting Theorem) and its usefulness.

CO4: Get background for further studies and research in different subject areas.

MJCPHY06	**Electrodynamics and Electromagnetism (T) - 05 Credit**	
Unit	**Topics to be covered**	**No. of Lectures**
1	**Maxwell's Equations:**Equation of continuity, Displacement Current Maxwell's equations in differential and Integral forms; Vector and scalar potentials, Poynting theorem and Poynting vector, energy conservation (qualitative idea of momentum conservation). Electromagnetic (EM) Energy Density. Physical Concept of Electromagnetic Field Energy Density, Momentum Density, Description of Lorentz force.	10
2	**Electromagnetic Wave Propagation in unbounded media:** Propagation of plane EM waves in free space and dielectrics ,Transverse nature of plane EM waves, refractive index and dielectric constant, wave impedance. Propagation of EM wave through conducting media, relaxation time, skin depth.	14
3	**EM Wave Propagation in Bounded Media:** Boundary conditions at a plane interface between two media. Reflection and Refraction of plane waves at plane interface between two dielectric media — Laws of Reflection and Refraction. Fresnel's Formulae for perpendicular & parallel polarization cases, Brewster's law. Reflection & Transmission coefficients. Total internal reflection. Metallic reflection (normal Incidence).	14
4	**Polarization of Electromagnetic Waves:** Description of Linear, Circular and Elliptical Polarization. Uniaxial and Biaxial Crystals. Light Propagation in Uniaxial Crystal. Double Refraction. Polarization by Double Refraction.	10

5	**Transmission Line:** Propagation of e.m. wave through transmission line, reflection coefficient, standing wave, characteristic impedance, propagation constant. **Wave Guides:** Fundamentals of wave guides, Condition of continuity at the interface. Expressions for field components, TE and TM modes. Propagation properties, cutoff frequency,. Field energy and Power transmission. **Optical Fibres:** Numerical Aperture. Step and Graded Indices (Definitions Only). Single and Multiple Mode Fibres (Concept and Definition Only).	12
	Total	**60**

Suggested Books:

1. Introduction to Electrodynamics, D.J. Griffiths, Benjamin Cummings. ,
2. Electromagnetic Field Theory for Engineers & Physicists, G. Lehner,Springer
3. Electromagnetic Fields & Waves, P. Lorrain & D. Corson, W.H. Freeman& Co.
4. Electromagnetics, J. A. Edminster, Schaum Series, Tata McGraw Hill.
5. Electromagnetic field theory fundamentals, B. Guru and H. Hiziroglu, Cambridge University Press.
6. Electrodynamics and Plasma Physics S.L.Kakan ,C. Herajan, CBS publisher
7. Electrodynamics :K.K Chopra &G.C Aggrawal
8. Classical Electrodynamics J D Jakson Wiley

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Semester IV

MJCPHY07: Optics

Course Title	Credit	Credit Distribution	
		Theory	Practical
Optics	5	3	2

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Understand Interference as superposition of waves from coherent sources derived from same parent source.
CO2: Demonstrate basic concepts of Diffraction: Superposition of wavelets diffracted from aperture.
CO3: Understand Fraunhoffer and Fresnel Diffraction.
CO4: Gain experience of using various optical instruments and making finer measurements of wavelength of light using Newton's Rings experiment, Fresnel Biprism, etc.
CO5: Get background for further studies and research in different subject areas.

MJCPHY 7	Optics (T) - 3 credit	
Unit	**Topics to be covered**	**No. of Lectures**
1	**Interference:** Light as EM Wave(Historical Perspective),Superposition of waves, Conditions for interference, Interference by Division of Wavefront (Fresnel's Biprism, Lloyd's single mirror) and by Division of Amplitude (Interference by Film), Newton's Ring, Complex Representation for Intensity calculation, Stoke's treatment.	12
2	**Interferometer:** Michelson interferometer and its applications, Multiple beam interference in parallel film, Fabry-Perot interferometer, Coherence – Spatial and Temporal.	08
3	**Fraunhofer Diffraction:** Conditions for diffraction, Fraunhofer diffraction due to single, double and multiple slits, Plane transmission grating. **Fresnel diffraction:** Fresnel half- period zones, Zone plate, Huygen's-Fresnel principle, Diffraction by a circular aperture, Diffraction by a straight edge,Rayleigh's criterion for limit of resolution, Resolving power of Grating, Telescope and Microscope.	12
4	**Polarization and Double Refraction:** Polarized light and its mathematical representation, Production of polarized light by reflection, refraction and scattering, Polarization by double refraction, Nicol prism, Quarter wave plate, Half wave plate, Babinet's compensator, Production and analysis of circularly and elliptically polarized light, Optical activity and Fresnel's theory, Bi-quartz polarimeter. Elementary ideas of LASERs,Einstein's A & B coefficients, Population Inversion and Holography.	13
	TOTAL	**45**

MJCPHY 7	Optics (P) - 02 Credit
1.	To determine Magnifying Power of a telescope by the Slit method/ Linear Scale using Microscope.
2.	To find the height of an inaccessible object (altitude or angular diameter of the Sun) using Sextant.
3.	To find angle of prism/ angle of minimum deviation and hence refractive index of material of prism using Spectrometer.
4.	To find value of Cauchy's Constant A and B for the material of a given prism using a Mercury Vapour Lamp.
5.	To determine Resolving Power of a prism.
6.	To determine diameter of a thin wire by studying the diffraction (and interference) pattern.
7.	To determine wavelength of sodium light using a plane diffraction grating.
8.	To determine Resolving Power of a plane transmission grating.
9.	To establish the dispersion relation for a plane transmission grating.
10.	To verify Fresnel's Law of reflection and refraction by using a plane refracting surface.
11.	Simple experiment demonstrating different applications of LASER and Optical Fibre.
12.	Determination of wavelength of light using biprism on optical bench.
13.	To determine the wavelength of the monochromatic light by Newton's Ring
14.	To determine the specific rotation of the cane sugar solution using bi-quartz polarimeter.

Suggested Readings :

1. Practical Physics : Geeta Sanon (S.Chand & Company); Harnam Singh & P.S. Hemne (R.Chand & Co.)
2. A Text Book of Practical Physics: Indu Prakash, Ramakrishna&A.K.Jha, Kitab Mahal
3. Advanced level Physics Practicals: Michael Nelson and Jon M. Ogborn, Heinemann Educational Publishers
4. A Laboratory Manual of Physics for undergraduate classes: D.P.Khandelwal, Vani Pub.
5. Practical Physics: G.L. Squires, Cambridge University Press.
6. A Laboratory Manual of Physics – D.P.Khandewal.
7. Optics- Eugene Hecht (Pearson).
8. Optics(Classical & Quantum)-Dr. R.K.Kar(Books & Allied).
9. Optics: Ajoy Ghatak, McGraw-Hill Education, New Delhi
10. Fundamental of Optics: Jenkins & White (Mc Graw Hill)
11. Fundamental of optics: B. K. Mathur,
12. Optics: Francis Weston Sears Addison-Wesley Publishing Company

SEMESTER – V

MJCPHY08: Elements of Modern Physics

Course Title	Credit	Credit Distribution	
		Theory	Practical
Elements of Modern Physics	5	5	0

Course Outcomes

After the completion of the course, the student will be able :

CO1: To understand the inadequacy of classical Mechanics.

CO2: To understand the historical development of Quantum Concepts.

CO3: To understand the behaviour of mother nature at microscopic level.

CO4: To prepare background for interdisciplinary research in condensed matter / Material Science/atomic Physics/Life Science etc.

CO5: To enhance employability skills as scientific officers at different research orientated centres

CO6: To promote application of nuclear energy in various areas

CO7: To Get background for further studies and research in different subject areas.

MJCPHY08	Elements of Modern Physics (T) - 6 Credit	
Unit	**Topics to be covered**	**No. of Lectures**
1	**Particle Properties of Radiations** Black Body Radiation and Planck's quantum Hypothesis, Discovery and Explanation of Photoelectric effect, Compton Scattering, Pair Production and Annihilation. **Wave Aspect of Particles** Idea De Broglie wavelength and matter waves, Davisson-Germer experiment for diffraction of electron, G.P. Thomson Experiment ,Phase velocity, wave packets and Concept of Velocity .	10
2	**Wave-Particle Duality** Concept of Wave-particle duality, Heisenberg Uncertainty Principle, Uncertainty relations involving canonical pair of variables and their Derivation from Wave Packets, Estimation of minimum energy for a confined particle using uncertainty principle, origin of natural width of emission lines, Uncertainty Principle and concept of Bohr Orbit.	10

3	**Atomic Structure** Introduction of Sommerfeld Quantization rule, Bohr -Sommerfield atomic theory ,Explanation of Hydrogen and Hydrogen-like Spectra, Comparison between H and He+ Spectra, Corrections for finite nuclear mass and corresponding variations in Rydberg Constant, Relativistic correction .	10
4	**Wave Mechanical Description of electron particles,** The Schrodinger Wave equation, properties ,concept of normalization of Wave function , Expectation value, Schrodinger equation for non-relativistic particles, Concept of operators in quantum mechanics. Time independent Schrodinger equation, Probability, probability current densities, Idea of energy eigenvalues and eigenfunctions	10
5	**Fundamental Properties of Nucleus** Size, constituent and structure of atomic nuclei, Idea of Isotope, Isobar, Isotope and Mirror nuclei , Mass defect, Packing fraction, Binding energy, Binding Energy per nucleon versus Mass number Curve. Stability of the nucleus and Nature of Nuclear force , Law of radioactive decay, Mean life and Half-life, successive radioactive disintegration, Basic Idea of Alpha , Beta and Gamma decay, Idea of energy-momentum and parity conservation in nuclear decay process, Q-value in nuclear reaction. Radiation Detector, Ionization Chamber, Geiger-Muller Counter, Neutron detection, Spark chamber, Bubble, Cloud and Scintillation, Cherenkov radiation.	20
	TOTAL	**60**

Suggested Readings :

1. Concepts of Modern Physics, Arthur Beiser, McGraw-Hill.
2. Introduction to Modern Physics – H.S. Mani & G.K Mehta (PHI)
3. Elements of Nuclear Physics - M L Prasad, RPS (Kedarnath Ramnath)
4. Q. Mechanics – H.C Verma (Surya Pub.)
5. Atomic & Nuclear Physics - K. Gopala Krishnan (Mac Million India Ltd.)
6. Modern Physics - S.K Gupt & B.S. Agarwal (Kedarnath Ramnath)
7. Introduction to Modern Physics – F.K Richtmyer, E.H Kennad , T. Lauritsen (Mac Grow)

SEMESTER – V

MJCPHY09: Basic Electronics

Course Title	Credit	Credit Distribution	
		Theory	Practical
Basic Electronics	5	3	2

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Understand fundamental designing concepts of different types of Logic Gates, Minimization techniques etc.

CO2: Design of different types of the Digital circuits, and to give the computational details for Digital Circuits.

CO3: Draw characteristics of devices like PNP and NPN junction diode and truth tables of different logic gates.

CO4: Understand basic elements and measurement of their values with multimeter and their characteristic study.

CO5: Get background for further studies and research in different subject areas.

MJCPHY 9	Basic Electronics (T) - 3 Credit	
Unit	**Topics to be covered**	**No. of Lectures**
1	**Digital Circuits:** Diffrence between Analog & Digital Circuits .BinaryNumbers.Decimal to Binary & vice-versa. AND,OR and NOT Gates(Realisation using Diodes & Transistors) NAND and NOR Gates as Universal gates.XOR and XNOR Gates.	04
2	**Basic Circuit Operations:** De Morgan's Theorem .Boolean Laws .Simplification of Logic Circuit using Boolean Algebra.Fundamental Products. Minterms and Maxterms. Conversion of a Truth Table into an Equivalent Logic Circuit by (1) Sum of Products Method and (2) Karnaugh Map (For Advanced Learners) **Combinational circuits:** Basic idea of Binary Addition. Binary Subtraction using 2's Complement. Half and Full Adders. Half & Full Subtractors.	08
3	**Semiconductor Devices :** P-andN-type semiconductors. Energy Level Diagram. Barrier Formation in PN Junction Diode. Qualitative Idea of Current Flow Mechanism in Forward and Reverse Biased Diode.P-N junction & its characteristics.Static and Dynamic Resistance.Principle and structure of (1) LEDs (2) Photodiode (3) Zener Diode (4) Solar .Cell. **Electronic Devices and their Applications:** (1) Rectifier Diode: Half-wave Rectifiers. Full-wave Rectifiers (Centre-tapped and Bridge), Calculation of Ripple Factor and Rectification Efficiency. (2) Voltage	14

	Regulation using Zener Diode. **Bipolar Junction transistors**:n-p-n and p-n-p Transistors, Characteristics of CB, CE and CC Configurations. Current gains α and β parameters, Relations between α and β parameters. Load Line analysis of Transistors. DC Load line and Q-point. Physical Mechanism of Current Flow: Active, Cutoff and Saturation Regions. **Amplifiers:** Transistor Biasing circuits and Stability. Fixed Bias and Voltage Divider Bias circuit for CE Amplifier. (h-parameter Equivalent Circuit). Analysis of a single-stage CE amplifier using Hybrid Model. Input and Output Impedance. Current, Voltage and Power Gains. Class A, B & C Amplifiers (For Advanced Learners).	
4	**Operational Amplifiers (Black Box approach):** Characteristics of an Ideal and Practical Op-Amp (IC 741), Open – loop Gain . CMRR, Concept of virtual ground. Applications of Op-Amp:(1) Inverting and Non-Inverting Amplifiers (2) Adder (3) Subtractor (4) Differentiator (5) Integrator . Feedback and Oscillation: Effects of Positive and Negative Feedback on Gain and Stability, Distortion and Noise. Sinusoidal Oscillators: Barkhausen's Criterion for self-sustained oscillations. RC andWien Bridge oscillator.	08
5	**Instrumentations:** Introduction to CRO:Block Diagram and Applications of CRO: (1) Study of Waveform (2) Measurement of Voltage ,Current ,Frequency and Phase Difference. **Power Supply:** Half Wave Rectifiers ,Centre-tapped and Full wave Rectifiers ,Calculation of Ripple Factor and Rectification Efficiency ,Basic Idea about capacitor filter , Zener Doide and Voltage Regulation. **Timer IC:** IC 555 Pin diagram and its applications as Astable and Monostable Multivibrators.	11
	TOTAL	**45**

MJCPHY09	**Basic Electronics (P) - 2 Credit**
1.	To measure (a) Voltageand (b) Time period of a periodic waveform using CRO.
2.	To test a Diode and Transistor using a Multimeter.
3.	To design a switch (NOT gate) using a transistor.
4.	To verify and design AND, OR, NOT and XOR gates using NAND gates.
5.	Half Adder ,Half Subtractor and 4-bit Binary Adder
6.	To study V-I characteristics of P-N junction ,Zener and Light emitting diode.
7.	To study the characteristics of a Bipolar Junction Transistor in CE configuration.
8.	To study the frequency response of voltage gain of a RC-coupled transistor amplifier.
9.	To design Inverting amplifier using Op-amp (741) and study its frequency response.
10.	To design an Astable Multivibrator using IC 555 Timer .
11.	To design a precision a Differentiator using an Op-Amp 741.

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Suggested Readings :

1. Electronic Principles & Applications: A.P.Malvino ,D.P.Leach and Saha(McGraw Hill).
2. Modern Digital Electronics- R.P.Jain ,Tata McGraw Hill,4th Edition.
3. Principles of Electronics:-V.K.Mehta& Rohit Mehta(s.Chand& Comp).
4. Basic Electronics Devices :-D.P.Kothari& I J Nagrath(McGraw Hill Educ).
5. Hand Book of Electronics-Gupta & Kumar.
6. Foundation of Electronics - Chattopadhyay; Rakshit;Saha;Purikait(Wily).

Semester – VI

MJCPHY10: Analytical Mechanics & Special Theory of Relativity

Course Title	Credit	Credit Distribution	
		Theory	Practical
Analytical Mechanics & Special Theory of Relativity	4	4	0

Course Outcomes

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

CO1: Understand Physical Principle behind derivation of Lagrange and Hamiltonion Equation.

CO2: Understand Canonical Transformation

CO3: Analysis the Centre of mass and Laboratory frames of reference and their use in explaining elastic and inelastic collisions

CO4: Understand the Planetary motions and motions of satellites using the principles of gravitation and Kepler's laws. Getting an idea of postulates of special theory of relativity and their implications.

CO5: Get background for further studies and research in different subject areas.

MJCPHY10:	Analytical Mechanics & Special Theory of Relativity (T) - 4 Credit	
Unit	**Topics to be covered**	**No. of Lectures**
1	**Constrainsts** : Holonomic, Non Holonomic, Scleronomous, Rheonomous, D'Alembert's Principle, Virtual Displacement, Principle of virtual work, concept of generalized co-ordinates, Derivation of Lagrange's equation from D'Alembert's Principle , simple applications of Lagrange's equations. **Variational Principle and Hamiltonian formalism:** Calculus of variation and its applications, Hamilton's Principle, Derivation of Lagrange's equations of motion from Hamilton's Principle, Velocity-dependent potential, Cyclic coordinates, Symmetries and conservation laws, Legendre transformation, Hamilton's equations of motion and its applications, Principle of least action.	15

2	**Canonical Transformation:** Canonical transformation and its applications, Poisson Brackets, Jacobi identity, Hamilton-Jacobi equation, Action-angle variables, Theory of small oscillations.	10
3	**Motion of a Rigid body :** Euler's Angle, Kinematics of rotation, Euler's equation of Motion, Twisting Torque on a Elastic Cylinder.	08
4	**Special Theory of Relativity:** Michelson-Morley Experiment and its outcome. Postulates of Special Theory of Relativity. Lorentz Transformations. Lorentz contraction. Time dilation. Relativistic addition of velocities. Variation of mass with velocity. Mass less Particles. Mass-energy Equivalence Four vectors.	15
	TOTAL	**48**

Suggested Books :

1. An introduction to mechanics - Kleppner D., Kolenkow R. J. (McGraw-Hill)
2. Mechanics, Berkeley Physics, vol.1 - Kittel C., Knight W., et.al. (Tata Mc Graw - Hill)
3. Physics - Resnick, Halliday and Walker ,Wiley (8/e)
4. Cengage Learning - Fowles G. R. and Cassiday G.L...
5. Sands M.Feynman Lectures,Vol. I- FeynmanR. P., Leighton R. B. (Pearson Education)
6. Mechanics - Mathur D. S. , S.Chand (Company Limited)
7. Special Relativity - B.C. Rai
8. University Physics - Sears F. W, Zemansky M. W., Young H.D... 13/e (Addison Wesley)
9. Physics for scientists and Engineers with Modern Phys. - JewettJ. W., Serway R. A. (Cengage Learning)
10. Theoretical Mechanics - Spiegel M.R. (Tata McGraw Hill)
11. Special Theory of Relativity - S. Chand.
12. Relativity - Gupta & Kumar (Pragati Prakashan)

SEMESTER-VI

MJCPHY11: Statistical Mechanics

Course Title	Credit	Credit Distribution	
		Theory	Practical
Statistical Mechanics	5	5	0

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Basic knowledge of thermodynamic systems.

CO2: Understand the basic idea about statistical distributions.

CO3: Impart the knowledge about the phase transitions and potentials.

CO4: Understand the applications of statistical laws

CO5: Get background for further studies and research in different subject

MJCPHY11:	Statistical Mechanics (T) - 5 Credit	
Unit	**Topics to be covered**	**No. of Lectures**
1	**Classical Statistics** Macrostate and Microstate, Phase Space, Elementary Concept of Ensemble, Entropy and Thermodynamic Probability. Maxwell-Boltzmann Distribution Law, Partition Function, Thermodynamic Functions of an Ideal Gas, Classical Entropy Expression, Gibbs Paradox, Sackur-Tetrode equation, Law of Equipartition of energy, its applications to Specific Heat and its Limitations.	15
2	**Classical Theory of Radiation** Black Body Radiation, Kirchhoff's law, Stefan-Boltzmann law(Thermodynamic proof), Radiation Pressure. Wien's Displacement Law. Wien's Distribution Law. Saha's Ionization Formula. Rayleigh-Jean's Law. Ultraviolet Catastrophe.	10
3	**Quantum Theory of Radiation** Spectral Distribution of Black Body Radiation. Planck's Quantum Postulates. Planck's Law of Blackbody Radiation: Experimental verification. Deduction of (1) Wien's Distribution Law (2) Rayleigh-Jeans Law, (3)Stefan-Boltzmann Law, (4) Wien's Displacement Law from Planck's Law.	10
4	**Bose-Einstein Statistics** Bose-Einstein distribution law, Thermodynamic functions of a strongly Degenerate Bose Gas, Bose Einstein condensation, Properties of liquid He (qualitative description), Radiation as a photon gas and Thermodynamic functions of photon gas. Bose derivation of Planck's law.	10

5	**Fermi-Dirac Statistics** Fermi-Dirac Distribution Law, Thermodynamic functions of a Completely and strongly Degenerate Fermi Gas, Fermi Energy, Electron gas in a Metal, Specific Heat of Metals, Relativistic Fermi gas, Chandrasekhar Mass Limit.	15
	TOTAL	**60**

Suggested Readings:

1. Statistical Mechanics, R.K. Patharia, Butterworth Heinemann: Oxford University Press.
2. Statistical Physics, Berkeley Physics Course, F. Reif, Tata McGraw-Hill.
3. An Introduction to Statistical Mechanics & Thermodynamics, R. H. Swendsen, Oxford Univ. Press.
4. Kersan Huang, Wiley India Pvt. Ltd.
5. Statistical Mechanics, Agrawal & Eisner, Wiley Ind. Pub.
6. Modern Thermodynamics with Statistical Mechanics, Carl S. Helrich, (Springer).

SEMESTER-VI

MJCPHY12: Quantum Mechanics & its Application

Course Title	Credit	Credit Distribution	
		Theory	Practical
Quantum Mechanics & its Application	5	3	2

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Learn to represent quantum states by ket vectors, physical observables as operators and their time evolution.

CO2: Understand commutator brackets between observables and their properties.

CO3: Learn concept of system of identical non- interacting particles: dynamics of two level systems, qubits.

CO4: Get background for further studies and research in different subject

MJCPHY12: Quantum Mechanics & its Application (T) - 3 Credit		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Wave-Particle duality** Need of quantum mechanics, de Broglie's theory of matter wave, concept of Wave Packet, Fourier transform and momentum -space wave function. Postulates of quantum mechanics,Explanation of Heisenberg's Uncertainty relation	05
2	**Time Independent Schrodinger Wave Equation** Derivation of Time independent Schrodinger wave equation, Physical intrepation of wave function. Application of Time independent Schrodinger wave equation in case of Hydrogen atom, Linear harmonic oscillator.PotentialWell,Potential Barrier	10
3	**Formalism of Quantum Mechanics** Hilbert Space and Concept of Ket and Bra notations, Representation of position operator in momentum space. Representation of momentum -operator in position space,Representation of eigen-state vector in momentum space and position space.	10
4	**Time Dependent Schrodinger Wave Equation** Dynamical evolution of a quantum state, Properties of time-development operator, Derivation of dynamical equation for an operator of a quantum system and its Consequences. Comparative Study of Schrodinger picture, Heisenberg picture and interaction picture.	10

5	**Angular Momentum Operator** Orbital Angular momentum operator and its Commutation relation, Spin angular momentum operator and Pauli's spin matrices. Commutation relation of Pauli's spin matrices, ladder operator for total angular momentum operator and its Commutation relation, Spin-Orbit Coupling in atoms(L-S and J-J coupling),Bohr Magneton	10
	TOTAL	**45**

MJCPHY09:	**Quantum Mechanics & its Application (P) - 2 Credit**
1. Solve the Schrodinger equation for the ground state & the 1st excited state of Hydrogen atom. 2. Solve the Radial equation for an atom. 3. Estimate the Energy values of Linear harmonic oscillator with the given data. 4. Estimate the Energy values in Potential Well having defined with & depth. 5. Estimate the allowed Energy values of given Potential Barrier.	

Suggested Readings :

1. Quantum Mechanics, Eugen Merzbacher, John Wiley and Sons, Inc.
2. Quantum Mechanics, G. P. Singh, (Pub: Bharti Bhavan)
3. Quantum Physics, H. C. Verma, (Pub: Surya Publication)
4. Introduction to Quantum Mechanics, David J. Griffith, Pearson Education
5. Quantum Mechanics, Walter Greiner, Springer
6. Quantum Mechanics, Bruce Cameron Reed, Jones and Bartlett Learning.
7. A Text book of Quantum Mechanics, P. M. Mathews and K.Venkatesan, McGraw Hill.
8. Quantum Mechanics, Leonard I. Schifi, Tata McGraw Hill.
9. Principle of Quantum Mechanics, Ishwar Singh Tyagi, Pearson Publication.

SEMESTER – VII

MJCPHY13: Physics of Atoms and Nuclei

Course Title	Credit	Credit Distribution	
		Theory	Practical
Physics of Atoms and Nuclei	5	3	2

Course Outcomes

After the completion of the course, the student will be able to understand:

CO1: To understand the idea of spectra of one and two valence electron atoms.

CO2: To understand the effect of external fields on spectral lines

CO3: To understand the concept of vector atom model.

CO4 To understand the structure of nucleus

CO5: To promote interdisciplinary research in spectroscopy and element analysis

CO6: Get background for further studies and research in different subject

MJCPHY13: Physics of Atoms and Nuclei (T) - 3 Credit		
Unit	**Topics to be covered**	**No. of Lectures**
1	**H-spectra** Fine structure of hydrogen spectra (H_α-line), Wilson-Sommerfeld quantization rule, Problems related to Bohr theory, Bohr-Sommerfeld theory and Ionization Potentials, Bohr-Sommerfeld (B-S) theoretical explanation of fine structure H-spectra, shortcomings of B-S theory, Stern-Gerlach Experiment to demonstrate the existence of electron spin, Difference between spectra of inner core electron (X-ray spectra) and optically active valence electron (UV-Visible and I.R. Spectra).	10
2	**Quantum mechanics of H-atom** Physical interpretation and properties of wave-function, Quantum mechanical treatment of one-electron atomic system (Hydrogen atom).Solution of Schrodinger equation for Hydrogen atom using separation of variables, Associated Legendre Polynomial,Hypergeometric series, Recurrence Formula, Spherical Harmonics,Interpretation of quantum numbers and electron-probability density, Expectation value and parity of eigenfunctions.	10

3	**Concept of Vector Atom model** Orbital magnetic dipole moment, Behaviour of magnetic dipole in external magnetic field, Larmor Precession, Space quantization, coupling of orbital and spin angular momentum, Spectroscopic term and their notations. Lamb Shift, Pauli's Exclusion Principle and wave function for identical particle system, Zeeman effect and Paschen Back effect for one electron system	08
4	**Spectra of 1 and 2 electron system (Alkali and Alkaline Earth Element)** Feature and explanation of Spectra of Alkali elements, Resonance lines and fine structure in Alkali spectra, Intensity ratio of Na- doublet lines, Interaction energy for L-S and J-J coupling for Alkaline Earth elements.	10
5	**Nuclear Models** Essence of Liquid drop model, Salient Features and Predictions of Shell model, Brief idea of Collective Model, Alpha particle model and Fermi gas model, Nuclear reaction and its types, Artificial Transmutation, Experimental determination of Q-value, Deuteron problem and its wavefunction, Central force and Non-Central force, Yukawa's model and π-meson.	10
	TOTAL	48

MJCPHY13: Physics of Atoms and Nuclei (P) - 2 Credit
1. To determine e/m by Millikan's oil drop method.
2. To draw the plateau curve for a GM count.
3. To study Zeeman Effect
4. To study specture of simple atoms.
5. To study H-line
6. To study Arc-Spectrum and its simulation Experiments.

Suggested Readings :

1. Physics of atoms and Molecule – Bransden & Jochain (Pearson)
2. Atomic and molecular Physics: Raj kumar (Kedarnath & Ram Nath)
3. Concepts of Nuclear Physics by B L Cohen, Tata McGraw Hill Publication
4. Physics and Engineering of Radiation Detection by S N Ahmed, Academic Press Elsevier,
5. Nuclear Physics: Roy & Nigam (Wiley Easter Ltd.) - John Lilley (Willy Indian.)

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SEMESTER – VIII

MJCPHY14: **Research Methodology**

Course Title	Credit
Research Methodology	5

The Paper will be common for all students of faculty of Science. There is a common Syllabus for MJC – 14, already done.

SEMESTER – VII

MJCPHY 15: Solid State Physics

Course Title	Credit	Credit Distribution	
		Theory	Practical
Solid State Physics	6	4	2

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Elucidate the concept of lattice, crystals and symmetry operations.

CO2: Understand the elementary lattice dynamics and its influence on the properties of materials.

CO3: Describe the main features of the physics of electrons in solids: origin of energy bands, and their influence electronic behavior.

CO4: Explain the origin of the dielectric properties exhibited by solids and the concept of polarizability.

CO5: Get background for further studies and research in different subject

MJCPHY15:	Solid State Physics (T) - 4 Credit	
Unit	**Topics to be covered**	**No. of Lectures**
1	**Crystal Structure:** Solids: Amorphous and Crystalline Materials, Lattice and Basis, Bravais Lattices. Lattice Translation Vectors, Types of Bravais Lattices, Unit Cell. Miller Indices. Reciprocal Lattice, Brillouin Zones, Diffraction of X-rays by Crystals. Bragg's Law.	12
2	**A. Crystal Bonding:** Elementary idea of Bonding in Solids, Cohesive Energy of Ionic Crystals, Lennard Jones Potential. **B. Elementary Lattice Dynamics:** Lattice Vibrations and Phonons: Linear Monoatomic and Diatomic Chains, Acoustical and Optical Phonons, Dulong and Petit's Law, Einstein theory Debye theory of specific heat of solids, T^3— law.	12
3	**A. Free Electron Theory:** Theory of free electron gas, Fermi surface, Fermi Energy, Density of States. **B. Elementary Band Theory:** Bloch Theorem, Kronig-Penny Model, Band Gap, Conductor, Semiconductor (P and N type) and insulator. Conductivity of Semiconductor, Measurement of conductivity (Four Probe Method), Mobility, Hall Effect & Hall coefficient.	12
4	**A. Magnetic Properties of Matter:** Origin of magnetism, Langevin's theory of Diamagnetism and Paramagnetism. Ferromagnetism and Antiferromagnetism. Curie-Weiss law, Ferromagnetic Domains.	12

	B. Superconductivity: Critical Temperature. Critical Magnetic Field, Meissner effect. Type Iand Type II Superconductors, London's Equation and Penetration Depth. Isotope effect, Idea of BCS theory(Basic Concept). **C. Dielectric Properties of Materials:** Polarization. Local Electric Field at an Atom, Depolarization Field, Electric Susceptibility, Polarizability, Clausius-Mossotti Equation.	
	TOTAL	**48**

MJCPHY15:	**Solid State Physics (P) - 2 Credit**
Practical	
1.	Measurement of susceptibility of paramagnetic solution (Quinck's Tube Method)
2.	To measure the Magnetic susceptibility of Solids.
3.	To determine the Coupling Coefficient of a Piezoelectric crystal.
4.	To measure the Dielectric Constant of a dielectric Materials with frequency
5.	To determine the complex dielectric constant and plasma frequency of metal using Surface Plasmon resonance (SPR).
6.	To determine the refractive index of a dielectric layer using SPR.
7.	To study the PE Hysteresis loop of a Ferroelectric Crystal.
8.	To draw the BH curve of Fe using Solenoid & determine energy loss from Hysteresis.
9.	To measure the resistivity of a semiconductor (Ge) with temperature by four-probe method (room temperature to 150°C) and to determine its band gap.
10.	To determine the Hall coefficient of a semiconductor sample.

Suggested Readings :

1. Introduction to Solid State Physics, Charles Kittel, Wiley India Pvt. Ltd.
2. Elements of Solid State Physics, J.P. Srivastava, Prentice-Hall of India.
3. Introduction to Solids, Leonid V. Azaroff, Tata Me-Graw Hill.
4. Solid-state Physics, H. Ibach and H. Luth, Springer.
5. Solid State Physics – R. L. Singhal, P.A. Alvi, (KedarNath, RamNath), M.A. wahab (Nurosa), S.O Pillai (New Age Pub.
6. www.youtube.com/distinctphysics - Lecture videos.

SEMESTER – VIII

MJCPHY16: Physics of Laser and Molecules

Course Title	Credit	Credit Distribution	
		Theory	Practical
Physics of Laser and Molecules	4	3	1

Course Outcomes

After the completion of the course, the student will be able to:

CO1: To understand the working of LASER- Sources.
CO2: To understand the applications of different types of LASER in day to day life.

CO3: To understand the concept of formation of Molecule
CO4: To understand the mechanism of spin Resonance Spectroscopy
CO5: To learn the working of Opto-electronic and Photonic devices

CO6: To enhance the employability in the field of optics
CO7: To explore research in the area of photonics
CO8: Get background for further studies and research in different subject

MJCPHY16: Physics of Laser and Molecules (T) - 3 Credit		
Unit	**Topics to be covered**	**No. of Lectures**
1	Basic Theory of LASER: Energy levels and process of Absorption and Emission Einstein's Predication, Difference between spontaneous and stimulated emission Important features of stimulated emission Einstein's A and B Co-efficient,Light Amplification condition for enhanced stimulated emission, population inversion and pumping method and schemes (two level, three level and four level): Amplifier and Optical Resonator with threshold condition for Lasing.	12
2	Application of LASER in Holography,Concept of Temporal and Spatial Coherence, Principle method of generating and observing hologram, types of holograms. Application in consumer electronic industry (Barcode reader and its elements), in communication-basic principle and element of optical fiber communication. Numerical aperture of fiber optics cables. In medical science, LASER diagnostics, LASER in ophthalmology and LASIK, LASER-surgery and LASER in Dermatology.	14
3	Concept of molecule, Basic idea of molecular bonding-Ionic Non-Rigid rotator and covalent formation of molecules, Morse potential energy curve, Molecule as oscillator, Concept of dissociation, wave function of H_2^+ Valence bond, Linear Combination of Atomic Orbitals (L.C.A.O.) concept.	10

4	Hamiltonian of molecule theory, Separation of electronic and nuclear motion (Born-oppenheimer approximation), Types of molecular energy states-vibrational, rotational and electronic, Types of molecular spectra-UV, IR, Raman; flame spectroscopy and flame photometry, X-Ray and Mossbauer spectroscopy.	12
5	Different Molecular spectroscopic techniques as a Tool- atomic absorption spectroscopy, Emission spectroscopy, Molecular Luminescence, Photo and Opto-acoustic spectroscopy (PAS/OAS), Nuclear Magnetic Resonance (NMR), Nuclear Quadrupole Resonance (NQR), Electron Spin Resonance (ESR) and Electron diffraction spectroscopy.	12
	TOTAL	**60**

MJCPHY16: Physics of Laser and Molecules (P) - 1 Credit	
1.	To verify Beer-Lambert law
2.	To detect impurity in given sample using spectrophotometer
3.	To determine speed light in air in Lab
4.	To calculate / evaluate the Numerical aperture of given fiber
5.	To use basic Transmission network using Demonstration Kit.
6.	To study Characteristics of LASER .
7.	To study UV/IR- Spectrum of given sample.

Suggested Readings :

1. Quantum Chemistry- R.K.Prasad (New Age International (P) Ltd.)
2. Physics of Atoms and Molecules B H Bransden and C J Joachain
3. Molecular Structure & Spectroscopy – G. Aruldhas (PHI)
4. Molecular Spectroscopy - B.K Sharma (Goel Publishing House)
5. Lasen Principle : Types & Application - K.R. Nambia (New Age Publication)
6. Laser & Opticals – L.V. Tarasor (Mir)7. Introduction Laser : Theroy & Application – M.N. Avdhanulu & P.S Hemne (S.Chand)

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SEMESTER- III

MICPHY03: Thermal Physics &Thermodynamics

Course Title	Credit	Credit Distribution	
		Theory	Practical
Thermal Physics &Thermodynamics	3	2	1

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Comprehended the basic concepts of thermodynamics, the first and the second law of thermodynamics.

CO2: Understand the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations.

CO3: Learn about Maxwell's relations and use them for solving many problems in Thermodynamics.

CO4: Learn the basic aspects of kinetic theory of gases, Maxwell-Boltzmann distribution law, equitation of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion.

MICPHY03: Thermal Physics &Thermodynamics (T) -2 Credit		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Kinetic Theory of Gases** Maxwell-Boltzmann Molecular Speed distribution Law for an Ideal Gas. Mean, RMS and Most Probable Speeds. Degrees of Freedom. Law of Equipartition of Energy (no derivation). Molecular Collisions: Mean Free Path. Estimation of Mean Free Path. Transport Phenomenon in Ideal Gases: (1) Viscosity, (2) Thermal Conductivity and (3) Diffusion. Brownian motion, Langevin and Einstein's theories and experimental determination of Avogadro's no., Rectilinear flow of heat in a metal rod, relation between thermal & electrical conductivities.	10
2	**Real Gases** Behavior of Real Gases. Van der Waal's Equation of State for Real Gases. Values of Critical Constants. Law of Corresponding States. Joule-Thomson Porous Plug Experiment. Joule-Thomson Effect for Real Gases. Joule-Thomson Cooling.	08
3	**Zeroth and First Law of Thermodynamics** Extensive and intensive Thermodynamic Variables, Thermodynamic Equilibrium, Zeroth Law of Thermodynamics and Concept of Temperature, Work, Heat, State Functions and path functions, First Law	05

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	of Thermodynamics, Internal Energy for ideal and real gases, Applications of First Law of thermodynamics in case of thin film, stretched wire, hydrostatics, and specific Molar Heat Capacity for gases, Specific heat General Relation between C_P and C_V.	
4	**Second Law of Thermodynamics** Cyclic ,reversible and irreversible process, Carnot engine, Carnot cycle, Principle of Refrigerator. Second Law of thermodynamics.Principal of heat engine and refrigerator Kelvin-Planck and Clausius Statements. Concept of Entropy, Clausius Inequality, Second Law in terms of Entropy, Temperature–Entropy diagrams. Third Law of thermodynamics, Thermodynamic Potentials: Internal Energy, Enthalpy, Helmholtz & Gibb's Functions, Maxwell's Relations, Co-efficient of performance, Clausius-Clapeyron equation and phase transition (1^{st} and 2^{nd})	07
	TOTAL	**30**

MICPHY03:	**Thermal Physics &Thermodynamics (P) -1 Credit**
1.	To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method.
2.	To determine the Coefficient of Thermal Conductivity of good conductor (Cu) by Searle's Apparatus.
3.	To determine the Temperature Coefficient of Resistance by Platinum Resistance Thermometer (PRT).
4.	To study the variation of Thermo-emf of a Thermocouple with Difference of Temperature of its Two Junctions using a null method.
5.	To determine Mechanical Equivalent of Heat, J, with the help of Joule's calorimeter.
6.	To plot a graph between temperature and pressure at constant volume using Joly's apparatus and to find the coefficient of increase of pressure at constant volume.

