RAMANUJAN COLLEGE

B.Voc. Programme

Courses Approved by UGC to our college:

- **B.Voc. (Software Development): IT Sector**
- **B.Voc.(Banking & Finance): Banking, Financial Services & Insurance(BFSI) Sector**

Scheme : Deen Dayal Upadhyay Kaushal Kendra (100 centres to be established by MHRD across the country. Our college is the only college of University of Delhi who got approval for the scheme so far and only two Kaushal Kendras have been set up in the Delhi till now.

1. **Eligibility criteria for admission**: 12th Class or equivalent in any stream. *(UGC Guidelines for B.Voc. See Annexure A , 5)*

2. **Total number of seats**:
   (i) B.Voc. (Software Development) : 50
   (ii) B.Voc. (Banking & Insurance): 50

3. **Reservation of Seats**: As per rules of University of Delhi

4. **Course Fee** : Student fee should be decided as per the prevalent mechanism for fee fixation for aided courses in the university/college. *(UGC Guidelines for B.Voc. See Annexure A , 9)*

5. **Admission Process**: Based on Merit (As per University rule)

6. **Curriculum:**
   (i) **Generic Component**:
   The general education component should adhere to the normal university standards. It should emphasise and offer courses which provide holistic development. However, it should not exceed 40% of the total curriculum.
   (*UGC guidelines for B.Voc. , Annexure A, 6.3(i)*)

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(ii) **Skill Component** :

- NSDC - SSCs will share the curriculum of the identified job roles which will in alignment to Qualification Packs and National Occupational Standards.
  (*UGC - NSDC MoU, See Annexure B, IV(7)*)
- The university/college should develop the curriculum in consultation with industry. The industry representatives should be an integral part of the academic bodies of the university/college. While doing so, they should work towards aligning the skills components of the curriculum with the NOSs developed by the respective Sector Skill Councils.
  (*UGC guidelines for B.Voc. , Annexure A, 6.6*)
- In case NOS is not available for a specific area / job role, the university/college should get the curriculum for this developed in consultation with industry experts.
  (*UGC guidelines for B.Voc. , Annexure A, 6.4(iv)*)

7. **Faculty**:

- The university/college should use its regular faculty for the conduct of general education component and also for the skills components, if existing. Additionally, they may hire faculty on contractual basis and guest faculty in the core trades only as per UGC norms.
  (*UGC guidelines for B.Voc. , Annexure A, 8.2*)

Existing Faculty	per lecture Rs.500/
Visiting/Guest faculty	per lecture Rs.2,000/

- NSDC will coordinate the availability of the services of the trained skills faculty, subject to the requirement of institution, from its funded training partners at UGC approved remuration as per guidelines of Community Colleges and NSDC funded training partner.
  (*UGC - NSDC MoU, Annexure B, IV(8)*)

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8. **Credit Calculation**: The following formula should be used for conversion of time into credit hours.

   a) One Credit would mean equivalent of 15 periods of 60 minutes each, for theory, workshops/labs and tutorials;

   b) For internship/field work, the credit weightage for equivalent hours shall be 50% of that for lectures/workshops;

   c) For self-learning, based on e-content or otherwise, the credit weightage for equivalent hours of study should be 50% or less of that for lectures/workshops.

   (UGC Guidelines for B.Voc. See Annexure A , 6.5.1 to 6.5.3)

   The suggested credits for each of the years are as follows

NSQF Level	Skill Component Credits	General Education Credits	Normal calendar duration	Exit Points / Awards
5 (Year 1)	36	24	Two semesters	Diploma
6 (Year 2)	36	24	Four Semesters	Advanced Diploma
7 (Year 3)	36	24	Six Semesters	B.Voc.
Total	**108**	**72**		

9. **Internal Assessment**
   - **Generic Component**: As per University guidelines (will be done by college).
   - **Skill Component**: As per NSDC - SSC guidelines (will be done by SSCs)

10. **Examination**

   (i). The **assessment for the general education component** should be done by the university as per their prevailing standards and procedures *(UGC guidelines for B.Voc. ,Annexure A, 7.1).*

   (ii) **Assessment of Skill Component**:
   - NSDC will ensure that post training, the assessment and certification of vocational component is done by NSDC approved Sector Skill Councils. The assessment will be done by Sector Skill Councils(SSC) through its affiliated Assessment Bodies who have SSC trained certified assessors.

   (UGC -NSDC MoU, See Annexure B, II(4))

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- The university may like to consult the respective Sector Skill Council for designing the examination and assessment pattern for the skill development components. The university may also consider using the designated assessors of Sector Skill Councils/industry associations for the conduct of practical assessment.
  (UGC guidelines for B.Voc. ,Annexure A, 7.2).

11. **Award of Certificate**: The certificate regarding skill component will be issued by the Sector Skill Council. This certificate will be a secured certificate and could be jointly be issued by the Sector Skill Council and Awarding Authority i.e., University/College concerned. This format of joint certification has been standardized by NSDC. However if any University/College wishes not to issue a joint certificate, the same will be issued solely by the Sector Skill Council.
(UGC - NSDC MoU, See Annexure B, II(5))

12. **Placements**
NSDC -SSCs will facilitate placements for at least 70% of the SSC certified candidates from UGC system.
(UGC -NSDC MoU, See Annexure B , IV(10))

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Sno. 23(R)

ज्ञान - विज्ञानं विमुक्तये

N·S·D·C
National
Skill Development
Corporation

MEMORANDUM OF UNDERSTANDING (MoU)

BETWEEN

UNIVERSITY GRANTS COMMISSION (UGC)

AND

NATIONAL SKILL DEVELOPMENT CORPORATION (NSDC)

For

Alignment of UGC Skill Development Schemes to Outcome based Trainings, Assessments and Certification on Qualification Packs (QP) and National Occupational Standards (NOS)

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This **Memorandum of Understanding** (MoU) is made on the 4th Day of August of the year 2014.

BY AND BETWEEN

National Skill Development Corporation, a Company incorporated under the Companies Act, 1956 having its registered office at A-Block, Clarion Collection, ShaheedJeet Singh Marg, New Delhi – 110016 (hereinafter referred to as "**NSDC**") which expression shall unless repugnant to the context thereof shall remain and include its successors, legal representatives and permitted assigns, on the **FIRST PART**.

AND

University Grants Commission(hereinafter referred to as "**UGC**"), a statutory organization set up by the Union Government under UGC Act1956, charged with the responsibility of, among others, coordination, determination and maintenance of standards of university education. It provides recognition to universities in India, and disburses funds to such recognized universities and colleges, on the **SECOND PART.**

Whereas NSDC and UGC have desired to work together to provide Outcome based Trainings, Assessments and Certification on Qualification Packs (QP) and National Occupational Standards (NOS) for the trainings of courses under the scheme of Community Colleges and B.Voc degree programs implemented by UGC.

I. PREAMBLE / BACKGROUND/OBJECTIVE

NSDC was set up as part of a National Skill Development Mission to fulfil the growing need in India for skilled manpower across sectors and narrow the existing gap between the demand and supply of skills. It develops appropriate models to enhance, support and coordinate private sector initiatives in skilling the youth and promoting employment oriented skills.

University Grants Commission has been vested with two responsibilities: that of providing funds and that of coordination, determination and maintenance of standards in institutions of higher education. The UGC's mandate includes: Promoting and coordinating university education, determining and maintaining standards of teaching, examination and research in universities, framing regulations on minimum standards of education, monitoring developments in the field of collegiate and university education; disbursing grants to the universities and colleges, serving as a vital link between the Union and State governments and institutions of higher learning, advising the Central and State governments on the measures necessary for improvement of university education

1) The Objective of this MoU is to improve employability skills of the learners of Community Colleges to be supported by UGC by their adoption of the National Occupational Standards (NOS) developed by NSDC through its Sector Skill Councils and associated Assessments and Certifications through the Sector Skill Councils, solely or jointly with along with the Technical Boards. NSDC through its Sector Skill Councils will also provide resources in holding regular Workshops,

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Training the Trainers, Capacity building & Course curriculum alignment. Under this MOU, the NSDC will ensure timely completion of assessment &certification in UGC managed Community Colleges. NSDC will also provide valuable help in facilitating employment of learners and On-the-Job-Training (OJT) to the learners trained by Community Colleges under the ambit of UGC. It is understood that NSDC would discharge all or any of the above activities either itself or through NSDC approved Sector Skill Council(s) or NSDC approved Training Providers.

2) UCG will advise the Community Colleges under its ambit to run and train the learners on the curriculum designed and developed by NSDC through its Sector Skill Councils which is based on the National Occupational Standards. It will also advise them to seek assistance of the Sector Skill Councils in getting Training of Trainers and Assessment & Certification for the skill portion through them. The community colleges will be further advised by UGC to seek Sector Skill Councils assistance for OJT and placements for its certified learners.

3) NSDC through its Sector Skill Councils will do the alignment of University Grants Commission's (UGC) B.Voc. Degree scheme to National Occupational Standards set by the Sector Skill Councils. The assessment and certification for the skilling portion will be done by Sector Skill Councils.

II. PURPOSE

1. The Government of India has started pilot scheme of Community Colleges during the 12th Five Year Plan. UGC was given a mandate by Ministry of HRD to set up 100 Community Colleges on pilot basis during F.Y. 2013-14 across the country.
2. The UGC has adopted this as independent UGC scheme from 2014-15. UGC also implemented scheme of B.Voc degree programs separately as one of the scheme of skill development courses in universities and colleges.
3. This engagement is envisioned to align trainings of Community Colleges of UGC and B.Voc Degree Programs to Qualification Packs (QPs) and National Occupational Standards (NOS) set by NSDC approved Sector Skill Councils.
4. NSDC will ensure that post training, the assessment and certification of vocational component is done by NSDC approved Sector Skill Councils. The assessment will be done by the Sector Skill Councils (SSC) through its affiliated Assessment Bodies who have SSC trained and certified assessors.
5. The certificate regarding skill component will be issued by the Sector Skill Council. This certificate will be a secured certificate and could jointly be issued by the Sector Skill Council and Awarding Authority *i.e.* University / College concerned. This format of joint certification has been standardized by NSDC. However if any University / College wishes not to issue a joint certificate, the same will be issued solely by the Sector Skill Council.

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6. From time to time, UGC will review with NSDC and consider introducing new sectors and courses, as per the demand of the industry under other vocations.

III. GENERAL PROVISIONS

1. This Memorandum will set up general conditions for cooperation in trainings in Community Colleges under UGC and that the Parties intend to use it as a framework to continue their cooperation.
2. The Parties intent to cooperate and focus their efforts on cooperation within area of Skill Based Training across the country.

IV. SCOPE OF ACTIVITIES

Targeting the above goals, when implementing cooperation for trainings in schemes of Community Colleges and B.Voc degree programs implemented by UGC, the Parties will direct their efforts towards:

1. Efficient and practical utilization of experience gained through cooperation in the Trainings, with an object of improving the training of learners of Community Colleges under UGC.
2. Enhancement of direct links between UGC, NSDC, and NSDC approved Sector Skill Councils, by holding workshops etc. to promote and enhance Skill Training;
3. Improving the quality of training of Community Colleges under UGC by aligning the Course Curriculum of training to the National Occupational Standards (NOS), set up by NSDC approved Sector Skill Councils.
4. Sector Skill Councils (SSCs) will conduct "Training of Trainers" of trainers of Community Colleges under UGC on the National Occupational Standards.
5. NSDC – SSC will jointly identify with UGC the sectors and job roles which would be of interest to UGC for both Community Colleges and B.Voc program.
6. Sector Skill Councils will advise in framing the guidelines for setting up labs including providing specifications of tools and equipment's as per the identified course.
7. NSDC – SSCs will share the curriculum of the identified job roles which will in alignment to Qualification Packs and National Occupational Standards.
8. NSDC will coordinate the availability of services of the trained skills faculty, subject to the requirement of institution, from its funded training partners at UGC approved remuneration as per guidelines of Community Colleges and B.Voc degree programmes. The commercials of the same would be between the participating Community College and NSDC funded Training Partner.
9. NSDC would give access to Community Colleges to enroll students into skill based courses via Skills Development Management System (SDMS). The access of the same will also be provided to UGC for monitoring purpose.

10. NSDC- SSCs will facilitate placements for at least 70% of the SSC certified candidates from UGC system.
11. Conduct timely assessment and certification of training through 'trained assessors', certified and approved by the NSDC approved Sector Skill Councils.
12. Review of current Skill based courses and introduction of new Skill based courses, as per the demand of the industry under other vocations.
13. Implementation of cooperation programs and projects through itself or NSDC approved Sector Skill Council;
14. Provide help in employment of learners trained by UGC & evaluated and assessed by 'trained assessors', certified and approved by the NSDC approved Sector Skill Councils.

V. IMPLEMENTATION OF THE MEMORANDUM

In order to ensure the implementation of this Memorandum, the Parties will create a "UGC-SSC Coordination Committee" (USCC) consisting of three officers nominated by Chairman, UGC and three officers of the NSDC nominated by MD&CEO, NSDC. The Coordination Committee will be responsible for:

i. Discussion of the progress of cooperation of Trainings under B.Voc. Programs and Community Colleges of UGC;

ii. Preparation and coordination of cooperation plans amongst the Parties;

iii. Coordination of communication with UGC, NSDC and NSDC approved Sector Skill Councils for cooperation in Skill based Training;

iv. Discussion of other issues pertaining to the implementation of this Memorandum.

v. Such other matters as may be decided by and between the parties.

VI. ROLE AND RESPONSIBILITIES OF UGC

1. UGC will run courses aligned to the Industry defined Qualification Packs (QP) and National Occupational Standards (NOS) set by the NSDC approved Sector Skill Councils in the Community Colleges under UGC.
2. UGC in consultation with NSDC will decide on the courses and finalize the content and curriculum based on QP and NOS set by the Sector Skill Councils.
3. UGC to ensure that all the trainings in Community Colleges and B.Voc. Degree Programs are aligned as per the Industry defined Qualification Packs (QP) and National Occupational Standards (NOS) set by the NSDC approved Sector Skill Councils.
4. UGC approved Community Colleges / institutions running B.Voc. programs may consult NSDC to take services of NSDC funded Training Partners for the implementation of the courses smoothly

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including taking faculty, setting up of labs and other activities of the program.

5. UGC will pay to the respective NSDC approved Sector Skill Councils for the Assessments and Certification as per the mutually agreed fee, which shall be jointly decided by UGC, NSDC and NSDC approved Sector Skill Councils. Fixation of such fee will be on the basis of budget set by UGC for the purpose.
6. UGC will share the records and other details related to students enrolment and training, with NSDC pertaining to Community College courses on quarterly basis.

VII. ROLE AND RESPONSIBILITIES OF NSDC

1. Assisting UGC in matching and aligning their courses to Qualification Packs (QP) and National Occupational Standards (NOS).
2. NSDC will provide Curriculum Alignment Manual and Courseware Quality Manuals for UGC which will lay down quality benchmark of training according to the standards and processes of NSDC.
3. NSDC to conduct 'Curriculum Alignment Workshops' for UGC to help them align their curriculum to the QPs and NOSs
4. NSDC approved Sector Skill Councils will set guidelines for setting up labs and will work with UGC to lay down lab specifications.
7. NSDC approved Sector Skill Councils will conduct "Train the Trainer" programs for trainers of Community College under UGC. The fees for the program will be mutually decided by UGC, NSDC and Sector Skill Councils. Fixation of such fee will be on the basis of budget set by UGC for the purpose.
5. NSDC will ensure timely assessment of skills of learners of Community Colleges under UGC through 'trained assessors', certified and approved by the NSDC approved Sector Skill Councils.
6. Every eligible student will be awarded a certificate on successfully attaining pass marks in the assessment as per the guidelines, either by Sector Skill Council or jointly by NSDC/SSC and University / College pertaining to the National Skill Qualification Framework Level.
7. Sector Skill Councils will drive Industry Interface and help UGC identifying local industries who will actively engage to help the delivery of the training and placement of students into internships/jobs.
8. NSDC- SSCs will facilitate placements for at least 70% of the SSC certified candidates from UGC system.
9. NSDC will provide access to Community Colleges and to UGC to SDMS to manage the electronic coordination among all the stakeholders – SSC, Institutions, UGC and NSDC.
10. It is understood that NSDC would discharge all or any of the above activities either by itself or through NSDC approved Sector Skill Council(s)

VIII. JOINT ROLES AND RESPONSIBILITES OF UGC AND NSDC

1. Both Parties will establish procedures to facilitate regular contact at the executive and operational levels to discuss issues arising in relation to the Project.
2. Both Parties constituted under this MoU will hold periodic meetings, between their senior officials to discuss the coordination of issues which are relevant for the successful implementation of this MOU.
3. It is understood that NSDC would discharge all or any of the above activities either by itself or through NSDC approved Sector Skill Council(s).

IX. MONITORING

1. Implementation of the MoU will be jointly monitored by UGC and NSDC through the UGC-SSC Coordination Committee as defined in Clause V of this MOU.

X. MISCELLANEOUS PROVISIONS

1. The Memorandum of Understanding (MOU) as outlined in this document is not intended to be a legally binding document. Rather, it is meant to describe the nature and cooperative intentions of UGC and NSDC to suggest guidelines for cooperation. Nothing, therefore, shall diminish the full autonomy of either party, nor any constraints be imposed by either upon the other, and nothing in this Agreement shall be deemed to create a partnership, joint venture, or agency relationship between the parties.
2. Any other matter not included in this MoU which is necessary for the smooth functioning of the Scheme shall be finalized among UGC and NSDC on mutual terms and conditions.
3. The use of the name, logo and/or official emblem of any of the Parties on any publication, document and/or paper is allowed only, after seeking explicit prior permission in writing by either party
4. The Memorandum of Understanding or any part thereof may be amended at any time during its tenure only by consent in writing of the parties.
5. The Memorandum of Understanding is not intended to create any legal relation of employer-employee or of principal and agent relationship amongst the parties.
6. This Memorandum of Understanding shall remain valid for a period of five years from the date of its signing, and can be extended on mutual terms and conditions and can also be terminated by giving one month notice by any of the parties.
7. Through this Memorandum of Understanding UGC and NSDC affirm their commitment to fulfil and achieve the objectives mutually agreed upon in this Memorandum of Understanding.

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Signed this Memorandum of Understanding on this 4th day of August2014 at New Delhi.

Prof. (Dr.) Jaspal S. Sandhu
Secretary
University Grants Commission

Dated: 04/08/2014

Mr. Dilip Harel Mitra Chenoy
MD & CEO
National Skill Development Corporation

Dated: 04/08/2014

Witness:

1. 4/8/14

2.

1. 04/08/14

2.

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UNIVERSITY GRANTS COMMISSION

GUIDELINES FOR INTRODUCTION OF BACHELOR OF VOCATION (B.VOC.) PROGRAMME IN UNIVERSITIES AND COLLEGES UNDER THE NATIONAL SKILLS QUALIFCATIONS FRAMEWORK (NSQF)

1. Introduction

It has been a long felt necessity to align higher education with the emerging needs of the economy so as to ensure that the graduates of higher education system have adequate knowledge and skills for employment and entrepreneurship. The higher education system has to incorporate the requirements of various industries in its curriculum, in an innovative and flexible manner while developing a holistic and well groomed graduate.

Ministry of HRD, Government of India had issued an Executive Order in September 2011 for National Vocational Education Qualification Framework (NVEQF). Subsequently, Ministry of Finance, in pursuance of the decision of Cabinet Committee on Skill Development in its meeting held on 19th December, 2013, has issued a notification for National Skills Qualifications Framework (NSQF) which supersedes NVEQF.

Under the National Skills Development Corporation, many Sector Skill Councils representing respective industries have/are being established. One of the mandates of Sector Skill Councils is to develop National Occupational Standards (NOSs) for various job roles in their respective industries. It is important to embed the competencies required for specific job roles in the higher education system for creating employable graduates.

The University Grants Commission (UGC) has launched a scheme on skills development based higher education as part of college/university education, leading to Bachelor of Vocation (B.Voc.) Degree with multiple exits such as Diploma/Advanced Diploma under the NSQF. The B.Voc. programme is focused on universities and colleges providing undergraduate studies which would also incorporate specific job roles and their NOSs alongwith broad based general education. This would enable the graduates completing B.Voc. to make a meaningful participation in accelerating India's economy by gaining appropriate employment, becoming entrepreneurs and creating appropriate knowledge.

UGC GUIDELINES FOR B.Voc.

2. Objectives

2.1 To provide judicious mix of skills relating to a profession and appropriate content of General Education.

2.2 To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the programme.

2.3 To provide flexibility to the students by means of pre-defined entry and multiple exit points.

2.4 To integrate NSQF within the undergraduate level of higher education in order to enhance employability of the graduates and meet industry requirements. Such graduates apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.

2.5 To provide vertical mobility to students coming out of 10+2 with vocational subjects.

3. Levels of Awards

The certification levels will lead to Diploma/Advanced Diploma/B. Voc. Degree in one or more vocational areas and will be offered under the aegis of the University. This is out-lined in Table I.

Table 1: Awards

Award	Duration	Corresponding NSQF level
Diploma	1 Year	5
Advanced Diploma	2 Years	6
B.Voc. Degree	3 Years	7

Each of the awards shall specify within parenthesis, the Skill(s) specialization for example:

- B. Voc. (Renewably Energy Management)
- B. Voc. (Retail Management)
- B.Voc. (Retail Management and IT)
- Advanced Diploma (Food Processing)
- Advanced Diploma (Health Care)
- Advanced Diploma (Hospitality and Tourism)
- Diploma (Green House Technology)
- Diploma (BPO)
- Diploma (Jewellery Designing)

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UGC GUIDELINES FOR B.Voc.

A suggestive list of vocational sectors and related specializations is given below: Universities and colleges may like to identify additional sectors/specializations in view of the potential for employment in the local industries and meet the standards laid down by National Occupational Standards.

No.	Sector	Specialization
1.	Automobiles	
	1.	Engine Testing
	2.	Vehicle Testing
	3.	Vehicle Quality
	4.	Auto Electricals and Electronics
	5.	Farm Equipment and Machinery
2.	Entertainment	
	1.	Theatre and Stage Craft
	2.	Contemporary Western Dance
	3.	Theatre studies
	4.	Acting
3.	Information Technology	
	1.	Software Development
4	Telecommunications	
	1.	Mobile Communication
5.	Marketing	
	1.	Retail
6.	Agriculture	
	1.	Farm Machinery and Power Engineering
	2.	Green House Technology
	3.	Renewable Energy
	4.	Processing and Food Engineering
	5.	Soil and Water Conservation
7.	Construction	
	1.	Building Technology
8.	Applied Arts	
	1.	Fashion Technology
	2.	Interior Design
	3.	Jewellery Design
9.	Tourism	
	1.	Tourism and Service Industry
10.	Printing and Publishing	
	1.	Printing Technology

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UGC GUIDELINES FOR B.Voc.

4. Eligibility /Target

All universities and colleges included under Sections 2(f) and 12(B) of the UGC Act, 1956 and receiving plan grant from the UGC are eligible for UGC financial assistance under the scheme.

5. Eligibility for admission in B.Voc.

The eligibility condition for admission to B.Voc.programme shall be 10+2 or equivalent, in any stream.

6. Curriculum

6.1 The curriculum in each of the years of the programme would be a suitable mix of general education and skill development components. Curriculum details should be worked before introduction of the courses.

6.2 Skill Development Components:

(i) The focus of skill development components shall be to equip students with appropriate knowledge, practice and attitude, so as to become work ready. The skill development components should be relevant to the industries as per their requirements.

(ii) The curriculum should necessarily embed within itself, National Occupational Standards (NOSs) of specific job roles within the industry sector(s). This would enable the students to meet the learning outcomes specified in the NOSs.

(iii) The overall design of the skill development component along with the job roles selected should be such that it leads to a comprehensive specialization in one or two domains.

(iv) In case NOS is not available for a specific area / job role, the university/college should get the curriculum for this developed in consultation with industry experts.

(v) The curriculum should also focus on work-readiness skills in each of the three years.

(vi) Adequate attention needs to be given in curriculum design to practical work, on the job training, development of student portfolios and project work.

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UGC GUIDELINES FOR B.Voc.

6.3 General Education Component:

(i) The general education component should adhere to the normal university standards. It should emphasise and offer courses which provide holistic development. However, it should not exceed 40% of the total curriculum.

(ii) Adequate emphasis should be given to language and communication skills.

6.4 The curriculum should be designed in a manner that at the end of year-1, year-2 and year-3, students are able to meet below mentioned level descriptors for level 5, 6 and 7 of NSQF, respectively:

Level	Process required	Professional knowledge	Professional skill	Core skill	Responsibility
Level 5	Job that requires well developed skill, with clear choice of procedures in familiar context	Knowledge of facts, principles, processes and general concepts, in a field of work or study	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools materials and information	Desired mathematical skill, understanding of social, political and some skill of collecting and organizing information, communication.	Responsibility for own work and learning and some responsibility for other's works and learning
Level 6	Demands wide range of specialized technical skill, clarity of knowledge and practice in broad range of activity involving standard / non-standard practices	Factual and theoretical knowledge in broad contexts within a field of work or study	A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	Reasonably good in mathematical calculation, understanding of social, political and, reasonably good in data collecting organizing information, and logical communication	Responsibility for own work and learning and full responsibility for other's works and learning

Level 7	Requires a command of wide ranging specialized theoretical and practical skill, involving variable routine and non-routine context	Wide ranging, factual and theoretical knowledge in broad contexts within a field of work or study	Wide range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	Good logical and mathematical skill understanding of social political and natural environment good in collecting and organizing information, communication and presentation skill	Full responsibility for output of group and development

a. *Professional knowledge is what a learner should know and understand with reference to the subject.*
b. *Professional skills are what a learner should be able to do.*
c. *Core skills refer to basic skills involving dexterity and use of methods, materials, tools and instruments used to perform the job including IT skills needed for that job.*
d. *Responsibility aspect determines the (i) nature of working relationship, (ii) level of responsibility for self and others, (iii) managing change and (iv) accountability for actions.*

6.5 Guidelines for credit calculations

6.5.1 This section contains credit framework guidelines. The university/ college should use these guidelines or adapt them.

6.5.2 The following formula should be used for conversion of time into credit hours.

a) One Credit would mean equivalent of 15 periods of 60 minutes each, for theory, workshops/labs and tutorials;

b) For internship/field work, the credit weightage for equivalent hours shall be 50% of that for lectures/workshops;

c) For self-learning, based on e-content or otherwise, the credit weightage for equivalent hours of study should be 50% or less of that for lectures/workshops.

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6.5.3 The suggested credits for each of the years are as follows:

Table 3

NSQF Level	Skill Component Credits	General Education Credits	Normal calendar duration	Exit Points / Awards
Year 3	36	24	Six Semesters	B.Voc.
Year 2	36	24	Four semesters	Advanced Diploma
Year 1	36	24	Two semesters	Diploma
TOTAL	**108**	**72**		

6.6 The university/college should develop the curriculum in consultation with industry. The industry representatives should be an integral part of the academic bodies of the university/college. While doing so, they should work towards aligning the skills components of the curriculum with the NOSs developed by the respective Sector Skill Councils.

6.7 The practical/hands-on portion of the skills development components of the curriculum should be transacted normally in face to face mode, either within the institution or at a specified industry partner location. However, if due to the nature of the skill to be learnt, the industry prescribes its acquisition through blended or distance mode, the same may be followed. In nutshell, the emphasis should be on learning outcome and not the input and processes. The general education component of the curriculum may be transacted in any mode without compromising on quality.

6.8 The specialization chosen by the university/college should be based on the existing/forecasted skill gaps in the industry.

6.9 Relevance of programmes offered, along with that of the curriculum is important. Therefore, monitoring, evaluation and updating of the curriculum needs to be done periodically in consultation with industry, keeping in view their requirements and changes in NOSs. The university/college should incorporate this as a continuous and dynamic process in-built in their system.

6.10 The university/college should appropriately use technology to improve the effectiveness of the delivery of courses.

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7. Examination and Assessment

7.1 The assessment for the general education component should be done by the university as per their prevailing standards and procedures.

7.2 The assessment for the skill development components should necessarily focus on practical demonstrations of the skills acquired. The university may like to consult the respective Sector Skill Council for designing the examination and assessment pattern for the skill development components.The university may also consider using the designated assessors of Sector Skill Councils/industry associations for the conduct of practical assessment.

7.3 The university has to necessarily establish a credit based assessment and evaluation system for the B.Voc. programme.

8. Infrastructure and Faculty for B.Voc. programme

8.1 University/college needs to have adequate laboratory /workshop facilities for face to face delivery of skills and hands-on practice either owned or arranged through tie-up with the partner industry or any institution recognized by the certification agency.

8.2 The university/college should use its regular faculty for the conduct of general education component and also for the skills components, if existing. Additionally, they may hire faculty on contractual basis and guest faculty in the core trades only as per UGC norms.