Suggested Readings :

1. Thermal Physics, S. Garg, R. Bansal and C. Ghosh, 1993, Tata McGraw-Hill.
2. Heat and Thermodynamics, M.W. Zemansky, Richard Dittman, 1981, McGraw-Hill.
3. A Treatise on Heat, MeghnadSaha, and B.N. Srivastava, 1958, Indian Press
4. Classical and Quantum Thermal Physics, R. Prasad, 2016, Cambridge University Press
5. Modern Thermodynamics with Statistical Mechanics, Carl S. Helrich, 2009, Springer.
6. Thermodynamics, Kinetic Theory & Statistical Thermodynamics, Sears & Salinger. 1988,Narosa
7. Thermal Physics ,Thermodynamics S.C Garg, R.M Bansal& C. K .Ghosh
8. Theory and Experiment on Thermal Physics: P.K.Chakrabarti, New Central Book Agency (p) Ltd
9. Thermodynamics: J.P Aggrawal & Satya Prakash
10. Advanced Practical Physics for students: B. L. Flint and H.T.Worsnop (Little Hampton Book)
11. B.Sc. Practical Physics :C.L.Arora (S.Chand)
12. Practical Physics: G.L. Squires (Cambridge University Press)

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SEMESTER- IV

MICPHY04: Electricity & Magnetism

Course Title	Credit	Credit Distribution	
		Theory	Practical
Electricity & Magnetism	3	2	1

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Understand the basic concepts of electrostatics.

CO2: Understand the dielectric properties of matter.

CO3: Understand the electromagnetic induction and electrical circuits.

MICPHY04: Electricity & Magnetism (T) -2 Credit		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Electrostatics:** Coulomb's law. Electric Field and potential, Field due to a uniformly charged sphere, Gauss's Law and its application: Electric dipole, Field and potential due to an electric dipole, Electrostatic Energy of a uniformly charged sphere, Energy of a condenser.	08
2	**Dielectric Properties of Matter:** Electrical susceptibility and Dielectric constant, Polarization, Electronic polarization, Atomic or ionic Polarisation, Surface Charge and bound charge, Displacement Vector **D**, Relations between **E**, **P** and **D**	06
3	**Magnetism:** Magnetic field , Magnetic force on a current carrying conductor placed in a uniform magnetic field, Biot – Savart's Law and its simple applications: straight wire and circular loop, Magnetic Dipole, and Ampere's Circuital law. Gauss's law of magnetism (Integral and Differential Forms). Magnetization current. Relative Permeability of a Material. Magnetic Susceptibility. Magnetization Vector (**M**), Magnetic Intensity (**H**), Relation between **B**, **M** and **H**. **Electromagnetic Induction:** Faraday's and Lenz's Laws. Mutual and Self Induction and their determination for a solenoid. Energy stored in a Magnetic Field, Induced magnetic field (Time varying electric field).	10

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4	**Electrical Circuits:** AC Circuits: Kirchhoff's laws for AC circuits. Reactance and Complex Impedance. Series and parallel LCR Circuit: (1) Resonance, (2) Quality Factor, and (3) Band Width. Power in AC Circuits.	06
	TOTAL	**30**

MICPHY-04	**Electricity and magnetism (P)-1 Credit**
1.	Use of Multimeter for measuring (a) Resistance, (b) AC and DC Voltages, (c) DC Current, (d) Capacitance, and (e) Checking electrical fuses.
2.	To calibrate the ammeter and voltmeter by potentiometer.
3.	To find the low resistance by Carey Foster's bridge after calibrating the bridge wire.
4.	Measurement of low resistance using Potentiometer.
5.	Figure of merit of moving coil galvanometer.
6.	To determine the angle of dip in the laboratory using an earth inductor.
7.	Compare the capacities of capacitors by De Sauty' bridge.
8.	To verify the Thevenin and Norton theorems.
9.	To verify the Superposition, and Maximum power transfer theorems.
10.	To determine self inductance of a coil by Anderson□s bridge.
11.	To study the response curve of a Series LCR circuit and determine its

Suggested Readings:-

1. Electricity and Magnetism, Basudev Ghosh (Books And Allied (P) Ltd
2. Introduction to Electrodynamics, D.J. Griffiths, 3rd Edn., 1998, Benjamin Cummings.
3. Electricity ad Magnetism
4. Fundamentals of Electricity and Magnetism, Arthur F. Kip, 2nd Edn.1981, McGraw-Hill.
5. Electricity, Magnetism & Electromagnetic Theory, S. Mahajan and Choudhury, 2012, Tata McGraw-Hill
6. Fundamentals of Electricity and Magnetism D.N Vasudev (S. Chand & Co)
7. Electricity and Magnetism- R. Murugeshan (S. Chand)
8. Electricity and Magnetism-K.K. Tiwari (S. Chand)

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SEMESTER-V

MICPHY-05: Mathematical Physics-II and Introduction to Computational Methods

Course Title	Credit	Credit Distribution	
		Theory	Practical
Mathematical Physics-II and Introduction to Computational Methods	03	02	01

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Master the basic elements of complex mathematical analysis.

CO2: Solve differential equations that are common in physical sciences.

CO3: Apply group theory and integral transforms to solve mathematical problems of interest in Physics.

CO4: Understanding how to use special functions in various physics problems

CO5: Provides background for further studies and research in different subject areas .

MICPHY05: Mathematical Physics and Introduction to Computational Methods (T) -2 Credit		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Curvilinear Coordinates, Tensors and special functions:** Spherical and Cylindrical Coordinate Systems. Ordinary Integrals of Vectors, Line, surface and volume integrals of Vector fields. Second Order Linear Differential Equation and its solution using Frobenius method.	06
2	**Partial Differential Equations:** Solutions to partial differential equations using separation of variables: Laplace's Equation in problems of rectangular, cylindrical and spherical symmetry.	06
3	Introduction: Importance of Computers in Physics, Algorithms and Flow Charts: Algorithm Definition, properties and development. Flowchart:	06

	concept of flowchart , symbols , guidelines, types.	
4	Scientific Programming: Basic ideas of Linux, some fundamental Linux commands (Internal & External commands), FORTRAN: Basic ideas for development of FORTRAN Programming. Layout of FORTRAN programs, writing of simple FORTRAN programs and concept of coding.	06
5	Control statements :Introduction of Subscripted variables, Functions and Subroutines (Arithmetic statements, Function, Function subprogram and subroutine), and their usage in programs of simple Physics Problems.	06
	Total	**30**

MICPHY05: Mathematical Physics and Introduction to Computational Methods (P) -1 Credit
Practical
1. Errors & error Analysis: Truncation & rounding of errors, absolute & relative errors.
2. Differential equations: Solutions of ordinary differential equation, solution of first order differential equation, solution of quadratic equation.
3. **Programs:** Sum & average of a list of numbers, Largest of a given list of numbers, Familiarity with DOS commands, Linux Commands and FORTRAN commands.

Suggested Readings:-

1. Introduction to Numerical Analysis: S. S Sastry
2. Mathematical Methods for Scientists & Engineers: D.A. McQuarie (Pub. Viva Books)
3. An Introduction to Computational Physics: T. Pang (Cambridge University Press)
4. Numerical Recipes in C: The Art of Scientific Computing, W.H.Pressetal (Cambridge University)

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SEMESTER- V

MICPHY-06: Electrodynamics and Electromagnetism

Course Title	Credit	Credit Distribution	
		Theory	Practical
Electrodynamics and Electromagnetism	3	3	0

Course Outcomes

After completing the course, the students will be able to:

CO1: Establish and analyse four Maxwell's equations of electromagnetism.

CO2: Understand the propagation of electromagnetic waves in vacuum, dielectrics, conductors and also in guided media and the phenomenon of reflection and refraction of plane waves at different boundaries.

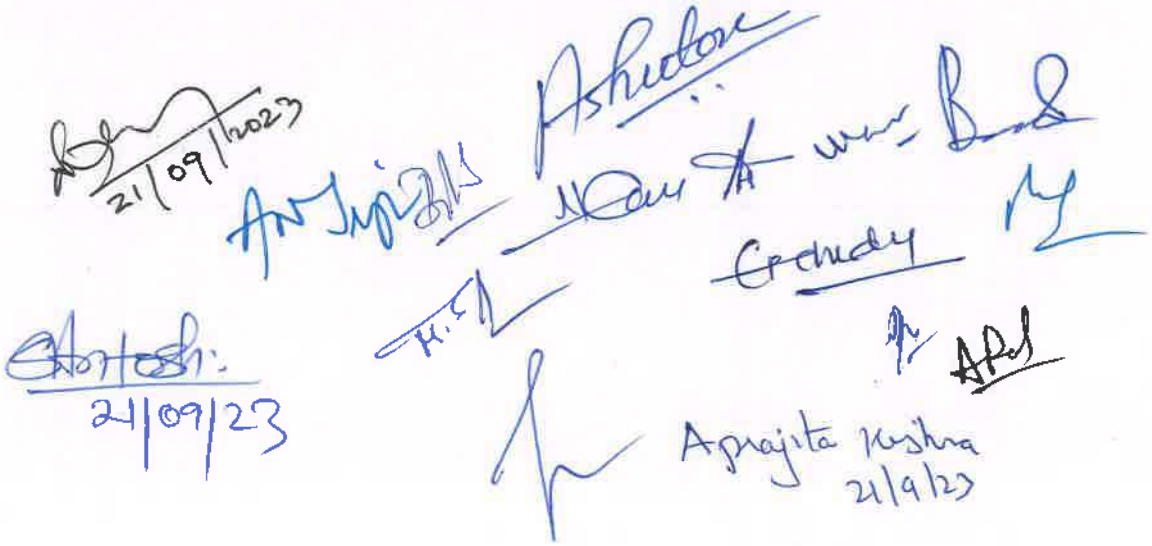
CO3: Understand the importance of energy flow(Poynting Theorem) and its usefulness.

MICPHY-06: Electrodynamics and Electromagnetism (T) -02 Credit		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Equations:** Equation of continuity, Maxwell's equations in differential and Integral forms; Vector and scalar potentials.Poyinting Theorem and Poynting Vector. Electromagnetic (EM) Energy Density. Physical Concept of Electromagnetic Field Energy Density.	07
2	**Electromagnetic Wave Propagation in unbounded media:** Propagation of plane EM waves in free space Transverse nature of plane EM waves, refractive index and dielectric constant, wave impedance. Propagation of EM wave through conducting media.	07
3	**EM Wave Propagation in Bounded Media:** Boundary conditions at a plane interface between two media. Reflection & Refraction of plane waves at plane interface between two dielectric media — Laws of Reflection & Refraction, Total internal reflection.	06

4	**Polarization of Electromagnetic Waves:** Description of Linear, Circular and Elliptical Polarization. **Wave Guides:** Condition of continuity at interface. Phase shift on total reflection. Solution of wave equation in Rectangular waveguide, Eigenvalue equations. Expressions for field components (TE and TM modes). Propagation properties, cutoff frequency, group & phase velocity of guided waves. **Optical Fibres:** Numerical Aperture. Step and Graded Indices (Definitions Only). Single and Multiple Mode Fibres (Concept and Definition Only).	10
	TOTAL	**30**

Suggested Readings:-

1. Introduction to Electrodynamics, D.J. Griffiths, 3rd Ed., 1998, Benjamin Cummings. ,
2. Elements of Electromagnetics, M.N.O. Sadiku, 2001, Oxford University Press.
3. Introduction to Electromagnetic Theory, T.L. Chow, 2006, Jones & Bartlett Learning
4. Fundamentals of Electromagnetics, M.A.W. Miah, 1982, Tata McGraw Hill
5. Electromagnetic field Theory, R. S. Kshetrimayun, 2012, Cengage Learning r
6. Electromagnetic Field Theory for Engineers & Physicists, G. Lehner, 2010, Springer
7. Electromagnetic Fields & Waves, P. Lorrain & D. Corson, 1970, W.H. Freeman & Co.
8. Electromagnetics, J. A. Edminster, Schaum Series, 2006, Tata McGraw Hill.



SEMESTER- VII

MICPHY 07: Optics

Course Title	Credit	Credit Distribution	
		Theory	Practical
Optics	3	2	1

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Understand Interference as superposition of waves from coherent sources derived from same parent source.

CO2: Demonstrate basic concepts of Diffraction: Superposition of wavelets diffracted from aperture.

CO3: Understand Fraunhoffer and Fresnel Diffraction.

CO4: Gain experience of using various optical instruments and making finer measurements of wavelength of light using Newton's Rings experiment, Fresnel Biprism, etc.

MICPHY07:	**Optics (T) -2 Credit**	
Unit	**Topics to be covered**	**No. of Lectures**
1	**Interference:** Light as EM Wave(Historical Perspective),Superposition of waves, Conditions for interference, Interference by Division of Wavefront (Lloyd's single mirror) and by Division of Amplitude Newton's Ring, Stoke's treatment.	07
2	**Interferometer:** Michelson interferometer and its applications, Multiple beam interference in parallel film, Coherence – Spatial and Temporal.	06
3	**Fraunhofer Diffraction:** Conditions for diffraction, Fraunhofer diffraction due to single, Plane transmission grating. **Fresnel diffraction:** Fresnel half- period zones, Zone plate, Huygen's-Fresnel principle, Diffraction by a straight edge,Rayleigh's criterion for limit of resolution, Resolving power of Grating, Telescope.	08
4	**Polarization and Double Refraction:**	07

	Polarized light and its mathematical representation, Production of polarized light by reflection, refraction and scattering, Polarization by double refraction, Nicol prism, Quarter wave plate, Half wave plate, Babinet's compensator, Production and analysis of circularly and elliptically polarized light. Elementary ideas of LASERs, Population Inversion and Holography.	
	TOTAL	**30**

MICPHY 07	**Optics (P) -1 Credit**

1. To determine Magnifying Power of a telescope by the Linear Scale.
2. To find the height of an inaccessible object (altitude or angular diameter of the Sun) using Sextant.
3. To find angle of prism/ angle of minimum deviation and hence refractive index of material of prism using Spectrometer.
4. To determine diameter of a thin wire by studying the diffraction (and interference) pattern.
5. To determine wavelength of sodium light using a plane diffraction grating.
6. To determine Resolving Power of a plane transmission grating.
7. Simple experiment demonstrating different applications of LASER and Optical Fibre.
8. Determination of wavelength of light using biprism on optical bench.
9. To determine the wavelength of the monochromatic light by Newton's Ring

Suggested Readings :

1. Optics(Classical & Quantum)-Dr. R.K.Kar(Books & Allied).
2. Optics:(2017), 6th Edition, Ajoy Ghatak, McGraw-Hill Education, New Delhi
3. Fundamental of Optics:Jenkins & White (Mc Graw Hill)
4. Fundamental of optics: B. K. Mathur,
5. A TextBook of Optics : N. Subrahmanyam, Brij V. Lal, M.N. Avadhanulu, S. Chand & Co Ltd
6. Practical Physics :Geetu Sunon(R.Chand& Company); Harnam Singh & P.S. Hemne(S.Chand& Co.)
7. A Text Book of Practical Physics: Indu Prakash, Ramakrishna&A.K.Jha, 11th Ed., 2011, Kitab Mahal
8. Advanced level Physics Practicals: Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
9. A Laboratory Manual of Physics for undergraduate classes:D.P.Khandelwal, 1985, Vani Pub.
10. Practical Physics: G.L. Squires, Cambridge University Press.
11. A Laboratory Manual of Physics – D.P.Khandewal.
12. Optics- Eugene Hecht(Pearson).

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SEMESTER – VI

MICPHY08: Elements of Modern Physics

Course Title	Credit	Credit Distribution	
		Theory	Practical
Elements of Modern Physics	3	3	0

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Main aspects of the inadequacies of classical mechanics as well as understanding of the historical development of quantum mechanics.

CO2: Formulation of Schrodinger equation and the idea of probability interpretation associated with wave-functions.

CO3: The spontaneous and stimulated emission of radiation, optical pumping and population inversion. Three level and four level lasers. Ruby laser and He-Ne laser in details. Basic lasing.

CO4: The properties of nuclei like density, size, binding energy, nuclear forces and structure of atomic nucleus, liquid drop model and nuclear shell model and mass formula.

MICPHY08:	Elements of Modern Physics (T) – 3 Credit	
Unit	**Topics to be covered**	**No. of Lectures**
1	**Wave-Particle Duality** Hertz Experiment and Discovery of Photoelectric effect;Explanation of Photoelectric effect by Einstein; Wave nature of particle ;Historical perspectives of de Broglie's Matter wave; Heisenberg's Uncertainty principle	12
2	**Understanding Atom** Different Atomic models; alpha particle scattering experiment performed by Geiger and Marsden, Rutherford's nuclear Model of atom; Bohr's Model and specrum of hydrogen atom, Limitations of Bohr's Theory; Fine structure of H-lines	12
3	**Basic properties of atomic nucleus** Mass number,Mass Defect, Binding Energy.Binding Energy per nucleon versusMass Number Curve;Concept of Nuclear forces;Stability of Nucleus Radioactivity, Law of RadioactiviteDisintegration.Application of radioactivity in Carbon -Dating and Therapy	12
	TOTAL	36

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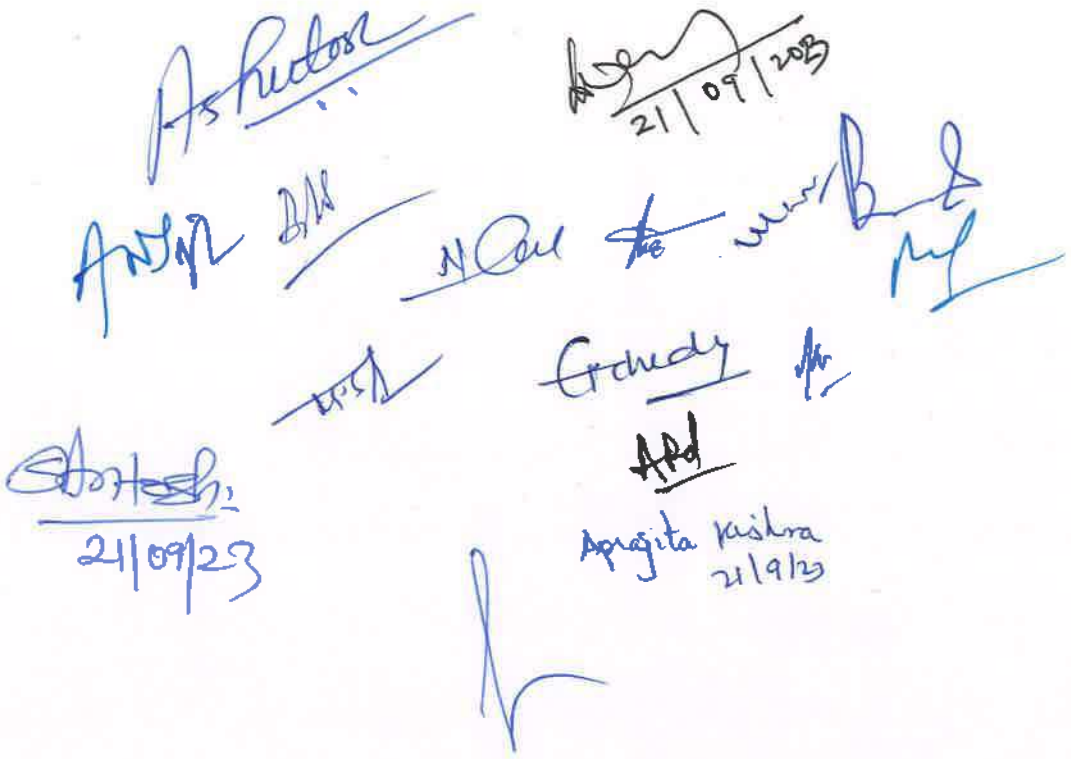
Suggested Readings :

1. Concepts of Modern Physics, Arthur Beiser, 2002, McGraw-Hill.
2. Modern Physics by R ASerway, C J Moses and C A Moyer, 3rd edition, Thomson Brooks Cole, 2012.
3. Modern Physics for Scientists and Engineers by S T Thornton and A Rex, 4th edition, Cengage Learning, 2013.
4. Concepts of Nuclear Physics by B L Cohen, Tata McGraw Hill Publication, 1974.
5. Quantum Mechanics, Robert Eisberg and Robert Resnick, 2ndEdn., 2002, Wiley.



SEMESTER – VII

MICPHY09: Basic Electronics

Course Title	Credit	Credit Distribution	
		Theory	Practical
Basic Electronics	**4**	**3**	**1**

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Understand fundamental designing concepts of different types of Logic Gates, Minimization techniques etc.

CO2: Design of different types of the Digital circuits, and to give the computational details for Digital Circuits.

CO3: Draw characteristics of devices like PNP and NPN junction diode and truth tables of different logic gates.

CO4: Understand basic elements and measurement of their values with multimeter and their characteristic study.

MJCPHY 09	**Basic Electronics (T) – 3 Credit**	
Unit	**Topics to be covered**	**No. of Lectures**
1	**Digital Circuits:** Diffrence between Analog & Digital Circuits .BinaryNumbers.Decimal to Binary & vice-versa. AND,OR and NOT Gates(Realisation using Diodes & Transistors) NAND and NOR Gates as Universal gates.XOR Gates.	07
2	**Basic Circuit Operations:** De-Morgan's Theorem .Boolean Laws .Simplification of Logic Circuit using Boolean Algebra. Conversion of a Truth Table into an Equivalent Logic Circuit by (1) Sum of Products Method **Combinational circuits:** Basic idea of Binary Addition. Binary Subtraction using 2's Complement. Half and Full Adders.	12
3	**Semiconductor Devices :** P-andN-type semiconductors. Energy Level Diagram. Barrier Formation in PN Junction Diode. Qualitative Idea of Current Flow Mechanism in Forward and Reverse Biased Diode.P-N junction & its characteristics.Static and Dynamic Resistance.Principle and structure of (1) LEDs (2) Photodiode (3) Zener Diode (4) Solar .Cell. **Electronic Devices and their Applications:** (1) Rectifier Diode: Half-wave Rectifiers. Full-wave Rectifiers (Centre-tapped and	10

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	Bridge), Calculation of Ripple Factor and Rectification Efficiency, (2) Voltage Regulation using Zener Diode. **Bipolar Junction transistors**:n-p-n and p-n-p Transistors, Characteristics of CB, CE and CC Configurations. Current gains α and β parameters, Relations between α and β parameters. Load Line analysis of Transistors. DC Load line and Q-point. Physical Mechanism of Current Flow: Active, Cutoff and Saturation Regions. **Amplifiers:** Transistor Biasing circuits and Stability. Fixed Bias and Voltage Divider Bias circuit for CE Amplifier. Input and Output Impedance. Current, Voltage and Power Gains. Class A	
4	**Sinusoidal Oscillations:** Feedback and Oscillation: Effects of Positive and Negative Feedback on Gain and Stability, Distortion and Noise. Sinusoidal Oscillators: Barkhausen's Criterion for self-sustained oscillations. RC andWien Bridge oscillator.	07
5	**Instrumentations:** Introduction to CRO:Block Diagram and Applications of CRO: (1) Study of Waveform (2) Measurement of Voltage ,Current ,Frequency and Phase Difference. **Power Supply:** Half Wave Rectifiers ,Centre-tapped and Full wave Rectifiers ,Calculation of Ripple Factor and Rectification Efficiency ,Basic Idea about capacitor filter , Zener Doide and Voltage Regulation.	09
	TOTAL	**45**

MICPHY 09	**Basic Electronics (P) – 1 Credit**
1.	To measure (a) Voltageand (b) Time period of a periodic waveform using CRO.
2.	To test a Diode and Transistor using a Multimeter.
3.	To design a switch (NOT gate) using a transistor.
4.	To verify and design AND, OR, NOT and XOR gates using NAND gates.
5.	Half Adder ,Half Subtractor and 4-bit Binary Adder
6.	To study V-I characteristics of P-N junction ,Zener and Light emitting diode.
7.	To study the characteristics of a Bipolar Junction Transistor in CE configuration.

Suggested Readings :

1. Electronic Principles & Applications: A.P.Malvino ,D.P.Leach and Saha(McGraw Hill).
2. Modern Digital Electronics- R.P.Jain ,Tata McGraw Hill,4th Edition.
3. Principles of Electronics:-V.K.Mehta& Rohit Mehta(s.Chand& Comp).
4. Basic Electronics Devices :-D.P.Kothari& I J Nagrath(McGraw Hill Educ).
5. Hand Book of Electronics-Gupta & Kumar.
6. Foundation of Electronics - Chattopadhyay; Rakshit;Saha;Purikait(Willey).

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Semester – VIII

MICPHY10: Analytical Mechanics & Special Theory of Relativity

Course Title	Credit	Credit Distribution	
		Theory	Practical
Introduction to Analytical Mechanics & Special Theory of Relativity	4	4	0

Course Outcomes

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

CO1: Understand Physical Principle behind derivation of Lagranges and Hamiltonion Equation.

CO2: Understand problems in space science theoretical research

CO3: Analysis the Centre of mass and Laboratory frames of reference andtheir use in explaining elastic and inelastic collisions

CO4: Understand the Planetary motions and motions of satellites and Space science. Getting an idea of postulates of special theory of relativity and their implications.

MJCPHY10 Analytical Mechanics & Special Theory of Relativity (T) – 4 Credit		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Rigid Body Motion:**Rigid body, Eulerian angles, Kinematics of rotation, Euler's equations of motion, Motion of a symmetrical top. **Variational Principle and Hamiltonian formalism:** Calculus of variation and its applications, Lagrange's equations of motion for non-holonomic system, Velocity-dependent potential, Cyclic coordinates, Symmetries and conservation laws, Legendre transformation.	14

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2	**Canonical Transformation:** Canonical transformation and its applications, Poisson Brackets, Jacobi identity, Hamilton-Jacobi equation.	08
3	**Collisions:** Elastic and inelastic collisions between particles. Centre of Mass and Laboratory frames.Elasticity: Review of relation between Elastic constants .	08
4	**Special Theory of Relativity:** Michelson-Morley Experiment and its outcome. Postulates of Special Theory of Relativity. Lorentz Transformations. Lorentz contraction. Time dilation. Relativistic addition of velocities. Variation of mass with velocity, mass energy equivalence	15
	TOTAL	**45**

Suggested Books :

1. Kleppner D., Kolenkow R. J. (1973).An introduction to mechanics,McGraw-Hill.
2. Kittel C, Knight W., et.al. (2007).Mechanics, Berkeley Physics, vol.1, Tata McGraw-Hill.
3. Resnick, Halliday and Walker (2008),Physics, Wiley, 8/e.
4. Fowles G. R. and CassidayG.L. (2005).Cengage Learning.
5. FeynmanR. P., Leighton R. B., Sands M. (2008). Feynman Lectures, Vol.I, Pearson Education.
6. MathurD. S. (2000). Mechanics,S. Chand and Company Limited.
7. SearsF. W, ZemanskyM. W., YoungH.D. (1986). University Physics. 13/e, Addison Wesley.
8. JewettJ. W., SerwayR. A. (2010). Physics for scientists and Engineers with Modern Phyε, Cengage Learning.
9. Spiegel M.R. (2006).Theoretical Mechanics, Tata McGraw Hill.
10. Special Theory of Relativity S.Chand
11. Gupta , kumar ,Pragati Prakashan

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Basket for Multidisciplinary Course (MDC)

Semester-III

Physics
• Acquaintance of Electrical and Electronic Appliances • Mesoscopic Materials • History And Philosophy Of Science • Sports Science • Atmospheric & Space Science • Physics Of Communication Technology

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Semester – III

MDCPHY- 3 Mesoscopic Materials

Course Title	Credit	Credit Distribution	
		Theory	Practical
Mesoscopic Materials	**3**	**3**	**0**

Course Outcome

- The Students will be able to understand
- the mysterious world of Mesoscopic materials
- comprehend the use of nano-structured materials in our daily life
- develop a multidisciplinary scientific logic and connect it to our day-to-day life
- the fascination of the diversity of mother nature

Unit 1 **(10 Hours)**

Mesoscopic sizes materials of bulk size materials of sub molecular sizes, sizes of nanometer range

Unit 2 **(10 Hours)**

Specialty in Physical Properties: Size dependents of physical properties like mechanical strength electrical conduction and magnetic properties of materials, applications of materials properties at Nanoscale

Unit 3 **(10 Hours)**

Mesoscopic materials in daily life: computers, Sensors, High-efficiency lasers and LEDs, ductile, ceramics drugs delivery

References:

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MDCPHY3: Acquaintance of Electrical and Electronic Appliances

Course Title	Credit	Credit Distribution	
		Theory	Practical
Acquaintance of Electrical and Electronic Appliances	3	3	0

Unit – I

Circuit Fundamental: **(10 Hours)**

Voltage, Current, Power, Work, Short circuit, open circuit, Ohm's Law.
Definition of Resistance, Capacitance, Inductance, Series Resistance, Parallel Resistance
Passive circuit Element, General, Resistors, types of Resistors, Resistors color code, SI unit, Checking Resistance with ohm meter.
Multimeter, components testing using a multimeter, Inductor, Inductance ofInductor, Mutual Inductance, SI unit. Capacitor, Capacitance, types of Capacitors, Cheeking capacitor with ohm meter.SI unit.

Unit – II **(10 Hours)**

Electronic Devices:
Diode, Transistor, LED, definition of symbol of these.
AC Circuit definition, Sine wave, DC current.
Power socket Identifying the phase, neutral, earth on power socket.
IC, PCB, bread Board, use a tester to monitor AC power, soldering, fuse definition, definition of an analog circuit, Decimal circuit,

Unit – III **(10 Hours)**

Hands on Training

- How to repair an electric cord
- Installing a new plug
- Disassembling the Fan
- How to repair electric Fan

Reference:
A Course in Electrical. & Electronics Measurements &Instrumentation-AK. Sawhney, (,Dhanpatrai & Co.) 1978

History and Philosophy of Science

Course Title	Credit	Credit Distribution	
		Theory	Practical
History and Philosophy of Science	**3**	**3**	**0**

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Subject Objective

- To introduce some fundamental issues in the history and philosophy of science
- To provide some understanding of the general principles of scientific thinking and methodology.
- To aim at understanding and debating what is meant by scientific enterprise
- To explore the connection between history, science and philosophy.

Expected Outcome

The Student will be able to learn

- Scientific method, reasoning, truth and evidence
- The contrast between empirical facts and philosophical facts.
- The change from Aristotelian worldview to the Newtonian worldview
- The recent developments in science especially relativity theory and evolutionary theory

Unit 1: Fundamental Issues **(06)**

What is science? , Science and its difference from other systems of belief and knowledge; science as a profession; difference between pure science and technology. Falsifiability, Instrumentalism and realism, problems and puzzles of Induction

Unit 2: Science & Technology: from the Aristotle to the Newton **(12)**

Greek Science. Seventeenth - century attack on Aristotelian Philosophy. Logical Reconstructionist, Philosophy of Science, Astronomical Data: The Philosophical Facts, The Ptolemaic System, The Copernicus System, Kepler's System, Galileo, Philosophical and conceptual connections in the Development of the New Science, Scientific Law Development of the Newtonian worldview 1700-1900

Unit 3: Metaphysical foundations of Science : Recent Developments in Science and Worldviews **(12)**

David Hume and the problem of causation, Naturalism and Anti-naturalism, Realism and antirealism about scientific theories; scientific explanation; and laws of nature, Karl

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popper inductivism and falsificationism, Thomas s Kuhn Rationality in Paradigm Change, normal science and scientific revolutions, Feyeraband scientific rationality and irrationlity

The special Theory of relativity, the general theory of relativity, Overview of the theory of Evolution, Philosophical and conceptual implications of Evolution, Worldviews: concluding Thoughts.

Text Books:

[1] Okasha Samir, *Philosophy of Science: A Very Short Introduction*, Oxford: Oxford University Press, 2002.

[2] Richard DeWitt, *Worldviews: An Introduction to the History and Philosophy of Science*, Blackwell publishing, 2004.

[3] Chalmers A. F., *What Is This Thing Called Science?*, (3rd ed.) Buckingham: Open University Press, 1999.

[4] Christopher R. Hitchcock, *Contemporary Debates in the Philosophy of Science*, Blackwell, 2004.

[5] John Losee, *A Historical Introduction to the Philosophy of Science*, Oxford University Press, 2001.

[6] Hard M., A. Jamison, Hubris and Hybrids. *A Cultural history of Technology and Science*, Routledge, 2005.

[7] Peter Godfrey-Smith *Theory and Reality: An Introduction to the Philosophy of Science*, University of Chicago

Reference Books:

- Erickson, M, "Scientists and Scientific Communities" (Chapter 5) *Science, Culture and Society: Understanding Science in the 21st Century*, Cambridge: Polity, 2005.
- Hacking I., 'What is Scientific Realism?, in *Hacking, Representing and Intervening*, Cambridge: Cambridge University Press, 1983
- Popper K.R., Ch. 11, *Conjectures and Refutations*. Routledge & Kegan Paul.1963, pp. 253-292.
- Searle J., 'The Building Blocks of Social Reality' in Searle, *The Construction of Social Reality*, London: the Penguin Press, 1995, pp.1- 29.
- Shapin Steven, "Don't Let That Crybaby in Here Again," London Review of Books, September, 2000,

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MDCPHY3: Physics of Communication Technology

Course Title	Credit	Credit Distribution	
		Theory	Practical
Physics of Communication Technology	3	3	0

SEMESTER-III
MDCPHY-3 SPORTS SCIENCE

Course Title	Credit	Credit Distribution	
		Theory	Practical
SPORTS SCIENCE	3	3	0

Unit – 1: **(10 Hours)**

Measurement: Physical quantities. Standards and Units. International System of Units. Standards of time, length and mass. Precision and significant figures.

Newton's laws of motion: Newton's firstlaw. Force, mass. Newton's second law. Newton's third law. Mass and weight. Applications of Newton's laws.

Projectile motion: Shooting a falling target. Physics behind Shooting, Javelin throw and Discus throw

Unit 2: **(10 Hours)**

Conservation laws: Conservation of linear momentum, collisions — elastic and inelastic. Angular momentum. (Physics behind Carom, Billiards, Racing)

Centre of mass: Physics behind Cycling, rock climbing, Skating, Gravitation: Origin, Newton's law of gravitation. Archimedes's principle, Buoyancy (Physics behind swimming)

Unit 3: **(10 Hours)**

Food and Nutrition: Proteins, Vitamins, Fat, Blood Pressure. Problems due to the deficiency of vitamins. Energy: Different forms of Energy, Conservation of mass-energy.

Physical exercises: Walking, Jogging and Running, Weight management.

Suggested Books:

1. Physics for Entertainment-Yakov Perelman, Createspace Independent Pub.
2. Physics Everywhere, Yakov Perelman - Prodinnova
3. Mechanics for Entertainment- Yakov Perelman – Prodinnova
4. Food Science- Sri Lakshami, New Age Publications
5. Physics, Resnick, Holiday and Krane, Wiley Student Edition
6. An introduction to the Physics of Sports-Vassilios McInnes Spathopoulos, Createspace Independent publishing Platform

Internet resources https://www.topendsports.com/biomechanics/physics.htm
https://www.real-world-physics-problems.com/physics-of-sports.html

Topics for Self Study: **https://www.real-world-physics-problems.com/physics-of-sports.html**
Archimedes Principle: Made EASY Physics in You tube

21/05/23

Aprajita Keshri 21/9/23

SEMESTER III

Atmospheric & SPACE SCIENCE

Course Title	Credit	Credit Distribution	
		Theory	Practical
Atmospheric &SPACE SCIENCE	**3**	**3**	**0**

Objective: **(30 Hours)**

To understand the basics of atmospheric and space science dealing with the structure of atmosphere, and stellar objects.

Expected Outcome

After this course, students will be able to

understand the structure of atmosphere

deal with tools and techniques used for space observation,

familiarize with our solar system,

realize the idea of the formation, evolution and classification of starsand

develop an idea of nucleo-synthesis and formation of heavy nuclei and theories of the Universe

connect the multi-disciplinary nature of development in science and technology to enhance the capability of space observation

UNIT I **(10 Hours)**

Earth and its atmosphere

Earth as a planet of the solar system: origin and internal structure, crustal types, heat flow and temperature gradient.

Elementary concepts of weather and climate; structure and composition of the atmosphere, Passage of solar radiation through the atmosphere, Atmospheric Windows, emissivity, Absorption spectra of atmospheric gases.

UNIT II **(10 Hours)**

Introduction:

Perception of Space from early civilization to pre-telescopic era and post-telescopic era, Important International Organizations involved in Space Exploration.

Observation of Space through our eyes, its limitations, and further explorations through instrumental aids.

21/09/23

21/09/23

Aprajita Mishra 21/9/23

Distance measuring units and Techniques for Distance Measurement, Use of Non-Optical Telescopes and its importance in space observation.

UNIT III **(10 Hours)**

Solar system, Star – Formation,Evolution and Classification

Formation of our Solar System, Origin and Fate ofour Sun and its source of energy, Solar Wind, Planets, Asteroids, Satellites and Comets.
Star Formation, Nucleo– Synthesis and Formation of Elements, Stellar Evolution and Stellar Remnants and Classification of Stars:Harvard Classification & Hertzsprung-Russel Diagram.