8.3 There is a provision of One Associate Professor and Two Assistant Professors (purely on contractual basis during XII Plan period), under this scheme.

9. Student Fee

Student fee should be decided as per the prevalent mechanism for fee fixation for aided courses in the university/college.

10. Other conditions

10.1 The university has to necessarily adopt a credit based assessment and evaluation system in semester mode for the B.Voc. programme.

10.2 The B.Voc. programme should be evaluated and monitored by the university/college through its existing mechanism or by setting up an alternate mechanism, with involvement of industry representatives.

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10.3 University/college should develop bye-laws for running the B.Voc. degree programme.

10.4 Bye-laws for the course should include provision of rejoining or re-admission to the course during the period and counseling/ mechanism for proper selection of specialization by the students at the time of admission.

10.5 A college/university should offer a minimum of 2 skill specializations under the B.Voc. programme.

11. Financial Assistance

The financial allocation will be made by UGC within overall ceiling of Rs. 1.85 crores for a period of three years under different heads as given below:

11.1 Start-up assistance: A one-time start-up assistance of Rs. 50.00 lakh for setting up of laboratories/workshops facilities, procurement of teaching and learning materials, machineries/equipment and renovation. This shall not cover any new construction.

11.2 Faculty: One Associate Professor and Two Assistant Professors – Rs. 75.00 lakh for three years (purely on contractual basis during XII Plan period). Rs. 25.00 lakhs per annum X 3 years = Rs. 75.00 lakh - to be reimbursed on actual basis within the total allocation.

11.3 Institutions should recruit faculty only in the core trades being offered under the Scheme.

11.4 Visiting/Guest Faculty: Rs. 5.00 lakh for first year and Rs. 10.00 lakh for second and Rs. 15.00 lakh for third year.

Existing Faculty	Rs.500/- per lecture
Visiting/Guest faculty	Rs.2,000/- per lecture

11.5 The operative yearly cost: The operative yearly cost shall be of Rs. 10.00 lakhs per annum.

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12. Procedure for applying under the scheme

12.1 University/college should submit proposal for introduction of B.Voc. programme directly to UGC in the prescribed proforma attached as Annexure-I. However, college should also submit a copy of "No Objection Certificate" from the affiliating university.

13. Annexures

(a) Proforma for submission of proposal for introduction of B.Voc. programme as given in Annexure-I.

(b) Proforma for submission of Mandate Form as given in Annexure-II.

(c) Proforma for Utilization Certificate is given in Annexure-III.

(d) Proforma for submission of statement of expenditure incurred for introduction of B.Voc. Course is given in Annexure-IV.

(e) Proforma for submission of Annual Progress Report is given in Annexure-V.

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ANNEXURE-I

Proposal Form for B.Voc. Programme

1. **Details of the University / College:** *Please ensure that the details entered below match exactly with the details registered with UGC.*

1.	**Name of the University / College:**			
2.	**Full Postal Address:**			
3.	**Name of the Affiliating University**			
4.	**Whether covered under Section 2(f) and 12(B) of the UGC Act, 1956 (If yes, please enclose a copy of the letter)**	Yes / No	**Whether Autonomous**	Yes / No
5.	**Whether the college is aided or self financing?**			
6.	**Name, designation and contact details (Tel/fax/mobile/email) of Head of the Institution.**			
7.	**Website URL of the College / University**			
8.	**Any other relevant information (*Maximum 100 words*) College / University may like to share**			

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2. Details of the Proposed Skills Specialisations in the B.Voc. Program

Programme	Name of the Specialisation (*)	Job Roles proposed to be covered in each year (Along with NSQF level)			Proposed intake of students (Annually)
		Yr-1	Yr-2	Yr-3	

(*) This would be mentioned within Parenthesis in the name of the Award, e.g. B.Voc. (Specialisation)

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3. **Proposed subjects / papers in the General Education component in each of the three years.**

	Year-1	Credits
1.		
2.		
3.		
4.		
5.		
	Year-2	
1.		
2.		
3.		
4.		
5.		
	Year-3	
1.		
2.		
3.		
4.		
5.		

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4. **Basis for choosing the specialisation(s):** The choice of specialisation should be based on:
   a) Skills Gap requirements, to ensure that the program fulfils the skills requirement of industry;
   b) University / College has expertise in the specialisation; and
   c) University / College have one or more committed industry partner(s) for design, delivery, internship and placement.

   Provide detailed basis for the choice of each of the specialisation(s). *This would be an important factor during the approval process of this proposal.*

4.1. Skill Gaps identified:

	Specialisation	**Skill Gaps Identified** *(Quantitative, Qualitative, Source,...)*
1.		
2.		
3.		

4.2. Existing expertise of the University / College:

	Specialisation	**Existing expertise** *(Which can be leveraged by the institution)*
1.		
2.		
3.		

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4.3. Industry Partner(s)

S.No.	Specialisation	Details of the Industry Partnership(s)		
		Name of Organisation and Address	Nature of Partnership / Support (*)	Name, Designation and Contact details of official
1.				
2.				
3.				
4.				

(*) Curriculum design, content creation, admission, conduct of courses, provision of infrastructure (in University / College, at employer location), internship, placement, etc.

4.3.1. Attach MOU(s), if any, signed with the industry Partner(s):

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5. Curriculum Design and Approval

5.1. What is the proposed process and plan for curriculum design? How is the University / College ensuring that the curriculum meets the objectives of the B.Voc. Program?

5.2. Status / Plan for curriculumapproval by the appropriate body of the University / Colleges?

6. Student placement plan:

6.1. How would the University / College set up an effective mechanism for placement of students?

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7. Faculty:

7.1. Availability of Faculty *(For year-1)*

	Specialisation / Area	Faculty Needed	Available with Institution	To be Recruited	Guest Faculty	Guest faculty to be provided by Industry Partner
1.						
2.						
3.						
4.						
5.						
6.						
7.						

7.2. Training needs of Faculty *(For Year-1)*

S.No.	Specialisation / Area	Details of Training Needed and duration	Training Provider
1.			
2.			
3.			
4.			
5.			
6.			

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8. Availability of Infrastructure

8.1.1. Details of physical infrastructure

	Name of the Specialisation	Availability of physical infrastructure		
		Infrastructure	Available in the College/ University	To be provided by Industry Partner
1.		Classroom		
		Laboratory		
		Workshop		
		Library		
		ICT Facility		
		Others		
2.		Classroom		
		Laboratory		
		Workshop		
		Library		
		ICT Facility		
		Others		
3.		Classroom		
		Laboratory		
		Workshop		
		Library		
		ICT Facility		
		Others		

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9. **Details of Expenditure:** *(It is assumed that the existing infrastructure / faculty will be used as far as possible. The expenditure to be listed here is only for any incremental requirements the University / College may need.)*

S. No.	Components	Expenditure (amounts in Rs.)				Remarks *(Provide justification for expenditure)*
		Y-1	Y-2	Y-3	Total	
1.	**Faculty / Staff**					
a.	Contractual					
b.	Guest					
c.	Lab Assistant					
d.						
2.	**Equipment for Labs / Workshops / Classrooms**					
a.						
b.						
c.						
3.	**Raw Materials etc. for Labs / Workshops**					
a.						
b.						
c.						
4.	**Faculty Training**					
a.						
b.						
5.	**Admission Process, Pre-admission Student Counselling etc.**					
6.	**Office Expenses / Contingencies** (including expenditure on publicity, guidance and counselling, transport, field visits, postage, stationery, electricity, water etc.)					
7.	**Travel**					
8.	**Others**					
a.	Assessments					
b.	Contingencies					
c.	Workshops / conferences / seminars					
e.	Any other expense					
	TOTAL					

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10. Student / Learner Fee details:

(All figures in Rupees)

S.No.	Programme(s)	Annual Fee per student	Proposed student intake per year				Total Fees proposed to be collected			
			Y1	Y2	Y3	Total	Y1	Y2	Y3	Total
1.										
2.										
Total										

11. Key Milestones / Plans for Year-1

	Key Plans / Milestones	Person Responsible	Expected Completion Date
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

12. Any other Information which the host college / university may like to provide.

Signature with Seal of the Head of the Host Institution

Name :

Date:

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ANNEXURE – II

MANDATE FORM

Electronic Clearing Service (Credit Clearing)/ Real Time Gross Settlement (RTGS) facility for receiving payments.

A. Details of Accounts Holders:-

1.	Name of Account Holder	
2.	Complete Contact Address	
3.	Telephone Number/Fax/E-mail	

B. Bank Account Details:-

1.	Bank Name	
2.	Branch Name with Complete Address, Telephone No. and E-mail	
3.	Whether the Branch is computerized?	
4.	Whether the Branch is RTGS enabled? If yes then what is the Branch's IFSC Code	
5.	Is the Branch also NEFT enabled?	
6.	Type of Bank Account (SB/Current /Cash Credit)	
7.	Complete Bank Account No. (Latest)	
8.	MICR Code of Bank	

I hereby declare that the particulars given above are correct and complete. If the transaction is delayed or not effected at all for reasons of incomplete or incorrect information I would not hold the use Institution responsible. I have read the option invitation letter and agree to discharge responsibility expected of me as a participant under the Scheme.

Date: Signature of Customer

Certified that the particulars furnished above are correct as per our records.

(Bank's Stamp)

Date: Signature of Customer

1. Please attach a photocopy of cheque along with the verification obtained from the bank.
2. In case your Bank Branch is presently not "RTGS enabled", then upon its up gradation to "RTGS Enabled" branch, please submit the information again in the above proforma to the Department at earliest.

NOTE:- Refund of Security Deposit/ Hire Charges Due to operation of E-payment w.e.f. 01/04/2012 the Mandate form may please be submitted, duly verified by the bank, to this office for claiming Refund of Security Deposit/Hire Charges along with a photocopy of blank Cheque.

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ANNEXURE – III

UNIVERSITY GRANTS COMMISSION, NEW DELHI

UTILIZATION CERTIFICATE

It is certified that the total grant of Rs._____ (Rupees .....) sanctioned by the UGC vide letter No. F._____ dated_____ has been utilized by the college/university as per details given in the attached statement (As per Annexure D) in accordance with the terms and conditions laid down by the UGC vide its letter No_____ dated_____ and that all the terms and conditions have been fulfilled by the college/university and the grant has been utilized for the purpose for which it was sanctioned.

It is further certified that the inventories of permanent and semi-permanent assets created/acquired wholly or mainly out of the grants given by the UGC as indicated in the enclosed statement are being maintained in the prescribed form and are being kept up-to-date and these assets have not been disposed off, encumbered or utilized for any other purpose.

If as a result of check or audit objection, some irregularity is noticed at a later stage, the college/university will refund the objected amount.

_____ _____

Signature of Principal / Registrar with Seal

Signature of Auditor with Seal

Note: The Utilization Certificate should be accompanied by audited statement of account indicating expenditure on various items.

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ANNEXURE-IV

UNIVERSITY GRANTS COMMISSION

PROFORMA FOR SUBMISSION OF STATEMENT OF EXPENDITURE INCURRED FOR THE OF B.VOC. PROGRAMMES (DIPLOMA/ ADVANCED DIPLOMA/DEGREE)

1. Name of the University/ College:
2. Name of the Vocational degree/Advance Diploma/Diploma Course:
3. No. & Date of UGC's approval
   No.F._____ Dated _____
4. Period to which the accounts related : w.e.f. _____ to _____.
5. Details of actual expenditure incurred :

	Grants approved	Grants released	Unspent balance	
	(i)	(ii)	(iii)	(iv)

NOTE

1. The statement of expenditure should be filled up separately for each vocational degree course.
2. List of equipment purchased should be submitted.
3. Details of periods taken, amount paid to leach teacher by name under guest faculty and internal faculty should be submitted.

Signature

Head of Institution / Principal/Registrar Govt. Auditor/CA

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ANNEXURE – V

UNIVERSITY GRANTS COMMISSION, NEW DELHI

ANNUAL PROGRESS REPORT (to be submitted annually to the UGC by each University /College)

1. Name and Address of the institution:

2. Name of the Head of the institution:

3. Period of the Progress Report:

4. Activities Taken up During the Year:

5. Utilization of Grants during the Year:

6. Specific Outcomes:

7. Difficulties encountered in implementation, if any:

CERTIFICATE

This is to certify that the data/ information presented in this Annual Progress Report are true and correct to the best of my knowledge and belief and the required documents will be provided to the UGC, as and when the same are called for.

Signature with Seal of Head of the University /College

Place:

Date:

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B.Voc. (Software Development)

Ramanujan College

(Structure and detailed syllabus)

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	B.Voc. (Software Development), Generic Component				
	Semester -1		**Credits**	**Skill Acquired**	**Department**
1	GEC1.1	English Communication (AECC, University Syllabus)	4	Communication Skill (English/MIL)	English
2	GEC1.2	Computer Fundamentals (Computer Application BA(P))	4	Basic Computer Skill	Computer Science
3	GEC1.3	Soft Skill (B.A(H) English)	4	Personality Development	English
	Semester – 2				
1	GEC2.1	Environmental Studies (AECC, University syllabus)	4	Environment Awareness	Environmental Science
2	GEC2.2	Internet Technology (Computer Application BA(P))	4	Information Management Skill	Computer Science
3	GEC2.3	Business Communication (B.Com(P) CBCS)	4	Communication Skill(English), Personality Development	Commerce
	Semester – 3				
1	GEC3.1	Hindi/MIL (AEEC, B.A/B.Com)	4	Communication Skill(Hindi)	Hindi
2	GEC3.2	Statistical Data Analysis Using Software Packages (AECC, B.Sc. Statistics)	4	Data Analysis Skill	Statistics
3	GEC3.3	Life Skills (AEEC, B.Sc. Home Science)	4	Soft Skill	Psychology
	Semester – 4				
1	GEC4.1	Management Information System (AEEC, B.A. Voc. OM&SP)	4	Writing Skill (English)	Commerce/Computer Science
2	GEC4.2	Cyber Crime and laws (AEEC, B.Com)	4	Cyber Awareness	Computer Science/Commerce
3	GEC4.3	Quantitative Techniques (AEEC, Operations Research)	4	Management Skill	Commerce
	Semester - 5				
1	GEC5.1	Organizational Behaviour B.Com(P) CBCS	4	Personality Development	Commerce
2	GEC5.2	Geographical Information System (AEEC, B.A. Geography)	4	Emerging Application	Computer Science
3	GEC5.3	Programming in Robotics	4	Emerging Application	Computer Science

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		(AEEC, B.Sc. Electronics)			
	Semester - 6				
1	GEC6.1	Effective Decision Making (AEEC,B.A(Hons.) Psychology)	4	Decision Making	Psychology
2	GEC 6.2	E-Commerce & E-Marketing	4	Emerging Application	Commerce
3	GEC 6.3	Entrepreneurship (AEEC,B.A.Business Economics)	4	Entrepreneurship Skill	Management/ Commerce

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	B.Voc. (Software Development) Skill Component		
	Semester - 1		**Credits (Th+Lab)**
1	SEC1.1	Fundamentals of Mathematics and Statistics	4 + 0
2	SEC1.2	Programming Skills using C	4 + 3
3	SEC1.3	Desktop Publishing	4 + 3
	Semester – 2		
1	SEC 2.1	C++ Programming Skills	4 + 3
2	SEC 2.2	Data Structures	4 + 3
3	SEC 2.3	Project I	4
	Semester – 3		
1	SEC 3.1	Aptitude & Logical Reasoning	4 + 0
2	SEC 3.2	Core Java Programming	4 + 3
3	SEC 3.3	Operating System Concepts	4 + 3
	Semester – 4		
1	SEC 4.2	Networking Fundamentals	4 + 3
2	SEC 4.3	Web Application and Development	4 + 3
3	SEC 4.4	Project II	4
	Semester - 5		
1	SEC 5.1	Software Engineering	4 + 0
2	SEC 5.2	Python Programming	4 + 3
3	SEC 5.3	Database Management Skills	4 + 3
	Semester - 6		
1	SEC 6.1	Introduction to Data Science	4 + 3
2	SEC 6.2	Mobile Application Development	4 + 3
3	SEC 6.3	Industrial Training	4

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B.Voc –Software Development

Fundamentals of Mathematics and Statistics
Paper Code: SEC 1.1

Credit - 4 **Max Marks: 100 Hours:3**

Part A – (Basic Mathematics)

1. Sets, relation and mappings. Basic number systems and their algebraic properties, complex numbers.
2. Basic algebra- Solution of quadratic equations, relation between roots and co-efficiencts of basics of quadratic and cubic equations.Arithmetic& Geometric progressions.Binomial theorem with simple applications.
3. Matrix Algebra Math- Types of Matrices, algebra of matrices. Computation of determinants and finding inverse of matrices upto third order.
Formulation and solution of system of linear equations (upto 3 unknowns) by Cramer's Rule and Matrix- inverse method.
4. Graphs of linear functions and simple functions such as :-
$y=x^2$, $y=x^2+1$ $y=x^3$ $Y= IxI$
5. Business Mathematics – percentage, profit and loss, simple and compound interest, present value

Part B – (Basic Statistics)

6. Presentation of statistical data by bar charts and pie charts.
7. Measures of Central Tendency – weighted mean, arithemetic mean, median and mode – simple problems.
8. Measures of Variation: Variance, Standard Deviation & Coefficient of Variation (Simple problems).
9. Simple Correlation and rank correlation. Simple Linear regression and Analysis.

Readings: -

1. Algebra-M.K. Singal and Asha Rani Singal.
2. Business Mathematics and Statistics- J.K. Thukral
3. Statistical Methods-S.P. Gupta.

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B.Voc –Software Development
Programming Skills using C

Paper Code: SEC 1.2

Credit - 7 **Max Marks: 100 Hours:3**

***Objective**: The objective of the paper is to make the students familiar with the basics of programming aspects,using C as the primary language. This course focuses on the programming constructs which are used in other languages as well. This is the introductory course on programming. So it does not require any perquisite.*

UNIT- I

Concept of algorithms, Flow Chart, Programming using C: C character set, Tokens, identifiers, Variables,Constants, data type in C, simple I/O Function calls from library, arithmetic, relational and logical operations, **Conditional Structure:** if, else, switch, break, continue and goto.

[T1],[T2] [No. of hrs. 15]

UNIT- II

Concept of loops: for, while and do-while and nested loops.

Arrays: One and Two dimensional .Initialization and some basic operation on 1-D and 2-D array, Strings asarray of character. Concept of Pointer, array and pointer relationship, pointer to array, array of pointers, pointer to functions.

[T1], [T2] [No. of hrs. 15]

UNIT-III

Functions: Concept of functions, Parameter passing techniques - call by value and call by reference, libraryfunctions.

Structure: Initialization of structure and their application, union.

[T2], [T1][No. of hrs. 15]

UNIT- IV

Files: Concept of files, Binary files, Text files, File Handling in C Using File Pointers, fopen( ), fclose( ), Inputand Output using file pointers, Character Input and Output with Files,

String: String manipulation Functions and their application.

[T2], [T1][No. of hrs. 15]

Text Books:

[T1] YashwantKanetkar, "Test your C Skills", BPB Publications
[T2] Programming in ANSI C, E. Balagurusamy; McGraw Hill, 6th Edition.

Reference Books:

[R1] Kernighan & Ritchie, "C Programming Language", The (Ansi C version), PHI, 2nd Edition
[R2] K.R Venugopal, "Mastering C", TMH
[R3] R.S. Salaria "Application Programming in C", Khanna Publishers, 4th Edition

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Programming Skills using C Lab

Credit-3 Lectures: 45 **Max Marks: 75**
Hours:3

List of Experiments:

1. Programs to illustrate the data types and simple arithmetic operators (i.e. area of a

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circle, conversion of Temperature units)

2. Programs to illustrate the conditional structure (i.e. largest of three numbers, simple calculator by switch – case)

3. Programs to illustrate the loop structure (find sum of a geometric series, find sum of first n natural numbers etc.)

4. Programs to illustrate 1- D array (i.e. find average of marks of a class in one subject)

5. Programs on function (i.e. to find the factorial of a number, to find the HCF of two nos).

6. Programs on function (to highlight the difference between call by value and call by reference)

7. Programs on library functions by using header files (i.e string and char functions).

8. Programs to illustrate 2-D array (i.e. program for matrices addition, Subtraction, multiplication)

9. Programs on structure (i.e. an array of record contains information of employees of a company. Display all the data of those employees having salary > 20000.)

10. Programs on union (to illustrate the difference and similarity between structure and union).

11. Programs on binary file (i.e. Store records of a student in a Binary File "Student.dat" read the file and display the content of the file.)

12. Programs on text file (i.e., to count the no of Lowercase, Uppercase and special characters presents in a text file).

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B.Voc –Software Development
Desktop Publishing

Paper Code: SEC 1.3

Credit - 7 **Max Marks: 100 Hours:3**

Objectives and Pre-requisites: *Basic knowledge of computer operation is expected. To prepare students having skills in the field of content designing or Desk top publishing where there is a great scope for them work in printing Press, News Paper houses, Publishing companies and Advertising Industries. Application software like Adobe Page maker and Corel draw are used for designing work Adobe Photoshop is a very popular image editing software and efficient working of these is absolutely essential to work in printing industry.*

Learning Outcomes: *Individuals who complete this program can start their own designing firm catering toproject works like brochure designing, visiting cards, banners, flyers, magazines and newsletters etc.*

UNIT–I

D.T.P for Publications: Introductions to Printing, Types of Printing, Offset Printing, Transparent Printout, Use of DeskTop Publishing in Publications, Importance of D.T.P in Publication, Advantage of D.T.P in Publication, Laser printers – Uses, Types and Advantage in publication.

[T1][No. of Hrs. 10]

UNIT–II

Introductions to Page Maker: Different page format / Layouts, News paper page format, Page orientations, Columns & Gutters, Printing in reduced sizes. PageMaker Icon and help, Tool Box, Styles, Menus etc., Different screen Views, Importing text/Pictures, Auto Flow, Columns.

Master Pages and Story Editor, Menu Commands and short-cut commands, Spell check, Find & Replace, Import Export etc., Fonts, Points Sizes, Spacing etc., Installing Printers, Scaling (Percentages).Use of D.T.P. in Advertisements, Books & Magazines, News Paper.

[T2][No. of Hrs. 17]

UNIT – III Introduction to CorelDraw

Introduction to CorelDraw Use and importance in Designing, Introduction to Screen and Work Area

.Introduction to Tools of CorelDraw, Managing Palettes ,Working with Images, Patterns and Textures ,Working with Shapes, Colours and Fills, Image Editing.

Page Setup and Designing, Using Styles and Templates, Working with Text, Formatting Text, Text Attributes. Designing Different Page Layouts, Column Layout, Working with Layers. Special Effect to Objects and Texts, Contour Tool, Layout for News Paper and Magazines.

Preparation of Visiting Cards & Invitation Cards, Logo Design and Brochure design.

[T3][No. of Hrs. 17]

UNIT- IV Introduction of PhotoShop

Introduction to Adobe Photoshop & Documents, Various Graphic Files and Extensions, Various Colour Modes and Models. Introduction to Screen and Work Area, Photoshop Tools & Palettes , Using Brushes , Rubber Stamp Options , Using the Editing Tool ,The Smudge Tool, Selection Tools ,Use of Layers , Applying Filters ,Working with Images

[T4][No. of Hrs. 16]

Text Books:

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[T1] Desktop Publishing and Design: A Beginner's Guide Paperback – 2003by Roger C Parker (Author) [T2] Adobe PageMaker 7.0EllennBehoriam, Erika Kendra Prentice Hall, 01-Mar-2002

[T3] Special Edition Using CorelDRAW 9 Steve Bain, D. Scott CampbellQue, 1999 [T4] Adobe Photoshop 7.0 Adobe Press

References Books:

[R1] Straight To The Point - PageMaker 7.0 Laxmi Publications, Ltd., 01-Jan-2009
[R2] Adobe PageMaker 7.0 Classroom in a Book by Adobe Creative Team.
[R3] Adobe Photoshop Elements 7.0 – Illustrated By Barbara Waxer, Lisa Tannenbaum
[R4]. Adobe Photoshop Elements 7 Classroom in a Book By Adobe Creative Team
[R5]. CorelDraw 10 for Windows By Phyllis Davis, Steve Schwartz, Steven A. Schwartz
[R6]. Bring it Home with CorelDRAW: A Guide to In-house Graphic Design Roger Wambolt Course Technology, 2012

Desktop Publishing Lab

Credit-3 Lectures: 45 Max Marks: 75
Hours:3

List of Experiments:-

1. Design Newspaper article in Multiple Columns in ADOBEPAGEMAKER.
2. Design a classified advertisement in ADOBE PAGEMAKER.
3. Perform experiments with the use of Master Pages in ADOBE PAGEMAKER.
4. Perform experiments with the use of import and export command in ADOBE PAGEMAKER.
5. Design Invitation Card in CORELDRAW.
6. Design a Logo in CORELDRAW
7. Design Greeting Card in CORELDRAW.
8. Design a Broucher in CORELDRAW
9. Design a Magazine Front Page in CORELDRAW.
10. Scan a BLACK& WHITE PHOTO and convert it into COLOR PHOTO in PHOTOSHOP.
11. Change dress color of a scanned photo using PHOTOSHOP.
12. Scan a PASSPORT SIZE PHOTO and apply various tools for finishing the photo in PHOTOSHOP.

Suggested Tool Kits: Adobe PageMaker 7, CorelDraw 9, Adobe Photoshop 7

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B.Voc –Software Development
C++ Programming Skills

Paper Code: SEC 2.1

Credit-4 Lectures: 60 **Max Marks: 100**
Hours:3

Objectives and Pre-requisites: The Student should have basic knowledge of computer operation and logic todevelop concept of C++. To understand the basics of Object Oriented Programming and their applications by using C++.

Learning Outcomes: The student will gain knowledge of objects, Class, Data Abstraction, Encapsulation,inheritance, Polymorphism and Dynamic Binding.Will able to develop and construct programs using Bottom up design approach.

UNIT-I

Introduction: Structured Programming, Object Oriented Programming, Programming Methodology, BasicConcepts of OOPs. C++ Overview, C++ Character Set, C++ Tokens, Constants & Variables, Data Types, Structure of C++ Program. Operators & Expressions, Type Conversion, Control Structure: if, switch-case, while, do- while, for. Operators & References in C++: Scope resolution operator, Reference variable, New & Delete, Pointer member operators.

[T1, T2][No. of Hrs: 15]

UNIT-II

Introduction of Function: Declaration / Prototyping, Main function, Call by Value, Call by Reference, Call byAddress, Inline Function, friend function.

Classes and Objects: Abstract data types, Classes, Objects, C++ class declaration, instantiation of objects,Array of Objects, Static Member function.

Constructors and Destructors: Parameterized constructors, Copy Constructor, Multiple Constructor,Destructor.

[T1, T2][No. of Hrs. 15]

UNIT-III

Inheritance: Inheritance, Types of Inheritance- Single, Multiple, Multilevel, Hierarchical, Hybrid, derivation–public, private & protected, Virtual Base Class, Constructor and Destructor in Inheritance.

Polymorphism: –Polymorphism, Types of Polymorphism- Compile time and runtime, Operator overloading,function overloading, parametric polymorphism

Pointer: Introduction, Pointer to Object, This Pointer, Pointer to derived Classes, Overriding inheritancemethods-Virtual Function, Pure Virtual Function.

[T1, T2][No. of Hrs: 17]

UNIT-IV

Input-Output & Manipulator: Stream Classes, Unformatted Input/ Output, Formatted Input/ Output,Manipulators.

File Handling: Classes for File Streams, Opening & Closing of File, File Opening Modes, Checking End OfFile, Working with Binary Mode.

Exception Handling: Basics of Exception Handling, Exception Handling Mechanism, Throwing Mechanism,Catching Mechanism.

[T1,T2,T3][No of Hrs: 13]

Text Books:

[T1] R. Lafore, "Object Oriented Programming using C++", BPB Publications, 2004.
[T2] E. Balaguruswamy, "Objected Oriented Programming with C++", TMH.
[T3] A.R.Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997.

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[T4] Hari Mohan Pandey, " Trouble Free C++", Ane Books Pvt. Ltd.

Reference Books:

[R1] YashwantKanethkar, "Object Oriented Programming using C++", BPB, 2004. [R2] Schildt Herbert, "C++ Programming", 2nd Edition, Wiley DreamTech.
[R3] D. Parasons, "Object Oriented Programming with C++", BPB Publication, 1999.
[R4] Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication, 2002.
[R5] Jibitesh Mishra, Muktikanta Sa, K. MadhuSudhan "Object Oriented Programming using C++"- 2nd Edn,Scitech Publication.