Suggested Books:

1. Astrophysics: A modern Perspective - K. S. Krishnaswami (New Age International)
2. Atmospheric Sciences: An introductory Survey -J.M. Wallace and P.V. Hobbs (Academic Press)
3. An Introduction to Astrophysics-Baidyanath Basu, T. Chattopadhyay, S. N. Biswas(PHI 2nd Eds.)
4. An Introduction to Atmospheric Radiation-K. N. Liou (Academic Press).

To,

The Principal Secretary to Governor,
Governor's Secretariat, Bihar, Patna

Reference: Letter No. BSU (UGC)- 02/2023 – 871 /(GS) 1 dated 09-06-2023

Subject: Preparation of Syllabus for 4 Year Undergraduate Courses in Universities of Bihar.

Dear Sir,

This is with reference to your letter no. BSU (UGC) 02/2023 – 871/ (GS) 1 dated 09-06-2023, we are, herewith submitting one set of prepared syllabus of Bachelor of Science, **Physics** for 4 Year Undergraduate Courses in Universities of Bihar.

Following members were authorized by your esteemed office.

With regards,

1. Dr. Awadhesh Prasad, Awadhesh Prasad 14.06.2023.

Head, P.G. Department of Physics, Veer Kunwar Singh University, Ara

(Mob No.- 8210531603 , email – draprasadjjc@rediffmail.com)

2. Dr. B.C Rai, 14.6.2023

Prof & Head, Department of Physics, C.O.C.A.S, Patliputra University, Patna

(Mob No.- 9304005275 , email – bcraiphy@gmail.com)

Shankar Kumar 14-06-2023

3. Dr. Shankar Kumar,

Head, Department of Physics, Patna Science College, Patna University, Patna

(Mob No.- 9939811053 , email – drshankarkr@gmail.com)

4. Dr. Aprajita Krishna,

Dean Science , Head, Department of Physics, Patna Women's College (Autonomous), Patna

(Mob No.- 9431632519 , email –aprajita.phy@patnawomenscollege.in)

Aprajita Krishna 14/6/23

Syllabus for 4 Year Undergraduate Courses in Universities of Bihar

Based on N.E.P. 2020

Bachelor of Science, Physics

Prepared By :

1. **Dr. Awadhesh Prasad (Mob. No.- 8210531603)** Awadhesh Prasad 14.06.2023.
   Head, P.G. Department of Physics, Veer Kunwar Singh University, Ara
2. **Dr. B.C Rai (Mob. No.- 9304005275)** B. C. 14.6.2023
   Prof & Head, Department of Physics, C.O.C.A.S, Patliputra University, Patna
3. **Dr. Shankar Kumar (Mob. No.- 9939811053)** Shankar Kumar 14-06-2023
   Head, Department of Physics, Patna Science College, Patna University, Patna
4. **Dr. Aprajita Krishna (Mob. No.- 9431632519)** Aprajita Krishna 14/6/23
   Dean Science , Head, Department of Physics, Patna Women's College (Autonomous), Patna

Physics

(A) Major Core Courses

Sl. No.	Sem	Type of Course	Name of Course	Credits	Marks
1.	I	MJC-1(T)	Introduction to Mathematical Physics & Classical Mechanics- (T)	4	100
		MJC-1 (P)	Introduction to Mathematical Physics & Classical Mechanics- (P)	2	100
2.	II	MJC-2 (T)	Oscillations& Waves (T)	4	100
		MJC-2 (P)	Oscillations& Waves (P)	2	100
3.	III	MJC-3 (T)	Thermal Physics & Thermodynamics (T)	3	100
		MJC-3 (P)	Thermal Physics & Thermodynamics (P)	2	100
4.		MJC-4 (T)	Electricity & Magnetism (T)	3	100
		MJC-4 (P)	Electricity & Magnetism (P)	1	100
5.	IV	MJC-5 (T)	Mathematical Physics and Introduction to Computational Methods (T)	3	100
		MJC-5 (P)	Mathematical Physics and Introduction to Computational Methods (P)	2	100
6.		MJC-6	Electrodynamics & Electromagnetism	5	100
7.		MJC-7 (T)	Optics (T)	3	100
		MJC-7 (P)	Optics (P)	2	
8.	V	MJC-8	Elements of Modem Physics	5	100
9.		MJC-9 (T)	Basic Electronics (T)	3	100
		MJC-9 (P)	Basic Electronics (P)	2	100
10.	VI	MJC-10	Analytical Mechanics & Special Theory of Relativity	4	100
11.		MJC-11	Statistical Mechanics	5	100
12.		MJC-12 (T)	Quantum Mechanics & its Application (T)	3	100
		MJC-12 (P)	Quantum Mechanics & its Application (P)	2	100
13.	VII	MJC-13 (T)	Physics of Atomsand Nuclei (T)	3	100
		MJC-13 (P)	Physics of Atoms and Nuclei (P)	2	100
14.		MJC-14	Research Methodology	5	100
15.		MJC-15 (T)	Solid State Physics (T)	4	100
		MJC-15 (P)	Solid State Physics (P)	2	100
16.	VIII	MJC-16 (T)	Molecular Spectroscopy and LASER: Principles& Applications (T)	3	100
		MJC-16 (P)	Physics of Molecules and Laser (P)	1	100

Sub Total = 80

(A) Minor Courses to be offered by the Department for students of other Departments of Science

Sl. No.	Sem	Type ofCourse	Name ofCourse	Credits	Marks
1.	I	MIC-1	Introduction to Mathematical Physics & Classical Mechanics- (T)	2	100
		MIC-1	Introduction to Mathematical Physics & Classical Mechanics- (P)	1	100
2.		MIC-2	Oscillations & Waves (T)	2	100
		MIC-2	Oscillations & Waves (P)	1	100
3.	III	MIC-3 (T)	Thermal Physics & Thermodynamics (T)	2	100
			Thermal Physics & Thermodynamics (P)	1	100
4.	IV	MIC-4 (T)	Electricity & Magnetism (T)	2	100
		MIC-4 (P)	Electricity & Magnetism (P)	1	100
5.	V	MIC-5 (T)	Mathematical Physics and Introduction to Computational Methods (T)	2	100
		MIC-5 (P)	Mathematical Physics and Introduction to Computational Methods (P)	1	100
6.	V	MIC-6	Electrodynamics & Electromagnetism	3	100
7.	VI	MIC-7 (T)	Optics (T)	2	100
		MIC-7 (P)	Optics (P)	1	100
8.	VI	MIC-8	Elements of Modem Physics	3	100
9.	VII	MIC-9 (T)	Basic Electronics (T)	3	100
		MIC-9 (P)	Basic Electronics (P)	1	100
10.	VIII	MIC-10	Analytical Mechanics & Special Theory of Relativity	4	100

Sub Total = 32

(C) Multidisciplinary Courses to be offered

Sl. No.	Sem	Type of Course	Name of Course	Credits	Marks
1.	I	MDC-1	To be selected from the basket	3	100
2.	II	MDC-2	To be selected from the basket	3	100
3.	III	MDC-3	To be selected from the basket	3	100

Sub Total = 09

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(D) Ability Enhancement Courses to be offered

Sl. No.	Sem	Type of Course	Name of Course	Credits	Marks
1.	I	AEC-1	MIL	2	100
2.	II	AEC-2	Environmental Science	2	100
3.	III	AEC-3	Disaster Risk Management	2	100
4.	IV	AEC-4	NCC/NSS/NGOs/Social Service/ Scout and Guide/Sports	2	100

Sub Total = 08

(E) Skill Enhancement Courses to be offered

Sl. No.	Sem	Type of Course	Name of Course	Credits	Marks
1.	I	SEC-1	To be selected from the basket	3	100
2.	II	SEC-2	To be selected from the basket	3	100
3.	III	SEC-3	To be selected from the basket	3	100

Sub Total = 09

(F) Value Added Courses to be offered

Sl. No.	Sem	Type of Course	Name of Course	Credits	Marks
1.	I	VAC-1	To be selected from the basket	3	100
2.	II	VAC-2	To be selected from the basket	3	100

Sub Total = 06

Sl. No.	Sem	Type of Course	Name of Course	Credits	Marks
1.	v	INT-1	Summer Internship	4	100

Sl. No.	Sem	Type of Course	Name of Course	Credits	Marks
1.	VIII	RP-1	Research/Dissertation	12	100

Grand Total = 160 Credits

(G) Basket for Multidisciplinary Courses (MDC)

To be decided by Respective Department

(H) Basket for Skill Enhancement Courses (SEC)

See at the end of structure (this booklet)

(I) Basket for Value Added Courses (VAC)

See at the end of structure (this booklet)

14.6.23.

14.6.2023

Question Paper Pattern

The question paper for end semester exam in theory paper will have following pattern-

1.Part A - Compulsory- Consisting of objective/Multiple choice type - each carrying two marks. 10x2= 20 marks

Part-B - Short answer type - Four questions are to be answered out of six questions. Each carrying five marks. 04x5 = 20 marks

Part- C - Long answer type questions. Three questions to be answered out of five Questions, each carrying ten marks. 03x10 = 30 marks

2. Examinations shall not be held on OMR Sheets .

(G) Basket for Multidisciplinary Courses (MDC)

Semester-I

Physics

- **Physics around us**
- Basics of Medical Physics
- Nano Science
- Physics of Diagnostics

Semester-II

Physics

- Basic of Medical science
- **Crystallography**
- Environmental Physics
- Engery Science
- Measurement & Instrumentation

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(H) Basket for Skill Enhancement Courses (SEC)

Semester–I

Physics
• Advance Spreadsheet Tools • Basic IT Tolls • Creative Writing • Communication Everyday life • **Physics Workshop Skills**

Semester–II

Physics
• Big Data Analysis • Beginners Course to Calligraphy • Introduction to Cloud Computing (AWS) • Personality Development &Communication • **Web Development** • Computational Physics Skill

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(I) Basket for Value Added Courses (VAC)

Semester–I (VAC-1)

Physics
• Ayurveda & Nutrition • Financial Literacy • Ethic & Culture • Art of Being Happy • Swachh Bharat • Fit India • Pancha kosh : Holistic Development of Personality • Culture & Communication • **Work of Great Indian Scientists**

Semester–II (VAC-2)

Physics
• Vedic Mathematics • Emotional Intelligence • Yoga Philosophy & Practice • Ethics &Values in Ancient Indian Tradition • Constitutional Values & Fundamental Duties • Social & Emotional Learning • Ecology & Literature • Contribution of Indian Scientists since Independence • **History of Science**

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Programme Outcomes:-

At the completion of the programme, students will attain the ability to:

PO 1- Acquire a systematic and coherent understanding of the diversified academic fields of Physics through good understanding on various components of Physical Science.

PO 2-Solve & understand major concept in all disciplines of Physics.

PO 3-Apply his / her comprehensive Laboratory training in their Professional life.
PO 4-Employ Scientific knowledge and Critical thinking in their daily life.

PO 5-Employ their Scientific Temperament in the field of research and higher studies.
PO 6-Employ their knowledge in the studies of upcoming advance merging technology.

PO 7-Demonstrate relevant generic skills for global competencies like investigative skills related to various issue and problems, analytical skills with ability to construct logical arguments, ICT skills.
PO 8-Demonstrate professional behaviour & help to become – objective unbiased & truthful individual, potentially ethical in work -related situation.

Programme Specific Outcomes

At the completion of the program, students will attain the ability to:

PSO1: Develop strong competencies in Physics and its applications in a technology-rich, interactive environment.

PSO2: Link not only to the research in the area of theoretical but also to the area of experimental physics.

PSO3: Acquire skills in the numerical technique for modeling physical system & for analysis & interpretation of complex system

PSO4: Develop & understanding on the impact of Physics & Science on Society

PSO5: Evolve as better human resource with a solid foundation in theoretical and experimental aspects in respective specializations as a preparation for career in academia and industry.

PSO6: Apply knowledge gained from this programme for employment in several sectors including Electronics, Manufacturing and Teaching Sector
PSO7: Conceptual understanding of Physics to general real-world situation.

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Semester-I

Introduction to Mathematical Physics & Classical Mechanics
Major Course I (MJC-1)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Introduction to Mathematical Physics & Classical Mechanics	6	4	2

Course Outcomes

After completion of the course, the student will be able to-

CO 1-Understand various mathematical techniques used in Physical Problems. Know the difference between Newtonian Mechanics and Analytic Mechanics.

CO 2- Understand utility of scalars and vectors and their operations- algebraic and D-operator

CO 3- Understand the concept of Pseudo force and its importance with application in real life situations.

CO 4-Realize the idea of centre of Mass and Laboratory frame.

CO 5- Understand the orbit of communication and Remote sensing satellite.

MJC -1(T)-4 Credit

Unit I-Concept of Differentiation & Integration- **01 Credit (15 hrs)**

Differential calculus: Geometric Meaning of derivative; Maxima & Minima; Approximation of derivative; Partial Differentiation, Approximation using Taylor and Binomial series.

Integral Calculus: Geometric Meaning of integration, order and degree of differential equation, Solution of First order (homogeneous & Non-homogeneous), Integrating Factor, Exact and Inexact Differentials, D-operator & Solution of Second order Differential Equation.

Unit II-Vector Algebra &Vector Calculus- **01 Credit (15 hrs)**

Vector Triple Products & their significance; concept of scalar & vector fields, Gradient of scalar , Divergence & Curl of vectors and their physical applications in Physics (e.g. Equation of continuity , Euler's equation of motion, Bernoulli's theorem, Fourier heat flow, Poisson's and Laplace's equation in a gravitational field, Gauss's law of in Electrostatic, etc.).

Unit III- Fundamentals of Dynamics – **01 Credit (15 hrs)**

Inertial and Non-Inertial Frame of Reference, Rotating frame of Reference, Centrifugal and Coriolis Forces with their applications (Effect on value of 'g', On path of freely falling body, Geo- physical effect); Foucault pendulum, Direct proof of rotation of Earth.

Unit IV- Centre -of- Mass Frame and Central Forces **01 Credit (15 hrs)**

Lab frame & Centre of Mass frame, Two dimensional collision in physical problems, Relation connecting Scattering angle, Recoil angle, final velocities in C-frame & L-frame, Cross section & Rutherford scattering, Central forces and their equations,: General Equation of central orbit, Kepler's law of Planetary motion , Artificial satellite.

Suggested Books :

1. H. Goldstein, C. P. Poole and J. F. Safko, Classical Mechanics, Addison-Wesley
2. N. C. Rana and P. S. Joag, Classical Mechanics, Tata McGraw-Hill.
3. Classical mechanics- J.C. Upadhyay
4. Classical mechanics- A.B Gupta
5. Classical mechanics- Tackwale & Puranik
6. Mathematical Physics- Pipes **OR** W.W. Bell
7. Innovative Mathematical Physics—Prof B. C. Rai
8. S. L. Gupta, V. Kumar and H. V. Sharma, Classical Mechanics, PragatiPrakashan.
9. Differential Equations, George F. Simmons, 2006, Tata McGraw-Hill.
10. Mathematical Methods for Physicists, Arfken, Weber and Harris, Elsevier

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MJC -I(P)-2 Credit

The theory involved in the prescribed practical should be discussed in class and students should be made familiar with associated concepts.

At least 6 experiments must be performed-

1. Elementary measuring apparatus – Use of Vernier calliper, Screw guage and Spherometer.
2. To determine least Count of (i) Travelling Microscope (ii)Spectrometer (iii) Polarizer.
3. To Evaluate value of "g" using Bar Pendulum
4. To Evaluate value of "g" using Kater's Pendulum
5. To Verify Conservation of linear Momentum using curved track apparatus.
6. To Determine Young's modulus of Elasticity by Flexure of Beam
7. To Determine Elastic constants for the material of a wire by Searle's method
8. To Determine Surface Tension by method of ripples/use of Capillary tube
9. To Determine Co-efficient of Viscosity of liquid by Stokes method/Poiseuille's method of flow of water through Capillary.
10. To study the motion of spring-mass system and to evaluate spring constant/value of 'g'.
11. To evaluate average error, standard deviation, and percentage error in measurement of focal length of a concave mirror/Convex lens.

The CIA examination in Practical should be just as Mock test and it must be on the Pattern of proper 3hrs End- semester Examination.

Sl. No.	Component	CIA	End- Semester
1	Experiment Allotted	15	45
2	Continuous Pratical Record	05	10
3	Viva-Voce	10	15
		30	**70**
		Total = 100 Marks	

Suggested Books :

1. Advanced Practical Physics for students, B.L.Flint and H.T.Worsnop, 1971, Asia Publishing House
2. A Text Book of Practical Physics, I.Prakash& Ramakrishna, 11th Ed., 2011, Kitab Mahal
3. Advanced level Physics Practical, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
4. A Laboratory Manual of Physics for undergraduate classes, D.P.Khandelwal, 1985, Vani Pub.
5. Properties of Matter- D. S. Mathur

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Introduction to Mathematical Physics & Classical Mechanics
Minor Course I (MIC-1)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Introduction to Mathematical Physics & Classical Mechanics	3	2	1

MIC -1 (T)-2 Credit

Introduction to Mathematical Physics & Classical Mechanics

Unit I-Introduction to Calculus & Vector **01 Credit (15 hrs)**

Differential calculus: Geometric Meaning of derivative; Maxima & Minima; Approximation of derivative; Partial Differentiation.

Integral Calculus: Geometric Meaning of integration, order and degree of differential equation, Solution of First order (homogeneous & Non-homogeneous), Integrating Factor, Exact and Inexact Differentials.

Recapitulation of Vectors, Vector Algebra involving two and three vectors, Introduction to Gradient, Divergence , Curl of Vectors with their physical significance.

Unit II-Fundamentals of Dynamics – **01 Credit (15 hrs)**

Inertial and Non-Inertial Frame of Reference, Rotating frame, Fictitious Forces-Centrifugal and Coriolis Forces with their applications (Effect on value of 'g', On path of freely falling body)

Introduction to special theory of relativity & its postulates

Suggested Books :

1. H. Goldstein, C. P. Poole and J. F. Safko, Classical Mechanics, Addison-Wesley
2. N. C. Rana and P. S. Joag, Classical Mechanics, Tata McGraw-Hill.
3. L. D. Landau and E. M. Lifshitz, Mechanics,Butterworth-Heinemann.
4. S. L. Gupta, V. Kumar and H. V. Sharma, Classical Mechanics, PragatiPrakashan.
5. R. D. Gregory, Classical Mechanics,Cambridge University Press.
6. Classical mechanics- J.C. Upadhyay
7. Classical mechanics-A.B Gupta

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MIC -I (P)-1 Credit

Introduction to Mathematical Physics & Classical Mechanics

The theory involved in the prescribed practical should be discussed in class and students should be made familiar with associated concepts.

1. Elementary measuring apparatus – Use of Vernier calliper, Screw guage and Spherometer.
2. To determine least Count of (i) Travelling Microscope (ii)Spectrometer (iii) Polarizer.
3. To Evaluate value of "g" using Bar Pendulum
4. To Evaluate value of "g" using Kater's Pendulum
5. To Verify Conservation of linear Momentum using curved track apparatus.
6. To Determine Young's modulus of Elasticity by Flexure of Beam
7. To Determine Elastic constants for the material of a wire by Searle's method
8. To Determine Surface Tension by method of ripples/use of Capillary tube
9. To Determine Co-efficient of Viscosity of liquid by Stokes method/Poiseuille's method of flow of water through Capillary.
10. To study the motion of spring-mass system and to evaluate spring constant/value of 'g'.

The CIA examination in Practical should be just as Mock test and it must be on the Pattern of proper 3hrs End- semester Examination.

Sl. No.	Component	CIA	End- Semester
1	Experiment Allotted	15	45
2	Continuous Pratical Record	05	10
3	Viva-Voce	10	15
		30	**70**
		Total = 100 Marks	

Suggested Books :

1. Advanced Practical Physics for students, B.L.Flint and H.T.Worsnop, 1971, Asia Publishing House
2. A Text Book of Practical Physics, I.Prakash& Ramakrishna, 11th Ed., 2011, Kitab Mahal
3. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition
4. A Laboratory Manual of Physics for undergraduate classes, D.P.Khandelwal, 1985, Vani Pub.
5. Properties of Matter- D. S. Mathur

14-06 Apd 14.6.23.

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Multidisciplinary Course (3 Credit)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Physics Around Us	3	3	0

Course Outcomes

After completion of the course, the student will be able to-

CO 1-Understand the physical laws governing climate and atmosphere
CO2- Explore the use of Physics in agriculture and its product Preservation.
CO3-Importance of Renewable energy and Physics behind its various harvested types.

Physics Around Us

UNIT **1** **01 Credit (15 hrs)**

Climate Science

Atmospheric science as multidisciplinary science, physical and dynamical metrology weather climate variables, and their difference. Surface weather station weather forecasting, Greenhouse effect, Physics of Climate change and Climate model

Unit 2 **01 Credit (15 hrs)**

Applications of Physics

Application in Agriculture,Agro Physics,Agro ecosystem,Soil Physics, Food preservation,Physics behind medical imaging, LASER –Surgery.

Unit 3 **01 Credit (15 hrs)**

Energy Sources- Importance of Renewable energy ; solar energy, hydro thermal energy, Geothermal Energy, Hydrogen based Fuel , CNG , Energy Harvesting

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Skill Development Course

Course Title	Credit	Credit Distribution	
		Theory	Practical
Physics Workshop Skill	3	1	2

Course Outcomes

After completion of the course, the student will be able to-
CO 1-Apply basic tools in Day-to-day applicaton

CO 2-Use acquired skills for detecting and correcting House hold electrical circuit and appliance

CO 3-Utilize acquired skills in market, as per the interest.

Physics Workshop Skill

Unit	Topics to be covered	Hours
1	**Introduction:** Measuring units. Conversion to SI and CGS unit. Familiarization with meter scale, Vernier calliper, Screw gauge Stop watch and Spherometer their utility. Measure the dimension of a solid block , thickness of metal sheet,. Archimedes Principle	15
	Practical (Hands on Training) **1.**To determine the height of a building using a Sextant **2.**Measurement of volume of a cylinder using vernier caliper. **3.** Measurement of diameter of thin wire using screw gauge, **4.**To learn working on Travelling Microscope. **5.** To determine the acceleration due to gravity using a simple pendulum. **6.**Use of Fuse & MCB in circuit **7.** Installing a new Plug. **8.** Use of multimeter / Soldering of electrical circuit. **9.** Repair an electric cord/ iron/ kettle. **10.** Study of Regulator power supply of a building.	30

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APd 14.6.23.

Value Added Course

Course Title	Credit	Credit Distribution	
		Theory	Project
Great Indian Scientists	3	2	1

Course Outcomes

After completion of the course, the student will be able to-

CO1-understand the importance of Scientific thinking and benefits of Consistant exploration.

CO2-recognize the benefits of consistent small efforts over cozy technological use

CO3-learn about contribution of Indian Scientist for national development and about Indian knowledge system.

CO4-realise the lead role of Indian Women in area of Science and Technology

Great Indian Scientists

Unit I **01 Credit (15 hrs)**

Life and work of Indian Scientists-I

Dr. C.V. Raman (Raman effect & Indian Academy of Science), Homi Jahangir Bhabha (Indian Nuclear Programme &Atomic Energy Commission), Sir Jagdish Chandra Bose (Radio-wave optics & Bose Institute), Dr. Vikram Sarabhai (Indian Space Program &Physical Research Laboratory) , Satendra Nath Bose (Bose Einstein work), Dr. Prafull Chandra Mahalanobis (Statistician, I.S.I)

Unit II **01 Credit (15 hrs)**

Life and work of Indian Scientists-II

M.G.K Menon (KGF Particle, TIFR), M.S. Swaminathan (Green Revolution, Agriculture Research), Shanti Swaroop Bhatnagar (colloid chemistry & CSIR), Bidhan Chandra Roy (National Doctor's Day) Verghese Kurien (White Revolution)

Unit III **01 Credit (15 hrs)**

Indian Women in Science

Janaki Ammal (Da Botanical Survey of India), Asima Chatterjee (Phyto Chemistry), Rajeshwari Chatterjee (1st Electrical & Communication energy Engineer), Dr. Kamale Solonie (1st Ph.D. holder), Anandi Bai Gopal Roy Joshi (1st Women Physician), Dr. Indra Hinduja (In-Vitro fertilisation)

NOTE:- *Students may undertake project on Scientific work of any Indian Scientist of their choice .*

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Semester-2
Major Course II (MJC-2)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Oscillations and Waves	6	4	2

Oscillations and Waves

Course Outcomes
After completion of the course, the student will be able to-
CO 1-understand the concept of Periodic and Oscillatory motion with application of free , Damped and Forced Oscillation in Physical Situation.
CO2-learn application of Lissajou Figure in different Physical Problems
CO3-explore the working of various Musical Instrument.
CO4-understand the Physics behind Accoustic of Building.
CO5-know the technique of sound Recording and Reproduction.

MJC -II(T)-4 Credit

Unit I :- Basics of Oscillations **01 Credit (15 hrs)**

Idea of S.H.M., its differential equation and solutions, Energy in S.H.M, Two body oscillation, coupled Pendulum: Normal modes of vibration, Compound Pendulum, Free, Damped and Forced Oscillations, Transient and steady states, Electrical Oscillations Resonance: Sharpness of Resonance and Quality factor.

Unit II :- Superposition of Oscillations **01 Credit (15 hrs)**

Addition of two S.H.Ms: Concept of Lissajou Figure, its Geometrical Composition & Application, Stationary waves as combination of oscillations (Waves in a linear bounded medium), Vibration of string and Sonometer .

Unit III :-Wave Motion **01 Credit (15 hrs)**

Wave front, Equation of Wave Motion, Superposion of two Harmonic waves : Interference, Beats & combination of tones, pressure, energy and intensity in wave propation, musical instruments.

Unit IV :- Sound Waves **01 Credit (15 hrs)**

Sound wave: Proparation and speed of sound (Accoustic) waves in media , speed in air : Newton's formula & Laplace Correction. Characteristics of Musical sounds & their analysis, Musical scale & consonance, Sound recording and reproduction, Accoustic of Buildings.

Suggested Books :

1. Waves & Oscillation- B. S. Agrawall .
2. Waves & Oscillation- Dongre & Bhattacharya
3. The Physics of Vibrations and Waves, H. J. Pain, John Wiley & Sons Ltd.
4. The Physics of Waves and Oscillations, N.K. Bajaj, 1998, Tata McGraw Hill
5. Waves and Oscillations, N Subrahmanyam, Brij Lal, Vikas Publishing House Pvt Ltd.
6. Theory of Vibration- W. T. Thomson
7. A Textbook of Sound- D.R. Khanna & R.S Bed.

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MJC -II (P)-2 Credit

Oscillations and Waves

The theory involved in the prescribed practical should be discussed in class and students should be made familiar with associated concepts.

At least 6 experiments must be performed:-

1- To determine frequency of Tuning Fork using Sonometer / verify laws of transverse vibration of stretched string
2- To determine frequency of Tuning Fork using Electrically maintained Melde's apparatus.
3- To determine the frequency of A. C. Mains using a sonometer and an electromagnet.
4- To Find the Speed of sound in the materials of given rod with a Kundt's tube / Quincke's tube.
5- To determine Speed of Ultrasonic waves in any given liquid (e.g. Kerosene)
6- To study motion of Spring – Mass System.
7- To study the directional characteristic of Microphone using signal Generator, Amplifier, microphone, multimedia & C. R. O.
8- To determine the damping constant , relaxation time and quality factor of damped mechanical oscillator using simple Pendulum with bobs of different material (Aluminium , Brass, Wood etc.)
9- To determine torsional constant using Torsional Pendulum.
10- To determine speed of sound using Resonance column Apparatus.

The CIA examination in Practical should be just as Mock test and it must be on the Pattern of proper 3hrs End- semester Examination.

Sl. No.	Component	CIA	End- Semester
1	Experiment Allotted	15	45
2	Continuous Pratical Record	05	10
3	Viva-Voce	10	15
		30	**70**
		Total = 100 Marks	

Suggested Books :

1. Advanced Practical Physics for students, B. L. Flint and H. T. Worsnop, 1971, Asia Publishing House.
2. Engineering Practical Physics, S. Panigrahi & B. Mallick, 2015, Cengage Learning India Pvt. Ltd.
3. Practical Physics, G. L. Squires, 2015, 4/e, Cambridge University Press.
4. A Text Book of Practical Physics, I. Prakash & Ramakrishna, 11/e, 2011, Kitab Mahal.

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Minor Course II (MIC-2)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Oscillations and Waves	3	2	1

MIC -II (T)-2 Credit

Oscillations and Waves

Course Outcomes

After completion of the course, the student will be able to-

CO 1-understand the concept of Periodic and Oscillatory motion with application of free , Damped and Forced Oscillation in Physical Situation.

CO2-learn application of Lissajou Figure in different Physical Problems

CO3-explore the working of various Musical Instrument.

CO4-understand the Physics behind Acoustics of Building.

CO5-know the technique of sound Recording and Reproduction

Unit I :- **01 Credit (15 hrs)**

Idea of S.H.M, Free, Damped & Forced Oscillation, Superpostion of two collinear and Perpendicular Simple Harmonic motion, Concept of Lissajou Figure & Stationary Waves.

Unit – II :- **01 Credit (15 hrs)**

Waves Characteristic of Wave Motion, Sound Wave, Equation of Plane Progressive Waves, Speed of sound (Newton's & Laplace Formula), Energy Transport & Intensity of Waves.

Suggested Books :

1. The Physics of Vibrations and Waves, H. J. Pain, john Wiley & Sons Ltd.
2. The Physics of Waves and Oscillations, N.K. Bajaj, 1998, Tata McGraw Hill
3. Waves and Oscillations, N Subrahmanyam, Brij Lal, Vikas Publishing House Pvt Ltd.
4. Waves & Oscillation – B.S. Agrawall
5. Waves & Oscillation – A.B Gupta

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MIC -II (P)-2 Credit

Oscillations and Waves

The theory involved in the prescribed practical should be discussed in class and students should be made familiar with associated concepts.

At least 6 experiments must be performed:-

1- To determine frequency of Tuning Fork Using Sonometer / verify laws of transverse vibration of stretched string
2- To determine frequency of Tuning Fork using Electrically maintained Melde's apparatus.
3- To determine the frequency of A. C. Mains using a sonometer and an electromagnet.
4- To find the speed of sound in the materials of given rod with a Kundt's tube / Quincke's tube.
5- To determine speed of ultrasonic waves in a given liquid (e.g. Kerosene)
6- To study motion of spring – mass system and find g.
7- To study the directional characteristic of Microphone using signal Generator, Amplifier, microphone, multimedia & C. R. O.
8- To determine the damping constant, relaxation time and quality factor of damped simple pendulum with bobs of different material (Aluminum, Brass, Wood, etc.)
9- To determine torsional constant using a Torsional Pendulum.
10- To determine speed of sound using Resonance column Apparatus.

The CIA examination in Practical should be just as Mock test and it must be on the Pattern of proper 3hrs End- semester Examination.

Sl. No.	Component	CIA	End- Semester
1	Experiment Allotted	15	45
2	Continuous Pratical Record	05	10
3	Viva-Voce	10	15
		30	**70**
		Total = 100 Marks	

Suggested Books:

1. Advanced Practical Physics for students, B. L. Flint and H. T. Worsnop, 1971, Asia Publishing House.
2. Engineering Practical Physics, S. Panigrahi& B. Mallick, 2015, Cengage Learning India Pvt. Ltd.
3. Practical Physics, G. L. Squires, 2015, 4/e, Cambridge University Press.
4. A Text Book of Practical Physics, I. Prakash & Ramakrishna, 11/e, 2011, Kitab Mahal.

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Multidisciplinary Course (3 Credit)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Crystallography	3	3	0

(03 Credit)

Course Outcomes

After completion of the course, the student will be able to-

CO 1-understand the structure of various crystal

CO2- know the theoretical framework like symmetry and space groups

CO3-know characterization of crystal using diffraction technique

CO4-know the analysis of collected diffraction data

Crystallography

Unit 1 **01 Credit (15 hrs)**

Elements of Crystallography

Unit cell,Lattice and Basis , Symmetry operation for a two dimensional crystal , Two and Three dimensional Bravais lattice. Reciprocal lattice, Lattice constant crystal plane and Miller indices, Inter plannar spacing, Simple crystal structure - hcp ,fcc, bcc SC diamond and Cesium Chloride Structure.

Unit II **01 Credit (15 hrs)**

Crystal Type and Crystal Binding

Ionic Crystal. Covalent crystal, Metal crystal, Molecular crystal. Hydrogen bonded crystal ,Calculation of BE in different type of crystals, Crystal of in inert gases.

Unit III **01 Credit (15 hrs)**

XRay Diffraction

Diffraction , Braggs law , Diffraction methods , Scattering by electrons , atoms. Laue , Bragg and Ewald Work on X- ray diffraction, Indexing of X-ray diffraction

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Skill Development Course (03 Credit)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Web Development	3	1	2

Course Outcomes

After completion of the course, the student will be able to-

CO1: Simple and impressive design techniques, from basics till advanced to focus on goal oriented and user centric designs.

CO2: How to and where to start research, planning for website & actually build excellent web sites.

CO3: To create web elements like buttons, text boxes and various UI designs.

CO4: Forms and validations for website. Setting up page layout, color schemes etc. in the designs.

Web Development

Unit	Topics to be covered	Hours
1	**Concept of Web Development:** A brief Introduction to the Web Development: Computer Networks, Internet, URL (Uniform Resource Locator), Internet Service Provider, Intranet, Extranet, Various Components of Web Development, Static v/s Dynamic Web pages, Introduction to HTML, CSS and Javascript	15
	Practical	
1	**Basics of HTML:** What is Internet Language? Understanding HTML, create a Web page, linking to other WebPages, Publishing HTML Pages, Text Alignment and Lists, Text Formatting Fonts Control, External Links and link within a Page, creating a Table, Creating HTML Forms, Custom Backgrounds and Colors.	10

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2	**Dynamic Webpage Development** **Cascading Style Sheet:** CSS, Defining Style with HTML Tags, Features of StyleSheet, Style Properties, Style Classes, External Style Sheet	10
3	**JavaScript** Introduction to JavaScript: Writing First Java Script, External Java Script, Variables: Rules forvariable names, Declaring the variable, assign a value to a variable, Scope of variable, Using Operators, Control Statements, JavaScript loops, JavaScript Functions: Defining a Function, returning value from function, User define function.	10

Reference:

1. AlamTanweer(2010), Web Designing and Development, Khanna Book Publishing, New Delhi
2. DeepaSonalet. Al.(2021), A trip to Web Designing: HTML, CSS and Javascript, InSc International Publication
3. Jennifer Kyrninet. al. (2023) Mastering HTML, CSS & Javascript Web Publishing, BPB Publication.

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Value Added Course (03 Credit)

Course Title	Credit	Credit Distribution	
		Theory	Project
History Of Science	3	2	1

Course Outcomes
After completion of the course, the student will be able to-

CO 1-understand the origin of science and the correlation between "Cause" & "Effect"

CO2-understand the contribution of Indian Scientists in area of Atomic Energy, Dairy Technology, Agriculture etc.

CO3-understand the legacy of ancient Indian Science.

CO4-understand the Indian calendar system and vedic mathematical calculations

Unit 1 **01 Credit (15 hrs)**

History of Science-

Origin and outline of historiography of science, Ancient Indian science from Vedic age to pre-independence Era, Indian contribution to Technology.

Unit 2 **01 Credit (15 hrs)**

Science in Post Independence era

Development of science In post Independence era, Indian contribution to Science and Technology in the field of Atomic energy ,Dairy technology, Agriculture, Bio-Technology.

Unit 3 **01 Credit (15 hrs)**

Astronomy

Ancient Astronomy, Vedic Astronomy, Modern Astronomy, Tools for Astronomy from early period, Indian Calender System, Computation of Eclipse, Lunar Eclipse ,Solar Eclipse;Full moon.

NOTE:- ***Student must undertake a project on science in ancient India.***

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Proposed Course Structure for 4 Year Undergraduate Programme under CBCS System

Skill Enhancement Course (SEC)

Semester – I (SEC- 1)

Science	Social Science/Arts	Commerce
• Advance Spreadsheet Tools • Basic IT Tolls • Creative Writing • Communication in Everyday life	• Advance Spreadsheet Tools • Public Speaking in English Language & Leadership • Creative Writing • Communication in Everyday life	• Advance Spreadsheet Tools • Digital Marketing • Creative Writing • Communication in Everyday life

Semester – II (SEC- 2)

Science	Social Science/Arts	Commerce
• Big Data Analysis • Beginners Course to Calligraphy • Introduction to Cloud Computing (AWS) • Personality Development & Communication	• Big Data Analysis • Beginners Course to Calligraphy • Personality Development & Communication • पटकथा लेखन	• Big Data Analysis • Beginners Course to Calligraphy • Business Communication • Personality Development & Communication

Semester – III (SEC- 3)

Science	Social Science/Arts	Commerce
• Prospecting E-waste for sustainability • Visual Communication & Photography • Graphic Design & Animation • Statistical Software Package • Communication in Professional Life	• Personal Financial Planning • Visual Communication & Photography • Statistical Software Package • Communication in Professional Life • रचानात्मक लेखन • रंगमंच	• Prospecting E-waste for sustainability • Sustainable Ecotourism & Entrepreneurship • Visual Communication & Photography • Statistical Software Package • Communication in Professional Life

LIST OF SKILL ENHANCEMENT COURSES (SEC)

SL. NO.	Course Title	LTP Distribution of the Course			Total Credits:	Total Marks = 100
		L	T	P		
1	Advance Spreadsheet Tools	1	0	3	3	End -Term Appraisal : 70 Marks Internal Assessment: 30 Marks
2	Basic IT Tolls	1	0	3	3	
3	Beginners Course to Calligraphy	1	0	3	3	
4	Big Data Analysis	1	0	3	3	
5	Business Communication	1	0	3	3	
6	Communication in Everyday life	1	0	3	3	
7	Communication in Professional Life	1	0	3	3	
8	Creative Writing	1	0	3	3	
9	Digital Marketing	1	0	3	3	
10	Graphic Design & Animation	1	0	3	3	
11	Introduction to Cloud Computing (AWS)	1	0	3	3	
12	Personal Financial Planning	1	0	3	3	
13	Personality Development & Communication	1	0	3	3	
14	Prospecting E-waste for sustainability	1	0	3	3	
15	Public Speaking in English Language & Leadership	1	0	3	3	
16	Statistical Software Package	1	0	3	3	
17	Sustainable Ecotourism & Entrepreneurship	1	0	3	3	
18	Visual Communication & Photography	1	0	3	3	
19	पटकथा लेखन	1	0	3	3	
20	रंगमंच	1	0	3	3	
21	रचानात्मक लेखन	1	0	3	3	

Skill Enhancement Course (SEC)

- ***Course Title - Advance Spreadsheet Tools***

Learning Objectives

The Learning Objectives of this course are as follows:

- To enable the students to use Excel for advanced data analysis
- To equip the students to with automation skills on excel
- To enable the students to use excel for informed decision making.