C++ Programming Skills Lab

Credit-3 **Lectures: 45** **Max Marks: 75**
Hours:3

List of Experiments:

1. Design an employee class for reading and displaying the employee information, the getInfo() and display Info () methods will be used respectively. Where get Info () will be private method.
2. Design the class student containing get Data() and display Data() as two of its methods which will be used for reading and displaying the student information respectively. Where get Data() will be private method.
3. Design a class Complex for adding the two complex numbers and also show the use of constructor.
4. Design a class Geometry containing the methods area() and volume() and also overload the area() function.
5. Overload the operator + for adding the timings of two clocks, And also pass objects as an argument.
6. Overload the + for concatenating the two strings. For e.g "c" + "++" = c++
7. Design a class for single level inheritance using public and private type derivation.
8. Design a class for multiple inheritance.
9. Implement the concept of method overriding.
10. Show the use of virtual function
11. String operations for string length , string concatenation
12. String operations for string reverse, string comparison.
13. Show the implementation of exception handling
14. Show the implementation for exception handling for strings
15. Design a class File Demo, open a file in read mode and play the total number of words and lines in the file.
16. Design a class to handle multiple files and file operations
17. Show the implementation of template class library for swap function.
18. Design the template class library for sorting ascending to descending and vice-versa

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B.Voc –Software Development
Data Structures

Paper Code: SEC 2.2

Credit - 7 **Max Marks: 100 Hours:3**

Single and Multidimensional arrays, Sequential Allocation, Address Calculations, Sparse matrices and their efficient representation. 6L
[2]: [chap 7: 7.1, 7.3,7.4.1, 7.4.2 up to Pg 256, 7.4.3 (up to pg. 261)]
Recursion, Application of stacks to recursion problems. 5L
[1]: [chap 5: 5.1 to 5.9]
Singly & Double Linked Lists, Operations on all these structures and applications of these structures. 6L
[1]: [chap 3: 3.1, 3.2]
Circular Linked Lists ,Self Organizing Lists 4L
[1]: [chap 3: 3.3, 3.5]
Stacks, Applications of stacks eg.: Infix to Postfix. Queues, Overview of priority queue 6L
[1]: [chap 4: 4.1 to 4.3]
Trees, Binary Trees, Complete Binary trees and almost complete Binary trees, BST, Tree traversal algorithms, Searching in Binary Search Tree. Introduction to Threaded Trees. 10L
[1]: [chap 6: 6.1 to 6.4.3 uptopg 235]
BST Insertion & Deletion 5L
[1]: [chap 6: 6.5(pg 241-242), 6.6 (pg 244-250)]
Sorting Techniques (without efficiency): Bubble Sort, Selection Sort, Insertion Sort. 9L
[3]: [chap 6: 6.2(pg 339-341), 6.3(pg 352-353), 6.4(uptopg 365)]
Searching Techniques (without efficiency): Linear search, Binary search, Hashing with Collision handling methods. 5L
[3]: [chap 7: 7.1(pg 384-390, 394-396), Ref. [1]: [ch10: 10.1 to 10.3 (pg 525-538)]
Multiway trees – B-Tree, B+ Tree. 4L
[1]: [chap 7 : (pg 301-316)]

Recommended Reading Material

Text Books

1. Adam Drozdek, Data Structures and algorithm in C++, Third Edition, Cengage Learning, 2012.
2. SartajSahni, Data Structures, Algorithms and applications in C++, Second Edition, Universities Press, 2011.
3. Aaron M. Tenenbaum, Moshe J. Augenstein, YedidyahLangsam, Data Structures Using C and C++, Second edition, PHI, 2009. Reference Books
4. D.S Malik, Data Structure using C++, Second edition, Cengage Learning, 2010.

Online Reading/Supporting Material

5. http://nptel.iitm.ac.in/video.php?subjectId=106102064

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Data Structures Lab

Credit-2 **Lectures: 30** **Max Marks: 50**
Hours:3

1. Write a menu driven program to implement the following sparse matrices using one-dimensional array: a) Diagonal Matrix b) Lower Triangular Matrix c) Upper Triangular Matrix d) Symmetric Matrix
2. I. Write a program to compute br using recursion where b represents base and r represents power.
   II. Write a program to reverse a user entered string using recursion.
3. Write a program to perform the following Queue operations using Circular Array implementation (Use Templates): a) Enqueue b) Dequeue
4. I. Write a program to add two large integers using stack.
   II. Write a program to evaluate postfix expression using stack.
5. Write a program to implement Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list and concatenate two linked lists (include a function and also overload operator +).
6. I. Write a program to perform the following Stack operations using linked list - Push Pop Clear
   II. Write a program to create and perform the following operations on Queues using linked list: a.Enqueueb.Dequeue
7. Write a program to implement Doubly Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.
8. Write a program to implement Circular Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.
9. Write a program to add two polynomials using linked list representation.
10. Write a menu driven program to implement the following operations in an ordered linked list: a) Insertion b) Deletion c) Merging
11. Write a Program to reverse elements of a Stack using an additional Stack.
12. Write a Program to reverse elements of a Stack using an additional Queue.
13. Write a menu driven program to implement the following operations in a Binary Search Tree: a) Insertion. b) Deletion by copying or by merging. c) Search a number in BST. d) Display the contents in one of preorder, postorder and inorder traversals using recursion. e) Display the contents by level-by-level traversal. f) Count the leaf and non-leaf nodes of the tree. g) Display the height of the tree. h) Create the mirror image of the tree.
14. Write a menu driven program to implement the following sorting and searching algorithms: a) Insertion Sort b) Binary Search c) Bubble Sort d) Selection Sort
15. Write a program to create a Hash Table that allows insertion, deletion and searching for an element.

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B.Voc –Software Development

Aptitude and Logical Reasoning

Paper Code: SEC 3.1

Credit - 4 **Max Marks: 100** **Hours:3**

UNIT-I
Data sufficiency, Measurement, Time and distance, Arithmetic, Relationship between numbers.
[T1][T2][No. of Hrs. 15]

UNIT-II
Basic mathematical relations and formula, Computation, Data interpretation.
[T1][T2][No. of Hrs. 15]

UNIT-III
Differences, Discrimination, Decision-making, Judgement, Problem-solving, Analogies, Analysis.
[T1][T2][No. of Hrs. 20]

UNIT-IV
Arithmetic reasoning, Relationship concept, Arithmetic number series, Similarities, Verbal and figure classification, Space visualization, Observation.
[T1][T2][No. of Hrs. 25]

Text Books:

[T1] Arun Sharma, "How to prepare for Logical Reasoning for the CAT".
[T2] A.K. Gupta, "Logical and Analytical Reasoning".

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B.Voc –Software Development
Core Java Programming

Paper Code: SEC 3.2

Credit - 7 **Max Marks: 100** **Hours:3**

Introduction to Java: Features of Java, JDK Environment (1L)

Object Oriented Programming Concept: Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++ and JAVA (10L)

Java Programming Fundamental:Structure of java program, Datatypes, Variables, Operators, Keywords, Naming Convention, Decision Making (if, switch),Looping(for, while) ,Type Casting (10L)

Classes and Objects: Creating Classes and objects, Memory allocation for objects, Constructor,Implementation of Inheritance, Implementation of Polymorphism, Method Overloading, Method Overriding, Nested and Inner classes (10L)

Arrays and Strings:

Arrays, Creating an array, Types of Arrays, String class Methods, String Buffer methods. (6L)

Abstract Class, Interface and Packages: Modifiers and Access Control, Abstract classes and methods, Interfaces, Packages Concept, Creating user defined packages (10L)

Exception Handling: Exception types, Using try catch and multiple catch, Nested try, throw, throws and finally, Creating User defined Exceptions.(4L)

File Handling: Byte Stream, Character Stream, File IO Basics, File Operations, Creating file, Reading file, Writing File (7L)

Applet Programming: Introduction, Types Applet, Applet Life cycle, Creating Applet, Applet tag (2L)

Books Recommended:

1. Ivan Bayross, Web Enabled Commercial Application Development Using Html, Dhtml,javascript, Perl Cgi , BPB Publications, 2009.
2. Cay Horstmann, BIG Java, Wiley Publication , 3rd Edition., 2009
3. Herbert Schildt , Java 7, The Complete Reference, , 8th Edition, 2009.
4. E Balagurusamy , Programming with JAVA, TMH, 2007

Core Java Programming Lab

Credit-3 **Lectures: 45** **Max Marks: 75**
Hours:3

1. WAP to find the largest of n natural numbers.
2. WAP to find whether a given number is prime or not.
3. Write a menu driven program for following:

a.Display a Fibonacci series
b.Compute Factorial of a number
c.WAP to check whether a given number is odd or even.
d.WAP to check whether a given string is palindrome or not.

4.WAP to print the sum and product of digits of an Integer and reverse the Integer.

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5. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
6. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
7. Write a program in java to input N numbers in an array and print out the Armstrong numbers from the set.
8. Write java program for the following matrix operations:
a. Addition of two matrices
b. Summation of two matrices
c. Transpose of a matrix
d. Input the elements of matrices from user.
9. Write a java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
10. Write a Java for the implementation of Multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
11. Write a java program to create a frame window in an Applet. Display your name, address and qualification in the frame window.
12. Write a java program to draw a line between two coordinates in a window.
13. Write a java program to display the following graphics in an applet window.
a. Rectangles
b. Circles
c. Ellipses
d. Arcs
e. Polygons
14. Write a program that reads two integer numbers for the variables a and b. If any other character except number (0-9) is entered then the error is caughtbyNumberFormatException object. After that ex.getMessage() prints the information about the error occurring causes.
15. Write a program for the following string operations:
a. Compare two strings
b. Concatenate two strings
c. Compute length of a string
16. Create a class called Fraction that can be used to represent the ratio of two integers. Include appropriate constructors and methods. If the denominator becomes zero, throw and handle an exception.

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B.Voc –Software Development
Operating System Concepts

Paper Code: SEC 3.3

Credit-4 **Max Marks: 100 Hours:3**

Introduction:Basic OS functions, resource abstraction, types of operating systems – multiprogramming systems, batch systems , time sharing systems; operating systems for personal computers & workstations, process control & real time systems.
Operating System Organization: processor and user modes, kernels, system calls and system programs.
Process Management: System view of the process and resources, process abstraction, process hierarchy, threads, threading issues, thread libraries; Process Scheduling, non-pre-emptive and pre-emptive scheduling algorithms; concurrent and processes, critical section, semaphores, methods for inter-process communication; deadlocks.
Memory Management: Physical and virtual address space; memory allocation strategies - fixed and variable partitions, paging, segmentation, virtual memory
File and I/O Management: Directory structure,file operations, file allocation methods, device management.
Protection and Security:
Policy mechanism, authentication, internal access authorization.

Recommended Books:

1. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications 2008.
2. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education 2007.
3. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education 1997.
4.W. Stallings, Operating Systems, Internals & Design Principles 2008 5th Edition, Prentice Hall of India.
5.M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.

LIST OF PRACTICALS OF OPERATING SYSTEMS
Credit-1 Lectures: 15 **Max Marks: 50**
Hours:3

BASIC UNIX COMMANDS

1. File Manipulation functions
   - creat,
   - open,
   - read,
   - write,
   - close,
   - mv,
   - cp,
   - rm.

2. Directory Manipulation functions such as mkdir, rmdir, cd, pwd.
3. ls with options such as –l, -s, etc
4. wc
5. diff

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6. cmp
7. chmod
8. who
9. who am i
10. passwd
11. du
12. date
13. cal
14. grep
15. cat
16. sort and tail

C/ C++ programs

1. WRITE A PROGRAM (using fork() and/or exec() commands) where parent and child execute:
a) same program, same code.
b) same program, different code.
c) before terminating, the parent waits for the child to finish its task.
2. WRITE A PROGRAM to report behaviour of Linux kernel including kernel version, CPU type and model. (CPU information)
3. WRITE A PROGRAM to report behaviour of Linux kernel including information on configured memory, amount of free and used memory. (memory information)
4. WRITE A PROGRAM to print file details including owner access permissions, file access time, where file name is given as argument.
5. WRITE A PROGRAM to copy files using system calls.
6. Write program to implement FCFS scheduling algorithm.
7. Write program to implement Round Robin scheduling algorithm.
8. Write program to implement SJF scheduling algorithm.
9. Write program to calculate sum of n numbers using thread library.
10. Write program to calculate factorial of number n using thread library.
11. Write program to calculate sum of n even numbers using thread library.

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B.Voc –Software Development
Networking Fundamentals

Paper Code: SEC 4.2

Credit-4 **Max Marks: 100** **Hours:3**

Introduction to Computer Networks: Network definition; network topologies; network classifications; network protocol; layered network
architecture; overview of OSI reference model; overview of TCP/IP protocol suite.
Data Communication Fundamentals and Techniques: Analog and digital signal; data-rate limits; digital to digital line encoding schemes; pulse code modulation; parallel and serial transmission; digital to analog modulation-; multiplexing techniques- FDM, TDM; transmission media.

Networks Switching Techniques and Access mechanisms: Circuit switching; packet switching- connectionless datagram switching, connection-oriented virtual circuit switching; dial-up modems; digital subscriber line; cable TV for data transfer.
Data Link Layer Functions and Protocol: Error detection and error correction techniques; data-link control- framing and flow control; error recovery protocols- stop and wait ARQ, go-back-n ARQ; Point to Point Protocol on Internet.
Multiple Access Protocol and Networks: CSMA/CD protocols; Ethernet LANS; connecting LAN and back-bone networks- repeaters, hubs, switches, bridges, router and gateways;
Networks Layer Functions and Protocols: routing; routing algorithms; network layer protocol of Internet- IP protocol, Internet control protocols.
Transport Layer Functions and Protocols: Transport services- error and flow control, Connection establishment and release- three way handshake;
Overview of Application layer protocol: Overview of DNS protocol; overview of WWW & HTTP protocol.

Recommended Books

1.B. A. Forouzan: Data Communications and Networking, Fourth edition, THM Publishing Company Ltd 2007.
2.A. S. Tanenbaum: Computer Networks, Fourth edition, PHI Pvt. Ltd 2002.

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B.Voc –Software Development
Web Application and Development

Paper Code: SEC 4.3

Credit - 4 **Max Marks: 100** **Hours:3**

Introduction: 15L
Basics of World Wide Web (WWW), Web Browser and its architecture, Hyper Text Markup Language (HTML), Common Gateway Interface (CGI), Content Management System (CMS), Remote Login (TELNET).
[1]:[chap.6 Complete].
JavaScript: 14L
Basic concepts, structure, variables, operators, functions, control structures, standard objects, event handling, Introduction to AJAX.
[1]: [chap. 7 Complete]
Java Server Pages:16L
Introduction to Java Server Pages (JSP), elements of a JSP
(directives, comments, scripting), developing a simple JavaBean, Java Database Connectivity (JDBC).
[1]: [9.1.5 – 9.1.8, 9.1.11, 9.1.12]

Recommended Reading Material
Text Books
1.A. S. Godbole and A. Kahate, Web Technologies: TCP/IP, Architecture and Java Programming, McGraw-Hill, 2nd Edition, 2012.