Learning outcomes

The Learning Outcomes of this course are as follows:

- By studying this course, students will be able to make meaningful representations of data in the form of charts and pivot tables.
- By studying this course, students will be able to draw analysis on data using spreadsheets and use interpretation to make decisions.
- By studying this course, students will be able to generate word documents with appropriate formatting, layout, proofing.
- By studying this course, students will be able to manage data for generating queries, forms and reports in a database.

SYLLABUS

Unit 1: Excel Advanced Techniques

Templates, Efficiency, and Risk (Standard Deviation, Variance, and Coefficient of Variation), Data Validation; *Functions and Power functions, Array Formulae (Frequency Distribution, mode.mult, mode.sngl), Tables, Advanced Range Names, What-if-analysis: Goal-seek, Data tables, and Scenario Manager; Data analysis ToolPak: Descriptive Statistics, Moving averages, Histogram, Covariance, correlation, and Regression analysis (only for projection); solver add in. Problem Solving using Solver (optimal product mix, workforce scheduling, transportation, capital budgeting, financial planning), Integrating excel with other tools: MS word, outlook, PowerPoint, Access, Power BI.

Unit 2: Excel Interactivity and Automation

Index and Match, Offset, Dynamic Charting, Database functions, Text functions, and Error functions: IfError, IsError, Aggregate, Circular Reference, Formula Auditing, Floating-Point Errors, Form Controls (Button, Combo, Check box, Spinner, List, Option), Visual Basic (only basic). Recording Macros, Absolute and relative macros, editing macros, Use of spinner buttons and command buttons; Sub Procedure, Function Procedure (creating New Functions); Working with Loops: Do_while loop, For_Next loop; Creating User Forms: Message Box, Input Box; If_Then_Else.

Unit 3: Introduction to VBA

Conditional Formatting, Charts that Inspire (Waterfall, Column, Line, Combo, Thermometer, Scatter, Histogram) Sheers, Sparklines, Graphics Tricks and Techniques, Worksheet Automation using Macros: Absolute and relative macros, editing macros, Creating new functions using macros, Use of spinner buttons and command buttons.

Unit 4: Data Analysis and Decision-Making

Working with External Data, Advanced Uses of PivotTables, PowerPivot, Reporting with PowerPivot, Power query, Dashboard, Creating a spreadsheet in the area of: Loan and Lease statement; Ratio Analysis; Payroll Accounting; Capital Budgeting (NPV & IRR), Portfolio Management, Breakeven analysis, and Sensitivity analysis; Operations Management: Constraint, Forecasting & Trend Analysis optimization, Assignment Problems; Depreciation Accounting (Single Method); Graphical representation of data; Frequency distribution and its statistical parameters; Correlation and Regression Analysis

Essential/recommended readings

- Excel 2016 Power Programming with VBA, Michael Alexander, Dick Kusleika, Wiley.
- Financial Analysis and Modelling Using Excel and VBA, Chandan Sengupta, Second Edition, Wiley Student Edition.
- MS Excel 2016, Data Analysis & Business Modelling, Wayne Winston, PHI.

Suggestive readings

- Microsoft Excel 2016 - Data Analysis and Business Modelling Paperback - 1 May
- 2017 Wayne L. Winston, Microsoft Press.
- Microsoft Excel Practical Formulae: From Basic Data Analysis to Advanced
- Formulae
- Manipulation Diane Griffiths.

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- ***Course Title – Basic IT Tools***

Learning Objectives

The Learning Objectives of this course are as follows:

- To enable students develop IT skills that are a pre-requisite in today's work environment.
- To equip them with basic computing skills that will enhance their employability in general.
- To enable the student to analyse and present information in a meaningful manner.

Learning outcomes

The Learning Outcomes of this course are as follows:

- By studying this course, students will be able to use word-processor to generate documents with appropriate formatting, layout, review and referencing.
- By studying this course, students will be able to manage data in worksheets and workbooks and analyze it using spreadsheet functions and inbuilt formulas.
- By studying this course, students will be able to draw analysis on data using spreadsheets to make decisions.
- By studying this course, students will be able to make meaningful representations of data in the form of charts and pivot tables.
- By studying this course, students will be able to manage data in database tables and use the same for generating queries, forms and reports.

SYLLABUS

Course Contents:

Unit 1: Introduction to Spreadsheets

Spreadsheets: Concept of worksheets and workbooks, creating, opening, closing and saving workbooks, moving, copying, inserting, deleting and renaming worksheets, working with multiple worksheets and multiple workbooks, controlling worksheet views, naming cells using name box, name create and name define; Exchanging data using clipboard, object linking and embedding; Printing and Protecting worksheets: Adjusting margins, creating headers and footers, setting page breaks, changing orientation, creating portable documents and printing data and formulae; Implementing file level security and protecting data within the worksheet; Understanding absolute, relative and mixed referencing in formulas, referencing cells in other worksheets and workbooks, correcting common formula errors, working with inbuilt function categories like mathematical, statistical, text, lookup, information, logical, database, date and time and basic financial functions.

Unit 2: Data Analysis in Spreadsheets

Consolidating worksheets and workbooks using formulae and data consolidate command; Choosing a chart type, understanding data points and data series, editing and formatting chart elements, and creating sparkline graphics, Analysing data using pivot tables: Creating, formatting and modifying a pivot table, sorting, filtering and grouping items, creating calculated field and calculated item, creating pivot table charts, producing a report with pivot tables. Introduction to recording and execution of macros.

Unit 3: Word Processing

Introduction: Creating and saving your document, displaying different views, working with styles and character formatting, working with paragraph formatting techniques using indents, tabs, alignment, spacing, bullets and numbering and creating borders; Page setup and sections: Setting page margins, orientation, headers and footers, end notes and foot notes, creating section breaks and page borders; Working with tables: Creating tables, modifying table layout and design, sorting, inserting graphics in a table, table math, converting text to table and vice versa; Create newspaper columns, indexes and table of contents, Spell check your document using inbuilt and custom dictionaries, checking grammar and style , using thesaurus and finding and replacing text; Create bookmarks, captions and cross referencing, adding hyperlinks, adding sources and compiling and bibliography; Mail merge: Creating and editing your main document and data source, sorting and filtering merged documents and using merge instructions like ask, fill-in and if-then-else; Linking and embedding to keep things together.

Unit 4: Databases

Introduction to Database Development: Database Terminology, Objects, Creating Tables, working with fields, understanding Data types, Changing table design, Assigning Field Properties, Setting Primary Keys, using field validation and record validation rules, Indexing, working with multiple tables, Relationships & Integrity Rules, Join Properties, Record manipulation, Sorting & Filtering; Select data with queries: Creating Query by design & by wizard (Select, Make Table, Append, Delete, Cross Tab, Update, Parameterized Query, Find Duplicate and Find Unmatched), Creating multi table queries, creating & working with table joins. Using operators & expressions: Creating simple & advance criteria; Working with forms: Creating Basic forms, working with bound, unbound and calculated controls, understanding property sheet, Working with Data on Forms: Changing Layout, creating Sub Forms, creating list box, combo box and option groups; Working with Reports: Creating Basic Reports, Creating Header & Footer, Placing Controls on reports, sorting & grouping, Creating Sub reports.

Essential/recommended readings

- Swinford, E., Dodge, M., Couch, A., Melton, B. A. (2013). Microsoft Office Professional 2013. United States: O'Reilly Media.
- Wang, W. (2018). Office 2019 For Dummies. United States: Wiley. Microsoft
  Lambert, J. (2019). Microsoft Word 2019 Step by Step. United States: Pearson Education.

Suggestive readings

- Jelen, B. (2013). Excel 2013 Charts and Graphs. United Kingdom: Que.
- Alexander, M., Jelen, B. (2013). Excel 2013 Pivot Table Data Crunching. United Kingdom: Pearson Education.
- Alexander, M., Kusleika, R. (2018). Access 2019 Bible. United Kingdom: Wiley.

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- ***Course Title*** **– Beginners Course to Calligraphy**

Learning Objectives

The Learning Objectives of this course are as follows:

- To teach students the art of Calligraphy.
- To make students better at handwriting and embellish the scripts.
- To help the students communicate with creativity.

Learning outcomes

The Learning Outcomes of this course are as follows:

- Students will be skilled in calligraphy scripts.
- Learning flourishing will help to develop good writing.
- Practice sessions will further a project at the end of semester.
- Will induce skills to set up a business, too.

SYLLABUS

Unit 1: Introduction to Calligraphy

- Definition, History of calligraphy, Calligraphy at the Global level, Types of Calligraphy:Classical Calligraphy & Modern Calligraphy
- Practice Sessions: Introducing students to Calligraphy and its types through images,videos and animations.

Unit 2: Introduction to the Writing tools

- Tool Kit, Different Types of Pens, Different Types of Nibs, Different Types of Brushes, Different Types of Inks
- Practice Sessions: Display of Writing items, Discussion on the usage of different types of pens, nibs and brushes through hands-on activities

Unit 3: Foundation to Calligraphy

- How to write letters?, Majuscules, Miniscules, Numbers, Learning Strokes, Sans SerifB- point, Celtic, Italian Script, Roman Script, Gothic Script
- Practice Sessions: Learning and practicing strokes- Upstroke, Downstroke, Overturn, Underturn, Compound curve, Oval, Ascending loop
- Hands-on activities and Assessment on Sans Serif B-point, Celtic, Italian Script,Roman Script, Gothic Script, Flourishing

Essential/recommended readings

- Suepsuan, P. A. (2021). Start Calligraphy The Right way to write: Learn Calligraphy The Complete Book - Modern Calligraphy Pen For Beginners, Learning Resources Step By Step Number Line, Mastering Modern Calligraphy. Independently published.
- C., & Co., T. P. (2020). Modern Calligraphy Set for Beginners: A Creative Craft Kit for Adults featuring Hand Lettering 101 Book, Brush Pens, Calligraphy Pens, and More. Paige Tate & Co.

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• Course Title – Big Data Analytics

Learning Objectives

The Learning Objectives of this course are as follows:

- To Understand the Big Data Platform and its Uses
- Provide an overview of Apache Hadoop
- Provide HDFS Concepts and Interfacing with HDFS.
- Provide hands on Hadoop Eco System
- To understand spark framework

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to identify Big Data and its Business Implications.
- After studying this course, students will be able to list the components of Hadoop and Hadoop Eco-System.
- After studying this course, students will be able to access and process data on distributed file system,
- After studying this course, students will be able to manage job execution in Hadoop environment.
- After studying this course, students will be able to develop Big Data Solutions using Hadoop Eco System.

SYLLABUS

Unit 1: Fundamentals of Big Data Analysis

Data Storage and Analysis, Characteristics of Big Data, Big Data Analytics, Typical Analytical Architecture, Requirement for new analytical architecture, Challenges in Big Data Analytics - Need of big data frameworks

Unit 2: Hadoop Framework

Hadoop, Requirement of Hadoop Framework, Design principle of Hadoop -Comparison with other system, Hadoop Components - Hadoop 1 vs Hadoop 2, Hadoop Daemon's - HDFSCommands, Map Reduce Programming: I/O formats, Map side join, Reduce Side Join, Secondary sorting, Pipelining Map Reduce jobs

Unit 3: HDFS (Hadoop Distributed File System)

The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.

Unit 4: Spark Framework and Data Analysis with Spark Shell

Introduction to GPU Computing, CUDA Programming Model, CUDA API, Simple Matrix, Multiplication in CUDA, CUDA Memory Model, Shared Memory Matrix Multiplication, Additional CUDA API Features. Writing Spark Application - Spark Programming in Scala, Python, R, Java - Application Execution.

Practical Exercises

- Downloading and installing Hadoop.
- Understanding different Hadoop modes. Startup scripts, Configuration files.
- Hadoop Implementation of file management tasks, such as Adding files and directories, retrieving files and Deleting files.
- Run a basic word count Map reduce program to understand map reduce paradigm: To count words in a given file, to view the output file, and to calculate the execution time.
- Map Reduce Program to analyse time-temperature statistics and generate report with max/min temperature.
- Implement of Matrix Multiplication with Hadoop Map Reduce.
- Implementation of K-means clustering using Map Reduce.
- To study and implement basic functions and commands in R programming.
- To build Word cloud, a text mining method using R for easy to understand and visualization than a table data.
- To implement clustering program using R programming

Essential/recommended readings

- Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.
- Mike Frampton, "Mastering Apache Spark", Packt Publishing, 2015.
- Tom White,"Hadoop:TheDefinitiveGuide",O'Reilly,4thEdition,2015.
- Nick Pentreath, Machine Learning with Spark, PacktPublishing,2015.
- Mohammed Guller, Big Data Analytics with Spark, Apress,2015.
- Donald Miner, Adam Shook, "Map Reduce Design Pattern", O'Reilly, 2012

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- ***Course Title*** **– Business Communication**

Learning Objectives

The Learning Objectives of this course are as follows:

- To train students to enhance written as well as oral communication in the corporate world.
- To help students in understanding the principles and techniques of business communication.
- To understand the use of electronic media for communication.

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to explain the need for communication in management.
- After studying this course, students will be able to appreciate the need of effective writing for communication.
- After studying this course, students will be able to demonstrate the skill of effective report writing and summarizing annual reports.
- After studying this course, students will be able to analyse business correspondence and e-correspondence.
- After studying this course, students will be able to appreciate oral presentations.

SYLLABUS

Unit 1: Introduction to the essentials of Business Communication
Meaning, process and functions. Need and importance. Medium: verbal & non-verbal communication. Channels: formal & informal. Levels of communication. Direction of communication: downward, upward, lateral, & diagonal. Effective communication: difficulties/barriers and solutions. Interactive and non-interactive techniques of communication. Listening as a tool of communication, Guidelines for effective listening.

Unit 2: Effective Writing
Guidelines for clear writing. References, bibliographical research tools. Citing methods, footnotes, discussion footnotes. Use of library and internet for collection, classification and interpretation of data and information.

Unit 3: Report Writing
Types of reports. Formal report: components and purpose. Organising information: outlining & numbering sections, section headings, sub-headings, & presentation. Writing reports on field work/visits to industries, business concerns. Summarising annual reports of companies: purpose, structure and principles. Drafting minutes.

Unit 4: Business Correspondence and E-Correspondence
Need and importance of business letters. Office memorandum, office circulars, notices and orders. Technology for communication. Effective IT communication tools. Electronic mail: advantages, safety and smartness in email. E-mail etiquettes.

Unit 5: Spoken English and Oral Presentation
Effective negotiation: elements, process and general guidelines. Telephonic conversation. Conducting & facing interviews. Conducting & participating in group decisions. Making presentations: content and organising. Features of a good presentation. Delivering a presentation.

Practical Exercises:

The learners are required to:

- learn how to summarise annual reports of companies.
- prepare presentations using power-point.
- participate in Group discussions and mock interviews.
- smartly draft business emails.

Essential/recommended readings

- C.B.Gupta (2019). Essentials of Business Communication, Sultan Chand & Sons.
- Kaul, A. Effective Business Communication, 2nd ed. PHI learning
- Lesikar, R.V. & Flatley, M.E. (2001). Basic Business Communication Skills for Empowering the Internet Generation, Tata McGraw Hill Publishing Company Ltd. New Delhi.
- Ludlow, R. & Panton, F.(1992). The Essence of Effective Communications, Prentice Hall of India Pvt. Ltd., New Delhi.
- Meyer C,Dev(2021). Communicating for Results,Oxford University Press
- Quintanilla, Kelly M, (2021), Business and Professional Communication, 4e, Sage Textbook
- R. C. Bhatia (2008), Business Communication, Ane Books Pvt Ltd, New Delhi.
- Raman and Singh(2012). Business Communication. Oxford University Press
- Scot, O., Contemporary Business Communication. Biztantra, New Delhi.

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- ***Course Title*** **– Communication in Everyday Life**

Learning Objectives

The Learning Objectives of this course are as follows:

- To lay down a basic foundation for basic communication that is a part of a student'severyday life.
- To inculcate the fundamentals of communication with the aim to enhance listening,speaking and writing skills.
- To hone practical skills that can be used in day-to-day affairs.

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to improve mediation skills.
- After studying this course, students will be able to building human relationships.
- After studying this course, students will be able to foster societal understanding
- &develop an independent perspective.
- After studying this course, students will be able to enhance social Communication skills of students.

SYLLABUS

UNIT 1
Theory of Communication

- Meaning, Features, Uses, Cycle, Feedback, Advantages
- Barriers
- 7 C's of Communication

UNIT 2
Listening Skills

- Netiquettes
- Audio-book Listening & Discussions
- Note-taking

UNIT 3
Speaking Skills

- Oral Presentation- Audio-Visual aids, Audience & Feedback, Delivery ofPresentation, Handling Questions
- Group Discussion- Culture & History, Current Affairs, Society-related
- Public Speaking- Public Speech, Extempore
- Interview- Personal, Conversational, Public

UNIT 4
Reading Skills

- Close Reading
- Skimming
- Scanning

UNIT 5
Writing Skills

- Summarising
- Paraphrasing
- Note-making
- Essays- Expository Essay, Descriptive Essay, Narrative Essay
- Letter Writing- Formal Letter, Informal Letter

- Reports- Incidence, Newspaper, Organisational Report
- Analysis & Interpretation- Textual
- Intra & Inter-personal Skills - Monologue, Dialogue

Suggested Readings

- Chaudhary, Shoma. "Understanding Interviews, Billy Elliot is my Story, Only LessHappy". Tehelka: The People's Paper, 18 February 2006.
- Kumar, Dinesh. "Understanding Values, Our Muddled Generation". The Hindu, 26March 2006.
- Learning to Write I, "Free Writing". In Fluency in English II, ed. Varma, Pramodiniand Mukti Sanyal, pp. 1-5, Oxford, New Delhi, 2015.
- Learning to Write II, "Editing". In Fluency in English II, ed. Varma, Pramodini andMukti Sanyal, pp. 25-27, Oxford, New Delhi, 2015.
- Learning to Write III, "What makes Good Writing Good". In Fluency in English II, ed. Varma, Pramodini and Mukti Sanyal, pp. 48-51, Oxford, New Delhi, 2015.

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Course Title – Communication in Professional Life

Learning Objectives

The Learning Objectives of this course are as follows:

- To prepare the students for their upcoming professional fields.
- To inculcate the fundamentals of professional and business communication.
- To learn aspects of global communication.
- To enhance employability skills of the learners by enabling them to write effective resumes and face interviews with confidence

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to improve presentation skills to be learnt by effective use of verbal and non-verbal communication for the professional field.
- After studying this course, students will be able to acquire practical employability skills to be disseminated through focused sessions on practical employable knowledge.
- After studying this course, students will be able to enhance professional communication.
- After studying this course, students will be able to improve persuasion and negotiation skills which will be useful for the professional field.

UNIT 1

- Theory of Business Communication
- Introduction
- What is Business Communication?
- Language of Business Communication
- Cultural Components - Cross-Cultural Communication, Cultural Shock, Stereotyping, Ethnocentrism
- Miscommunication & Effective Communication

UNIT 2
Listening Skills

- Netiquettes
- Audio-book Listening & Discussions
- Note-taking

UNIT 3
Speaking Skills

- Presentation Skills- Oral Presentation, Ppt. Preparation, Ppt. Presentation
- Group Discussion
- Talks- Domain-specific, Ted-Talks, Business Meets, Motivational Talks
- Telephonic Skills
- Persuasion Skills
- Meeting & Negotiation
- Interview- Promotion Interview, Job Interview, Business Interview
- Functions and activities of PR

UNIT 4

Writing Skills

- Summarising & Paraphrasing
- Job-Oriented Skills- CV, Resume & Bio- Data, Job Application Letter
- Documentation
- Advertisements & Invitation
- Letter Writing- Applications, Business Letters
- Report- Analytical Report, Project Report
- Digital Communication in Social Space- Social Media Posts (Twitter, Facebook), Blog Writing, Review Writing
- Advertisement/Invitation/Poster Designing- Canva/MS Word/Coral
- Memo, Office Order, Minutes
- Making Online Academic/Work Profile- LinkedIn

Suggested Readings

- Kaushik, J.C. and K.K. Sinha eds., English for Students of Commerce, OxfordUniversity Press, New Delhi.
- Sethi, Anjana & Bhavana Adhikari, Business Communication, Tata McGraw Hill.
- Anjana Neira Dev, et.al, eds. Business English, Department of English, Universityof Delhi, 2011, Pearson Publications, New Delhi.

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Course Title – Communication in Professional Life

Learning Objectives

The Learning Objectives of this course are as follows:

- To build creative writing skills of students in the main inodes of creative writing vizpoetry, fiction (novel, short stories), non-fiction (life narratives, autobiographies andbiographies) and drama.
- To inculcate practical skills in students by mapping their creative talent which bebeneficial for employability too.
- To perform hands-on-activities to students to develop their creative skills throughpractical sessions.

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to be sensitive to the texture ofliterary language.
- After studying this course, students will be able to develop craft in creative writing.
- After studying this course, students will be able to develop sense of expressingthemselves through poetry/short story/biography.
- After studying this course, students will be able to induce an understanding of therelationship between an individual and society.
- After studying this course, students will be able to get into different fields andpursue versatile career opportunities.
- After studying this course, students will be able to develop an understanding of theatre and performance through drama will also help them to develop observatoryand behavioural skills.
- After studying this course, students will be able to develop a critical thought processand a knack in putting it in words. Students may also utilise the learnings of proofreading and editing for their academic and professional growth.
- After studying this course, students will be able to go for publishing their own work.
- After studying this course, students will be able to write a book and submit.

SYLLABUS

UNIT 1

- Introduction to Creative Writing- Meaning, Importance
- Imagination & Writing- Peer-interaction, Activities on Imagination
- Tropes, Motifs and Figures- Learning tropes, motifs and figures through videos, Discussion on the findings
- Craft of Writing- Figure of Speech, Word Play, Character Creation
- Character Creation- Dialogue Enaction, Learning Characters through discussion on famous writings, Character Analysis, Writing activities on creating different types ofcharacters (gender/social background/ethnicity etc.)

UNIT 2

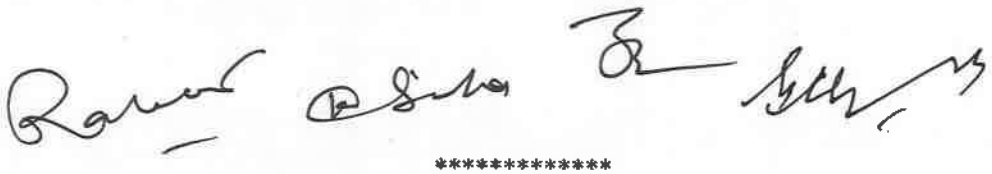
- Close Reading
- Analysis and Interpretation- Reading different works in Literature, Discussionin small groups, Practice Writing Session
- Proofreading & Editing- Practice sessions on Proofreading & Editing of different types of writing

UNIT 3

- Steps of Creative Writing- Pre-Writing, Writing, Post-Writing/Final Draft
- Types of Creative Writing- Poetry, Fiction, Non-Fiction (Life Narratives), Drama
- Creative Writing & Media- Film Review, Book Review, Other Writings in Media, Submission, Publication
- Learning to write Poetry- Reading & understanding Poetry; Practising tone, rhyme, metre, verses; Writing sessions
- Learning to write Fiction- Reading & understanding Fiction; Practicing different elements of fiction (Short story, Novella, Novel); Writing sessions
- Learning to write Non-Fiction- Reading & understanding Non-Fiction (Biographies & Autobiographies); Practicing different elements of non-fiction; Writing sessions
- Learning to write Drama- Reading & understanding Drama; Practicing different elements (plot, character, climax, verbal & non-verbal cues) of Drama; Writing sessions
- Submission & Publication (in Print & Digital) - Discussions over how & where to submit and publish (online/offline), Hands-on activities

Suggested Readings

- *Creative Writing: A Beginners ' Manual* by AnjanaNeira Dev et al. for The Departmentof English, University of Delhi (New Delhi: Pearson, 2008).



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Course Title – Digital Marketing

Learning Objectives

The Learning Objectives of this course are as follows:

- To acquaint the students with the knowledge of growing integration between the traditional and digital marketing concepts and practices in the digital era.
- To familiarize the students with the tools and techniques used by the digital marketers for driving the marketing decisions to attain marketing objectives.

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to understand the concept of digital marketing and its integration with traditional marketing.
- After studying this course, students will be able to understand customer value journey in digital context and behaviour of online consumers.
- After studying this course, students will be able to understand email, content and social media marketing and apply the learnings to create digital media campaigns.
- After studying this course, students will be able to examine various tactics for enhancing a website's position and ranking with search engines.
- After studying this course, students will be able to leverage the digital strategies to gain competitive advantage for business and career.

SYLLABUS

Unit 1: Marketing in the Digital World

Digital marketing: Concept, Features, Difference between traditional and digital marketing, Moving from traditional to digital Marketing; c

Digital Marketing Channels: Intent Based- SEO, Search Advertising; Brand Based-Display Advertising; Community Based-Social Media Marketing; Others-Affiliate, Email, Content, Mobile.

Customer Value Journey: 5As Framework; The Ozone 03 Concept Key; Traits of online consumer

Unit 2: Content and Email Marketing

Content Marketing: Step-by-step Content Marketing Developing a content marketing strategy Email Marketing: Types of Emails in email marketing, Email Marketing best practices

Unit 3: Social Media Marketing and Display Marketing

Social Media Marketing: Building Successful Social Media strategy; Social Media MarketingChannels; Facebook, LinkedIn, YouTube (Concepts and strategies)

Display Advertising: Working of Display Advertising; Benefits and challenges; Overview of Display ad Process.; Define- Customer, Publisher, Objectives; Format-Budget, Media, Ad Formats, Ad Copy.

Unit 4 Search Engine Marketing

Introduction of SEM: Working of Search Engine; SERP Positioning; online search behaviour, DMI's 5P Customer Search Insights Model.
Search Engine Optimization: Overview of SEO Process; Goal Setting-Types.
On-Page Optimization: Keyword Research, SEO Process -Site Structure, Content, Technical Mechanics, Headings, Image & Alt text, Social Sharing, Sitemaps, Technical Aspects- Compatibility, Structured Data Markup.
Off Page Optimisation: Link Formats, Link Building, Content Marketing, Social Sharing; Black and White Hat Techniques
Search Advertising: Overview of PPC Process; Benefits of Paid Search; Basis of Ranking; Goal Setting-Objectives; Account Setting-Creation of Google Ads, Campaign architecture, Campaign setup, Targeting, Bid Strategy, Delivery, Ad Scheduling, Ad Rotation, Keyword Selection; Ad Copy composition, Ad Extension

Essential/recommended readings

- Dodson, I. (2016). The art of digital marketing: the definitive guide to creating strategic, targeted, and measurable online campaigns. John Wiley & Sons.
- Kartajaya, H., Kotler, P., & Setiawan, I. (2016). Marketing 4.0: moving from traditional to digital. John Wiley & Sons.
- Ryan, Damien: Understanding Digital Marketing - Marketing Strategies for Engaging the Digital Generation. Kogan Page Limited.

Suggested Readings

- Moutusy Maity: Internet Marketing: A practical approach in the Indian Context:
- Oxford Publishing
- Seema Gupta: Digital Marketing: Mcgraw Hill
- Ultimate guide to digital Marketing by Digital Marketer

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Course Title – Graphic Design and Animation

Learning Objectives

The Learning Objectives of this course are as follows:

- To introduce the students to the skill of animation.
- To learn about the application of 2D and 3D animation.

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to understand the importance of animation and graphics design
- After studying this course, students will be able to learn graphics design in 2D and 3D animation.
- After studying this course, students will be able to learn the application of graphics design in 2D and 3D animation in advertising and other areas.

SYLLABUS

Unit 1:2D Animation

Introduction to 2D Animation: Introduction to 2D Animation, Drawing concept, Colour theory & basics, Incorporating sound into 2D animation

Layout & Designing: Basic of sketching, still life and assignment of basic drawing, Composition of basic elements, Work in different media, such as drawing, collage, and painting, Explore the relationship between elements and principal, Pixel and resolution: Vector and Bitmap Graphics.**Graphics and advertising (Practical)**

- Creating Digital Layout
- Professional image editing (PHOTOSHOP)
- Advertising and relevant case , Graphics and illustration (Corel Draw, Paint)
- Vector Composition , 2D animation (Macromedia Flash)

Broadcast Design (Practical)

- Working with visual images
- Story Boarding
- Titles and Credit Making
- Stop motion animation

Production / Post-Production (Practical)

- Paint & animate (scanning, tracing, ink & Paint)
- Understanding Background composition
- Basic Understanding of 2D animation and technique
- Animation with flash, Portfolio Making

Unit 2: 3D Animation

3D Modeling: Introduction to 3D space in Blender, Introduction to Modeling Techniques, In-organic Modeling, Organic Modeling

3D Shading: Use of Materials & Shader, Shader and Texture Editing, Shading Organic Model, Shading In-Organic Models

3D Animation and Rigging (Practical)

- Introduction to 3D Animation
- Create, Edit and working with Animation Graph, Rigging using Blender
- Setting up controllers for joints
- Simple Skeleton structure with proper joint orientation

3D Lighting and Rendering (Practical)

- Understanding Lighting in Cycles
- Direct and Indirect Lighting
- Light Linking, Final Composition
- Creating composition and Light with the Shaded Models

3D Dynamics (Practical)

Introduction to Dynamics, Active and Passive Bodies
Creating basic Simulation and collusion using Rigid body
Cloth Simulation, Simulation of Brick wall collusion
Introduction to Fluid Effects, Creating fluid simulation

Project

(Digital Imaging)

- Design Print advertisement for Service
- Design Print advertisement for Product
- Design Print advertisement an Event
- Design Print advertisement on Social Awareness
- Design a collage with a social message

2D Animation

- Drawing fundamentals using lines
- Sketching of cartoon characters
- 2D Logo designing
- Storyboarding of a 30 seconds film
- Portfolio making of an organization

3D Animation

- Exploring the Interface of 3D application & Basic Modeling
- Create different types of Materials and create a Shading
- Create a simple walk cycle using the character rigs
- Create a composition and Light set up
- Create a Fluid simulation & rendering

Suggested Readings:

- The Illusion of Life: Disney Animation, Ollie Johnston and Frank Thomas, Disney Editions.
- Blender Production Creating Short Animations from Start to Finish, Roland Hess, Routledge.
- Animating with Blender: Creating Short Animations from Start to Finish, Roland

Hess, Focal Press

- Simplified Drawing for Planning Animation, Wayne Gilbert, Anamie Entertainment Ltd.
- Getting Started in 3D with Maya, Adam Watkins, Routledge,
- Creating Characters with Personality: For Film, TV, Animation, Video Games, and Graphic Novels, Tom Bancroft, Watson-Guptill
- Force: Dynamic Life Drawing for Animators, Mike Mattesi, Focal Press

Note: Learners are advised to use the latest edition of readings.

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Course Title – Introduction to Cloud Computing (AWS)

Learning Objectives

The Learning Objectives of this course are as follows:

- To learn about cloud computing through Amazon Web Services (AWS) platform.
- To learn about AWS cloud concepts, services, security and architecture to build an application.

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to Understanding cloud computing platform
- After studying this course, students will be able to differentiate between on-premises, hybrid-cloud, and all-in cloud
- After studying this course, students will be able to describe the basic global infrastructure of the AWS Cloud
- After studying this course, students will be able to understanding the core AWS services, including compute, network, databases, and storage.

SYLLABUS

Unit 1

Introduction to cloud computing, Creating AWS account, AWS Management Console, AWS Documentation overview, Availability Zones, AWS Global Infrastructure.

Unit 2

Compute in the Cloud Amazon EC2, instance types.

Unit 3

Storage and Databases: - Amazon Simple Storage Service (Amazon S3),Amazon Relational Database Service (Amazon RDS), Amazon DynamoDB.

Project

Create an AWS account and implement AWS cloud for deploying any application.

Suggested Sources

- Any free platform can be used, for example Amazon, Google, Azure etc.

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Course Title – Personal Financial Planning

Learning Objectives

The Learning Objectives of this course are as follows:

- To familiarize students with different aspects of personal financial planning like savings, investment, taxation, insurance, and retirement planning
- To develop the necessary knowledge and skills for effective financial planning.

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to understand the meaning and appreciate the relevance of financial planning.
- After studying this course, students will be able to understand the concept of investment planning and its methods.
- After studying this course, students will be able to examine the scope and ways of personal tax planning.
- After studying this course, students will be able to analyse insurance planning andits relevance.
- After studying this course, students will be able to develop insight into retirement planning and its relevance.

SYLLABUS

Unit 1: Introduction to Financial Planning:
Financial goals, steps in financial planning, budgeting incomes and payments, time value of money. Introduction to savings, benefits of savings, management of spending & financial discipline, Setting alerts and maintaining sufficient funds for fixed commitments.

Unit 2: Investment Planning:
Process and objectives of investment, concept and measurement of return & risk for various asset classes, measurement of portfolio risk and return, diversification & portfolio formation. Gold bond; Real estate; Investment in greenfield and brownfield Projects; Investment in fixed income instruments, financial derivatives & commodity market in India. Mutual fund schemes; International investment avenues. Currency derivatives and digital currency.

Unit 3: Personal Tax Planning:
Tax structure in India for personal taxation, Scope of personal tax planning, exemptions and deductions available to individuals under different heads of income and gross total income. Comparison of benefits - Special provision u/s 115 BAC vis-a-vis General provisions of the Income-tax Act, 1961, tax avoidance versus tax evasion.

Unit 4: Insurance Planning:
Need for insurance. Life insurance, health insurance, property insurance, credit life insurance and professional liability insurance.

Unit 5: Retirement Benefits Planning:

Retirement planning goals, process of retirement planning, Pension plans available in India, Reverse mortgage, Estate planning.

Practical Exercises:

The learners are required to:

- Perform electronic fund transfers through net banking and UPI.
- Identify certain recent Ponzi schemes in the market.
- Prepare tax planning for a hypothetical individual.

Suggested Readings:

- Halan, M. "Let's Talk Money: You've Worked Hard for It, Now Make It Work for You" Harper Collins Publishers, New York.
- Indian Institute of Banking & Finance. "Introduction to Financial Planning" Taxmann Publication, New Delhi.
- Keown A.J. "Personal Finance" Pearson, New York.
- Madura, J. "Personal Finance", Pearson
- Pandit, A. "The Only Financial Planning Book that You Will Ever Need" Network 18 Publications Ltd., Mumbai.
- Sinha, M. "Financial Planning: A Ready Reckoner" McGraw Hill Education, New York.
- Tripathi, V. "Fundamentals of Investment" Taxmann Publication, New Delhi.

Note: Learners are advised to use the latest edition of readings.

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Course Title – Personality Development and Communication

Learning Objectives

The Learning Objectives of this course are as follows:

- To develop inter personal and effective communication skills.
- To develop problem solving skills and understand its influence on behaviour and attitudes of individuals.

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to understand the importance of oral and written communication in day-to-day working of the organisation.
- After studying this course, students will be able to develop inter personal skills and problem-solving skills.
- After studying this course, students will be able to understand the role of body language in effective communication.

SYLLABUS

Unit 1

Introduction, need for Communication, Process of Communication, Written and Verbal Communication, Visual communication, Signs, Signals and Symbols, Silence as a Mode of Communication, Inter-cultural, Intra-cultural, Cross-cultural and International communication, Communication through Questionnaires, Business Letter Writing, Electronic Communication.

Unit 2

Business Cases and Presentations, Letters within the Organizations, Letters from Top Management, Circulars and Memos, Business Presentations to Customers and other stakeholders, presenting a Positive Image through Verbal and Non-verbal Cues, Preparing andDelivering the Presentations, Use of Audio-visual Aids, Report Writing.

Unit 3

Barriers to Communication, Improving Communication Skills, Preparation of Promotional Material, Non-verbal communication, Body language, Postures and gestures, Value of time, Organizational body language, Importance of Listening, Emotional Intelligence. Working individually and in a team, Leadership skills, Leadership Lessons, Team work and Team building, Feedback, Feed forward Interpersonal skills - Delegation, Humour, Trust, Expectations, Values, Status, Compatibility and their role inbuilding team - work Conflict Management - Types of conflicts, how to cope with conflict.

Unit 4

Negotiation Skills, Types of Negotiation, Negotiation Strategies, Selling skills - Selling to customers, Selling to Superiors Selling to peer groups, team mates and subordinates, Conceptual selling, Strategic selling, Selling skills - Body language.

Essential/recommended readings

- Kushal Jin - Business Communication, VK India.
- Krishnamacharyulu, C. S. G, Ramakrishnan Lalitha - Personality Development, Interpersonal Skills and Career Management, Himalaya Publishing.
- Corvette Budjac - Conflict Management: A Practical Guide to Developing NegotiationStrategies, Pearson.

Suggestive Readings

- Mitra, B. K., Personality Development and Soft Skills, Oxford University Press.
- Kumar Sanjay and Pushplata, Communication Skills, Oxford University Press.
- Mandal S. K., Effective Communication and Public Speaking, Jaico Publishing.

Note: Latest edition of the readings may be used

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Course Title – Prospecting E-waste for Sustainability

Learning Objectives

The Learning Objectives of this course are as follows:

- To provide in-depth knowledge on the effective mechanisms to regulate the generation, collection, and storage of e-waste
- To gain insights into the internationally/nationally acceptable methods of transport, import, and export of e-waste within and between countries
- To develop a holistic view on recycling, treatment, and disposal of e-waste and related legislative rules.

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to holistically analyze the environmental impacts of e-waste
- After studying this course, students will be able to apply the skills and various concepts for sustainable management of e-waste
- After studying this course, students will be able to decipher the role of various national and international regulations for e-waste management
- After studying this course, students will be able to provide specific recommendations for improved methods for handling e-waste at different stages such as generation, collection, storage, transport, and recycling.

SYLLABUS

Practical/Hands-on Exercises

- Identification of e-waste and its types
- Composition of e-waste and segregation- from the material provided
- Dismantling of e-waste and handling process
- Visit a nearby e-waste handling facility

- Environmental protection laws and producer's responsibility for e-wastemanagement Build an understanding of how regulatory mechanisms can be utilized in the management of e-waste in educational institutions.
- Discussion on plausible ways and implementation of e-waste reduction at the source Evaluation of the status of e-waste handling at your institution. Suggest potential solutions as per the existing norms of E-Waste (Management) Rules, 2016 and beyond.
- Estimate how recycling of e-waste in metro cities will go in sync with the circular economy
- Develop an understanding and itinerary of the process for procuring e-waste import permissions.
- Inventory of the e-waste disposal mechanisms.
- Study the evolution of e-waste management rules and its implementation- Hazardous Waste Rules, 2008, E-waste (Management and Handling) Rules, 2011; and E-Waste (Management) Rules, 2016
- Study the international laws on e-waste management- the international legislations:The Basel Convention; The Bamako Convention; The Rotterdam Convention;
- Waste Electrical and Electronic Equipment (WEEE) Directive in the European Union; Restrictions of Hazardous Substances (RoHS) Directive

Teaching and learning interface for practical skills:

To impart training on technical and analytical skills related to the course objectives, a wide range of learning methods will be used, including (a) laboratory practicals; (b) field-work exercises; (c)customized exercises based on available data; (d) survey analyses; and (e) developing case studies; (f) demonstration and critical analyses; and (h) experiential learning individually and collectively.

Prospective sector(s):

© Electric and electronic industries,
® E-waste Recycling Unites,
® Private entrepreneurs,
• Environmental consultancies,
© Pollution Boards, and
© Environmental NGOs

Suggested Readings:

- Hester, R.E. and Harrison, R.M., 2009. Electronic Waste Management:
- Design. Analysis and Application. Royal Society of Chemistry Publishing.
- Cambridge, UK.
- Fowler, B.A., 2017. Electronic Waste: Toxicology and Public Health Issues.Academic Press.
- Gaidajis, G., Angelakoglou, K. and Aktsoglou, D., 2010. E-waste:environmental
- problems and current management. Journal of Engineering Science and
- TechnologyReview, 3(1), pp. 193-199.
- Janyasuthiwong, S., 2020. Metal Removal and Recovery from Mining
- Wastewaterand E-waste Leachate. CRC Press.

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Course Title – Public Speaking in English Language and Leadership

Learning Objectives

The Learning Objectives of this course are as follows:

- To impart leadership skills to students along with adequate communication skills tocurate strong leaders in the emerging social, political and corporate world.
- To create leaders with ethics and resilience in industry-based fields as well as social
- fields.

® To allow students to realise their leadership skills and curate them through a hand-on practical approach which will be helpful in generating employable skills for them.

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to learn effective communication through Public Speaking will instill leadership development among students.
- After studying this course, students will be able to lead in different fields at the undergraduate level, be responsible citizens and employ leadership skills in their future endeavours, too.
- After studying this course, students will be able to strengthen their critical mindset, help them being assertive and put forward constructive viewpoints employing the skills learnt in the practice sessions.

SYLLABUS

UNIT 1

© Introduction to Effective Communication- Features, Advantages & Disadvantages

- Importance of Listening
- Oral communication- Meaning, Features & Importance
- Reading Public Speech- Reading documented speeches delivered in the past; Understanding the art of word play, vocabulary and putting thoughts into words

UNIT 2

- Public Speaking-
  - V What is Speech?, Overcoming Fear of Public Speaking, Language of Public Speech
  - V Drafting a Public Speech (Reading, research, writing, Fact check, Re-writing, Delivery)
  - Y' 3P's of Public Speaking (Preparation, Practice, Performance)
  - *S* Rhetoric Skills, Art of Informative & Persuasive speaking, Concluding Speech with Power
- Types of Public Speaking-
  - *S* Physical & Online
  - *S* Political, Organisational, Educational & Motivational
  - *S* Ted Talks, Public Speaking in Media
- Listening in groups and Discussion- Listening famous speeches (from history & everyday life); Analysis of its elements & classroom discussion
- Writing Public speech- Classroom Practice Sessions

UNIT 3

- Leadership Skills- (2 hrs.)
  - S Meaning, Features & Importance
  - S Historical Overview
  - S Leadership in Academic Life, Corporate Space, Public Life, Social Leadership and Political Leadership
- Leadership & Innovations- (2 hrs.)
  - S Audience analysis
  - S Audience Engagement & Leadership
  - S Influencing through Leadership
- Execution & Delivery of Public Speech- Learning rhetorics through speeches in the form of Audio/ Video; Learning Body Language & Paralanguage through ICT
- Developing leadership competence through Public Speaking- Intra-class Speech Competitions; Extempore; Group Discussion

UNIT 4

- Importance of Public Speaking in developing Leadership Skills
- Ethics in Public Speaking & Leadership
- Mock Parliament/MUNs
- Workshop

Suggested Readings:

S Beebe, S. A., & Beebe, S. J. (2012). Public speaking: An audience-centredapproach. (8th ed.). Boston: Pearson.

S Cardon, P. (2014). Business communication: Developing leaders for a networkedworld. (international ed.). New York: McGraw-Hill.

S Jaffe, C. I. (2013). Public speaking: Concepts & skills for a diverse society. (7thed.). Boston: Cengage Learning.

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Course Title – Statiscal Software Package

Learning Objectives

The Learning Objectives of this course are as follows:

- To familiarize students with data analysis using a statistical software package like SPSS or any other equivalent.
- To provide skills for research analysis and increase employability.
- To lay a foundation for advance data analysis work and higher education.

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to understand basic functions of statistical software package for managing variables and generate descriptive statistics to describe the data and analyze data through graphs and charts.
- After studying this course, students will be able to test differences in sample means.
- After studying this course, students will be able to identify relationships between variables and develop models for predicting dependent variables on the basis of independent variables.
- After studying this course, students will be able to understand data structures and identify clusters in data.
- After studying this course, students will be able to identify principal components that are relevant from a host of variables.

SYLLABUS

Unit 1: Getting started with the Software

Introduction: Data Entry, Storing and Retrieving Files, Generating New Variables; Managing Data - Listing cases, replacing missing values, computing new variables, recoding variables, selecting cases, sorting cases, merging files, Graphs - Creating and editing graphs and charts; Descriptive Statistics Procedures: Frequencies, Descriptive,Explore, Cross Tabulation.

Unit 2: Hypothesis Testing for Means

T-tests: One sample test, Independent samples and paired samples t-test; ANOVA - One- way analysis of variance with post hoc analysis, Two-way analysis of variance.

Unit 3: Testing for Association between Variables

Chi-square Test of Independence; Bivariate Correlation Analysis: Simple Scatter Plot; Correlation Coefficient: Pearson, Spearman Rho and Kendall Tau Coefficient. Factor analysis.

Unit 4: Regression Analysis

Linear Regression: Simple Linear Regression, Multiple regression analysis with matrix scatterplot. Multiple Regression: Standard (Enter) and Stepwise Method. Binary Logistic Regression.

Essential/recommended readings

- Performing Data Analysis using IBM SPSS, Lawrence S. Meyers, Glenn C. Gainst, J. Guarino, Wiley Publication
- SPSS for Windows Step by Step A Simple Guide and Reference, Darren George andPaul Malley
- SPSS in Simple Steps, Kiran Pandya, Smruti Bulsari, Sanjay Sinha, Dreamtech Press

Suggestive Readings

- Using SPSS in Research, Dr. Radha Mohan, Neelkamal.

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Corse Title – Sustainable Ecotourism and Enterpreneurship

Learning Objectives

The Learning Objectives of this course are as follows:

- To train students in concepts and principles of sustainable ecotourism leading to a new generation of entrepreneurs
- To inculcate field-based practical skills in translating ecological systems into wealth generation while conserving natural resources
- To transform local biological wealth into a hub of global attraction and generate a scientific basis of Indian traditional knowledge

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to develop next-generation ecological entrepreneurs
- After studying this course, students will be able to evolve eco-literate society by integrating market-based instruments with eco-cultural knowledge of traditional societies
- After studying this course, students will be able to practice ecological knowledge for wealth generation, environmental conservation, and popularization of Indian traditional knowledge

SYLLABUS

Practical/Hands-on Exercise

- Assess the current state of ecotourism in little-known/explored areas and examine ecotourism potential
- Field surveys to identify the existing locations having ecological, wildlife, scenic, and ethnic potential for ecotourism and analyze existing prevalent eco-practices having the potential to integrate with ecotourism programme
- Identify ten plant species having ecological, economic, and cultural significance as ecotourist attraction
- Develop stories on the selected wild habitats to attract ecotourists from within and outside the country
- Identify suitable track and prepare a checklist of birds and animals with their stories for a diverse group of ecotourists
- Examine the current state of natural resources and develop suitable messages and appropriate media for educating different target groups
- Survey and identify the target group for ecotourism based on their age, education, economic and other criteria and evaluate their psychological barriers to ecotourism
- Conduct inventory of facility and analyze a preliminary competitive advantage over ecological attractions in the nearby area
- Analyze tourist spending patterns and track preferences for ecotourism attractions in nearby areas and add value to ecological, wildlife, and cultural attractions
- Survey attitude and perception of residents regarding ecotourism plan and analyze costs and benefitsof the sustainable ecotourism development programme using a demand-driven marketing approach
- Develop messages, stories, and pictures to attract tourists and promote ecotourism in the target area
- Analyze basic elements of ecotourism, the special needs of ecotourists, develop trips and travel packages offering an array of experiences and predict the market trends
- Develop ecotourist activities for individuals, families, and groups and craft social media campaigns for the proposed ecotourism business
- Develop a plan for strategic alliances and partnerships with other projects/groups /organizations for public- private partnership in the proposed ecotourism programme.

Teaching and learning interface for practical skills:

To impart training on technical and analytical skills related to the course objectives, a wide range of learningmethods will be used, including

(a) laboratory practical;

(b) field-work exercises;

(c) customized exercises based on available data;

(d) survey analyses;

(e) developing case studies;

(f) demonstration and critical analyses;

(h) experiential learning individually and collectivelyrospective sector(s):

- Forest Departments
- Tourism industry .
- World Bank
- UNDP
- WWF
- Environmental NGOs

Suggested Reading:

- Ballantyne, R. and Packer, J., 2013. International Handbook on Ecotourism. Edward Elgar Publishing Limited, UK
- Blumstein, D.T., Geffroy, B., Samia, D.S. and Bessa, E., 2017. Ecotourism's promise and
- Peril. A Biological Evaluation. Springer Int. Publ. (Chapters 10-11)
- Fennell, D.A., 2014. Ecotourism. An Introduciton. Routledge, London, UK.
- Fletcher, R., 2014. Romancing the wild. In Romancing the Wild. Duke University Press.
- Tanguay, G.A., and Rajaonson, J., (2015). Evaluating Sustainable Tourism Using Indicators:
- Problems and Solutions. In: Brophy, S.C., (Ed), Ecotourism: Practices, Benefits and o Environmental Impacts. Nova Science Publishers, pp. 119 - 134.
- Wearing, S. and Schweinsberg, S., 2019. Ecotourism: Transitioning to the 22nd century. Routledge

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Course Title – Visual Communication and Photography

Learning Objectives

The Learning Objectives of this course are as follows:

- To synthesize a comprehensive view of principles involved in Visual Communication.
- To appreciate and express the cultural significance of photography as visual art and understand its evolution and purposes.
- To develop an awareness of compositional and organizational strategies for the effective deployment of formal elements of visual art.
- To read visual texts with a deep knowledge of visual history and theory.
- To create an ability of situating the content and form of the visual representation of thematic context.

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to acquire knowledge of the
- culturaland historical importance of the visual medium.
- After studying this course, students will be able to explore the
- fundamentals andunderlying theories of Visual Communication.
- After studying this course, students will be able to develop a thorough
- knowledge ofconcepts, and skills in creating photographs.
- After studying this course, students will be able to learn to identify and
- analyzesemiotics in photographs.
- After studying this course, students will be able to develop a craftsmanship in
- creating aesthetically pleasing photographs.

SYLLABUS

Unit 1: Historical Background and Basics of Visual Communication

Unit Description: The Unit I will give a brief history of the visual arts from the caveman to modern man. Skills of artistic schools of thought and Intertextuality in art in relation to culture.

Topics- Concept and History of Visual Communication, Human Eye and Visual Process, Visual culture and Information Education Communication, Theories of visual communication - Gestalt Theory of visual communication, Perceptual theory of Visual communication, Semiotics and cognitive approach in visuals

Unit II: Theories of Visual Communication

Unit Description: This unit will put emphasis on theories, semiotics and the study of signs. Through semiotic theories improve critical thinking skills, and learn to use semiotics to think logically and to analyze visual media in context of culture.

Topics: Fundamentals of Design: Definition. Approaches to Design, Centrality of Design, Elements of Design, Principles of Visual and other Sensory Perceptions. Colour psychology and theory (some aspects), Definition, Optical / Visual Illusions, etc., Various stages of design process, Learning skills to read signs and signifier in visuals for social messaging

Unit III: Photography as Visual Communication

Unit Description: This unit will provide skills to learn camera and lighting techniques.

Topics: Introduction to photography, Camera - structure and function of camera ,

Characteristics of light, Sources of Light-Nature, Artificial and Available, Lighting techniques-three-point lighting, Exposure - focusing, aperture, shutter speed, Depth of field.
, Kinds of light indoor and outdoor - Electronic flash and artificial lights, Light meters

Unit IV: Camera Compositions and Accessories

Unit Description: This unit will provide skills about camera accessories and designing aesthetically rich compositions.

Topics: Camera lenses and accessories, Basic shots, angle, and view, Composition, Role of photographic image in visual communication, Basics of photojournalism, photo-features, photo - essays, writing captions, visual storytelling.

Essential Readings

- Barnes, Susan B. An Introduction to Visual Communication: From Cave Art to Second Life, Peter Lang Pub, 2011.
- Berger, Arthur Asa, Seeing is Believing: An Introduction to Visual Communication, McGraw-Hill Education, 2012.
- Lester, Paul Martin, Visual Communication: Images with Messages (6ed), Cengage Learning, 2013.
- Photography: A Critical Introduction - edited by Liz Wells London, Routledge, Oxon, 2015.
- Farrell, I. Complete Guide to Digital Photography, Quercus Publishing, UK, 2014.

Suggested Readings

- Mandav, Pradeep, Visual Media Communication, Authors Press, 2001.
- Williams, Rich, Visual Communication: Integrating Media, Art, and Science, Routledge, 2007

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Course Title - पटकथा लेखन

Course Objective

- पटकथा लेखन का परिचय कराना।
- विद्यार्थी की लेखन–क्षमता और भाषा–कौशल को बढ़ावा देना।
- विद्यार्थी की लेखन में रोजगार सम्बन्धी क्षेत्रों के लिए तैयार करना।

Course Learning Outcomes:

- पटकथा लेखन तथा उसके तकनीकी शब्दों से विद्यार्थी अवगत हो सकेगा।
- पटकथा लेखन की जानकारी मिलने के उपरान्त विद्यार्थी के लिए रोजगार की संभावनाएँ बनेंगी।
- विद्यार्थी भाषायी सम्प्रेषण को समझते हुए लेखन से सम्बन्धित विभिन्न पक्षों से अवगत हो सकेगा।
- विद्यार्थी में अभिव्यक्ति कौशल का विकास हो सकेगा।

SYLLABUS

यूनिट 1

- पटकथा लेखनः परिचय
- पटकथा के तत्व
- पटकथा के प्रकार
- पटकथा की शब्दावली

यूनिट 2

- पटकथा लेखन में शोध का महत्व
- चरित्र की निर्मिति और विकास
- एक दृश्य का लिखा जाना
- तीन अंक (थ्री एक्ट) और पाँच अंक (फाइव एक्ट) को समझना

यूनिट 3

- वेबसीरीज के लिए पटकथा लेखन
- लघु फिल्म के लिए पटकथा लेखन
- वृत्तचित्र के लिए पटकथा लेखन
- विज्ञापन फिल्म के लिए पटकथा लेखन

यूनिट 4

- पटकथा का पाठ और विश्लेषण
- किसी आईडिया को स्क्रीन प्ले के तौर पर विकसित करना

सन्दर्भ पुस्तकें:

- पटकथा कैसे लिखें: राजेद्र पांडेय – वाणी प्रकाशन, दिल्ली, संस्करण 2015
- पटकथा लेखन : एक परिचय – मनोहर श्याम जोशी– राजकतल प्रकाशन, दिल्ली संस्करण 2000
- कथा–पटकथा : मन्नू भंडारी – वाणी प्रकाशन, दिल्ली , संस्करण 2014
- व्यावहरिक निर्देशिका: पटकथा लेखनः असगर वजाहत – राजकमल प्रकाशन, दिल्ली, संस्करण 2011
- आईडिया से परदे तकः रामकुमार सिंह–राजकमल प्रकाशन, दिल्ली, संस्करण 2021

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Course Title - रंगमंच

Course Objective

- हिन्दी रंगमंच का परिचय कराना।
- नाट्य–प्रस्तुति की प्रकिया की जानकारी देना।
- अभिनय के विभिन्न पक्षों से अवगत करना।
- रंगमंच के खेलों और गतिविधियों से अवगत कराना।

Course Learning Outcomes:

- नाट्य–प्रस्तुति की प्रकिया से विद्यार्थी अवगत हो सकेगा।
- रंगमंच की जानकारी मिलने के उपरान्त इस क्षेत्र में विद्यार्थी के लिए रोजगार की संभावनाएँ बनेंगी।
- रंगमंचीय गतिविधियों से विद्यार्थी के व्यक्तित्व का विकास हो सकेगा।
- विद्यार्थी में अभिव्यक्ति कौशल का विकास हो सकेगा।

SYLLABUS

यूनिट 1

- भरत मुनि कृत नाट्यशास्त्र (संक्षिप्त परिचय)
- हिन्दी का पारंपरिक रंगमंच (संक्षिप्त परिचय)

यूनिट 2

प्रस्तुति–प्रकियाः आलेख का चयन, अभिनेताओं का चयन,दृश्य–परिकल्पना (ध्वकन–संगीत–नृत्य–प्रकाश), पूर्वाभ्यास

यूनिट 3

अभिनय की तैयारीः वाचिक, आंगिक, आहार्य, सात्विक

यूनिट 4

आशु अभिनय, थिएटर गेम्स, संवाद–वाचन, शारीरिक अभ्यास, सीन वर्क

यूनिट 5

मंच प्रबंधनः सेट, रंग–सामग्री, प्रचार–प्रसार, ब्रोशर–निर्माण

सन्दर्भ पुस्तकें:

- संक्षिप्त नाट्यशास्त्रम् – राधावल्लभ त्रिपाठी, वाणी प्रकाशन, दिल्ली, 2009
- रंग स्थापत्यः कुछ टिप्पणियाँ – एच0 वी0 शर्मा राष्ट्रीय नाट्य विद्यालय प्रकाशन, दिल्ली संस्करण 2004
- पारंपरिक भारतीय : रंगमंच अनंतधाराएँ – कपिला वात्स्यायन, अनुवाद–बदी उजम्मा, नेशनल बुल ट्रस्ट, दिल्ली, 1995
- हिंदी रंगमंच का लोकपक्ष, सं प्रो0 रमेश गौतम, स्वराज प्रकाशन, दिल्ली 2020
- मंच आलोकन – जी0 एन0 दासगुप्ता, अनुवाद – अजय मलकानी, नेशनल बुक ट्रस्ट, दिल्ली 2006
- रंगमंच के सिद्धांत –सं महेश आनंद, देवेन्द्र राज अंकुर, राजकमल प्रकाशन, दिल्ली 2008

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Course Title- रचनात्मक लेखन

Learning Objectives

- विद्यार्थीयों के मौखिक और लिखित अभिव्यक्ति कौशल को विकसित करना।
- उनमें कल्पनाशीलता और रचनात्मकता का विकास करना।
- साहित्य की विविध विधाओं और उनकी रचनात्मक शैली का परिचय कराते हुए लेखन की ओर प्रेरित करना।
- प्रिंट एवं इलेक्ट्रानिक माध्यमों के लिए लेखन की प्रवृति को विकसित करना।

Learning outcomes

The Learning Outcomes of this course of this course are as follows:

इस पाठ्यकम के अध्ययन के पश्चात् विद्यार्थीयों में :

- मौखिक और लिखित अभिव्यक्ति कौशल को विकसित होने में मदद मिलगी।
- उसमें कल्पनाशीलता और रचनात्मकता का विकास हो सकेगा।
- साहित्य की विधि विधाओं और उनकी रचनात्मकता शैली का परिचय होगाा जिससे वे स्वयं भी विधाओं में लेखन की अग्रसर हो सकेगे।
- प्रिंट एवं इलेक्ट्रानिक माध्यमों के लिए लेखन की ओर भी ये अग्रसर होंगे।

SYLLABUS

यूनिट 1

रचनात्मक लेखकः अवधारणाः स्वरूप आधार एवं विश्लेषण

- भाव एवं विचार की रचना में अभिव्यक्ति की प्रकिया
- अभिव्यक्ति के विविध क्षेत्रः साहित्य पत्रकारिता विज्ञापन भाषण

- लेखन के विविध रूपः मौखिक–लिखित गद्य–पद्य कथात्मक–कथेतर
- अर्थ निर्मित के आधारः शब्द और अर्थ की मीमांसा शब्द के पुराने–नए प्रयोग, शब्द की व्याकरणिक कोटि

यूनिट 2

भाषा भंगिमा और साहित्य लेखन

- भाषा भंगिमाएँः औपचारिक–अनौपचारिक, मौखिक–लिखित, मानक भाषिक संदर्भः क्षेत्रीय, वर्ग–सापेक्ष, समूह–सापेक्ष
- रचना–सौष्ठवः शब्दशक्ति, प्रतीक, बिम्ब, अलंकारवक्रता
- कविताः संवेदना भाषिक सौष्ठव, छंदबद्ध–छंदमुक्त, लय, गति, तुक
- कथा–साहित्यः वस्तु, पात्र, परिवेश, कथ्य और भाषा

यूनिट 3

विविध विधाओं एवं सूचना माध्यमों के लिए लेखन

- नाट्य–साहित्यः वस्तु, पात्र, परिवेश, कथ्य, रंगमंच और नाट्य–भाषा
- विविध गद्य विधाएँः निबंध, संस्मरण, आत्मकथा, व्यंग्य,रिपोर्ताज, यात्रा–वृत्तांत
- प्रिंट माध्यम के लिए लेखनः फीचर, यात्रा–वृत्तांत, साक्षात्कार, विज्ञापन
- इलेक्ट्रानिक माध्यम के लिए लेखनः विज्ञापन, पटकथा, संवाद

Practical Exercises if any:

नोटः उपर्युक्त का परिचय देते हुए इनका अभ्यास भी करवाया जाए।

References and suggested readings

1. साहित्य चिंतनः रचनात्मक आयामः रघुवंश
2. शैलीः रामचंद्र मिश्र
3. रचनात्मक लेखकः सं0 रमेश गौतम
4. कविता क्या हैः विश्वनाथ प्रसाद तिवारी
5. कथा–पटकथाः मन्नू भंडारी
6. पटकथा लेखनः मनोहर श्याम जोशी
7. कला की जरूरतः अर्नेस्ट फिशरः अनुवादकः रमेश उपाध्याय
8. साहित्य का सौंदर्यशास्त्रः रवींद्रनाथ श्रीवास्तव
9. कविताः रचना–प्रकियाः कुमार विमल

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Proposed Course Structure for 4 Year Undergraduate Programme under CBCS System

Value Added Course (VAC)

Semester – I (VAC- 1)

Science	Social Science/Arts	Commerce
• Ayurveda & Nutrition • Financial Literacy • Ethic & Culture • Art of Being Happy • Swach Bharat • Fit India • Panchakosha: Holistic Development of Personality • Culture & Communication	• Gandhi & Education • Sports for life • Ethic & Culture • Art of Being Happy • Swach Bharat • Fit India • Panchakosha: Holistic Development of Personality • भारतीय भक्ति परम्परा और मानव मूल्य	• Digital Empowerment • Sports for life • Ethic & Culture • Art of Being Happy • Swach Bharat • Fit India • Panchakosha: Holistic Development of Personality • Culture & Communication

Semester – II (VAC- 2)

Science	Social Science/Arts	Commerce
• Vedic Mathematics • Emotional Intelligence • Yoga Philosophy & Practice • Ethics & Values in Ancient Indian Tradition • Constitutional Values & Fundamental Duties • Social & Emotional Learning • Ecology & Literature	• Vedic Mathematics • Emotional Intelligence • Yoga Philosophy & Practice • Ethics & Values in Ancient Indian Tradition • Constitutional Values & Fundamental Duties • Social & Emotional Learning • सृजनात्मक लेखन के आयाम	• Vedic Mathematics • Emotional Intelligence • Yoga Philosophy & Practice • Ethics & Values in Ancient Indian Tradition • Constitutional Values & Fundamental Duties • Social & Emotional Learning • Ecology & Literature

List of Value-Added Course (VAC)

SL. No.	Course Title	LTP Distribution of the Course			Total Credits:	Total Marks = 100
		L	T	P		
1	Art of Being Happy	1	0	3	3	End -Term Appraisal : 70 Marks Internal Assessment: 30 Marks
2	Ayurveda & Nutrition	1	0	3	3	
3	Constitutional Values & Fundamental Duties	1	0	3	3	
4	Culture & Communication	1	0	3	3	
5	Digital Empowerment	1	0	3	3	
6	Ecology & Literature	1	0	3	3	
7	Emotional Intelligence	1	0	3	3	
8	Ethics and Culture	1	0	3	3	
9	Ethics & Values in Ancient Indian Tradition	1	0	3	3	
10	Financial Literacy	1	0	3	3	
11	Fit India	1	0	3	3	
12	Gandhi & Education	1	0	3	3	
13	Panchakosha: Holistic Development of Personality	1	0	3	3	
14	Social & Emotional Learning	1	0	3	3	
15	Sports for life	1	0	3	3	
16	Swach Bharat	1	0	3	3	
17	Vedic Mathematics	1	0	3	3	
18	Yoga Philosophy & Practice	1	0	3	3	
19	भारतीय भक्ति परम्परा और मानव मूल्य	1	0	3	3	
20	सृजनात्मक लेखन के आयाम	1	0	3	3	

Value Added Courses (VAC)

Course Title – Arts of Being Happy

Course Objectives

- To synthesize the insights developed by Human Development experts, Psychologists, Anthropologists on one hand, and the intellectual traditions of Vedantic Philosophy and Indology on the other towards the experience of happiness.
- To illustrate various factors that determine the subjective experience of happiness in a cross cultural context.

Learning Outcomes

- The students shall be able to evaluate the factors contributing to the phenomenon of happiness in the personal, familial and community life of an individual in different cultures in the Indian context.
- They will be able to develop healthy interpersonal relationships and wellbeing, cherishing the values of Indian culture and philosophy.
- They will be able to relate to the global phenomenon of sustainable development and become sensitive to the needs of the planet.
- They will be able to apply the experience of *Aananda* at a personal level.

Syllabus of *The Art of Being Happy*

Unit 1:Human Ecology and Happiness
• Definitions/Factors of Happiness: Environmental and Social • Physical, emotional and psychological well-being for happiness • Physiological and hormonal basis of happiness • Coping with Stress: A life saving skill
Unit 2:Indological Theories of Happiness
• *Panch Kosh* Theory & Idea of Well Being • Idea of Self and other • Hierarchy and stages of happiness 13

Unit 3 : Happiness: Cross-cultural Contexts
• Culture and Happiness • Interpersonal Relationship: Comparative Perspective • Towards Self-Actualization
Unit 4:Local and Global Perspective of Happiness
• Measuring happiness: Key indicators • Happiness Index • India in Global Happiness Indices

Practical/ Practice Component

The course will be based on students' identification and operationalization of the concept of happiness and well-being. Students will explore the indicators and actualization of these concepts in everyday life.

- Community surveys on the facilities promoting positive mental health practices such as Yoga and Meditation Centres, Recreation clubs, and Parks for youth and senior citizens shall be carried out by the students.
- Extending help and social service by visiting old age homes/ hospitals/slum areas or any other disadvantaged groups.
- Students can undertake a field work / project independently or work as an Intern with NGOs working in the area of happiness and well-being.
- Critical appreciation of a documentary/ film based on Happiness and Well-being can be undertaken by the students.
- Workshops/ Sessions for the actualization of innate creative potential- (Music, Drawing, Calligraphy, Dramatics)
- Hands-on Happiness: Gardening, Cleaning, Washing, Cooking, etc.
- If required, students can share their experiences in the form of a Project Report.
- Students may share their experiences in the form of Audio-video presentations of 15-20 minutes.
- Any other Practical/Practice as decided from time to time

Essential Readings

- Ramavathy, Vinayachandra & Choudry, Anuradha. (2013). Understanding Happiness: A Vedantic Perspective. Psychological Studies. 59. 141-152. 10.1007/s12646-013-0230-x.
- Leontiev, Dmitry. (2012). Anthropology of Happiness: the state of Well-Being and the way of Joy,In SocialScience,sVol43 No 2 P93-104
- Snyder .C.R. S.J. Lopez & J.T. Pedrotti. (2015). Positive Psychology (The Scientific and Practical Explorations of Human Strengths): Sage Publication. (Chapter 5: Subjective Well-being: The Science of Happiness and Life Satisfaction, Page 63 to 73)
- WorldDevelopmentIndicators2016. (2016).United States: World Bank Publications.
- Zelenski, John. (2019).

Suggested Readings

- Baumgardner,S&Crothers,M.(2014).Positive Psychology. New Delhi: Pearson Education, India.
- Goleman,D.(2007).Social Intelligence:The new science of human relationships, RHUK
- Mathews, Gordon and Carolina Izquierdo. (eds). (2010). Pursuits of Happiness: Well being in Anthropological Perspective. Berghan Books
- Seligman,M.(2002). Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment.NewYork:FreePress.
- Sri Aurobindo, The Synthesis of Yoga, Part Three: The Yoga of Divine Love, Chapter 7, The Ananda Brahman, pp. 569-570
- PositivePsychology:TheScienceofWell-Being,-CarletonUniversity,Ottawa, Canada, Sage Publications Chapter3:Happiness;page 77 to 110)

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Course Title – Ayurveda and Nutrition

COURSE OBJECTIVES:

- To introduce the basic principles of nutrition in Ayurveda
- To link the Ayurvedic nutrition with modern dietary practices for health
- To analyse basic tenets of traditional diets and health recipes
- To understand the contemporary food habits in everyday life

LEARNING OUTCOMES:

- Awareness of traditional food cultures of India
- Evaluate changing food patterns and lifestyle over the years
- Understand Indian Knowledge Systems (IKS) and key Vedic principles with respect to Food and Nutrition
- Apply basic tenets of traditional diets for health and disease
- Prepare selected healthy recipes based on Ayurvedic principles

Syllabus of *Ayurveda and Nutrition*

Unit 1: Introduction to Ayurvedic Nutrition
• Ayurveda and Indian food cultures • Nutrition and lifestyle transition over the years • Regional Food Traditions of India
Unit II: Basic principles of Food and Nutrition and Ayurveda
• Understanding rich sources of nutrients • Concept of *Doshas* & assessment • Ayurvedic Principles of food habits and factors determining quality of food *(Ahara vidhi visheshaayatana)* • FSSAI regulations on Ayurvedic Aahar
Unit III: Ayurvedic Diets
• Principles of Diet: *Aharavidhi vidhan, Sattvic, Rajasi, Tamasic* foods • Incompatible food (*Viruddha Ahara*), *Pathya; Apathya; Viprita Ahaar* • Lifestyle Management with *Dincharya* and *Ritucharya* • Application of Ayurvedic diets to stress linked food behaviour

Practical/ Practice Component

- Visit your local market and classify the available food items according to *Sattvic, Rajasi, Tamasic*foods
- Conduct a survey of 10-15 households in your locality:
  - To study food behaviour and analyse them in light of Ayurvedic dietary principles of *Sattvic, Rajasi, Tamasic*
  - To study the food consumption patterns and intake of incompatible food: *Viruddha Ahara, Pathya; Apathya; VipritaAhaar*
  - To know about their adopted lifestyle *Dincharya* and *Ritucharya*

Students are required to visit available e-resources of University of Delhi, Ministry of

- Ayushwith regard to Ayurvedaand Nutrition.
- If required, students can share their experiences in the form of a Project Report.
- The students may share their experiences in the form of audio-visual presentations of 15-30 minutes.
- Any other Practical/Practiceas decided from time to time

Essential Readings

- Rastogi S (2014) Ayurvedic Science of Food and Nutrition. ASIN: BOOHWMV094, Springer: ISBN-13:978-1461496274
- Rastogi S (2010) Building bridges between Ayurveda and modern science. Int J AyurvedaRes. 1(1):41-46.
- FSSAI regulations on Ayurveda Aahar Regulations 2022. Gazette of India CG-DL-E-07052022-235642. New Delhi, Friday, May 6, 2022/ Vaisakhal6, 1944.
- Frawley D (2012) Ayurvedichealing: A comprehensive guide. Lotus Press, India.
- https://iksindia.org/:Indian Knowledge Systems

Suggested Readings

- Charaka Samhita, Charaka (1998) In: Tripathi BN (ed) Sutra Stahan Maharashitiya Adhyay. Chaukhamba Orientelia, Varanasi.

- Kapoor Kapil & Singh AK Indian Knowledge Systems Volume– 1. Indian Institute of Advanced Study Shimla. Published by DK Printworld (P) Ltd, N.Delhi. https://www.lkouniv.ac.in

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Course Title – Constitutional Values And Fundamental Duties

COURSE OBJECTIVES:

- Enrich students with knowledge and relevance of the Constitution.
- Develop awareness about Duties and Values.
- Inculcate a sense of Constitutionalism in thought and action.

LEARNING OUTCOMES:

- Understand the Constitution and its relevance
- Appreciate the values and goals embedded in the Constitution.
- Recognise the importance of Fundamental Duties enshrined in the Constitution.
- Apply the spirit of fundamental values and duties in everyday national life.

Syllabus of *Constitutional Values and Fundamental Duties*

Unit I: **The Constitution of India – an Introduction**
• Federal Republic, Rule of Law, Separation of Powers • Sovereignty, Socialism, Democracy • Secularism and *Sarva Dharma Sama Bhava*
Unit II: Constitutional Values
• **Justice:** Social, Political, Economic • **Liberty**: Thought, Expression, Belief, Faith, Worship • **Equality** : Equality before law & equal application of laws • **Fraternity:** Dignity, Unity and Integrity
Unit III: Fundamental Duties
• Reflecting on the ancient Indian notions of righteousness and duty consciousness • Fundamental Duties- Article 51A [(a) – (k)] • Legal status of Fundamental Duties - Judicial approach

Practical/ Practice Component

- Reflections on some of the constitutional values/ fundamental duties and its contemporary relevance in day-to-day national life through group discussions and projects.
- Conduct workshops to spread awareness on the Fundamental Duties and Values.
- Students are required to conduct a survey (minimum 25 respondents) on assessing the awareness of the constitutional duties amongst the citizens.
- Students may share their experiences on Fundamental Duties and Values in the form of a Project Report.
- Any other Practical/Practice as decided from time to time

ESSENTIAL READINGS

- *Preamble* to the Constitution of India, 1950.
- The Constitution of India, Articles - 14, 19, 21.
- The Constitution of India, Fundamental Duties [Ar. 51 A (a) – (k)].

SUGGESTED READINGS

- Durga Das Basu, *et al.*, *Introduction to the Constitution of India* (LexisNexis, 26th edn, 2022).
- Leila Seth, *We, the Children of India: The Preamble to Our Constitution* (New Delhi, Puffin Books, Penguin Books India, 2010).
- Mahendra Pal Singh, V.N. Shukla's Constitution of India, (Eastern Book Company, Lucknow, 13th revised edn. 2017)
- B.R. Ambedkar Selected Speeches, (Prasar Bharati, New Delhi, 2019) *available at:* https://prasarbharati.gov.in/whatsnew/whatsnew_653363.pdf.

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Course Title - CULTURE AND COMMUNICATION

Learning Objectives:

- To focus on traditional values disseminated from Indian cultural heritage.
- To understand the interconnections between the legacy of our past and needs of our contemporary society.
- To learn to adapt, interact and celebrate our diversity and pluralistic culture.
- To develop communication skills in speaking, listening, reading and writing and apply them in our quotidian life as young citizens of contemporary India.
- To integrate ethical values and life skills.

Course Outcomes:

- Students will be able to appreciate the relevance of ancient Indian wisdom and core ethical values in our contemporary life.
- Students will be able to engage in a dialogue between the past and the present and inculcate the best principles towards a meaningful life.
- Students will be encouraged to involve themselves in team work and group activities to address challenges faced in metropolitan cities.
- Students will be able to develop communication skills, that is, analytical reading, empathetic listening, considerate speaking as well as informed writing.
- Extension activities will equip the students, drawn from diverse backgrounds, with life skills and confidence to integrate with a multicultural environment and work towards an inclusive community.
- Students will be encouraged to envisage and work towards an ethically robust society and thereby strengthen the nation.