Reference Books
2.H.M. Deitel, P.J. Deitel and A.B. Goldberg, Internet and World Wide Web: How to Programe, 4th Edition, Pearson Prentice Hall, 2008
3.N. P. Gopalan and J. Akilandeswari, Web Technology: A Developer's Perspective, PHI, 2013.
4.J. C. Jackson, Web Technologies: A Computer Science Perspective, PHI, 2009.

Online Reading / Supporting Material
1.http://www.w3schools.com/
2.http://netbeans.org/

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Web Application and Development Lab

Credit-3 **Lectures: 45** **Max Marks: 75**
Hours:3

LIST OF PRACTICALS

1. Create an admission form of your college which includes:
   - College name and its website address that links to the website
   - numbered list of various fields
   - Check boxes
   - image for photograph
   - combo box
   - submit button

2. Design a set of web pages to organize the content on the topic 'WebTechnology' or any other topic of your choice using frames.

3.Design a web page using CSS to demonstrate a web portal of tutorials.
4.Put validation checks on all possible fields on admission form (Pract. 1) using JavaScript.
5.Create an interactive multiple-choice quiz using JavaScript and AJAX.
6.Create an Ajax-enabled HTML page for accepting a user ID and password from the user, and check if the user ID and password are correct.
7.Create a JDBC connection to the admission form (Pract 1) for generating a database of students. Send an appropriate acknowledgement to the student after accepting the form. (Make use of JSP, JDBC and MySql)

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B.Voc –Software Development
Software Engineering

Paper Code: SEC 5.1

Credit - 4 **Max Marks: 100** **Hours:3**

Introduction:05L
The Evolving Role of Software, Software Characteristics, Changing Nature of Software, Software Engineering as a Layered Technology, Software Process Framework, Framework and Umbrella Activities, Process Models, Capability Maturity Model Integration (CMMI)
[1]:[1.1, 1.3, 1.4, up to 2.1.2, 2.3 –up to 2.3.3, 3.1 –3.3 (before 3.3.1), 30.3]

Requirement Analysis: 4L
Software Requirement Analysis, Initiating Requirement Engineering Process, Requirement Analysis and Modeling Techniques.
[2]: [3.1.2 (pg: 72-75), 3.2 up to 3.2.2 (pg: 75-87), 3.3 up to 3.3.2]

Design Engineering:8L
Design Concepts, Architectural Design Elements, Software Architecture, Data Design at the Architectural Level and Component Level, Mapping of Data Flow into Software Architecture.
[2]: [upto 6.2],[1]: [9.1.1, 9.6 up to 9.6.1].

Quality Management:7 L
Quality Concepts, Software Quality Assurance, Software Reviews, Metrics for Process and Projects.
[1]: [14.4, up to 15.2, up to 16.2]
Software Metrics:4 L
ProductMetrics, Measures, Metrics and Indicators, Function Based Metrics, Process and Project Metrics, Software Measurements, and Metrics for software quality
[1]: [up to 23.1.1, 23.2-up to 23.2.1, up to 25.2.3, 25.3]

Estimations and Scheduling:05L
Estimations for Software Projects, Empirical Estimation Models, Project Scheduling.
[1]: [26.5, 26.6-up to 26.6.6,26.7.2, 26.7.3, 27.5-up to 27.5.1]

Testing Strategies & Tactics:05L
Software Testing Fundamentals, Strategic Approach to Software Testing, Test Strategies for ConventionalSoftware, Black-Box Testing, White-Box Testing, Basis Path Testing.
[1]: [up to 17.1.3, 17.3, 17.6, 17.7, 18.2-18.4, 18.6 up to 18.6.3
(exclude 18.6.1)]

Risk Management:7L
Software Risks, Risk Identification, Risk Projection and Risk Refinement, Risk Mitigation, Monitoring and Management.
[1]: [up to 28.6]

Recommended Reading Material
Text Books

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1.R.S. Pressman, Software Engineering: A Practitioner's Approach, McGraw-Hill, Ed 7, 2010.
2.P. Jalote, An Integrated Approach to Software Engineering
, Narosa Publishing House, Edition 3, 2011.

Reference Books

3.R. Mall, Fundamentals of Software Engineering, Prentice-Hall of India, 3rd Edition, 2009.
4.I. Sommerville, Software Engineering (9th edition), Addison Wesley, 2010

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B.Voc –Software Development
Python Programming

Paper Code: SEC 5.2

Credit - 4 **Max Marks: 100 Hours:3**

Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.
(10L)
Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.
(10L)
Overview of Programming : Structure of a Python Program, Elements of Python
(8L)
Introduction to Python: Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators(Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator,
Increment or Decrement operator).
(16L)
Creating Python Programs : Input and Output Statements, Control statements(Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.),
Defining Functions, default arguments.
(16L)

Reference Books

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Python Tutorial/Documentation www.python.or 2015
3. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012
4. http://docs.python.org/3/tutorial/index.html
5. http://interactivepython.org/courselib/static/pythonds
6. http://www.ibiblio.org/g2swap/byteofpython/read/

Software Lab Based on Python

Credit-3 **Max Marks: 75 Hours:3**

Section: A (Simple programs)

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon users choice.

2. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria :

Grade A: Percentage >=80
Grade B: Percentage>=70 and <80 Grade C: Percentage>=60 and <70 Grade D: Percentage>=40 and <60 Grade E: Percentage<40

3. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input paramters from user.

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4. WAP to display the first n terms of Fibonacci series.
5. WAP to find factorial of the given number.
6. WAP to find sum of the following series for n terms: 1 – 2/2! + 3/3! - - - - - n/n!
7. WAP to calculate the sum and product of two compatible matrices.

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Section: B (Visual Python):

All the programs should be written using user defined functions, wherever possible.

1. Write a menu-driven program to create mathematical 3D objects I. curve

II. sphere III. cone
IV. arrow
V. ring

VI. cylinder.

2. WAP to read n integers and display them as a histogram.
3. WAP to display sine, cosine, polynomial and exponential curves.

4. WAP to plot a graph of people with pulse rate p vs. height h. The values of p and h are to be entered by the user.

5. WAP to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula m=60/(t+2), where t is the time in hours. Sketch a graph for t vs. m, where t>=0.

6. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows:

P(t) = (15000(1+t))/(15+ *e)*
where the time t is measured in hours. WAP to determine the size of the population at given time t and plot a graph for P vs t for the specified time interval.

7. Input initial velocity and acceleration, and plot the following graphs depicting equations of motion:

I. velocity wrt time (v=u+at)
II. distancewrt time (s=u*t+0.5*a*t*t)
III. distancewrt velocity (s=(v*v-u*u)/2*a)

8. WAP to show a ball bouncing between 2 walls. (Optional)

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B.Voc –Software Development
Database Management Skills

Paper Code: SEC 5.3

Credit-4 **Max Marks: 100 Hours:3**

Introduction: Database concepts, characteristics of database approach, data models, data independence, database users, and database system architecture. 5L
[1]:[1.1 to 1.8, 2.1 to 2.6]
Relational Data Model: Relational model concepts, relational database constraints. 6L
[1]: [3.1 to 3.4]
The Relational Algebra and Relational Calculus 6L
[1]: [6.1 to 6.5]
SQL Programming: 8L
Data Definition Language, Data Manipulation Language, basics of SQL, query designing in SQL using aggregate functions and nested queries.
[1]: [4.1 to 4.5]
Entity Relationship (ER) Modeling: Entity types, entity set, attribute and key, relationships, relation types, entity relationship, ER modeling, ER diagrams, database design using ER diagrams.10L
[1]: [7.1 to 7.7]
Enhanced Entity-Relationship (EER) model.5L
[1]: [8.1 to 8.5]
Database Design: Relational database design by ER and EER-to-Relational Mapping.4L
[1]: [9.1 to 9.2]
Functional dependencies, Normal forms.8L
[1]: [15.1 to 15.7]
Transaction Processing:8L
Introduction to Transaction Processing Concepts and Theory.
[1]: [21.1 to 21.3]

Recommended Reading Material

Text Books

1.R. Elmasri, S.B. Navathe, Fundamentals of Database Systems, 6th edition, Pearson Education, 2010.

Reference Books

2.A. Silberschatz, H. Korth and S. Sudarshan, Database System Concepts, 5th Edition, McGraw Hill, 2010.
3.R. Ramakrishnan, J. Gehrke, Database Management Systems, 3rd edition, McGrawHill International Edition, 2007

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Database Management Skills Lab

Credit - 3 **Max Marks: 75 Hours:3**

Query List

1.Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.
2.Query to display unique Jobs from the Employee Table.
3.Query to display the Employee Name concatenated by a Job separated by a comma.
4.Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.
5.Query to display the Employee Name and Salary of all the employees earning more than $2850.
6.Query to display Employee Name and Department Number for the Employee No= 7900.
7.Query to display Employee Name and Salary for all employees whose salary is not in the range of $1500 and $2850.
8.Query to display Employee Name and Department No. Of all the employees in Dept 10 and Dept 30 in the alphabetical order by name.
9.Query to display Name and Hire Date of every Employee who was hired in 1981.
10.Query to display Name and Job of all employees who don't have a current Manager.
11.Query to display the Name, Salary and Commission for all the employees who earn commission. Sort the data in descending order of Salary and Commission.
12.Query to display Name of all the employees where the third letter of their name is 'A'.
13.Query to display Name of all employees either have two 'R's or have two 'A's in their name and are either in Dept No = 30 or their Manger's Employee No = 7788.
14.Query to display Name, Salary and Commission for all employees whose Commission Amount is greater than their Salary increased by 5%.
15.Query to display the Current Date.
16.Query to display Name, Hire Date and Salary Review Date which is the 1st Monday after six months of employment.
17.Query to display Name and calculate the number of months between today and the date each employee was hired.
18.Query to display the following for each employee:
-<E-Name> earns < Salary> monthly but wants < 3 * Current Salary >.
Label the Column as Dream Salary.
19.Query to display Name with the 1st letter capitalized and all other letter lower case and length of their name of all the employees whose name starts with 'J', 'A' and 'M'.
20.Query to display Name, Hire Date and Day of the week on which the employee started.
21.Query to display Name, Department Name and Department No for all the employees.
22.Query to display Unique Listing of all Jobs that are in Department # 30.
23.Query to display Name, Dept Name of all employees who have an 'A' in their name.
24.Query to display Name, Job, Department No. And Department Name for all the employees working at the Dallas location.
25.Query to display Name and Employee no. Along with their Manger's Name and the Manager's employee no; along with the Employees' Name who do not have a Manager.
26.Query to display Name, Dept No. And Salary of any employee whose department No. And salary matches both the department no. And the salary of any employee who earns a commission.
27.Query to display Name and Salaries represented by asterisks, where each asterisk (*) signifies $100.
28.Query to display the Highest, Lowest, Sum and Average Salaries of all the employees

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29.Query to display the number of employees performing the same Job type functions.
30.Query to display the no. of managers without listing their names.
31.Query to display the Department Name, Location Name, No. Of Employees and the average salary for all employees in that department.
32.Query to display Name and Hire Date for all employees in the same dept. As Blake.
33.Query to display the Employee No. And Name for all employees who earn more than the average salary.
34.Query to display Employee Number and Name for all employees who work in a department with any employee whose name contains a 'T'.
35.Query to display the names and salaries of all employees who report to King.
36.Query to display the department no, name and job for all employees in the Sales department.

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B.Voc –Software Development

Introduction to Data Sciences

Paper Code: GEC 6.1

Credit - 4 **Max Marks: 100** **Hours:3**

Data Scientist's Tool Box:
Turning data into actionable knowledge, introduction to the tools that will be used in building data analysis software: version control, markdown, git, GitHub, R, and RStudio.7L
R Programming Basics:
Overview of R, R data types and objects, reading and writing data,Control structures, functions, scoping rules, dates and times, Loop functions, debugging tools, Simulation, code profiling7L
Getting and Cleaning Data:
Obtaining data from the web, from APIs, from databases and from colleagues in various formats.basics of data cleaning and making data "tidy".7L
Exploratory Data Analysis:
Essential exploratory techniques for summarizing data, applied before formal modeling commences, eliminating or sharpening potential hypotheses about the world that can be addressed by the data, common multivariate statistical techniques used to visualize high-dimensional data. 12L
Reproducible Research:
Concepts and tools behind reporting modern data analyses in a reproducible manner, To write a document using R markdown, integrate live R code into a literate statistical program, compile R markdown documents using knitr and related tools, and organize a data analysis so that it is reproducible and accessible to others.12L

Reference Books

1. Rachel Schutt, Cathy O'Neil, "Doing Data Science: Straight Talk from the Frontiline" by Schroff/O'Reilly, 2013.
2. Foster Provost, Tom Fawcett, "Data Science for Business" What You Need to Know About Data Mining and Data-Analytic Thinking" by O'Reilly, 2013.
3. John W. Foreman, "Data Smart: Using data Science to Transform Information into Insight" by John Wiley & Sons, 2013.
4. Ian Ayres, "Super Crunchers: Why Thinking-by-Numbers Is the New Way to Be Smart" Ist Edition by Bantam, 2007.
5. Eric Seigel, "Predictive Analytics: The Power to Predict who Will Click, Buy, Lie, or Die", 1st Edition, by Wiley, 2013.
6. Matthew A. Russel, "Mining the Social Web: Data mining Facebook, Twitter, LinkedIn, Goole+, GitHub, and More", Second Edition, by O'Reilly Media, 2013.

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B.Voc –Software Development
Mobile Application Development

Paper Code: SEC 6.2

Credit-4 **Max Marks: 75 Hours:3**

Introduction:12 L
History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture.
[2],[3]: pages1 to 10
Overview of object oriented programming using Java:11 L
OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine.
[5]: pages1 to50
Development Tools:12 L
Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project – Hello Word, run on emulator, Deploy it on USB-connected Android device.
[1]: Chap1, Chap2, Chap3 (page 55-59) ,[4]:pages1 to 20.
User Interface Architecture:3 L
Application context, intents, Activity life cycle, multiple screen sizes
[6]: pages1 to 11,[7]: pages 1 to 8, [8]: page 1to 6.
User Interface Design:13 L
Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners(Combo boxes),Images, Menu, Dialog.
[1]: chap4(page 65-89), chap7(page 163-167), chap8(179-189): [10]: 16 pages, [11]: 9 pages
Database:9 L
Understanding of SQLite database, Connecting with the database.
[1]: chap9 (page 197-207), [12]:1 to 6 pages

Recommended Reading Material
Text Books
1.Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.