Unit I: Ethical Valuesfrom Indian Cultural Heritage • *VasudhaivaKutumbakam* • United WeStand, Divided WeFall • *Ek Bharat, ShreshtBharat*
Unit II: Developing Life Skills • Empathy • Adaptability • Conserving our natural resources • Sharing knowledge resources
Unit III: Effective Communication in Everyday Life • empathetic listening • considerate speaking • analytical reading • informed writing

Practical/ Practice Component

As hands-on experience is an essential component of the course, this section will focus on the practical aspects to correlate with the fundamental principles and learnings of the theory portion. Students will be encouraged to use the communicationtools learnt through Unit 3 and corroborate the continuitiesof core principles studied in Unit 1 and 2.

- Students will be asked to conduct surveys/interviews in their neighbourhood or commuting routes to assess the nature and quality of negotiating our cultural diversity and pluralist traditions.
- Students would be assigned visits to old-age homes, hospitals, cancer wards, etc. to interact and write about their experiences with old people, caregivers, patients, nursing staff, helpers, etc.

staff, helpers, etc.

- They will also be assigned visits to historically important places and monuments within the city and also converse with the tourists in order to trace a comprehensive view of the rich cultural history of India. They may create video documentaries, take and record tourists' interviews and/or write a journal entry of the visit using the communication skills learnt.

- Students shall make group presentations or individual reports on the activities undertaken. Discussions with classmates and the teacher shall be undertaken to evolve clarity of vision on the ethical values and effective communication skills learned through this course.

ESSENTIAL READINGS:

- Ramanujan, A.K. 'A Flowering Tree', *Cultural Diversity, Linguistic Plurality & Literary Traditions in India*. Department of English, OUP, 2015. pp 125-138
- Haksar, A. N. D. 'Chanakya Niti Shastra', *Chanakya Niti*. India, Penguin Random House India Private Limited, 2020.
- Dhanavel. S.P. *English and Soft Skills*. Orient Black Swan, 2010.
- Murthy, Sudha. 'The Nobel Prize', *Wise & Otherwise*. India, Penguin Random House India Private Limited, 2006.
- Murthy, Sudha. 'How to Beat the Boys', *Three Thousand Stitches: Ordinary People, Extraordinary Lives*'. Penguin Books, 2017.
- Soyinka, Wole. 'Telephone Conversations', *The Individual and Society*, Department of English, Pearson Education, 2006. pp 122-23
- Bansode, Hira. 'Bosom Friend', *The Individual and Society*, Department of English, Pearson Education, 2006. pp 49-50

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Course Title - Digital Empowerment

COURSE OBJECTIVES:

- Understand the digital world and need for digital empowerment
- Create awareness about Digital India.
- Explore, communicate and collaborate in cyberspace.
- Building awareness on cybersafety and security.

LEARNING OUTCOMES:

- Use ICT and digital services in daily life.
- Develop skills to communicate and collaborate in cyberspace using social platforms, teaching/learning tools.
- Understand the significance of security and privacy in the digital world.
- Evaluate ethical issues in the cyber world.

Syllabus of *Digital Empowerment*
Unit I: Digital inclusion and Digital Empowerment
• Needs and challenges • Vision of Digital India: DigiLocker, E-Hospitals, e-Pathshala, BHIM, e-Kranti (Electronic Delivery of Services), e-Health Campaigns • Public utility portals of Govt. of India such as RTI, Health, Finance, Income Tax filing, Education
Unit II: Communication and Collaboration in the Cyberspace
Syllabus of *Digital Empowerment*
Unit I: Digital inclusion and Digital Empowerment
• Needs and challenges • Vision of Digital India: DigiLocker, E-Hospitals, e-Pathshala, BHIM, e-Kranti (Electronic Delivery of Services), e-Health Campaigns • Public utility portals of Govt. of India such as RTI, Health, Finance, Income Tax filing, Education
Unit II: Communication and Collaboration in the Cyberspace

• Electronic Communication: electronic mail, blogs, social media • Collaborative Digital platforms • Tools/platforms for online learning • Collaboration using file sharing, messaging, video conferencing
Unit III:Towards Safe and Secure Cyberspace
• Online security and privacy • Threats in the digital world: Data breach and Cyber Attacks • Blockchain Technology • Security Initiatives by the Govt of India
Unit IV: Ethical Issues in Digital World
• Netiquettes • Ethics in digital communication • Ethics in Cyberspace

Practical/ Practice Component

The course should be conducted in an interactive mode through demonstration, using appropriate tools.

• Conduct workshops on e-services initiated under Digital India.

• Spread digital literacy/awareness amongst the vulnerable groups and marginalised sections of the society like street vendors, domestic help, security guards, senior citizens.

• Students will take up team activities/ projects exploring digital services in the areas such as education, health, planning, farming, security, cyber security, financial inclusion, and justice, e-Kranti.

• Any other Practical/Practice as decided from time to time

Essential Readings /Online Resources

1. Rodney Jones and Christoph Hafner. "Understanding digital literacies: A practical Introduction". Routledge Books, 2nd edition, 2021.

2. https://www.digitalindia.gov.in

3. https://www.digilocker.gov.in

4. https://www.cybercrime.gov.in

5. https://www.cybersafeindia.in

6. https://www.meity.gov.in/cyber-surakshit-bharat-programme

Suggested Readings:

1. David Sutton. "Cyber security: A practitioner's guide", BCS Learning & Development Limited, UK, 2017.
2. https://www.mha.gov.in/document/downloads/cyber-safety-handbook

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Course Title – Emotional Intelligence

COURSE OBJECTIVES

- Introduce the concept of emotional intelligence, its models and components.
- Understand the significance of emotional intelligence in self-growth and building effective relationships.
- Identify the measures of emotional intelligence.

LEARNING OUTCOMES

- Self-Awareness, Self-Management, Social Awareness & Relationship Management.
- Discover personal competence and techniques of building emotional intelligence.
- Gain insights into establishing positive relationships.

Syllabus of *Emotional Intelligence*

Unit I: Fundamentals of Emotional Intelligence
• Nature and Significance • Models of emotional intelligence: Ability, Trait and Mixed • Building blocks of emotional intelligence: self-awareness, self-management, social awareness, and relationship management
Unit II: Personal Competence
• Self Awareness: Observing and recognizing one's own feelings, Knowing one's strengths and areas of development. • Self Management: Managing emotions, anxiety, fear, and anger.
Unit III: Social Competence
• Social Awareness: Others' Perspectives, Empathy and Compassion • Relationship Management: Effective communication, Collaboration, Teamwork, and Conflict management
Unit IV: Emotional Intelligence: Measurement and Development
• Measures of emotional intelligence • Strategies to develop and enhance emotional intelligence

Practical/ Practice Component

Students will practice self-management techniques to regulate emotions such as

- Mindfulness
- Conditioned relaxation response
- Boundary setting
- Any other

Students will practice various techniques of relationship management such as engaging with:

- Display of empathy
- Effective communication

- Teamwork
- Conflict resolution
- Any other

- If required, students can share their experiences in the form of a Project Report.

Essential Readings

- Any other Practical/Practice as decided from time to time
- Bar-On, R., & Parker, J.D.A.(Eds.) (2000). The handbook of emotional intelligence. San Francisco, California: Jossey Bros.
- Goleman, D. (2005). Emotional Intelligence. New York: Bantam Book.
- Sternberg, R. J. (Ed.). (2000). *Handbook of intelligence.* Cambridge University Press.

Suggested Readings

- HBR's 10 Must Reads on Emotional Intelligence (2015)
- HBR's 10 Must Reads on Managing Yourself (2011)
- Self Discipline : Life Management, Kindle Edition, Daniel Johnson.

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Course Title - Ecology and Literature

Course Objectives:

- To raise awareness among students towards the urgent predicament of Environmental and Ecological crisis and the need for reducing our carbon footprint upon fast depleting, ravaged ecological reserves.
- To develop a heightened ecological consciousness among students, leading to more responsible ecological behavior.
- To view environmental concerns as raised through plays, stories and poems.

Learning Outcomes:

- The course will highlight the urgency of environmental crisis, making studentsconscious and aware of the role each one of us plays.
  into environmental sensitivity and responsible ecologicalbehavior.
- Students will be encouraged to respond to incidents of habitat destruction, deforestation, etc. and realize the need for our urgent intervention.

Syllabus of *Ecology and Literature*

Unit I: Negotiating environmental issues creatively 1. William Wordsworth: 'In April beneath the scented thorn' 2. Rabindranath Tagore: 'The Waterfall' 3. Gieve Patel: 'On Killing a Tree'
UNIT II. Ecocritical literary representations 1. Mary Oliver: 'Sleeping in the Forest' 2.AK Ramanujan: 'A Flowering Tree'
3.Mamang Dai: 'Small Townsand the River'
UNIT III: Empathetic exploration and imaginative re-enactments 1. Amitav Ghosh's 'Part I: Stories' from *The GreatDerangement: Climate Change and the Unthinkable.* 2. ThangjamIbopishak: 'Volcano,Youcannot erupt' from *Dancing Earth: An Anthology of Poetry from North-East India* 3. ThangjamIbopishak. 'Dali, Hussain, or Odour of Dream, Colour of Wind' from *Dancing Earth: An Anthology of Poetry from North-East India*

Practical/ Practice Component

• Students would undertake field visits to a school or a slum in the neighborhood or the play area of residential complexes to share, narrate stories, poems and articulate the ideas

engaged with in the classroom lectures.

- They shall apply imaginative and creative ways of presenting socially responsible ecological behavior through re-tellings of the texts they have studied in the class.
- Creative re-enactment of key ideas studied by students in the form of a play, to be done Individually and/or in a group to create awareness regarding environmental consciousness.
- They can also collectively organize a tree plantation drive in and around the college campus and adopt a sapling each in the college premises and in their neighborhood to take care of.
- Any other Practical/Practice as decided from time to time

SUGGESTED READINGS:

1. Akhter, Tawhida, and Ahmad Bhat, Tariq. Literature and Nature. United Kingdom, Cambridge Scholars Publishing, 2022.

2. Shiva, Vandana. 'Development, Ecology and Women', Staying Alive: Women Ecology and Development. India: Zed Books, 1988. pp 1-14

3. Carl, Safina. Prologue & Chapter 1, Beyond Words: What animals think and feel. Souvenir Press, 2015.

. Garrard, Greg. *Ecocriticism*. United Kingdom: Taylor & Francis, 2011.

5. Wohlleben, Peter. *The Hidden Life of Trees: What They Feel, How They Communicate—Discoveries from a Secret World*. India: Penguin Books Limited, 2016.

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Course Title - Ethics and Culture

Course Objectives

- The course aims to help students explore ethical and cultural dimensions of their lives.
- The course provides a forum for students to pause, revisit their assumptions and beliefs, and become mindful of their thoughts, emotions and actions.
- It gives the students an opportunity to express themselves and inquire into their decision making processes. This will enable them to cultivate ethical values and participate in the creation of a society based on acceptance, compassion, and justice.

Learning Outcomes

- Explore perspectives on ethics in thoughts, words and actions
- Evolve ethical decision making practises
- Understand the need for an ethical society and culture
- Introspect, become conscious of and assess one's stance in life
- Cultivate empathy, tolerance and compassion
- Apply the values learnt in the course to everyday life.

Syllabus of *Ethics and Culture*

Unit 1

Unit I: Introduction | The Basis of Ethics
• Getting to Know Each Other • What to Expect from the Course? • Recognition of Our Common Humanity • Empathy, Compassion and Justice
Unit II: The Role of Intelligence, Reason and Emotions
• Discernment: What Is The Right Thing To Do? • The Art of Conflict Resolution • Destructive and Constructive Emotions • The Need for Emotional Balance
Unit III: Cultivating Inner Values | Ethics in the World of Work and Play
• Training the Mind: Mindfulness and Kindness • Meditation • Discovering your Vocation and Interests • Self-discipline, Integrity, Commitment, Creativity • Work-Life Balance
Unit IV: Striving for a Better World | Outreach Activities
• Means and Ends • Debate and Dialogue • Culture as Shared Values • Creating and Sustaining Ethical Cultures: The Role of Philosophy, Religion, Literature, Theatre, Cinema, Music, Media

Practical/ Practice Component
Unit 1

1. The teacher may ask students to introduce themselves, sharing their regional and cultural roots. They may be asked to reflect on those aspects of their identities that reflect their cultural roots.
2. After a round of initial introduction, the teacher may ask students to list down a set of values that they think they have developed through their parents and grandparents. Are these values unique to their families, regional and/or ethnic backgrounds? Of these, which are the values they would like to sustain and which are the ones they would wish to modify?
3. The teacher may draw upon the values discussed by students in the previous lesson. Using these as the base, the teacher may ask students to think of ethical values that form the basis of their decisions.

4. The teacher may ask students to think of people who they think have lived an 'ethical life'. These may be people who they know from their personal lives or people known for upholding ethical values in the face of adversity.
5. Students are encouraged to identify what are common human values necessary to realise shared common humanity–the feeling of interconnectedness/interdependence.
6. Class to be divided in small groups to discuss how each would make an effort to cultivate new morals/ethical values for betterment of their local environment.
7. Celebrating 'Sharing and Caring' based on regional diversity can be encouraged.
8. Engage students to do activities of 'being in the shoes of others' (peers, parents, siblings, house help/support or in any local community grappling with problems) to understand the problems empathetically.
9. The students can be asked to make bookmarks/cards to remind them about virtues pertaining to empathy versus sympathy, need versus greed, just versus unjust or compassion versus insensitivity.
10. Compassion is about cultivation of it as a daily value so students can in small groups undertake compassion based activities of looking after animals, birds, needy, elderly, differently abled, non-privileged etc. and share their thoughts in the class.

Unit 2

1. Make the student think of a hard decision they have made. What made it hard? How did you make the decision? How do you assess it retrospectively?
2. Encourage students to think of judgements and decisions based on the dilemmas and challenges they faced? How do they go about making these decisions?
3. The teacher may introduce any well known story and ask the students to discuss the story from the point of view of the different characters.
4. Ask students how willing they are to deal with a conflict when it occurs. What strategies do they adopt to resolve the conflict?
5. The teacher may ask students to prepare posters with captions like "avoidance", "competition", "cooperation" and "adaptation" and then may ask students to identify with one of these styles which according to them best represents their style of dealing with conflict.
6. The students may be asked to discuss different such similar situations that they may have encountered and a discussion may be initiated on how they resolve those conflicts.
7. The students can be asked to write down certain destructive emotions that they are experiencing presently. How would they work to make them constructive? A classroom discussion could follow around this.
8. Ask the students to note down a list of constructive emotions experienced by them

recently. Were the constructive emotions less powerful as compared to the destructive ones experienced by them? Discussion in class can follow.

9. How do you (i) express, (ii) handle anger/ disgust/ distress/ fear (any destructive emotion can be taken up). A healthy discussion in the class can take place around this.
10. Students may be asked to practice a simple breathing exercise. They can sit straight with eyes opened or closed in a comfortable position to just observe their breathing. They can repeat this exercise six to eight times and share (if they like) their experience of silence.
11. To identify your interests and develop a meaningful hobby.
12. Have an open conversation in the class about happiness.

Unit 3

1. The students could observe various emotions that bottle-up in their minds and be asked to watch the flow of emotions non-judgmentally.
2. Students may be asked to recall their journey to the college that morning. Do they remember road signs, faces of people they crossed, the roads that they took, the people they interacted with, the sights and smells around them, or anything else?
3. Students could be asked to cultivate the habit of simple greeting as practice of gratitude and celebrate a day of joyful giving.
4. The students can close their eyes for 2-3 minutes and be asked to observe their thoughts, list them and categorise them into 'to be kept' or 'to let go'.
5. The teacher may ask students to close their eyes and imagine a situation in which they are truly happy. Students could wish for the well-being of two students in the same classroom in their meditative state.
6. Students could meditate on who has been their inspiration and the qualities of the person who has inspired them and then express gratitude to the person concerned.
7. The teacher may ask the students to think retrospectively about what they thought they would take up as a vocation when they were younger. How and why their choices were influenced and changed, if at all.
8. The teacher may ask the students to imagine and chart a journey and destination for themselves. They may also talk about the challenges they foresee.
9. The teacher may encourage the students to maintain a daily diary of their scheduling of time or a worklog and see how much time they effectively give to their work. The teacher may help the students identify the distractors and where one may be 'wasting' time and energy. The activity is designed to help students understand the value of effective time utilisation.
10. In this lesson, the teacher may ask the students to draw up a list of team ethics. They may build this based on their experiences of working with each other in groups.

11. The teacher may ask the students to share an incident each where they felt pressurised/bored to complete some work. How did they deal with their stress and monotony of work?

Unit 4

1. Students will be asked to work in pairs and develop situations that pose ethical dilemmas and how to resolve them.
2. Students may be asked to look at a film or at an advertisement and discuss what they think about the question/s posed in them. The teacher may ask them if they can think of an alternative ethical approach to the problem posed.
3. Students will be asked to think of situations in which they lost their temper. Have they ever felt that in a fit of emotion they said something that they regretted later? If they had paused to listen and then respond, what would the other person have said? How would the outcome of the situation have been different?
4. A debate on any relevant topic may be conducted in the class. After the first round the students may be asked to adopt and argue their opponents point of view. At the end of this exercise the students can have an open discussion on which position finally appealed to them.
5. The teacher may give a short story to the students and ask them to change the ending. They may be asked to observe how characters and their views may have undergone change in the process.
6. There can be a discussion around a topic such as, the idea of corporal punishment, euthanasia etc. Students can be given a sheet of paper and can be asked to write for or against the theme. The idea is to enable them to understand that the positions they have taken vis-a-vis the theme are a result of different value orientations.
7. Popular foods from many parts of India can be discussed. Their origins can be traced to chart a kind of food history.
8. The teacher on the basis of discussions with students can draw from Philosophy, Religion, Literature, Theatre, Cinema, and Media to highlight that the choices people/characters make are grounded in their culture.
9. The students can discuss classical/folkdances that are performed in their respective groups. Details can be drawn based on the number of dancers, music (live or recorded) and costumes. The role of oral traditions and literature in indicating the importance of ethics in our everyday lives can be discussed.

Suggested Activities for Outreach: Social/ Community Engagement and Service

In the weeks that follow, students will be expected to engage in outreach activities that shall enable them to put into practice some of the ethical considerations deliberated upon and imbibed in the previous modules. A list of suggested outreach activities is as follows:

- Adopt a village with the aim of cultural and ethical learning
- Discussing health and hygiene issues in a community
- Tutoring students Gender sensitization
- Working on environmental issues
- Working with Child Care Centre such as Anganwadis and Balwadis
- Working with differently abled students
- Preserving cultural and heritage sites
- Spending time with senior citizen including a Senior Citizens Home
- Extending care to animals in animal welfare shelters
- Addressing issues relating to Reproductive Health
- Spreading awareness about adolescent health
- Addressing issues relating to mental health
- Health and nutrition awareness
- Swacchata Abhiyaan
- Sensitisation towards disease awareness
- Vriksharopan

If required, students can share their experiences in the form of a Project Report

Any other Practical/Practice as decided from time to time

Suggested Readings:

- Aristotle. *Nichomachean Ethics*. London: Penguin Classics, 2004
- Swami Vivekananda. *The Complete Works of Swami Vivekananda*. Advaita Ashrama, 2016.

  ---https://www.ramakrishnavivekananda.info/vivekananda/complete_works.html
- Panch Parmeshwar in English translation as The Holy Panchayat by Munshi Premchand
- The Silas Marner by George Eliot
- We are Seven by Wordsworth
- The Chimney Sweeper by William Blake

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Coures Title - Ethics and Values in Ancient Indian Traditions

COURSE OBJECTIVES:

- To understand the rich cultural traditions relating to discourses on life and its purpose, instilling of values relating to ethical and moral propriety.
- To make students more engaged with the past traditions of the country.
- To introduce students to early epics: Puranic, Buddhist and other traditions.

LEARNING OUTCOMES:

- Students will develop an overview of indigenous philosophies.
- Understanding the richness of Indian heritage leading to greater sensitivity.
- Inspiration from history to deal with contemporary issues.
- Appreciate the traditions of diversity, discussions, debates and knowledge transmission.

Syllabus of *Ethics and Values in Ancient Indian Traditions*

Unit I The idea of India and Bharat
1. 'Jambudvipa'; 'Aryavrata'; 'Bharat' ; India 2. Early discourse on moral order- ṛta in Vedic traditions 3. Debates in the Upanishads and the Shramanic traditions
Unit II State, Society and Dharma
1. Kingship and Society: *Dharma, Neeti* and *Daṇḍa* 2. Rashtra, Sanskar and making of socio-cultural milieu
Unit III The 'Purpose of Life' in Texts
1. 'Right Conduct': Buddhist, Jaina and Shramanic Traditions 2. Puruṣārtha Chatushtaya*: Dharma, Artha, Kāma and Mokṣa* 3. Assimilation and Assertion: Ethical issues in Epics and Puranic traditions

Practical/ Practice Component

- Discuss in your locality, in 10-15 households with regard to Ethics and Values in Indian traditions:
  - Vedic traditions
  - Puruṣārtha Chatushtaya
  - Buddhist, Jaina and Shramanic Traditions
  - Jambudvipa; Aryavrata; Bharat; India
- Students are required to explore e-resources available with University of Delhi and other academic institutions.

- Students are required to watch documentaries and films on the subject-related topics.
- If required, students can share their experiences in the form of a Project Report.
- Students may share their experiences in the form of audio-visual presentations of 15-30 minutes.
- Any other Practical/Practice as decided from time to time

Essential Readings

Buietenen, J.A.B. Van, *The Bhagwadgita in the Mahabharata: Text and Translation.* Chicago: Chicago University Press, 1981. Bhagwadgita by Geeta Press Gorakhpur.

Bhasham, A.L, *Wonder that was India: A Survey of the Culture of the Indian Subcontinent Before the Coming of the Muslims.* London, Sidgwick and Jackson, 1954

Dasgupta, S. N. *History of Indian Philosophy*. Cambridge University Press, 1923, Vol. I-II.

Hiltebeital, Alf. *Rethinking the Mahabharata: A Reader's Guide to the Education of the Dharma King.* Chicago: Chicago University Press, 2001.

Kane, P.V. *History of Dharmashastra (Ancient and Medieval Religious and Civil Law),* vol. II, parts 1-2; vol. III 3rd ed. Pune: Bhandarkar Oriental Research Institute,[1941, 1946].

Olivelle, Patric. King, Governance, and Law in Ancient India: Kautilya's Arthashastra. Oxford: Oxford University Press, 2013.

Sharma, Arvind. 'On Hindu, Hindustan, Hinduism and Hindutva'. Numen, 49(1), 2002, p. 1-36.

Suggested Readings

Olivelle, Patric. (text and trans.) *Manu's Code of Law: A Critical Edition and Translation of the Manava-Dharmashastra.* New Delhi: Oxford University Press, 2006.

Rocher, Ludo. 'The Concept of Boundaries in Classical India', in Peter Gaefkke and David A. Utz (eds.), *The Countries of South Asia: Boundries, Extensions, and Interrelations*

Philadelphia: University of Pennsylvania, Department of South Asia Regional Studies (Proceedings of The South Asia Seminar, III, 1982-1983), 1988, p. 3-10.

Sukthankar, V.S., S.K. Belvalkar, and P.L. Vaidya(ed.). *The Mahabharata.* Poona: Bhandarkar Oriental Research Institute, 1933-66.

Tripathi, Radhavallabh, ed. *India's Intellectual Traditions: A Revealed Through Sanskrit Sources*. New Delhi: Sahitya Akademi, 2016.

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Coruse Title - Financial Literacy

Course Objectives

- Familiarity with different aspects of financial literacy such as savings, investment, taxation, and insurance
- Understand the relevance and process of financial planning
- Promote financial well-being Learning Outcomes
- Develop proficiency for personal and family financial planning
- Apply the concept of investment planning
- Ability to analyse banking and insurance products
- Personal tax planning

Syllabus of *Financial Literacy*
Unit I: Financial Planning and Financial products
• Introduction to Saving • Time value of money • Management of spending and financial discipline
Unit II: Banking and Digital Payment
• Banking products and services • Digitisation of financial transactions: Debit Cards (ATM Cards) and Credit Cards. Net banking and UPI, digital wallets • Security and precautions against Ponzi schemes and online frauds
Unit III: Investment Planning and Management
• Investment opportunity and financial products • Insurance Planning: Life and non-life including medical insurance schemes
Unit IV: Personal Tax
• Introduction to basic Tax Structure in India for personal taxation • Aspects of Personal tax planning • Exemptions and deductions for individuals • e-filing

Practical/ Practice Component

- Regular class activities to enhance students' understanding of topics and the application of concepts. The case study method may be followed as a teaching pedagogy.
- Numerical questions pertaining to each unit wherever applicable should be practiced.
- For the second unit, students may be assigned a project wherein they can log on to the website of various banks and conduct an in-depth analysis and comparison of various financial products offered.
- For Unit III, a Project related to building a dummy portfolio of stocks and tracking their returns may be given.

- An investment budget may be given to the students to select investment options that maximize the return and minimize the tax implications.
- For the last unit, students may also file a dummy IT return to get hands-on experience with e-filing.
- Students may conduct a financial literacy survey among at least 25 respondents to measure the level of financial literacy and share the findings in the awareness in the form of a report.
- Any other Practical/Practice as decided from time to time

References

- *Introduction to Financial Planning (4th Edition 2017)* – Indian Institute of Banking & Finance.
- Sinha, Madhu. *Financial Planning: A Ready Reckoner July 2017,* McGraw Hill.

Additional Resources

- Halan, Monika. *Lets Talk Money: You've Worked Hard for It, Now Make It Work for You* July 2018 Harper Business.
- Pandit, Amar *The Only Financial Planning Book that You Will Ever Need* , Network 18 Publications Ltd.

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Course Title - Fit India

Course Objectives:

- Encourage physical activity through engaging the students in sports and yoga.
- Understand the importance of a balanced diet .
- Build skills for self-discipline, self-confidence, cooperation and teamwork.
- Promote fitness as a joyful activity.

Learning Outcomes:

- Adopting a healthy lifestyle.
- Knowledge of nutrition, diet and psycho-physiological aspects of fitness.
- Develop Self-esteem, Self-confidence, Self-discipline and team spirit as indicators of fitness.

Syllabus of *Fit India*
Unit I: Participation in Physical Activity • Fit India Protocol • Physical Activity, Health and Fitness • Indicators of Fitness Practical/Practice • Aerobic Work Out / Physical Activity (Walking) • Yoga – Asanas (Lying, Sitting and Standing positions) and Pranayama • Cardiovascular Testing by 12min/9 min Cooper Run/Walk test
Unit II: Health Related Fitness and their Components • Muscular Strength and Endurance • Body Composition and Flexibility Practical/Practice • Flexibility Training: Back Saver Sit and Reach test • Muscular Strength Training: Curl Ups / Standing Broad Jump/ VerticalJump/ Plyometric • Endurance Training: 1 Mile RockPort Testor 12 /9 minute Cooper run/walk test. • Ideal Body Weight,Body Mass Index (BMI), Waist-Hip Ratio, Waist-Height Ratio (Data of at least 10 persons to be collected)

Unit III: Nutrition and Fitness

- Healthy Eating Plate
- Balanced Diet
- Caloric Content of Food

Practical/Practice

- Preparing Daily Diet and Calorie Chart
- Aerobic Work Out / Physical Activity (Walking)
- Assessment of Physical Activity with the Calorie intake.
- Asanas for :
  - digestive system
  - excretory system

Unit IV: Psycho-physiological aspects of Fitness

- Sports Physiology and Psychology
- Depression, Anxiety and Stress Scale (DASS)
- Rosenberg Self Esteem Scale

Practical/Practice

- Skills learning and Participation in sports
- Group Games / Relays/ Minor Games
- Meditative Asanas and Pranayama
- Fitness component testing (as per Fit India Protocol and Norms) and Analysis of Results
- Data of at least 10 persons to be collected on DASS and self-esteem scale

Note: Concepts are to be taken up during the practical/practice hours.

Essential Readings:

- Fit India Website: https://fitindia.gov.in
- Wener W.K. Hoeger, Sharon
- A. Hoeger - Fitness and Wellness-Cengage Learning (2014).

SUGGESTED READINGS:

- Charles B. Corbin, Gregory J Welk, William R Corbin, Karen A Welk Concepts of Fitness And Wellness_ A Comprehensive Lifestyle Approach-McGraw-Hill (2015)
- W.Larry Kenney, Jack H. Wilmore, Devid L.Costil(2015). Physiology of Sports and Exercise, Second Edition. USA. Human Kinetics.
- Websites of International Sports Federations
- Website of Ministry of Youth Affairs and Sports

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Course Title - GANDHI AND EDUCATION

Course Objectives

1. Seek inspiration from Gandhi's thoughts on education.
2. Analyse Gandhian education philosophy for moral and character development.
3. Understand Gandhi's Idea on Self-reliant education (Swavalambi Shiksha)
4. Relate Gandhi's educational thoughts to NEP 2020

Learning Outcomes

1. Value Gandhian perspective on education
2. Appreciate the significance of education in Indian languages
3. Evaluate the application of Gandhian thoughts in NEP 2020
4. Realise the principles of NEP 2020 in vocational and skill oriented education.

Unit I: Gandhi's Philosophy and education
• Gandhi's Philosophy on education • Education for character building and moral development • Education relating to health, hygiene, heritage, and handicraft
Unit II: Gandhi's Experiment in Education
• Gandhi's educational ideas on use of Indian Language as a medium of Instruction, TextBook and Teacher. • Gandhi's educational thought on Elementary and Adult Education. • Gandhi's vision on Higher Education
Unit III: Gandhi's Educational Thought on Skill and Vocational Education • Rural development through Skill and Local Need Based education • Skill education in NEP 2020 and Gandhi • Gandhi's Idea on Self-reliance (Swavalambi Shiksha) and its reflection in contemporary educational policy.

Practical/ Practice Component

- Regular visits to Gandhi Museum and library to gain insight on Gandhi
- Excursion to Gandhi Ashrams located in different places like Sewagram, Wardha, Sabarmati, Ahmedabad etc.
- Workshops/projects in collaboration with Gandhi Bhawan, Gandhi Smriti and Darshan, Gandhi Peace Center. Ashrams based on innovation in village & cottage industry, Khadi, handicrafts, organic farming etc.
- Adoption of one place for Swachhta Mission or Skill Education
- If required, students can share their experiences in the form of a Project Report.
- Any other Practical/Practice as decided from time to time

ESSENTIAL READINGS

- महात्मा गांधी. (2014). बनि यादी शिक्षा. वाराणसी : सर्वसेवा संघ प्रकाशन.
- गांधी, मो. क. (2010). मेरेसपनों का भारत. अहमदाबाद : नवजीवन प्रकाशन मंदिर. नवजीवन प्रकाशन मंदिर. (1960). शरीर-

श्रम. अहमदाबाद: मो. क. गांधी. pp– 196-231

- प्रभ, ुआर. के. व राव, य. ूआर. (1994). महात्मा गांधी के विचार. इंडिया: नेशनल बकु ट्रस्ट.
- Anand T. Hingorani, ed.] Gandhi, M.K. Our Language Problem (Bombay:
- Bharatiya Vidya Bhavan,), pp. 53-55
- TOWARDS NEW EDUCATION written by M. K. Gandhi Edited by Bharatan Kumarappa

SUGGESTED READINGS:

- गांधी, मो·क· (2012). स य के योग अथवा आ मकथा (वेद , काशीनाथ,अनवु ादक) अहमदाबाद: नवजीवन काशन मं दर·
- गांधी, मो·क· (2012). हदं वराज (नणावती, अमतलालृ ठाकोरदास, अनवु ादक)· अहमदाबाद·नवजीवन काशन मं दर
- Coomaraswamy, Anand K . (1910). Art and Swadeshi . Munshi Ram Manoharalal. Delhi

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Course Title - Panchakosha: Holistic Development of Personality

Course Objectives

- To introduce Five *Koshas* – five levels of mind-body complex – *Annamaya, Pranayama, Manomaya, Vigyanamaya* and *Anandamaya Kosha*; for a holistic development of personality.
- To generate awareness about physical and mental wellbeing through the Indian concept of *Panchkosha*.
- To develop a positive attitude towards self, family and society amongst students.
- To guide students build personalities based on the understanding of *Panchkosha*.

Learning Outcomes

- Enhanced physical and mental health.
- Coping with peer pressures and stress.
- Improved concentration leading to better overall performance.
- Manage life situations through a balanced and mature approach.

Syllabus of *Panchkosha: Holistic Development of Personality*

Unit I: Elements of Personality
• *PanchaKosha*: Introduction • Five aspects of Human Personality: *Annamaya Kosha* (Physical body), *Pranamaya Kosha* (Vital life force energy), *Manomaya Kosha* (Psychological wellness), *Vijnanamaya Kosha* (Intellect), *Anandamaya Kosha* (Happiness and Blissfulness) • Health: Mental and Physical
Unit II: *Annamaya Kosha* and *Pranamaya Kosha*
• Human Body and *Pancha Karmendriyas* • *Annamaya Kosha:* Balanced diet and exercise for healthy body • *Pranamaya Kosha:* Development of life force, *Pranayam* • *Charucharya:* Social Etiquettes
Unit III: *Manomaya Kosha* and *Vijnanamaya Kosha*
• *Antahkarana* and its functions • *Pancha Gyanendriyas* • *Manomaya Kosha* : Controlling the *Mana* (mind) • *Vijnanamaya Kosha*: Ability of discretion and decision making
Unit IV: *Anandamaya Kosha* and Beyond
• *Anandamaya Kosha:* Experience of happiness and bliss • Self-realisation, Nature of Consciousness: *Sat-Chit-Ananda*

Practical/ Practice Component

- Recitation of select verses from *Taitiriyopansid*
- *Asana*
- *Pranayama*
- Meditation
- Visit to a Yog shivir or meditation centres
- Students are required to watch documentaries and films on the subject-related topics.
- If required, students can share their experiences in the form of a Project Report.
- Any other Practical/Practice as decided from time to time

Essential Readings

- पंचकोश विवेक,स्वामी परमहंस योगनान्द, https://ndl.iitkgp.ac.in/पर उपलब्ध
- विवेक चड़ामू णि, आदि शंकराचार्यद्वारा लिखित, अरविन्द आनंद द्वारा अनदि त, चौखम्भा प्रकाशन, वाराणसी, 2015
- Vivek Chudamani, Adi Shankaracharya, Swami Turiyananda (Sanskrit and English), Sri Ramakrishna Math, Mylapore, 2019
- सभी के लिए योग,बी.के.एस. आयंगार, प्रभात प्रकाशन, 2018
- Yoga The Path to Holistic Health: The Definitive Step-by-step Guide, B.K.S. Iyengar, Dorling Kingsley, London, 2021
- The Sacred Science of Yoga & The Five Koshas, Christopher Sartain, CreateSpace Independent Pub, 2015 Suggested Readings
- PanchaKosha: The five sheaths of the human being, Swami Nishchalanand, Kindle edition.
- Upanisadvakya Mahakosa. (An Upanishadic Concordance, taken from 239 Upanishads, G. S. Sadhale (Compiled by). Chowkhamba Vidyabhawan, Varanasi, 2014
- The Pentagon of Creation: As Expounded in the Upanishads, Ajai Kumar Chhawchharia, CreateSpace Independent Pub, 2015

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Course Title - Social and Emotional Learning

Course Objectives

- This course aims to develop social and emotional awareness in students and initiate them towards better personal and social well-being.
- To create an awareness towards self, others, the environment and their harmonious coexistence.

Learning Outcomes

- Students will be able to become aware of oneself and the society.
- Make informed lifestyle choices and extend the self in the joy of giving.
- Develop empathy, compassion, connect with nature and evolve emotionally to create a more harmonious society.
- Cultivate sensitivity towards discriminatory practices and explore possible solutions.

Syllabus of *Social and Emotional Learning*
Unit I: **Introduction | Self-Awareness and Happiness**
• Getting to Know Each Other • What to Expect from this Course? • Getting to Know Oneself • What Makes One Happy/ Unhappy? Outer vs Inner Sources of Happiness, Joy of Giving
Unit II: Social Relationships | Mindfulness
• Sharing vs Power: Peers, Family and Society • Going Beyond Power Relationships Through Open Conversation • The Value of Silence and Reflection • Practice of Mindfulness
Unit III: **Identity, Self-Image, Status, Self-Worth | Digital Identity**
• Identity Construction and Expression: Individual and Collective • Accepting and Valuing Oneself • Understanding the Gendered World • Identifying and transcending stereotypes • Identity Formation and Validation in the Digital World • Discrimination and its Forms

Unit IV : **Lifestyle Choices | Stress and Its Management**
• What Choices Does One Get To Make? • Is Choice influenced? Relationships, Career Choices • Career Pressures, Examinations • Dealing with Disappointment, Coping Skills, Health and Fitness • Connect With Nature: Sensitivity Towards Other Sentient Beings

Practical/ Practice Component
Unit 1

Getting to Know Each Other

In this lecture, the teacher will facilitate social engagement and personal reflection through a round of introductions. This also provides an opportunity for the teacher and students to recognise the deeper meanings that lie underneath routine exercises of introduction. For example, the adjectives that people use to describe themselves are indicative of the image that they wish others to hold of them. But do they hold the same image about themselves?

Teachers may begin the class by introducing themselves. Any introductory exercise that serves as an ice breaker and creates the classroom space as one of vibrant and open discussions, may be used. Teachers should try and ensure participation of all students in this exercise.

Activities

1.Who is in your circle?

Students may be asked to draw three concentric circles on their notebooks. The central circle is for the topic, the second for 'Love', and third for 'Like'. The space outside the circles is for 'Don't like'. The class decides on one topic, such as food, movies, web series, books, music, interests, etc. Each topic is taken up in turn and students are asked to write what they love, like, and don't like in the circles and share it with others. The exercise helps students to identify with their peers in commonalities and differences. The teacher may use prompts such as 'Why do you like this show?', 'Why do you dislike this food?' etc.