OnlineReading/ Supporting Material
2.http://www.developer.android.com
3.http://developer.android.com/about/versions/index.html
4.http://developer.android.com/training/basics/firstapp/index.html
5.http://docs.oracle.com/javase/tutorial/index.htm
(Available in the form of free downloadable ebooks also).
6.http://developer.android.com/guide/components/activities.html
7.http://developer.android.com/guide/components/fundamentals.html
8.http://developer.android.com/guide/components/intents-filters.html
9.http://developer.android.com/training/multiscreen/screensizes.html
10.http://developer.android.com/guide/topics/ui/controls.html
11.http://developer.android.com/guide/topics/ui/declaring-layout.html
12.http://developer.android.com/training/basics/data-storage/databases.html

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Mobile Application Development Lab

Credit-3

1.Create "Hello World" application. That will display "Hello World" in the middle of the screen in the emulator.Also display "Hello World" in the middle of the screen in the Android Phone.
2.Create an application with login module.(Check username and password).
3.Create spinner with strings taken from resource folder(res >> value folder) and on changing the spinner value, Image will change.
4.Create a menu with 5 options and selected option should appear in text box.
5.Create a list of all courses in your college and on selecting a particular course teacher-in-charge of that course should appear at the bottom of the screen.
6.Create an application with three option buttons, on selecting a button colour of the screen will change.
7.Create and Login application as above . On successful login pop up the message.
8.Create an application to Create, Insert , update , Delete and retrieve operation on the database.

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B.Voc –Software Development
English Communication
Paper Code: GEC1.1

Credit - 4 **Max Marks: 100** **Hours:3**

Preamble:

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. One of the critical links among human beings and an important thread that binds society together is the ability to share thoughts, emotions and ideas through various means of communication: both verbal and non-verbal. In the context of rapid globalization and increasing recognition of social and cultural pluralities, the significance of clear and effective communication has substantially enhanced.

The present course hopes to address some of these aspects through an interactive mode of teaching-learning process and by focusing on various dimensions of communication skills. Some of these are:

Language of communication, various 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.

While, to an extent, the art of communication is natural to all living beings, in today's world of complexities, it has also acquired some elements of science. It is hoped that after studying this course, students will find a difference in their personal and professional interactions.

The recommended readings given at the end are only suggestive; the students and teachers have the freedom to consult other materials on various units/topics given below. Similarly, the questions in the examination will be aimed towards assessing the skills learnt by the students rather than the textual content of the recommended books.

1. **Introduction**: Theory of Communication, Types and modes of Communication
2. **Language of Communication**: Verbal and Non-verbal
   (Spoken and Written)
   Personal, Social and Business Barriers and Strategies
   Intra-personal, Inter-personal and Group communication
3. **Speaking Skills**:
   Monologue
   Dialogue
   Group Discussion

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Effective Communication/ Mis-Communication Interview
Public Speech

4. **Reading and Understanding**
Close Reading
Comprehension
Summary
Paraphrasing
Analysis and Interpretation
Translation(from Indian language to English and vice-versa) Literary/Knowledge Texts

5. **Writing Skills**
Docume nting
Report Writing
Making notes
Letter writing

Recommended 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. *Language through Literature* (forthcoming) ed. Dr. Gauri Mishra, Dr Ranjana Kaul, Dr Brati Biswas

B.Voc –Software Development
Computer Fundamentals
Paper Code: GEC1.2

Credit - 4 **Max Marks: 100** **Hours:3**

Introduction: Introduction to computer system, uses, types.	**6L**
Data Representation: Number systems and character representation, binary arithmetic	**10L**
Human Computer Interface: Types of software, Operating system as user interface, utility programs	**6L**
Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter	**10L**
Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory,	**6L**

hard disks, optical disks

10L

Computer Organisation and Architecture: C.P.U., registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors.

8L

Overview of Emerging Technologies: Bluetooth, cloud computing, big data, data mining, mobile computing and embedded systems.

Use of Computers in Education and Research: Data analysis, Heterogeneous storage, e-Library, Google Scholar, Domain specific packages such as SPSS, Mathematica etc. **4L**

Reference Books:

1. A. Goel, Computer Fundamentals, Pearson Education, 2010.
2. P. Aksoy, L. DeNardis, Introduction to Information Technology, Cengage Learning, 2006
3. P. K.Sinha, P. Sinha, Fundamentals of Computers, BPB Publishers, 2007

Practical :

The practical assignment must include connecting parts of a computer and assembling it to an extent, media formatting and installation of some software. Practical exercises based on Open Office tools using document preparation and spreadsheet handling packages.

Text Editor

1. Prepare **a grocery list** having four columns (Serial number, The name of the product, quantity and price) for the month of April, 06.
    - Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
    - The headings of the columns should be in 12-point and bold.
    - The rest of the document should be in 10-point Times New Roman.
    - Leave a gap of 12-points after the title.

2. Create a **telephone directory**.
    - The heading should be 16-point Arial Font in bold
    - The rest of the document should use 10-point font size
    - Other headings should use 10-point Courier New Font.
    - The footer should show the page number as well as the date last updated.

3. Design a **time-table form** for your college.
    - The first line should mention the name of the college in 16-point Arial Font and should be bold.
    - The second line should give the course name/teacher's name and the department in 14-point Arial.
    - Leave a gap of 12-points.
    - The rest of the document should use 10-point Times New Roman font.
    - The footer should contain your specifications as the designer and date of creation.

4. BPB Publications plans to release a new book designed as per your syllabus. Design the **first page of the book** as per the given specifications.

The title of the book should appear in bold using 20-point Arial font.
The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
The details of the offices of the publisher (only location) should appear in the footer.

□ Create the following one page documents.

Compose a note inviting friends to a get-together at your house, Including a list of things to bring with them.
Design a certificate in landscape orientation with a border around the document.
Design a Garage Sale sign.
Make a sign outlining your rules for your bedroom at home, using a numbered list.

6. Create the following documents:

(a) A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.

(b) Use a newsletter format to promote upcoming projects or events in your classroom

or college.

7. Convert following text to a table, using comma as delimiter

Type the following as shown (do not bold).
Color, Style, Item
Blue, A980, Van
Red, X023, Car
Green, YL724, Truck
Name, Age, Sex
Bob, 23, M
Linda, 46, F
Tom, 29, M

9. Enter the following data into a table given on the next page.

Salesperson	Dolls	Trucks	Puzzles
Kennedy, Sally	1327	1423	1193
White, Pete	1421	3863	2934

Pillar, James	5214	3247	5467
York, George	2190	1278	1928
Banks, Jennifer	1201	2528	1203
Atwater, Kelly	4098	3079	2067

Add a column Region (values: S, N, N,S,S,S) between the Salesperson and Dolls columns to the given table Sort your table data by Region and within Region by Salesperson in ascending order:

In this exercise, you will add a new row to your table, place the word "Total" at the bottom of the Salesperson column, and sum the Dolls, Trucks, and Puzzles columns.

1. Wrapping of text around the image.

2. Create your resume by incorporating most of the options learned till now.

7. Following features of menu option must be covered

FILE	Complete menu
EDIT	Complete menu
VIEW	Complete menu
INSERT	Complete menu
FORMAT	Complete menu
TABLE	Complete menu
WINDOW	Complete menu
HELP	Complete menu
TOOLS	All options except Online collaboration, Tools on Macro, Templates

Spreadsheet

1. Enter the Following data in Excel Sheet

REGIONAL SALES PROJECTION

State	Qtr1	Qtr2	Qtr3	QTR4	Qtr Total	Rate Amount
Delhi	2020	2400	2100	3000	15	
Punjab	1100	1300	1500	1400	20	
U.P.	3000	3200	2600	2800	17	

Harayana	1800	2000	2200	2700	15
Rajasthan	2100	2000	1800	2200	20

TOTAL
AVERAGE

(a) Apply Formatting as follow:

I.Title in TIMES NEW ROMAN

ii. Font Size - 14

iii. Remaining text - ARIAL, Font Size -10

iv. State names and Qtr. Heading Bold, Italic with Gray Fill Color.

v. Numbers in two decimal places.

vi. Qtr. Heading in center Alignment.

vii. Apply Border to whole data.

(b) Calculate State and Qtr. Total

(c) Calculate Average for each quarter

(d) Calculate Amount = Rate * Total.

2. Given the following worksheet

	A	B	C	D
1	Roll No.	Name	Marks	Grade
2	1001	Sachin	99	
3	1002	Sehwag	65	
4	1003	Rahul	41	
5	1004	Sourav	89	
6	1005	Har Bhajan	56	

Calculate the grade of these students on the basis of following guidelines:

If Marks	Then Grade
>= 80	A+
>= 60 < 80	A
>= 50 < 60	B
< 50	F

3. Given the following worksheet

	A	B	C	D	E	F	G
1	**Salesman**			**Sales in (Rs.)**			
2	No.	Qtr1	Qtr2	Qtr3	Qtr4	Total	Commission
3	S001	5000	8500	12000	9000		
4	S002	7000	4000	7500	11000		
5	S003	4000	9000	6500	8200		
6	S004	5500	6900	4500	10500		
7	S005	7400	8500	9200	8300		
8	S006	5300	7600	9800	6100		

Calculate the commission earned by the salesmen on the basis of following Candidates:

If Total Sales	Commission
< 20000	0% of sales
> 20000 and < 25000	4% of sales
> 25000 and < 30000	5.5% of sales
> 30000 and < 35000	8% of sales
>= 35000	11% of sales

The total sales is sum of sales of all the four quarters.

4. A company XYZ Ltd. pays a monthly salary to its employees which consists of basic salary, allowances & deductions. The details of allowances and deductions are as follows:

Allowances

- HRA Dependent on Basic
  30% of Basic if Basic <=1000
  25% of Basic if Basic>1000 & Basic<=3000
  20% of Basic if Basic >3000
- DA Fixed for all employees, 30% of Basic
- Conveyance Allowance Rs. 50/- if Basic is
  <=1000 Rs. 75/- if Basic >1000 &
  Basic<=2000
  Rs. 100 if Basic >2000
- Entertainment Allowance NIL if Basic is <=1000
  Rs. 100/- if Basic > 1000

Deductions

- Provident Fund 6% of Basic
- Group Insurance Premium Rs. 40/- if Basic is <=1500
  Rs. 60/- if Basic > 1500 & Basic<=3000
  Rs. 80/- if Basic >3000

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Calculate the following:

Gross Salary = Basic + HRA + DA + Conveyance + Entertainment
Total deduction = Provident Fund + Group Insurance Premium
Net Salary = Gross Salary – Total Deduction

1. Create Payment Table for a fixed Principal amount, variable rate of interests and time in the format below:

No. of Instalments	5%	6%	7%	8%	9%
1	XX	XX	XX	XX	XX
2	XX	XX	XX	XX	XX
3	XX	XX	XX	XX	XX
4	XX	XX	XX	XX	XX

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a) Use an array formula to calculate Simple Interest for given principal amounts given the rate of Interest and time

Rate of Interest	8%
Time	5 Years
Principal	Simple Interest
1000	?
18000	?
5200	?

(i) The following table gives year wise sale figure of five salesmen in Rs.

Salesman	2000	2001	2002	2003
S1	10000	12000	20000	50000
S2	15000	18000	50000	60000
S3	20000	22000	70000	70000
S4	30000	30000	100000	80000
S5	40000	45000	125000	90000

(*a*) Calculate total sale year wise.

(*b*) Calculate the net sale made by each salesman

(*c*) Calculate the maximum sale made by the salesman

(d) Calculate the commission for each salesman under the condition.

(*i*) If total sales >4,00,000 give 5% commission on total sale made by the salesman.

(*ii*) Otherwise give 2% commission.

(*e*) Draw a bar graph representing the sale made by each salesman.

(*f*) Draw a pie graph representing the sale made by salesman in 2000.

8. Enter the following data in Excel Sheet

PERSONAL BUDGET FOR FIRST QUARTER

Monthly Income (Net): 1,475

EXPENSES	**JAN**	**FEB**	**MARCH**	**QUARTER TOTAL**	**QUARTER AVERAGE**
Rent600.00	600.00	600.00			
Telephone	48.25	43.50	60.00		
Utilities	67.27	110.00	70.00		
Credit Card	200.00	110.00	70.00		
Oil	100.00	150.00	90.00		
AV to Insurance	150.00				
Cable TV	40.75	40.75	40.75		
Monthly Total					

(a) Calculate Quarter total and Quarter average.

(b) Calculate Monthly total.

(c) Surplus = Monthly income - Monthly total.

(d) What would be total surplus if monthly income is 1500.

(e) How much does telephone expense for March differ from quarter average.

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(f) Create a 3D column graph for telephone and utilities.

(g) Create a pie chart for monthly expenses.

9. Enter the following data in Excel Sheet

TOTAL REVENUE EARNED FOR SAM'S BOOKSTALL

Publisher name	1997	1998	1999	2000	total
A	Rs. 1,000.00	Rs. 1100.00	Rs. 1,300.00	Rs. 800.00	
B	Rs. 1,500.00	Rs. 700.00	Rs. 1,000.00	Rs. 2,000.00	
C	Rs. 700.00	Rs. 900.00	Rs. 1,500.00	Rs. 600.00	
D	Rs. 1,200.00	Rs. 500.00	Rs. 200.00	Rs. 1,100.00	
E	Rs 800.00	Rs. 1,000.00	Rs. 3,000.00	Rs. 560.00	

(a) Compute the total revenue earned.

(b) Plot the line chart to compare the revenue of all publisher for 4 years.

(b) Chart Title should be 'Total Revenue of sam's Bookstall (1997-2000)'

(c) Give appropriate categories and value axis title.

10. Generate 25 random numbers between 0 & 100 and find their sum, average and count. How many no. are in range 50-60

B.Voc –Software Development
Soft Skills
Paper Code: GEC1.3

Credit - 4 **Max Marks: 100** **Hours:3**

Soft Skills

Teamwork
Emotional Intelligence
Adaptability
Leadership
Problem solving

Suggested Readings

1. *English and Soft Skills.* S.P. Dhanavel. Orient BlackSwan 2013

English for Students of Commerce: Precis, Composition, Essays, Poems eds. Kaushik,et al.

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B.Voc –Software Development
Environment Studies

Paper Code: GEC2.1

Credit - 4 **Max Marks: 100** **Hours:3**

AECC, University Syllabus.