2. I am...

Students are asked to complete the sentences. The teacher may take turns and ask random students to answer it or the teacher may write these on the board and ask every student to write the answer in their notebooks. Some suggested prompt sentences are:

I am excited about.....

I wish I could.....

I am wondering.....

I am feeling anxious about....

Students can choose to share some of the answers with the class. The purpose of the exercise is to bring most students to speak in class and share their honest feelings and thoughts.

3. Introduce Yourself... Know Yourself

In this exercise, the teacher asks all students to take turns to introduce themselves. It is likely that most students will talk about their names, previous qualifications and hobbies. At the end of the introductions, the teacher can identify commonalities such as previous courses undertaken, regional identities, age, or similar common factors. The teacher may then use the following prompts to facilitate discussion:

Do these define you? Are you something more?

Would you like to change any of these qualifiers?

Is there something about you that you would like to share with us? Do you ever wonder about your identity/ identities?

What to Expect from this Course?

In this class, the focus is on understanding the relevance of the course and providing a course overview. Students will be able to explore the various dimensions of their lives and develop insights about themselves and their relationships. By discussing the outline of the course and the suggested activities, the teacher shall bring to the fore the exploratory journey that the students will embark upon. The students' questions relating to the course contents will also be addressed in this lecture.

Activities

In this class, the teacher may undertake an overview of the course, discussing each week's themes briefly. The nature of assignments and evaluation can also be detailed out. The teacher may hold a discussion with students on the following:

1. Why is social and emotional learning important?
2. What can the teacher do to make the classroom a more welcoming and open space for you?
3. What would be some of the activities that you would like to undertake during the course? Such
   as watching movies, reading books, maintaining a reflective journal, engagement in the field, mindfulness exercises, etc.

Self Awareness and Happiness

The aim of this module is to help students develop awareness about themselves – who they are, what their strengths and limitations are, and how they can develop themselves. This will help them to learn interlinkages and distinctions between thoughts, emotions and behaviours. This module will make them aware of the difference between happiness and pleasure and help them ponder on sources of happiness.

Self Awareness

Self-awareness is the experience and understanding of one's own personality – how an individual understands his own feelings, motives, desires, and behaviour, and the triggers for the same. Hence, self-awareness can be considered to be vital for personal development.

Students would thereby become more grounded and confident. This lesson will focus on the student's intrapersonal and interpersonal awareness through discussions and activities.

Activities

1. Students are asked to make a timeline of important events in their life and how each one affected them at that time. Do they see it differently today?
2. SWOT Analysis can be done by each student – Strengths, Weaknesses, Opportunities and Threats.
3. How do they envision their ideal person – What does your ideal person look like? What characteristics do they possess? Identify the gap. How do they plan to fill/reduce the gap?

Happiness

The term 'happiness' includes pleasant and positive emotions which can range from deep satisfaction and contentment to pleasure and excitement. The focus of this session would be to discuss techniques to develop the long-lasting feelings of contentment rather than momentary and short-lived emotions of excitement and pleasure. This will encourage and foster feelings of wellbeing and life satisfaction. The teacher will use activities in order to inculcate the ways of developing and sustaining happiness.

Activities

Writing a gratitude Journal – include in it what you are grateful for.

Mindfulness exercises and developing a mindful way of doing things.

"As one door closes, another door opens". A discussion based on the three opportunities that they think they lost and consider what it was they gained in the process.

Unit 2

Social Relationships

In this module, students will be asked to turn their gaze towards the society in which they are located and where they form social relations. They will be asked to introspect and understand the ways in which they connect with their immediate and extended social surroundings. In this context, peers and family exercise a significant influence on the identities of adolescents and young adults. The students will be asked to assess the nature of their relationship with friends and family and explore these negotiations in the context of sharing versus power.
The teacher will help students broaden their understanding by extending the discussion to include other social relationships, beyond peers and family. They will be encouraged to think about how they are influenced and how they in turn influence the people around them. The class shall explore the importance of open conversation as a means to resolve conflicts and contradictions.

Sharing vs Power: Peers

Identity formation and development is significantly dependent on the peer group with which the individual interacts. During this class, the students may pose the following question to themselves and to each other- What is the nature of the relationships that they share with their peers? Adolescents and young adults like to conform to peer expectations. Students may

explore whether relationships between peers are equal. What forces mediate these relationships? By posing examples from real life, the teacher will encourage the students to closely examine their relationships with their friends and family.

Activities

Ask the students to describe their close friends with fictitious names. They should then be asked why they are close to them and what is the one quality about their friends that they appreciate.

Divide students into groups of 5 each. This can vary depending on the class size. Each group can discuss how they were influenced by their friends in decision making processes.

The class/ group can share a story from their life about how they made a decision based on peer pressure. They should also share the result. Were they happy or unhappy about it? The findings can be discussed in the class.

Sharing vs Power: Family

The family is often considered to be a given and stable construct in which one is born or placed. As the relationships of adolescents with people outside the home grow, their interactions with their families evolve and take on a new and sometimes difficult character. Discussions and activities in the class should help the students objectively analyse their family space and the way in which they negotiate with it at different points of time. Through examples from day to day life, the teacher will help the students understand such spaces and the role they play.

Activities

Describe the ideal family. The students can think about the nature of the ideal created by them. What is the role played by siblings in your personal development?

Role play can be used to perform the different roles in a family so as to understand the different points of view within it.

Sharing vs Power: Society

The individuals generally extend the nature of their relationships with the family to the larger social world. In their pursuit to seek autonomy and independence, they may form new kinds of relationships in the larger social context. These relationships may be characterised by imbalances in power. This lecture will try to help the students strike a balance between self and society and stress the role of dialogue, sharing and cooperation.

Activities

The teacher can ask the students to describe any one constructive social role performed by them. (Any way in which they helped people around them). They can draw, speak, share a photograph or write a creative piece about it.

In the years to come what kind of role do you see yourself performing in society?

Share any one story about a person that has really influenced you? It can be about a public figure or anyone around you.

Going Beyond Power Through Open Conversation

In the previous lectures, the discussion has been around family, peer groups and society. In this session, the focus will be on the ways to build a more egalitarian society—one that is more collaborative, inclusive and takes into account different points of view. Open Conversation is suggested as a way by which acceptance, active listening and empathy can be

encouraged.

Activities

The students can be asked to present a brief performance showing the way in which open conversation can help in conflict resolution.

Movies in line with classroom discussions held in the past few weeks can be shown to the students. Movie screening should be followed by a discussion.

A short story, poem or a play can be used to build on classroom discussions.

Mindfulness

This module focuses on the significance of silence, introspection and non- judgmental awareness of the present moment. These mental practices are for understanding and building humane connection with self and others. The students are sometimes unable to spare time for their inner growth. Mindfulness practices aim at self-awareness and self- acceptance for overall well being. Valuing and practicing silence helps in the process of deeper reflection and builds inner strength to face conflicts with calmness. It hones the ability to develop mental equanimity and equipoise.

The Value of Silence and Reflection

The students will learn to understand the value of silence in the noise around. The practice of silence helps in self-reflection and connecting the inner and outer worlds. It enables one to experience joy, contentment and peace. Silence is a way of understanding how to enjoy one's own company and not to confuse being alone with loneliness. The students will appreciate that silence and solitude are positive and constructive.

Activities

The students can be asked to maintain silence and watch the flow of thoughts and emotions. In the process of silence the students can identify what gives them happiness and what they can do to create happiness for others.

The students can visit natural spaces to understand how silence runs in the sounds of nature which can help them realise peace.

Practice of Mindfulness

Through this lesson, the students will understand the significance of mindfulness as a daily practice for understanding that happiness depends on the self-training of mind. The joy of living in the moment with full awareness and steadiness of mind are important for accepting and cherishing all experiences positively and non-judgmentally.

Suggested Activities

Mindful walk/trek in the garden/forest/mountains or at a monument. Mindful eating while enjoying all elements of tastes in different types of food can also be done.

The students can be engaged in groups for non-judgmental listening

The class can be divided to discuss what activities of the day they engage with full awareness and where the moments go unnoticed

Identity, Self-image, Status, Self-worth

The module is designed to help the learners revisit the constructs of identity, self and personhood. It builds on questions such as 'who am I', 'how do others and I see myself', 'does status and self-image affect my sense of self-worth'. Specifically, it deals with how one's identity takes shape and thereon begins to be an integral part of oneself. It encourages the students to think about what factors influence their self-worth, such as achievements and accumulations, wealth, career or popularity. The students learn to accept and appreciate self and others.

Identity Construction and Expression: Individual and Collective

This lesson is aimed to help the learners deconstruct their sense of identity and rechart the signifiers/ markers and processes which have played a pivotal role in constructing their sense of identity and self. Itunfoldshowprocessesofsocialisationwithinfamily,school,community and society at large have played a role in making students who they are. How do these processes shape our notions of self-concept, self-evaluation, and self-esteem? The students will be able to become aware of their individual and collective sense of identity and self.

Activities

The teacher may ask the students to imagine one's identity in different contexts that are significant for identity construction. For instance, what does identity of being someone's 'child' entail; likewise what kind of an identity does one expect of oneself as a sibling, student and as a friend.

The teacher may ask the students to read from biographies/autobiographies of people from other cultures and discuss excerpts from the books. The teacher may elaborate the qualities of these people.

The teacher may organise a field visit with the students to different places. Ask the students to survey people from those locales about their experiences.

Accepting and Valuing Oneself

This lesson builds on the previous lesson by unpacking how concerns revolving around self-image and status may affect one's sense of self. It aims to make one aware why a challenge to one's identity may lead to discomfort and conflict. Students will be encouraged to accept their physical appearance and identity and to value self-worth. This lesson invites them to undertake an inward journey.

Activities

The teacher may ask students to respond to different characters in a movie where challenges to their identity lead to different kinds of responses.

What will change after 10 years in terms of your identity and what according to you will not change?

The teacher may ask the students to identify an 'open space' and 'sit alone' and write a reflective essay on the theme, 'remember what makes you, you'.

Gender Roles

The objective of this module is to enable the students to differentiate between biological and psychological context of gender in order to understand how their gendered identities are socially constructed. Gender refers to the characteristics of men and women and includes norms, behaviour and roles associated with being man or woman, girl or boy. Further, this will enable the students to become aware that their destiny need not be determined by biology.

Understanding a Gendered World

The objective of this lecture is to enable the students to understand that gender roles are taught by the process of socialization, beginning with the family. Everyday things that we do like eating, speaking, walking, our gestures and even the professions that we think we choose are all often influenced by societal norms.

Activities

The teacher may ask the students to list things associated under the heading; men and women. Once listed, the headings can be interchanged and a discussion may follow.

Ask students to bring an artefact from home, it can be a childhood picture.On the basis of the picture students can share childhood experiences. Through the narrative of their oral history students can share experiences of how they acquired gender.

Identifying and Transcending Stereotypes

In the previous lecture, students have been made aware that gender stereotypes are socially constructed, that the ways in which we interact with others and with ourselves are shaped by gender. The objective of this lecture is to explain the importance of thinking beyond the stereotypes and to reinforce that biological differences between genders should not lead to social discrimination.

Activities

Movie viewing: Students and teachers can choose any movie for discussion.
Quiz cards: On the cards the following can be written and the student can be asked to identify which is socially constructed and which refers to biology.

Men are Breadwinners, Women are homemakers.

Males have XY chromosomes, Females have XX chromosomes.

Women give birth to babies, men don't.

Boys don't cry

Digital Identity

It may be constricting to identify exclusively with ideas like region, ethnicity, language, gender, nationality. For, in this increasingly interconnected world, students find themselves at the intersection of many ideas - evolving and fixed, dominant and marginalised. This rainbow of ideas provides an opportunity to appreciate the diversity in the constitution of an individual's identity. But what happens when one is given a chance to construct a digital identity for oneself? Digital platforms and social networking sites arguably provide an individual the choice to portray oneself the way one likes. Do we choose to present our authentic selves or do we prefer to present highly curated versions of ourselves? Do social media posts reflect self- respect and self-love?

Identity Formation and Validation in the Digital World

Through this session, students are expected to realise the ways in which they construct themselves digitally and how that construction is a manifestation of conformity, resistance and/or subversion, of the dominant ideologies. Students should be encouraged to reflect on what exactly they are seeking from engaging with social media. They need to think how the joy of sharing ideas may be different from the egoic need for compulsive validation.

Activities

Think of the digital filters that you use before sharing your photographs with others. Why do you think you need to do that?

We often feel happy about being validated in the form of 'likes' and positive comments on our social media posts. However, do you feel sad when that does not happen? What could be the possible reason for your mind to have this line of thought?

Digital Identities: Impact on the Self

The students will carry forward the learnings from the previous session and continue their inquiry in the realm of motivations for curating a digital self and its relation to self-esteem. They would be encouraged to engage in a non-judgemental conversation which would motivate them to inquire whether their digital activities are a result of anxiety which may be emanating from their self-image.

Activities

Do you think the use of digital filters is disrespectful to your self? Is not using them a source of anxiety for you? Can this have anything to do with your self-esteem?

Think of situations that make you feel sad on social media. Note them down. Do you think not exposing yourself to such a situation is a solution or do you think you also need to locate the issue within yourself?

Try spending a day without doing any activity on social media like posting anything or surfing other people's accounts for their activities. At the end of the day observe how you feel.

Unit IV

Lifestyle Choices

How we choose to live and behave influences our social and emotional wellbeing. In this module we analyse our lifestyle choices relating to material and cultural consumption, relationships and career. Students will be encouraged to inquire whether our everyday choices are based on a culture of passive consumption and conformism. We will seek to explore possibilities of alternative forms of living premised on ethical consumption, altruism, simple and sustainable living.

What Choices Does One Get to Make?

In this session, the attempt will be to explore the extent to which consumerism impacts our lifestyle choices and the repercussions of these on our natural and social environment. Today we live in an era of mass consumption and consumer culture fostered by advanced technologies and global production systems. Overt materialism, wasteful and conspicuous

consumption unmindful of the larger implications are key aspects of this phenomenon. In this lecture, we explore our lifestyle choices such as our physical image, attire, dietary choices, desire for dream homes and destination weddings. This would be the starting point for a re-imagination of a world based upon choices that would lead to simple and sustainable living.

Suggested Activities

Students may be asked to work through their consumption history right from their childhood. A discussion may then be initiated by asking the students to reflect on their consumption choices and their motives behind the same.

The teacher may identify a few products like tea, coffee, coca-cola, jeans etc and ask the students to trace product histories and geographies.

The students may be asked to discuss a strong desire to possess an object and then deconstruct that desire. Discussion may emphasise upon why they wanted it?

Is Choice Influenced? Relationships, Career Choices

In this lecture, we examine the extent to which lifestyle choices, regarding relationships and career, get influenced and by what factors. Do we really have a choice as regards the career that we intend to pursue? Often factors like family, gender, the need for security and stability influence our choices. Recognizing and mapping the space of freedom and unfreedom with respect to our choices is a necessary life skill that would enable a more self-aware and harmonious living.

Activities

Reflect on an instance where you may have inflicted pain on someone and also think of a moment when you felt someone was insensitive in their conduct of a relationship.

The teacher may divide the class into small groups and hold a discussion on what constitutes a successful career.

Reflect on the various career options available in your society and discuss what you would prefer to pursue and why?

Discrimination

The module is designed to help the learners understand the origin and nature of discrimination and the effects thereof. Discrimination can be on various grounds such as ethnicity, religion, caste, race, gender, disability, or place of birth. One's discriminatory actions can lead to social fragmentation. The module encourages the learners to introspect their actions and seeks to celebrate diversity.

Why and How? Forms of Discrimination

The objective of this lesson is to make learners aware of different forms of discrimination. On the one hand, an individual can be a victim of discrimination, and on the other, the same person

may harbour prejudice or discriminate against others. It is pertinent to understand our own biases and introspect our actions.

Activities

The teacher can ask students to count their friends who belong to different backgrounds. They can reflect on what they have learned by interacting with these friends.

Ask students to learn about their neighbourhood and document what groups live there, what has been the nature of their relationships.

An exercise on privilege using nothing but wadded up papers and a trash can. Students Learn A Powerful Lesson About Privilege. https://youtu.be/2KlmvmuxzYE

Stress and Its Management

This module is designed to give students an opportunity to articulate the pressures and challenges that one experiences in life. It gives students a chance to spell out how pressure to perform well can become a source of stress. The module is aimed to equip the learners with ways of dealing with disappointments with regard to the choice of career path and with performance related stress. It brings to fore skills of coping with stress and disappointments. It also highlights the role of physical well-being in keeping oneself mentally healthy.

Career Pressures, Examinations

This lesson is designed to help students have a relook at the challenges and pressures they have recently faced or are facing on account of career choices and examinations. It gives them a space to articulate what they might have faced while making these choices. This lesson also gives them an opportunity to highlight the uncertainties and challenges they foresee in their future lives.

Activities

The teacher may ask the students to organise themselves in groups of 4-6. Each of the groups have to do a role-play around the themes on career pressures.

Show images of different people and ask the students to quickly jot down impressions. The collective answers serve as a springboard for discussions. Students may learn about their own

biases through this activity.

The teacher may ask the students to identify movies where struggles related to career and performance pressure stand out.

The teacher may ask the students to share their experiences about the following:

- First few months into an academic programmes
- 2 months before examinations
- On the day of examination
- 15 days after examinations get over

Dealing with Disappointments, Coping Skills, Health and Fitness

This session aims to equip the learners with coping skills to manage stress and deal with disappointments. Furthermore, it makes them aware of the importance of health and fitness for maintaining mental health.

Activities

The teacher can ask the students to write how they come to know they are stressed and what they do when they are stressed? The teacher may engage them in a discussion on coping skills and channelize students' energies into positive ways of resolutions of conflict and stress.

The teacher may ask the students to discuss the lives of high achievers and low achievers and how performance pressures drive their lives. Can they draw similarities and differences in the sources of stresses and how they deal with these stresses?

Ask each of the students to share their daily regime to keep themselves physically fit. The students may also share how each one mentally 'feels/experiences' when one is engaged in physical exercises.

Connect with Nature

This module is designed to strengthen bonds with nature while understanding its intrinsic value as opposed to its instrumental value. Issues of global warming and environmental degradation are the consequences of a disconnect between humans and nature. The aim is to cultivate environmental awareness through virtues of altruistic responsibility, empathy, cohesiveness, and mutual sustainability between nature, flora-fauna, animals and humans. The students may be engaged in activities to build bridges between the inner environment (one's self) and external environment (nature). In this way, they can celebrate oneness with nature and perceive nature not as a means but an end in itself.

Sensitivity Towards Other Sentient Beings

The students, in this session, would participate in group based environmental activities as a way of building social responsibility towards all sentient beings. Any action against even a part of nature impacts the whole. Thus, it is the responsibility of all, to create a safe environment for all sentient beings to live in harmony.

Activities

Students can be encouraged for Nature walks, nature drives, treks and hikes, nature photography, adopting natural spaces in local areas, plantation drives, visiting biodiversity parks, adopting spaces for greening etc.

Visits to animal shelters can be organised to sensitise the students.

Films can be screened on environmental sustainability, environmental consciousness etc

- Any other Practical/Practice as decided from time to time

Suggested Readings

- Black,Donna Lord(2022). Essentials of Social and Emotional Learning (SEL). NJ : Wiley.
- Goleman,Damiel (2005). Emotional Intelligence.USA:Bantam.
- Swami Vivekanand. (2016).The complete works of Swami Vivekanand. Advaita Ashrama.(https://www.ramakrishnavivekanand.info/vivekanand/complete works.html)

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Course Title - Sports for Life

Course Objectives

- To imbibe the significance of sports to promote health, fitness and wellness in life.
- To understand the values of teamwork, tolerance, goal-setting and decision making.
- To learn the strategies and tactical moves while playing a sport.
- To understand the importance of physical activity in reference to 3S: strength, speed and suppleness.

Learning Outcomes

- Acquire values of cooperation, team spirit, determination, and endurance.
- Acquire good health and psychological well-being through sports participation.
- Apply the decision making-ability and goal-setting skills acquired through sports participation in everyday life.
- Acquire skills for engaging in moderate or vigorous physical activity and sports participation.
- Reduce exposure to screen time on electronic gadgets and channelising energy through sports participation.

Syllabus of *Sports for Life*

Unit I: Rules and Techniques
Concept • Rules of the Sport • Techniques / skills in the sport/ Aerobic Skills ***Practical*** • Marking of the court / field • Outdoor Adventure Activity • Skills learning in sports • Group Games / Relays • Participation in Intramural competitions

Unit II: Components of Fitness

Concepts

- Meaning and Development of Strength, Speed, Endurance, Flexibility and Coordinative Abilities.

Practical

- Skills learning and Participation in sports
- Group Games / Relays / Minor games
- Participation in Intramural competitions

Unit III: Benefits of sports and physical activity

Concepts

- Effect of exercise on the body
- Organizing of a sports competition
- Balanced Diet

Practical

- Skills learning and participation in sports
- Group Games, / Relays /Step Aerobics
- Participation in Intramural competitions

Unit IV: Sports in Contemporary Times

Concepts

- Honours and Awards associated with sports and sportspersons

Practical

- Skills learning and Participation in sports
- Participation in Intramural competitions

Note

- **The concepts are to be dealt with during the practical/practice classes.**

- The list of suggestive sports: Aerobics and Physical Activity, Athletics, Archery, Badminton, Basketball, Boxing, Chess, Carrom, Cricket, Football, Handball, Hockey, Kabaddi, Kho-Kho, Swimming, Shooting, Squash, Table-Tennis, Tennis, Taekwando, Volleyball, Wushu, Wrestling etc.

Suggested Readings

- James R Morrow Jr., Dale P. Mood, James G. Disch, Minsoo Kang - Measurement and Evaluation in Human Performance-Human Kinetics Publishers (2015)
- W.Larry Kenney, Jack H. Wilmore, Devid L.Costil.(2015). Physiology of Sports and Exercise, Second Edition. USA.Human Kinetics.
- Wener W.K. Hoeger, Sharon A. Hoeger - Fitness and Wellness-Cengage Learning (2014).
- Kansal DK (2012).A practical approach to Measurement Evaluation in Physical Education &Sports selection. Sports & Spiritual Science Publications, New Delhi.
- Websites of International Sports Federations, Ministry of Youth Affairs and Sports Govt. Of India.

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Coruse Title - Swachh Bharat

COURSE OBJECTIVES:

- To understand the developmental challenges with reference to sanitation infrastructure and practices.
- To build values of cleanliness, hygiene and waste management in diverse socio-economic contexts.
- To understand planning of social policy and programmes.
- To use waste management techniques at community level.
- To instill a sense of service towards society and the Nation. LEARNING OUTCOMES:
- Understanding the significance of the Swachh Bharat Abhiyan.
- Ability to analyse and predict the sanitation challenges of India
- Determine the link between sanitation and development.
- Contribute to the Swachh Bharat Abhiyan through real time projects/fieldwork

Syllabus of *Swachh Bharat*

Unit I: Introduction to Swachh Bharat Abhiyan
• Gandhian philosophy of Cleanliness • Swachh Bharat Abhiyan (SBA) • Hygiene, Sanitation & Sustainable Waste Management • Agencies and nodal Ministries for SBA • Different phases of the SBA and its evaluation • Citizens' Responsibilities: Role of *Swacchagrahi*
Unit II: Swachh Bharat: Rural and Urban Facets
• Indicators for Swachh Bharat • Rural ❖ Sanitation coverage across households (2014 vs. 2022) ❖ Open Defecation Free (ODF) Villages: Parameters ❖ ODF plus model: Key indicators • Urban ❖ Sustainable sanitation ❖ Waste/water and solid waste management ❖ Garbage Free Cities
Unit III: Prospects and Challenges
• Attitudes and Perceptions • Operational and Financial issues • Monitoring & Supervision • Community Mobilization

Practical/ Practice Component

Suggested Activities: List of activities to be undertaken:

- Identify plastic and e-waste in and around the institution and suggest innovative technologies to minimize wastage.
- Identify events/fests that generate maximum waste and ways to minimize it.
- Visit canteen/shops and track the lifecycle of wet/dry waste in and around the institution and document the findings in the form of a Project Report.
- Conduct interviews of stakeholders to understand the level of awareness.
- Conduct a Clean Audit of the Institution and identify areas for action.
- Conduct cleanliness drives.
- Organise Swachhata Pakhwada meetings, rallies, and mobilization camps within the identified
- communities.
- Students may participate in the Swachh Bharat Internship programme.
- If required, students can share their experiences in the form of a Project Report.
- Any other Practical/Practice as decided from time to time

Essential Readings

- "Swachh Bharat Mission - Gramin, Department of Drinking Water and Sanitation, Ministry of Jal Shakti"
- India 2021, Ministry of Information & Broadcasting
- http://swachhbharatmission.gov.in/SBMCMS/swachhta-pakhwada.htm
- https://swachhbharatmission.gov.in/SBMCMS/about-us.htm
- https://www.communityledtotalsanitation.org/sites/communityledtotalsanitation.org/files/ODF_verification_checklist.pdf
- https://sbm.gov.in/phase2dashboard/PhaseII/NationDashboard.aspx
- https://www.niti.gov.in/sites/default/files/2019-08/Report%20of%20Sub-Group%20of%20Chief%20Ministers%20on%20Swachh%20%20Bharat%20Anhiyaan.pdf

Suggested Readings

- **https://swachhbharatmission.gov.in/SBMCMS/writereaddata/Portal/Images/pdf/brochure/Greywatermanagement.pdf**
- **https://swachhbharatmission.gov.in/SBMCMS/writereaddata/Portal/Images/pdf/brochure/PWMB5_28th_June.pdf**
- GoI (2020). Swachh Bharat Mission (Grameen) Phase 2: Operational guidelines. Department of Drinking Water and Sanitation, Ministry of Jalshakti.
- MoHUA (2017). Guidelines for Swachh Bharat Mission - Urban (PDF). Ministry of Housing and Urban Affairs, Government of India.

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Vedic Mathematics Syllabus

Course Objectives:

- Foster the love for mathematics by creating a positive attitude through Vedic and Ancient Bhartiya (Indian) Mathematics
- To generate awareness among the younger generations about contributions of Great Bhartiya (Indian) Mathematicians in the various fields of Mathematics.
- To promote Vedic mathematics in NEP 2020 under Bhartiya Gyan Parampara (IKS)
- To instill pride in the Bhartiya (Indian) Knowledge System.
- To develop conceptual knowledge of mathematical concepts

Learning Outcomes:

After completion of the course, students shall be able to

- Think Logically.
- High Speed Calculation
- Find mathematical solution of algebraic expressions.
- Appreciate the Mathematical advancements of Ancient Bharat.
- Researches in Vedic Mathematics

Credit - 1

1. **Contribution of Bhartiya (Indian) Mathematician**
   - Aryabhat
   - Bhaskaracharya
   - Varahmihir
   - Mahaviracharya
   - Sridharacharya
   - Srinivas Ramanujan
   - Bharti Krishna Tirth
2. **Introduction of Vedic Mathematics by Swami Bharti Krishna Tirth**
   - 16 Sutra
   - 13 Upsutra
3. **High Speed Calculation**
   - Addition and Subtraction
   - Multiplication
   - Division
   - Square and square root
   - Cube and cube root
   - Vinculum and its application.
   - Mixed Operations

02/08/2024

02.08.2024

2/8/24

Credit - 2

4. **Easy Solution of Algebra by Vedic Maths.**
   - Multiplication and Division of Algebraic Expression
   - Factorisation
   - Partial Fraction
   - Linear Equations
   - Quadratic Equation
5. **Meru Prastaar**
6. **Vedic Geometry**
   - Bodhayana Theorem
   - Bodhayana Number
   - Sum and Difference of Bodhayana number
   - Value of $\sqrt{2}$ in Bodhayana Sulbha Sutra.
7. **Bhartiya Panchang**
   - Parts of Panchang
   - Calculation of Time
   - Bhartiya Units for time calculation.
   - National Panchang

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02/08/2024.

2/8/24

02.08.2024

Course Title - Yoga: Philosophy and Practice

Course Objectives

- To learn the fundamentals of Yoga for harmonising the body, mind and emotions.
- To demonstrate the value and the practice of holistic living.
- To value the heritage of Yoga for self and society.

Learning Outcomes

- Understanding ways to harmonise the body and mind through Yoga.
- Disciplining the mind through practicing Yoga.
- Understanding of consciousness through practical training.

Syllabus of *Yoga: Philosophy and Practice*

Unit I: Yoga: *Asana, Prāṇāyāma* and *Dhyana*
• History of Yoga • Significance of Asana • Effect of Praṇayama • Importance of *Dhyana*
Unit II: Patanjali's *Yogasūtra* and *Chakra*
• Patanjali's Yogasūtra: a summary • First sutra • Second sutra • *Chakras* (psychic centres)
Unit III: Understanding *Asana* and *Pranayama*
• Asana: the basics • *SuryaNamaskara* • *Nadishodhana Praṇayama*

Practical/ Practice Component

- Surya Namaskar
- Selected Asana
- *Praṇayama*
- Relaxation exercises for the eyes (7 steps) neck (4 steps)
- Concentration on *Bhrumadhya*

- Project Work (effect of everyday concentration on breath for 15 minutes: reflections to be compiled in the form of a Project report.
- Any other Practical/Practice as decided from time to time

Essential Readings

- Āsanas, Prāṇāyāmaand Mudra Bandh , Swami SatyanandaSaraswati, Yoga Publications Trust, Munger, Bihar, India, 2004.
- Patanjali Yogasutras, Commentary by Swami Vivekanand, Rajyoga

Suggested Readings

- PatanjalYog Pradeep- Swami OmanandSaraswati, Gita Press, Gorakhpur, 2013.
- Science of Pranayama-Swami Sivananda, Edition by David De Angellis, 2019, All Rights Reserved.
- Udayveer Shastri Granthavali,4, Patanjal- Yoga Darshanam, Udayavir Shastri, Govindram Hasanand, Delhi 6.

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Course Title - भारतीय भक्ति परंपरा और मानव मूल्य

COURSE OBJECTIVES

- भारतीय भक्ति की महान परंपरा, प्राचीनता और इसके अखिल भारतीय स्वरूप सेछात्रों का परिचय कराना
- भारतीय भक्ति परंपरा के माध्यम सेछात्रों मेंमानव मूल्यों और गुणों को जगाकर उनका चारित्रिक विकास करना और एक अच्छे मनुष्य का निर्माण करना ।
- छात्रों को भारतीय नैतिक, सांस्कृतिक और सामाजिक मल्ूयों के प्रति जागरूक करना ।
- भारतीय भक्ति परंपरा के माध्यम सेराष्ट्रीयता और अखिल भारतीयता की भावना जागतृ करना।

LEARNING OUTCOMES

- भारतीय भक्ति परंपरा के माध्यम सेछात्रों मेंमानव मल्ूयों और गुणों को विकास होगा और वे एक अच्छेऔर चरित्रवान मनष्ुय बन सकेंगे।
- भारतीय भक्ति परंपरा के सांस्कृतिक और सामाजिक पक्षों की जानकारी हो सकेगी।
- भक्ति की प्राचीनता और अखिल भारतीय स्वरूप की जानकारी सेराष्ट्रीयता और अखिल भारतीयता की भावना जागतृ और मजबतू होगी।
- प्रमखु भक्त कवियों का परिचय और उनके विचारों की जानकारी हो सकेगी।

Unit I: भारतीय भक्ति परंपरा

भक्ति: अर्थऔर अवधारणा भक्ति के विभिन्न संप्रदाय और सिद्धांत भारत की सांस्कृतिक एकता और भक्ति भक्ति का अखिल भारतीय स्वरूप
Unit II: भारत के कुछ प्रमखु भक्त और उनके विचार
संत तिरुवल्लवर ु , आण्डाल, अक्कमहादेवी, ललयद , मीराबाई, तलसीदास ु , कबीरदास, रैदास, गरु ु नानक, सरदास ू , जायसी, तकाराम ु , नामदेव, नरसिंह मेहता, वेमना, कं चन ु , नम्बियार, चैतन्य महाप्रभ, ुचंडीदास, सारला दास, शंकरदेव
Unit III: मानव मल्ू य और भक
मानव मल्ू य का अर्थ चयनित भक्त कवियों की जीवन मल्ू यपरक कविताएँ

Practical/ Practice Component

• पाठ्यक्रम मेंउल्लिखित कवियों मेंसेकिसी एक कवि की रचनाओंमेंविभिन्न मानव मल्ूयों केआधार पर प्रोजेक्ट

• वर्तमान समय मेंभक्ति की प्रासंगिकता को समझना; सर्वे और साक्षात्कार पद्धति केआधार पर.

• जीवन मेंमानव मल्ूयों के प्रतिपालन पर सर्वे और साक्षात्कार केआधार पर एक रिपोर्टबनाना.

• उल्लिखित कवियों मेंसेकिसी एक कवि सेसंबंधित किसी मठ, आश्रम या मंदिर आदि, अथवा कोई फिल्म/ डॉक्यमु ेंट्री केआधार पर रिपोर्टबनाना.

• आवश्यक हो, तो छात्र प्रोजेक्ट रिपोर्ट के रूप में अपने अनभव साझा कर ु ें

• Any other Practical/Practice as decided from time to time

Essential Readings

• 'भक्ति का उद्भव और विकास तथा वैष्णव भक्ति के विविध रूप', भारतीय साहित्य का समेकित इतिहास, संपादक- डॉ नगेंद्र, हिंदी माध्यम कार्यान्वयन निदेशालय, दिल्ली विश्वविद्यालय, दिल्ली, पष्ृठ संख्या 215-250

• कुछ प्रमखु कवियों के चयनित पद

• 'भक्ति आंदोलन और भक्ति काव्य', शिव कुमार मिश्र, अभिव्यक्ति प्रकाशन, इलाहाबाद, 1994

• 'मानव मल्ूय और साहित्य', डॉ धर्मवीर भारती, भारतीय ज्ञानपीठ, नई दिल्ली,1999 Suggested Readings:

• 'भक्ति केआयाम', डॉ. पी. जयरामन, वाणी प्रकाशन, नई दिल्ली

• 'हिंदी साहित्य का इतिहास', आचार्यरामचंद्र शक्ु ल, लोक भारती प्रकाशन, इलाहाबाद

• 'मध्यकालीन हिंदी काव्य का स्त्री पक्ष', डॉ. पनमू कुमारी, अनामिका पब्लिशर्सएंड डिस्ट्रीब्यटुर्स, नई दिल्ली

• 'मध्यकालीन हिंदी भक्ति काव्य: पनु मूल्मूयांकन केआयाम', डॉ. पनमू कुमारी, अनामिका पब्लिशर्सएंड डिस्ट्रीब्यटुर्स , नई दिल्ली

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Course Title - सृजनात्मक लेखन के आयाम

पाठ्यक्रम का उद्देश्य (Course Objectives):

1. सृजनात्मक और भाषायी कौशल का संक्षिप्त परिचय कराना
2. विचारों का प्रभावी प्रस्तुति करण करना
3. सृजनात्मक चिंतन और लेखन क्षमता को विकसित करना
4. मीडिया लेखन की समझ विकसित करना पाठ्यक्रम अध्ययन के परिणाम

(Learning Outcomes):

1. सृजनात्मक चिंतन और लेखन क्षमता का विकास हो सके गा
2. लेखन और मौखिक अभिव्यक्ति की प्रभावी क्षमता विकसित हो सके गी
3. मीडिया लेखन की समझ विकसित होगी
4. विद्यार्थी में अपने परिवेश, समाज तथा राष्ट्र के प्रति संवेदनशीलता का विकास होगा

Syllabus: सृजनात्मक लेखन के आयाम

इकाई – 1 (Unit I): सृजनात्मक लेखन • सृजनात्मक लेखन: अर्थ, स्वरूप और बोध • सृजनात्मक लेखन और परिवेश • सृजनात्मक लेखन और व्यक्तित्व निर्माण
इकाई – 2 (Unit II): सृजनात्मक लेखन : भाषिक संदर्भ
• भाव और विचार का भाषा में रूपान्तरण • साहित्यिक भाषा की विभिन्न छवियाँ • प्रिंट तथा इलेक्ट्रोनिक माध्यमों की भाषा का अंतर
इकाई 3 (Unit III): सृजनात्मक लेखन – विविध आयाम

- कविता, गीत, लघु कथा
- हास्य - व्यंग्य लेखन,
- पल्लवन, संक्षेपण, अनूच्छेद

Practical/ Practice Component

- कक्षा में प्रत्येक विद्यार्थी द्वारा 'मेरी पहली रचना' शीर्षक से किसी भी विधा में लेखन
- किसी भी साहित्यिक रचना का भाषा की दृष्टि से विश्लेषण
- इकाई- 3 में उल्लिखित विधाओं में विद्यार्थियों द्वारा लेखन एवं सामहू िक चर्चा
- प्रत्येक इकाई से संबन्धित परियोजना कार्य: o समसामयिक विषयों पर किसी भी विधा में लेखन – बदलते जीवन मल्ू य, महामारी, राष्ट्र निर्माण में छात्र की भमि ू का, यवाओं के क ु र्तव्य, पर्यावरण संरक्षण, लोकतन्त्र में मीडिया की भमि ू का, ऑनलाइन शॉपिंग अथवा अन्य समसामयिक विषय o किसी उत्सव, मेला, प्रदर्शनी, संग्रहालय और किसी दर्शनीय स्थल का भ्रमण तथा उस पर परियोजना कार्य
- प्रिंट माध्यम के खेल, राजनीति, आर्थिक और फिल्म जगत आदि से जड़ी साम ु ग्री का भाषा की दृष्टि से विवेचन
- इलेक्ट्रोनिक माध्यम के समाचार, धारावाहिक, विज्ञापन आदि का भाषा की दृष्टि से विवेचन
- आवश्यक हो, तो छात्र प्रोजेक्ट रिपोर्ट के रूप में अपने अनभव साझा कर ु ेंं
- Any other Practical/Practice as decided from time to time अनिवार्य पाठ

(ESSENTIAL READINGS)

- लेखन एक प्रयास, हरीश चन्द्र काण्डपाल

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Title of the Program: India The Mother of Democracy

Credits: 03

(Value added course)

Course Curriculum: Undergraduate level course for the Universities of Bihar

Objective of the Course : For long it has been perceived by certain intellectual trajectory that 'Democracy' is a by-product of Occidental Philosophy. On the contrary, Democratic ethics have been an integral part of State functioning in Bharat, i.e. India, since time immemorial. Multiple inscriptions and historical records related to our Democratic values are testimony to this. The concept of 'Vasudhaiva Kutumbakam' amply conveys the message of 'Democracy' through Bharatiya Philosophy only. Students at graduate level should be aware of the fact that 'Democracy' as an ethic is deep rooted in Bharatiya practices.

Credit-I

A) People's Polity in India: Origin, Growth and Institutionalization
B) The Ideal King- According to Kautilya and *Rajarsi in Bhagwat Gita*
C) Ancient India Value System and Concept of Kingship
D) Governing Principles of Democracy in Ancient Sanskrit Scriptures
E) Monarchial Democracies of Ancient India

Credit-II

A) Roots of Indian Democracy and its Formation
B) Democratic Thoughts and Traditions as Reflected in *Arthasatra*
C) Corporate Bodies and Community Participation during *Kakatiya* Times
D) Democracy as Known to Ancient Buddhism
E) Democratic Governance Traditions in Janjatis

1880

Credit-III

A) *Panchayat* System in India

B) Democratic Traditions Among Janjatis of North-East

C) Democratic ideals and Indian Villages-A little Republic

D) Indian State System in Medieval Times and Village System of Governance

E) Colonial Confluence and Destruction of Village *Panchayats* in 19th Century

Proposed Course Structure for 4 Year Undergraduate Programme under CBCS System

Ability Enhancement Courses (AEC)

Semester – I (AEC- 1)

Science	Social Science/Arts	Commerce
• MIL	• MIL	• MIL

Semester – II (AEC- 2)

Science	Social	Commerce
• Environmental Science	• Environmental Science	• Environmental Science

Semester – III (AEC- 3)

Science	Social	Commerce
• Course on Disaster Risk Management	• Course on Disaster Risk Management	• Course on Disaster Risk Management

Semester – IV (AEC- 4)

Science	Social Science/Arts	Commerce
• Course on NCC/NSS/NGO's/Social Service/Scout & Guide/Sports	• Course on NCC/NSS/NGO's/Social Service/Scout & Guide/Sports	• Course on NCC/NSS/NGO's/ Social Service/Scout & Guide/Sports

List of Ability Enhancement Course (AEC)

SL. NO.	Course Title	LTP Distribution of the Course			Total Credits:	Total Marks = 100
		L	T	P		
1	MIL (Semester – I)	2	1	0	2	End -Term Appraisal : 70 Marks Internal Assessment: 30 Marks
2	Environmental Science (Semester – II)	2	1	0	2	
3	Course on Disaster Risk Management (Semester – III)	2	1	0	2	
4	Course on NCC/NSS/NGO's/Social Service/Scout & Guide/Sports (Semester – IV)	2	1	0	2	

Proposed Course Structure for 4 Year Undergraduate Programme under CBCS System

Ability Enhancement Course (AEC)

Semester – I (AEC- 1)

Science	Social Science/Arts	Commerce
• **MIL**	• **MIL**	• **MIL**

ENGLISH COMMUNICATION

Course Learning Objectives:

The purpose of this course is to introduce students to the theory, fundamentals and tools of communication and to develop in them vital communication skills which should be integral to personal, social and professional interactions. The present course hopes to address some of the aspects of effective communication skills through an interactive mode of teaching-learning process. The various dimensions of communication skills that will be focused in the course include language of communication, speaking skills such as personal communication, social interactions and communication in professional situations such as interviews, group discussions and office environments, important reading skills as well as writing skills such as report writing, note taking etc.

Syllabus:

1. Introduction:
   - Theory of Communication
   - Types and modes of Communication
   - Effective Communication/ Mis- Communication
   - Barriers and Strategies
2. Language of Communication:
   - Verbal and Non-verbal (Spoken and Written)
   - Personal, Social and Business
   - Intra-personal, Inter-personal and Group communication
3. Speaking Skills
   - Dialogue
   - Group Discussion
   - Interview
   - Public Speech
   - Role Play/Extempore Presentations

4. Reading and Understanding

- Close Reading
- Comprehension, Analysis and Interpretation

- Summary ParaphrasingTranslation (from Indian language to English and vice-versa)

Literary/Knowledge Texts

5. Writing Skills

- Making notes
- Documenting
- Report Writing
- Writing Letters - job applications, CV and Resume
- Academic Writing
- Writing a Proposal

Readings:

1. Fluency in English - Part II, Oxford University Press, 2006.
2. Business English, Pearson, 2008.
3. Language, Literature and Creativity, Orient Blackswan, 2013.
4. 4. Language through Literature (forthcoming) ed. Dr. Gauri Mishra, Dr Ranjana Kaul, Dr Brati Biswas

REMEDIAL ENGLISH

Learning Objectives:

English language skills – reading, writing, speaking and listening – are fundamental in constructing knowledge in all academic disciplines, succeeding in the world of work, and making sense of everyday life. The standards and benchmarks enlisted in this syllabus can help students adapt to the continually changing world of communication and develop a global outlook.

Through this course the students will be able to acquire the following set of literacy standards/ skills and implement them as working strategies: 1. Will engage in and gain basic proficiency in reading and comprehension 2. Will speak to a) inform b) describe c) explain d) persuade. The style and vocabulary will be at the beginners' level. 3. Make use of the grammar, syntax and tone of speech at the preliminary level. 4. Will read a variety of materials to facilitate comprehension. 5. Will understand the elements of grammar and its functions in a text. 6. Employ reading strategies such as scanning, selecting and summarising at the preliminary level. 7. Learn types of sentences – statement, question, exclamation, affirmative and negative. 8. Will gain and demonstrate basic competence in speaking, reading and writing.

Syllabus:

READING

1. Simple comprehension texts of description, narration, information, explanation and persuasion based on higher order thinking skills.
2. Contextualised grammar focus.
3. Vocabulary – basic synonyms and antonyms.

GRAMMAR

1. Parts of speech
2. Transformation of parts of speech
3. Nouns – gender and number; Countable and uncountable nouns
4. Verbs and tenses
5. Use of auxiliaries
6. Agreement of verb with subject
7. Use of articles
8. Use of adjectives and adverbs
9. Use of selected prepositions
10. Affirmative, negative and interrogative sentences
11. Question tags
12. Phrasal verbs
13. Direct and indirect narration

ENGLISH: ACADEMIC WRITING

Learning Objectives:

The syllabus aims to develop a critical and informed response to a range of texts/extracts, the skills of summarization and condensation, the skills of comprehension, the skills of analysis, synthesis and evaluation of content, correct usage and application of vocabulary.

Syllabus:

1. Features of Argumentative/Persuasive Writing

Reading and General Understanding

Writing practice: identifying arguments, counterarguments, non- arguments refuting arguments, style of persuasion, organizing an argumentative essay
Grammar Focus: Use of conjunctions as connectors, conditionals, noun clauses

2. Features of Comparison and Contrast Essay

Reading and General Understanding
Writing Practice: developing a comparison-contrast structure
Grammar Focus: Clauses for comparison, contrast, concession, transitions

3. Features of Literary Analysis

Reading and General Understanding

Writing Practice: plot devices, themes, symbols, figures of speech, tone, mood, style, organizing discourse structure

Grammar Focus: Conditional Sentences

4. Planning an Academic Essay

Writing Practice: discourse structure, essay-outline, paragraph-sequence, using citation.

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SEMESTER - I
MIL Hindi (AEC-1)
Theory 02 credits

Course Objectives

हिंदी व्याकरण के कुछ महत्वपूर्ण पक्षों, हिंदी रचना के विभिन्न रूपों और प्रयोजनमूलक हिंदी के कार्यालयी पक्षों से अवगत कराना इस पाठ्यक्रम का एक महत्वपूर्ण उद्देश्य है। इसके साथ ही हिंदी काव्य और गद्य के कुछ चुनिंदा और रोचक रचनाओं से आपको परिचित कराना भी इस पाठ्यक्रम के उद्देश्यों में शामिल है। यह पत्र एक हद तक रोजगरोन्मुखी पत्र भी है।

MIL Hindi (AEC-01) Theory 2 credits			
Unit	**Topics to be covered**	**No. of Lectures**	**L-T-P 2 -1- 0 Per weak**
1.	• हिंदी की ध्वनियाँ और उसके प्रकार, उच्चारण, लिपि की आवश्यकता, हिंदी भाषा और देवनागरी लिपि, देवनागरी लिपि की विशेषताएँ और उसके मानकीकरण का प्रश्न • निबंध - लेखन, संक्षेपण, पल्लवन(Expansion), अवबोध(Comprehension), हिंदी मुहावरे और कहावतें, हिंदी से अंग्रेजी और अंग्रेजी से हिंदी अनुवाद • कार्यालयी हिंदी : सरकारी पत्राचार, टिप्पण, प्रारूपण (मसौदा लेखन), राजभाषा, राज्यभाषा, संपर्क भाषा, संविधान की अष्टम अनुसूची और उसके निहितार्थ	10	
2.	➢ **हिंदी की चयनित गद्य रचनाएँ** • कहानी : 'बेटोंवाली विधवा' (प्रेमचंद) • निबंध : 'भय' (रामचंद्र शुक्ल) • ललित निबंध : 'गेहूँ और गुलाब' (रामवृक्ष बेनीपुरी) • संस्मरण : 'श्री राहुल सांकृत्यायन' (रामधारी सिंह दिनकर) • व्यंग निबंध : 'सदाचार का ताबीज' (हरिशंकर परसाई) • एकांकी : 'बाबर की ममता' (देवेन्द्रनाथ शर्मा)	10	
3.	➢ **हिंदी की चयनित कविताएँ : काव्यांश**	10	

	• **कबीर** : साखी : 'करणीं बिना कथणीं कौ अंग' तथा 'कथणीं बिना करणीं कौ अंग' (कबीर ग्रंथावली : संपादक माताप्रसाद गुप्त) • **मलिक मुहम्मद जायसी** 'मंडप गमन खंड' (पद्मावत: सं. वासुदेव शरण अग्रवाल) • **तुलसी दास** : 'रामचरितमानस (बालकांड) गीता प्रेस, गोरखपुर, पुष्पवाटिका प्रसंग ; दोहा संख्या 226 से 236 तक • **भारतेंदु** : 'भारत-दुर्दशा' • **सूर्यकांत त्रिपाठी निराला** : 'राजे ने अपनी रखवाली की' ('राग विराग': संपादक रामविलास शर्मा) • **रामधारी सिंह दिनकर** : 'अघटन घटना क्या समाधान' कविता ('बापू' नामक संग्रह)		
	कुल	**30**	

COURSE OUTCOMES

इस पत्र से विद्यार्थी हिंदी भाषा की ध्वनियों, लिपि और वर्त्तनी का परिचय प्राप्त कर भाषा के शुद्ध उच्चारण, रचनात्मक लेखन, औपचारिक लेखन के साथ भाषाई सम्प्रेषण एवं संवाद में दक्ष हो सकेंगे। हिंदी-लेखन के अनेक रूपों - निबंध, संक्षेपण, पल्लवन, अवबोध आदि की जानकारी प्राप्त करेंगे। प्रयोजनमूलक हिंदी के कुछ उपयोगी रूपों से परिचित होंगे। हिंदी की कुछ रचनाओं के आस्वादन से अपनी संवेदना का विस्तार कर सकेंगे। विद्यार्थियों की रचनात्मकता का विकास होगा। यह पत्र मूलतः हिन्दी के व्यावहारिक और व्याकरणिक पक्ष को एकसाथ मजबूत करनेवाला है। पत्र रोजगार की दृष्टि से भी उपयोगी है।

सहायक पुस्तकें -

1. हिंदी शब्दानुशासन: किशोरीदास बाजपेयी
2. हिंदी व्याकरण : कामता प्रसाद गुरु
3. आधुनिक हिंदी व्याकरण और रचना : वासुदेवनंदन प्रसाद
4. प्रयोजनमूलक हिंदी : माधव सोनटक्के
5. प्रयोजनमूलक भाषा कार्यालयी हिंदी : कृष्ण कुमार गोस्वामी
6. प्रयोजनमूलक कामकाजी हिंदी : कैलाश चंद्र भाटिया
7. प्रारूपण, शासकीय पत्राचार और टिप्पण लेखन विधि : राजेंद्र प्रसाद श्रीवास्तव
8. कवि -समीक्षा : आनंद नारायण शर्मा

Syllabusof Urdu for Four Year Undergraduate Course in CBCS:

SEMESTER-I

MIL(AEC-1) Study of Urdu Ghazal:

Total Marks:-100

Division of Marks:

CIA - 30

ESE - 70

Total- 100

Question Pattern:

There will be three types of Questions divided into three groups:

Group-A – Multiple Type Objective Questions : 10*2=20

Group-B – Four out of ~~five~~ six short questions to be answered : 5*4=20

Group-C – Three out of ~~four~~ five long questions to be answered : 3*10=30

Objective:

This paper has been designed with a purpose to make students acquinted with the history and art of Urdu Ghazal as well as some classical poets.

Course Outcome:

After the completion of the paper, the students will be able:

C01: to understand the comprehensive history and art of Ghazal.

C02: to learn the special features of classical Ghazals.

C03: to learn and identify the technique of Ghazals of particular classical poets.

MIL (STUDY OF URDU GHAZAL)

(THEORY: 2 CREDITS)

Unit	Topics to be Covered	Credits	No. Of Lectures	L-T-P
1	(A)Urdu Ghazal Tareef, Ajzaye-Tarkeebi, Maqbooliat ke Asbaab	1	8	7-1-0
2	(B)Following poets with below mentioned texts to be studied: (1) Wali: Mufflisi Sab Bahar Khoti Hai (2)Meer: Ashk Aaankhon Mein Kab Nahin Aata (3) Dard: Arzo-sama Kahan Teri Wosat Ko paa Sake (4)Momin: Aankhon se Haya Tapke hai Andaaz to dekho (5) Ghalib: Baske Dushwaar hai har kaam ka aasaan hona (6)Shaad :Tamannaon mein uljhaya gaya hun	1	12	10-2-0
		Total= 2	**20**	

14/6/23 14/6/23 14/6/23

Reference Books:

1. Ghazal Aur Motala-e-Ghazal by EbadatBrailvi.
2. Dilli ka Dabistan-e-Shayri by Noorul Hassan Hashmi.
3. Urdu Shayri par ek nazar by Kalimuddin Ahmad.
4. Urdu Ghazal by Yusuf Hussain Khan.

Jamil.
14.6.2023

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Shahab Zafar Azmi
14/6/23

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Shaista Anjum Noori
Mob — 9431460601
Email — shaista.noori@gmail.com

(Semester – I)
AEC – I (MIL) – Sanskrit

Course Code: AEC-I
CIA (Marks): 30

Total Credit: 02
ESE (Marks): 70

(A) Learning Objectives

- संस्कृत काव्य से छात्रों को परिचित कराना
- कथाओं के माध्यम से छात्रों को नैतिक एवं व्यावहारिक शिक्षा प्रदान करना

(B) Learning Outcomes

- इस पाठ्यक्रम के माध्यम से छात्र संस्कृत काव्य से परिचित होगें
- रामायण एवं महाभारत से छात्र परिचित होंगे
- छात्रों में संस्कृत व्याकरण एवं अनुवाद की समझ विकसित होगी

(C) Course Contents

Unit	Prescribed Course	Number of Lectures
1	**संस्कृत काव्य** ▪ रामायण एवं महाभारत का सामान्य परिचय ▪ हितोपदेश (मित्रलाभः) – आरम्भ से वृद्धव्याधपथिककथापर्यन्त	15 Hrs
2	संस्कृत व्याकरण एवं अनुवाद ▪ सुप् एवं तिङ् – प्रत्ययों का सामान्य परिचय ▪ सरल संस्कृत अनुवाद (हिन्दी से संस्कृत)	15 Hrs

(D) Essential/Recommended Readings

- हितोपदेश –मित्रलाभः, व्याख्याकार–आचार्य श्रीशेषराजशर्मा रेग्मी, चौखम्बा सुरभारती प्रकाशन
- आधुनिक संस्कृत व्याकरण और रचना, श्यामनन्दन शास्त्री, प्रकाशक–भारती भवन, पटना

(E) Suggestive Readings

- उपाध्याय, बलदेव, संस्कृत साहित्य का इतिहास, वाराणसी, शारदा निकेतन, 1975
- उपाध्याय, रामजी, संस्कृत साहित्य का आलोचनात्मक इतिहास, वाराणसी : चौखम्भा विद्याभवन, 1993
- ऋषि, उमाशंकर शर्मा, संस्कृत साहित्य का इतिहास, वाराणसी, चौखम्भा भारती अकादमी, 1999
- Winternitz, Maurice, A History of Indian Literature (Vol. II), Translated by Subhadra Jha, Delhi : Motilal Banarasidas, 1966
- आधुनिक संस्कृत अनुवाद–उमाकान्त शास्त्री, प्रकाशक–भारती भवन, पटना

Mamta 24/08/2023

24/8/23

Prof. A.K. Bachchan
Dean, Faculty of Humanities
L.N. Mithila University, Darbhanga.

24/8/23.

HEAD
University Deptt. of Sanskrit
L. N. Mithila University
Darbhanga

MIL

विषयः–मैथिली
प्रश्न पत्रक रूपरेखा

पूर्णांक–100
सैद्धांतिक–70
सी.आइ.ए.–30

खण्ड–अ– अनिवार्य वस्तुनिष्ठ/बहुविकल्पी कोटिक 10 प्रश्न रहत आ प्रत्येक 02 अंकक होएत। **10x02=20**

खण्ड–ब– लघुत्तरीय 06 टा प्रश्न पूछल जाएत, जाहिमेसँ 04 टाक उत्तर दातव्य होतएत। प्रत्येक प्रश्न 05 अंकक होएत। **04x05=20**

आवश्यकतानुसार, एहि खण्डमे व्याख्यात्मक कोटिक प्रश्न सेहो राखल जा सकैत अछि। एहिना स्थितिमे 02टा लघूत्तरीय आ 02टा व्याख्यात्मक प्रश्नक उत्तर दातव्य होएत। प्रत्येक 05–05 अंकक होएत। जाहिमे 02 टा व्याख्यात्मक लेल 03 टा प्रश्न आ 02टा लघूत्तरीय लेल 03 टा प्रशन पूछल जाएत।

खण्ड–स– दर्घ उत्तरीय 05 टा प्रश्न पूछल जाएत, जाहिमे सँ 03 टाक उत्तर होएत। प्रत्येक प्रश्न 10–10 अंकक होएत। **03x10=30**

14.06.23.

14.6.23

Aruna Chaudhary 14.6.23

MIL स्नातक (भोजपुरी)

क्रेडिट–02
अंक–100

आधुनिक भारतीय भाषा (भोजपुरी)

उद्देश्यः–(1) छात्र लोगन के आधुनिक भोजपुरी कविता से परिचय करावल।
(2) आधुनिक भोजपुरी कहानियन के भावभूमि आ शिल्प से परिचित करावल।

Outcomes (परिणाम)

(1) भोजपुरी कविता आ कहानी के बारे में जनला के बाद छात्र लोगन के अंदर भोजपुरी भाषा आ साहित्य के प्रति रूझान पैदा होई।
(2) आधुनिक कविता– कहानी के अध्ययन से छात्र लोगन में राजनीतिक सामाजिक, आ सांस्कृतिक समझ पैदा होई।

अंक–विभाजन

समय–03 घंटा

1. आलोचनात्मक 05 प्रश्नन में से 03 गो के उत्तर जरूरी–

10X3=30

2. अधूत्तरी 06 प्रश्नन में से 04 गो के उत्तर जरूरी–

5X4=20

3. वस्तुनिष्ठ प्रश्नन के उत्तर जरूरी–

10X2=20

टोटल–70

आंतरिक मूल्यांकन

1.	लिखित परीक्षा	–15
2.	एसाइनमेंट	–05
3.	सेमिनार / क्विज / मौखिकी	–05
4.	उपस्थिति	–05
		30

काव्य–अरज–निहोरा–लेखक प्रकाश उदय, प्रकाशक राजकमल प्रकाशन, पटना, दिल्ली।

इकाई–01–	निर्धारित पाठ चुप्पे चोरी जमशेदपुर टाटा फूलगोभी	**व्याख्यान 6** **ट्यूटोरियल 2=08**

कहानी– कथा मंजूषा–कन्हैया सिंह सदय, प्रकाशक–जमशेदपुर भोजपुरी साहित्य परिषद, जमशेदपुर

14-06-23

इकाई—02—	निर्धारित पाठ— हम जरूर आईबि सोमरूआ के लोकतंत्र आबरू ममता चाहीं	व्याख्यान 6 ट्यूटोरियल 2=08

14-06-23

मो०- 9430622134

Email. diwakarara3@gmail.com

AECC 1 (MIL) Study in Arabic Language

Under CBCS 4 years course

Max Marks	100
CIA	30
End Sem Exam	70
Credit	02

Objectives:

1- To enable students to read Arabic language and understand the text
2- To promote Arabic language and understand the Arab world
3- To instil the importance of ethics and morality in the minds of students for creating a better society

Topic: Arabic Grammar & Prose

Course Outcomes:

CO 1: To help the students to learn basic Arabic grammar and vocabularies

CO 2: To develop reading skills and make them aware of the unique nature and functions of various Arabic structures

CO 4: To gain the ability to translate sentences into Arabic and Urdu/English

Numbers of Lectures:

Each unit will consist of 12 lectures (12*2=24)

Unit-01: **Marks: 35**

An Introduction to basic Arabic grammar and its rules (Instruction of parts of Speech, Nouns and Verbs- Past, present and future with conjugation)

مبادي اللغة العربية: حروف الهجاء

القواعد النحوية: الكلمة وأنواعها (الإسم والفعل والحرف) والمفرد والجمع، والتذكيروالتانيث والمعرفة والنكرة، وأسماء الإشارة وغيرذلك...

القواعد الصرفية: الفعل الماضى والمضارع والأمروالنهي مع التصريف.

Unit- 02: **Marks: 35**

Learning selected lessons from Arabic text book (1-10 lessons)

Translation of Arabic into English/Urdu and vice versa, and common vocabularies and simple sentences

الدروس العربية: من منهاج العربية، الجزء الأول

المفردات والجمل السهلة مع الترجمة إلى الإنجليزية والأردية وبالعكس

رجل، تلميذ، جامعة، درس، سيارة، سبورة، فصل، معلم، طريق، غرفة، نافذة، باب، المستشفى، إمرأة، إبن، أخت، عم، طبيب، خياط، حقيبة، بقال، سوق، مهندس، تفاح، مطعم، معرض، زهرة، عاصمة، بيت، جوال، الطالب ذكي، المطار كبير، الباب مفتوح، بتنة عاصمة بيهار، دخل المعلم في الفصل، فازت التلميذة في الامتحان، يأكل الأخ في المطعم، تكتب الأخت على السبورة .....

Recommended Books

1. Kitab al Nahwu (كتاب النحو/ عبد الرحمان أمرتسري)
2. Kitab al Sarf (كتاب الصرف/ عبد الرحمان أمرتسري)
3. Al- Jadeed fi al- lughat- al- Arabia, Part-1 (الجديد في اللغة العربية/ إحسان الرحمان)
4. Muallim al-insha Part-1 (معلم الإنشاء، الجزء الأول/ عبد الماجد الندوي)
5. Arabic for Beginners by Dr.Sayed Ali
6. Al-qiraat al-wadeha (القرأة الواضحة، الجزء الاول / وحيد الزمان الكيرانوي)
7. Durus al-lughat al-arabia li al-mubtadien, by NCPUL (دروس اللغة العربية للمبتدئيين)
8. Essential Arabic by Prof. Rafiul Imad Faynan

14/6/23
Dr. Sarwar Alam
Patna University

Anwarul 14/06/2023
Dr. Anwarul Hasan
MMHA&P University, Patna

Mhal 14/06/203
Dr. Md. Mahfoozur Rahman
MMHA&P University, Patna

AEC-1 (MIL-Modern Indina Language)

B.A
Semester-I
Type of Course AEC-1 (Bengali)

Full Marks-100

Theory-70

Internal assessment-30

Credit-02

Unit-02

Total Hours-20

Classes-24

Unit 1- Bangla Byakaran : Pad Binyas ,Linga SamachharitaBhinnarthak shabda,EK kathay Prakash, Karak samas shabda Bhandar, Chalit Bhasa, Sadhu Bhasha, Biparetarthak, Shabda.

Unit 2- (i) Karna Kunti Sambad- Rabindranath Takhur.(ii) Galper Satkahan (Galpa Sankalan) : Dr Amitabh Kumar Biswas. Pices (a) Galper Satkahan (b) Gurudev (c) Football Match (d) Kalchakra (e) Darpachurna.

Books Recommended :

1.	Bangla Bhasha Itibritta	:	Sukumar Sen
2.	Bangla Bhasha Bigyan	:	Rameshwar Shaw
3.	Bangla Byakaran Prasanga	:	Pabitra sarkar.
4.	Karna Kunti sambad	:	Rabindra nath Thakur
5.	Galper Satkahan	:	Dr. Amitabh kr Biswas

Sd/-
14.6.23
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स्नातक (मगही)

MIL

आधुनिक भारतीय भाषा (मगही)

उद्देश्य

(क) छात्र/छात्रा लोगन मे मगही भाषा के प्रति रूझाान पैदा करे लेल
(ख) छात्र/छात्रा लोगो के बीच मगही व्याकरण के सामान्य जानकारी
(ग) आधुनिक मगही कविता के कथ्य आउ शिल्प के जानकारी मिलत

परिणाम–

(क) मगही व्याकरण के जानकारी भेला से छात्र/छात्रा लोगन के भाषा परिमार्जित होवत
(ख) आधुनिक मगही कविता के जानकारी से सामाजिक, राजनीतिक, सांस्कृतिक तथ्य के जानकारी मिलत

इकाई–1 काव्यः नयकी मगही संपादक–डॉ० ब्रजेश कुमार राय, प्रज्ञा प्रकाशन, पटना

निर्धारित पाठ

वधवा में भेलै बिहान, कुतवो से दिन हम्मर पातर हे, जूता महापुराण, साँझ, एक पइसा हरदी, मतजा तू परदेश, को–रोना, हर हस्ती हिमालय, साम सुबह भज S हो भाई, हमरा काहे कोई लजैतै बिहरिया कह के ना, ठहर–ठहर के गाव S गीत।

इकाई–2 निबंध

इकाई–3 संक्षेपन

इकाई–4 लिंग–निर्णय

इकाई–5 मुहावरा

मगही व्याकरण आउ रचना–डॉ० सम्पत्ति अर्याणी, संदीप प्रकाशन, पटना

अंक बँटवारा

आलोचनात्मक 3 सावाल में दू ठो लिखल जरूरी	15ग2त्र 30
निबंध तीन में से एगो पर लिखल जरूरी	1ग10त्र 10
संक्षेपन देलगेल संदर्भ के	1ग10त्र 10
मुहावरा 8 में से 05	5ग2 त्र10
वस्तुनिष्ठ	5ग2 त्र10
	कुल–70

आन्तरिक मूल्यांकन

लिखित परीक्षा	15 अंक
अकादमिक कार्य (असाइनमेंट)	05 अंक
सेमिनार/क्विज/मौखिकी	05 अंक
उपस्थिति	05 अंक
	कुल–30

14/6/23

14.6.23

14.06.23.

तिलका माँझी भागलपुर विश्वविद्यालय, भागलपुर-812007

यू० जी०सी० निर्देशानुसार मानविकी संकाय अंतर्गत अंगिका भाषा साहित्य हेतु चार वर्षीय स्नातक प्रीतिष्ठा के लिए प्रस्तावित पाठ्यक्रम |

सेमेस्टर-I (MIL-I)

अंगिका साहित्य के सामान्य परिचय

समय-3 घंटा — पूर्णांक-100

 # अंक वितरण: - बाहय परीक्षा -70 + आंतरिक परीक्षा -30

 # बाहय परीक्षा -70

(क) वस्तुनिष्ठ प्रश्न वैकल्पिक -2x10=20

(ख) लघुउतरीय या व्याख्या -4x5=20

(ग) दीर्घउतरीय -3x10=30

इकाई 01: -अंगिका साहित्य के सामान्य परिचय | व्याख्यान-10

इकाई 02: -अंगिका उपन्यास: -नया सूरज नया चाँद | व्याख्यान-10

इकाई 03: -मंजूषा कला के समान्य परिचय | व्याख्यान-10

कुल व्याख्यान-30

 # सहायक ग्रंथ:

1. **मुठिया चाउर: -कुलगीतकार 'आमोद मिश्र ' |**
2. **नया सूरज नया चाँद: -अनुपलाल मंडल |**
3. **अंगिका साहित्य केरो इतिहास: -डोमन साहु समीर, तेजनारण कुशवाहा, डॉ अमरेन्द्र |**
4. **अंगिका भाषा विज्ञान: -डॉ शिवचनद्र झा |**
5. **अंग प्रदेश की लोककला: -स० चंद्रप्रकाश जगप्रिय |**

14.06.23

14.6.23

Separate Sheet

(Instructions for Question Paper Pattern)

The question paper pattern shall consists of three parts- (For End Semester Examinations- ESE)

Part A- Compulsory – consisting of objective/multiple choice type
each carrying two marks 10x2= 20

Part B- Short Answer Type- Four questions to be answered out of six questions-
each carrying five marks 04x5= 20

Part C- Long Answer Type- Three questions to be answered out of five questions-
each carrying ten marks 03x10=30

Total – 70 marks

Note- Internal Assessment of each paper will carry 30 marks

14.06.23

14.6.23

Semester – II (AEC- 2)

Science	Social Science/Arts	Commerce
• Environmental Science	• Environmental Science	• Environmental Science

Unit 1: Introduction to environmental studies

- Multidisciplinary nature of environmental studies
- Scope and importance; Concept of sustainability and sustainable development.

Unit 2: Ecosystems

- What is an ecosystem?
- Structure and function of ecosystem;
- Energy flow in an ecosystem: food chains, food webs and ecological succession.
- Case studies of the following ecosystems:
  a) Forest ecosystem
  b) Grassland ecosystem
  c) Desert ecosystem
  d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 3: Natural Resources: Renewable and Non – renewable Resources

- Land resources and land-use change; Land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forests,
- biodiversity and tribal populations.
- Water: Use and over – exploitation of surface and ground water, floods, droughts, confl - icts
- Over water (international & inter-state), Dams – benefits and problems.
- Food resources: World food problems, changes caused by agriculture and over-grazing, effects
- of modern agriculture, fertilizer-pesticide problems, waterlogging, salinity.
- Energy resources: Renewable and non-renewable energy sources, use of alternate energy
- sources, growing energy needs, case studies

Unit 4: Biodiversity and Conservation

- Levels of biological diversity: genetic, species and ecosystem diversity; Bio-geographic zones
- of India; Biodiversity patterns and global biodiversity hotspots.
- India as a mega-biodiversity nation; Endangered and endemic species of India, threats to
- biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions.
- Conservationof biodiversity: In – situandEx – situconservationofbiodiversity.
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and
- Informational value.

Unit 5: Environmental Pollution

- Environmental pollution: types, causes, effects and controls; Air, water, soil and noise
- pollution
- Nuclear hazards and human health risks
- Solid waste management: Control measures of urban and industrial waste.
- Pollution case studies

Unit 6: Environmental Policies & Practices

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human
- communities and agriculture
- Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution)
- Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest
- Conservation Act. International agreements: Montreal and Kyoto protocols and Convention
- on Biological Diversity (CBD).
- Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian
- context.

Unit7: Human Communities and the Environment

- Human population growth: Impacts on environment, human health and welfare.
  - Resettlement and rehabilitation of project affected persons; case studies.
- Disaster management: floods, earthquake, cyclones and landslides.
- Water conservation, rain water harvesting, watershed management.
- Wasteland reclamation.
- Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan.
- Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.

1. Visit to local polluted site **(any one)**

   a) Urban: Identify the major sources of air pollution in a city or town of North Bengal region.
   b) Rural: Analyse the major sources of organic pollution in villages and adjoining agricultural fields.
   c) Industry: Prepare a list of the large and medium industries in and around your college are and the probable pollutants they may produce.

2. Study of flora and fauna **(any one)**

   a) Prepare a list of the economic plants available in the college block.
   b) List the birds sighted and found nesting at the college campus and its surroundings with the season of their occurrence.
   c) Record insects associated with any common crop/grassland/tree of the college area with an idea of their habitat.

3. Visit to local area to document environmental assets **(any one)**:

a) Trip to any riverine system of Terai or the dooars: comment on the direction, volume and quality of water, flowing as observed.
b) Record the nature of vegetation/forest type/land use pattern at the site of visit.
c) Analyse the cause of deforestation and landslide on hill slope, if sighted.

4. Study of ecosystems. **(any one)**

a) Pond: water parameters – turbidity, pH, producers (phyto and zooplanktons) and related consumers (fishes and birds).
b) Grassland on hill slope: producers (plants), insects, consumers (birds, mammals, reptiles etc.)
c) Forest: practical concept of forest type, stories, dominant trees and sub – dominant vegetation, observed and reported major herbivores and carnivores in a forest ecosystem.

5. Submission of a field work (covering the above practical works undertaken)

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Semester – III (AEC- 3)

Science	Social Science/Arts	Commerce
• Course on Disaster Risk Management	• Course on Disaster Risk Management	• Course on Disaster Risk Management

Learning Objectives:

The course is intended to provide a general concept in the dimensions of disasters caused by nature beyond the human control as well as the disasters and environmental hazards induced by human activities with emphasis on disaster preparedness, response and recovery.

Introduction on Disaster Different Types of Disaster :

A) Natural Disaster: such as Flood, Cyclone, Earthquakes, Landslides etc.

B) Man-made Disaster: such as Fire, Industrial Pollution, Nuclear Disaster, Biological Disasters, Accidents (Air, Sea, Rail & Road), Structural failures(Building and Bridge), War & Terrorism etc. Causes, effects and practical examples for all disasters.

Risk and Vulnerability Analysis :

1. Risk : Its concept and analysis
2. Risk Reduction
3. Vulnerability : Its concept and analysis
4. Strategic Development for Vulnerability Reduction

Disaster Preparedness and Response Preparedness:

1. Disaster Preparedness: Concept and Nature
2. Disaster Preparedness Plan
3. Prediction, Early Warnings and Safety Measures of Disaster.
4. Role of Information, Education, Communication, and Training,
5. Role of Government, International and NGO Bodies.
6. Role of IT in Disaster Preparedness
7. Role of Engineers on Disaster Management.

Response

1. Disaster Response: Introduction
2. Disaster Response Plan
3. Communication, Participation, and Activation of Emergency Preparedness Plan

4. Search, Rescue, Evacuation and Logistic Management

5. Role of Government, International and NGO Bodies

6. Psychological Response and Management (Trauma, Stress, Rumor and Panic)

7. Relief and Recovery

8. Medical Health Response to Different Disasters

10. Role of Educational Institute.

Rehabilitation, Reconstruction and Recovery

1. Reconstruction and Rehabilitation as a Means of Development.
2. Damage Assessment
3. Post Disaster effects and Remedial Measures.
4. Creation of Long-term Job Opportunities and Livelihood Options,
5. Disaster Resistant House Construction
6. Sanitation and Hygiene
7. Education and Awareness,
8. Dealing with Victims' Psychology,
9. Long-term Counter Disaster Planning

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4. Search, Rescue, Evacuation and Logistic Management

5. Role of Government, International and NGO Bodies

6. Psychological Response and Management (Trauma, Stress, Rumor and Panic)

7. Relief and Recovery

8. Medical Health Response to Different Disasters

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Semester – IV (AEC- 4)

Science	Social Science/Arts	Commerce
• Course on NCC	• Course on NCC	• Course on NCC

Learning Objectives:

The course aims to :

(a) Provide knowledge about the history of NCC, its organization, and incentives of NCC for their career prospects.

(b) Inculcate spirit of duty and conduct in NCC cadets.

(c) Provide understanding about different NCC camps and their conducts.

(d) Provide understanding about the concept of national integration and its importance.

(e) Provide understanding about the concept of self-awareness and emotional intelligence.

(f) Provide understanding about the concept of critical & creative thinking.

(g) Provide understanding about the process of decision making & problem solving.

(h) Provide understanding about the concept of team and its functioning.

(i) Provide understanding about the concept and importance of Social service.

Learning Outcomes:

After completing this course, the cadets will be able to: -

(a) Understand the basic concept of NCC.

(b) Respect the diversity of different Indian culture.

(c) Practice togetherness, teamwork and empathy in all walks of their life.

(d) Do their own self-analysis and will work out to overcome their weakness for better performance in all aspects of life.

(e) Critically think and analyse.

Medium of Instruction: Hindi and English

Syllabus of NCC-I

Unit I: NCC General 4 Lectures
Subtopics: • Aims, Objectives and Organization of NCC • Incentives for NCC Cadets • Duties of NCC Cadets • NCC Camps: Types and Conduct
Unit II: National Integration
Subtopics: • National Integration: Importance and Necessity • Factors affecting National Integration • Unity in Diversity • Threats to National Security
Unit III: Personality Development
Subtopics: • Factors • Self-Awareness • Empathy • Critical and Creative Thinking • Decision Making and Problem Solving
Unit IV: Social Service and Community Development
Subtopics: • Basics of Social Service • Rural Development Programmes • NGO's • Contribution of Youth

Practical/Practice Component

- Drill
- Field Craft & Battle Craft
- Map Reading
- Weapon Training
- Social Service & Community Development
- Any other Practical/Practice as decided from time to time

Suggested Readings:

- DGNCC Cadet's Hand Book - Common Subjects -All Wings (in English)
- DGNCC Cadet's Hand Book - Common Subjects -All Wings (in Hindi)
- DGNCC Cadet's Hand Book – Specialised Subjects –Army, Navy and Air Wing

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