B.Voc –Software Development
Computer Network and Internet Technology

Paper Code: GEC2.2

Credit - 4 **Max Marks: 100** **Hours:3**

Computer Networks: Introduction to computer network, data communication, components of data communication, data transmission mode, data communication measurement, LAN, MAN, WAN, wireless LAN, internet, intranet, extranet. **6L**

Network Models: Client/ server network and Peer-to-peer network, OSI, TCP/IP, layers and functionalities. **8L**

Transmission Media: Introduction, Guided Media: Twisted pair, Coaxial cable, Optical fiber. Unguided media: Microwave, Radio frequency propagation, Satellite. **4L**

LAN Topologies: Ring, bus, star, mesh and tree topologies. **2L**

Internet Terms: Web page, Home page, website, internet browsers, URL, Hypertext, ISP, Web server, download and upload, online and offline. **2L**

Internet Applications: www, telnet, ftp, e-mail, social networks, search engines, Video Conferencing, e-Commerce, m-Commerce, VOIP, blogs. **6L**

Introduction to Web Design: Introduction to hypertext markup language (html) Document type definition, creating web pages, lists, hyperlinks, tables, web forms, inserting images, frames, hosting options and domain name registration. Customized Features: Cascading style sheet (css) for text formatting and other manipulations. **16L**

JavaScript Fundamentals: Data types and variables, functions, methods and events, controlling program flow, JavaScript object model, built-in objects and operators. **14L**

Network Devices: NIC, repeaters, hub, bridge, switch, gateway and router. **2L**

Reference Books:

1. Andrew S. Tanenbaum, David J. Wetherall Computer Networks (5th Edition),PHI, 2010 2.B. A. Forouzan, Data Communication and Networking , TMH,2003.
3. D.R. Brooks, An Introduction to HTML and Javascript for Scientists and Engineers, Springer
4. HTML A Beginner's Guide, Tata McGraw-Hill Education, 2009.

5. J. A. Ramalho, Learn Advanced HTML 4.0 with DHTML, BPB Publications, 2007

Practical :

Networking exercises in a trial lab, where effects of different connectors, topologies in practical could be demonstrated.

Before moving to JavaScript practicals, students must get an idea about fundamental programing using Scratch (https://scratch.mit.edu). Students should be encouraged to learn Scratch on their own and work on assignments available online such as https://sites.google.com/site/christopherscfahs/scratch-programming/scratch-assignments or http://scratched.gse.harvard.edu/resources/uw-catapult-project .
Alternatively, students may use Alice (http://www.alice.org/index.php) and learn basic programming. A lot of online assignments and spoken tutorials on YouTube would be helpful.

Practical exercises based on concepts listed in theory using HTML.

1. Create HTML document with following formatting – Bold, Italics, Underline, Colors, Headings, Title, Font and Font Width, Background, Paragraph, Line Brakes, Horizontal Line, Blinking text as well as marquee text.
2. Create HTML document with Ordered and Unordered lists, Inserting Images, Internal and External linking
3. Create HTML document with Table:

<table>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="3"></td><td colspan="2" rowspan="2">Some image here</td></tr>
<tr><td colspan="3"></td></tr>
</table>

4. Create Form with Input Type, Select and Text Area in HTML.
5. Create an HTML containing Roll No., student's name and Grades in a tabular form.
6. 6. Create an HTML document (having two frames) which will appear as follows:

<table>
<tr><td>About

Department 1

Department 2

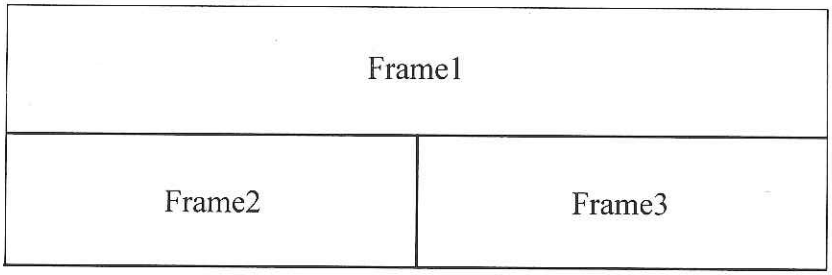
Department 3</td><td>This frame would show the contents according to the link clicked by the user on the left frame.</td></tr>
</table>

7. Create an HTML document containing horizontal frames as follows:

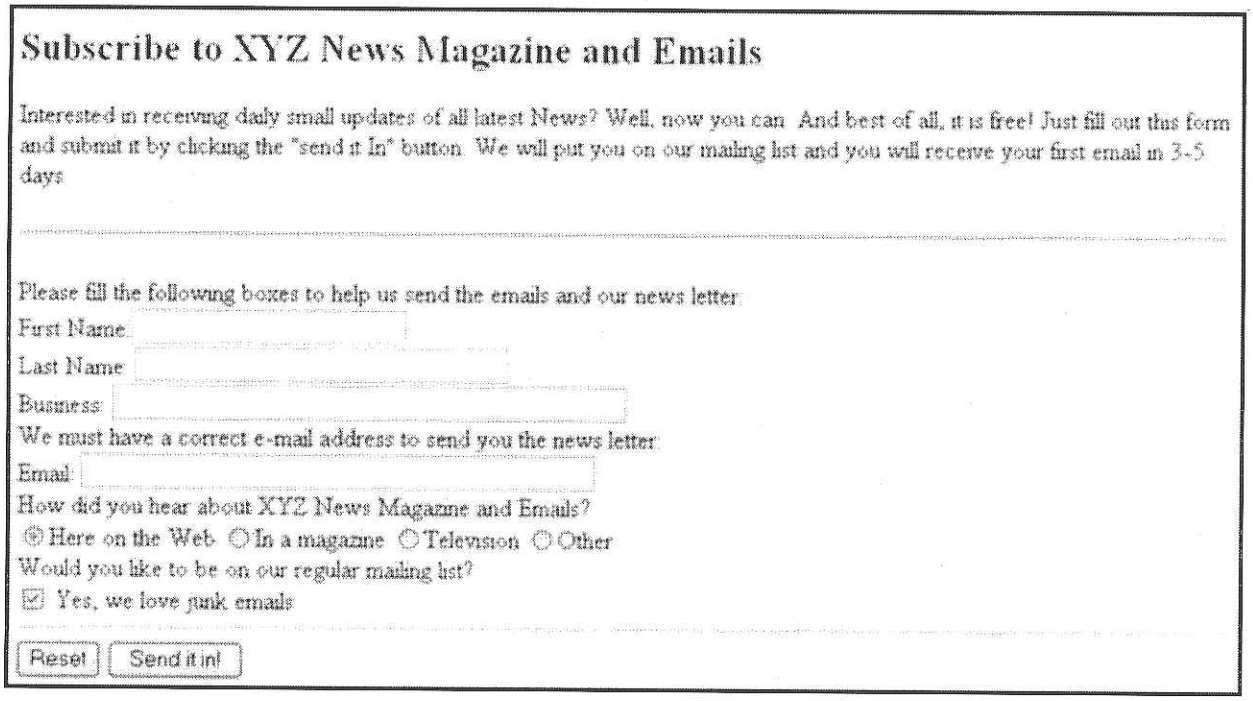
<table>
<tr><td>Department Names (could be along with Logos)</td></tr>
<tr><td>Contents according to the Link clicked</td></tr>
</table>

8. Create a website of 6 – 7 pages with different effects as mentioned in above problems.
9. Create HTML documents (having multiple frames) in the following three formats:

<table>
<tr><td>Frame1</td></tr>
<tr><td>Frame2</td></tr>
</table>



10. Create a form using HTML which has the following types of controls:
    I. Text Box
    II. Option/radio buttons
    III. Check boxes
    IV. Reset and Submit buttons



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List of Practicals using Scratch : (self-learning by students)

1. Join the Scratch community on scratch.mit.edu. Explore featured projects and modify any one of them.
2. Create a game using SCRATCH similar to that of Beach Baby Volleyball. The game MUST meet the following objectives.

    - Have at least 3 sprites. All of which move, bounce, fall, etc. 10 pts.
    - Edit at least one of the sprites in some way to make it your own. 10 pts.
    - Make some or all sprites move with the use of certain keys. 15 pts.
    - Create or use a given background on your game. 10 pts.
    - Incorporate sound into your game. 10 pts.
    - Use a counter or score keeper in your game. 15 pts.
    - Must include a forever loop, show, hide, and "when I receive." 30 pts.

List of Practicals using Javascript :

Create event driven program for following:

1. Print a table of numbers from 5 to 15 and their squares and cubes using alert.
2. Print the largest of three numbers.
3. Find the factorial of a number n.
4. Enter a list of positive numbers terminated by Zero. Find the sum and average of these numbers.
5. A person deposits Rs 1000 in a fixed account yielding 5% interest. Compute the amount in the account at the end of each year for n years.

Read n numbers. Count the number of negative numbers, positive numbers and zeros in the list.

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B.Voc –Software Development
Business Communication

Paper Code: GEC2.3

Credit - 4 **Max Marks: 100** **Hours:3**

Objective: To acquire skills in reading, writing, comprehension and communication, and also to use electronic media for business communication.

Unit I: Introduction **Lectures 6**
Nature, Process and Importance of Communication, Types of Communication (verbal & Non Verbal), Different forms of Communication. Barriers to Communication: Linguistic Barriers, Psychological Barriers, Interpersonal Barriers, Cultural Barriers, Physical Barriers, Organizational Barriers.

Unit II: Business Correspondence **Lectures 8**
Letter Writing, presentation, Inviting quotations, Sending quotations, Placing orders, Inviting tenders, Sales letters, claim & adjustment letters and social correspondence, Memorandum, Inter -office Memo, Notices, Agenda, Minutes, Job application letter, preparing the resume.

Unit III: Report Writing **Lectures 8**
Identify the types of reports, define the basic format of a report, identify the steps of report writing, write a report meeting the format requirements, determine the process of writing a report, importance of including visuals such as tables, diagrams and charts in writing report, apply citation rules (APA style documentation) in reports.

Unit IV: Business language and presentation **Lectures 4**
Importance of Business language, Vocabulary Words often confused, Words often misspelt, Common errors in English. Oral Presentation Importance, Characteristics, Presentation Plan, Power point presentation, Visual aids.

Unit V: Technology and Business Communication **Lectures 4**
Role, effects and advantages of technology in Business Communication like email, text messaging, instant messaging and modern techniques like video conferencing, social networking. Strategic importance of e-communication.

Suggested Readings:

3. Lesikar, R.V. & Flatley, M.E.; *Basic Business Communication Skills for Empowering the Internet Generation*, Tata McGraw Hill Publishing Company Ltd. New Delhi.
4. Bovee, and Thill, *Business Communication Today,* Pearson Education
5. Shirley, Taylor, *Communication for Business,* Pearson Education
6. Locker and Kaczmarek, *Business Communication: Building Critical Skills,* TMH

Note: Latest edition of text books may be used.

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B.Voc –Software Development
Hindi/MIL

Paper Code: GEC3.1

Credit - 4 **Max Marks: 100** **Hours:3**

As per University Syllabus.(B.A.(P) Hindi)

B.Voc –Software Development
Statistical-Data Analysis Using Software Packages

Paper Code: GEC3.2

Credit - 4 **Max Marks: 100** **Hours:3**

This course will review and expand upon core topics in statistics and probability, particularly by initiating the beneficiaries of the course to at least one of the software packages viz., SPSS, Minitab, Matlab, for statistical computing.

UNIT I
Learn how to load data, plot a graph viz. histograms (equal class intervals and unequal class intervals), box plot, stem-leaf, frequency polygon, pie chart, ogives with graphical summaries of data

UNIT II
Generate automated reports giving detailed descriptive statistics, correlation and lines of regression.

UNIT III
Random number generation and sampling procedures. Fitting of polynomials and exponential curves. Application Problems based on fitting of suitable distribution, Normal probability plot.

UNIT IV
Simple analysis and create and manage statistical analysis projects, import data, code editing, Basics of statistical inference in order to understand hypothesis testing and compute p-values and confidence intervals.

SUGGESTED READING:

1. Moore, D.S. and McCabe, G.P. and Craig, B.A. (2014): Introduction to the Practice of Statistics, W.H. Freeman
2. Cunningham, B.J (2012):Using SPSS: An Interactive Hands-on approach
3. Cho, M,J., Martinez, W.L. (2014) Statistics in MATLAB: A Primer, Chapman and Hall/CRC

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B.Voc –Software Development
LIFE SKILLS EDUCATION

Paper Code: GEC3.3

Credit - 4 **Max Marks: 100** **Hours:3**

Unit 1: Concept and Meaning of life skills

Definitions and concept of life skills and life skills education.
Importance in daily living; Criteria for using life skills.
Evolution of Life Skills
Core Life Skills- classification and concept
Theoretical perspectives and models to understand life skills education.

Unit 2: Components for Planning & Organizing Life Skills Programs

Understanding group characteristics and needs

Life skills in context: importance of focusing on contextual specificities and cultural ideologies as important aspects affecting individual ideas.
Focusing on cultural practices that govern everyday life.
Analyzing the gender nuances that exist within the group.
Self components to imparting life skills program: critical thinking skills, decision making skills, interpersonal communication skills, coping with stress and emotions; self-management skills, etc.

Importance of communication in imparting life skills education

Concept and Importance of communication
Aspects to develop social potentials (effective listening, speaking, building and maintaining relationships, understanding group dynamics and functioning in groups, delegating responsibilities)

Core Approaches and Strategies to Implement Life Skills Program

Understanding and developing self-skills/potential: self-awareness, self-esteem self-confidence, creative thinking, interpersonal skills, etc.
Use of participatory techniques and methods: Individual exercises, Group activities, games etc.
Communicating with the audience: receiving feedback, handling questions, etc.

Organizing a Life Skills Program

Planning a need based viable life skills program (select components)
Determining the purpose, collecting materials, organizing content.
Getting prepared for the presentation: psychological level
Delivering the presentation

Life Skills Assessment

Scales and quantitative techniques
Qualitative approaches

Unit 2: Life Skills and Youth Development

Adolescence and Youth- Definitions, Conception- socio cultural perspectives
Youth demographics and role in society
Challenges of adolescence and youth development

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Formal and Non formal approaches to youth development
Positive Youth Development

Learning Experiences

Students may be given several in house experiences to observe and evaluate existing life skills programs. They may also get experiences to interact with experts in the discipline through panel discussions and similar organized experiences.

Visiting and observing Life skills education programme
Critique formal and non-formal life skills programmes
Evaluate approaches and activities of life skills education for different target groups.

RECOMMENDED READINGS

Agochiya D. 2010, life competencies for adolescents. Training manual for facilitators, teachers and parents. Sage Publications.

Dakar Framework for Action,(2000).Education for All: Meeting our Collective Commitments, Dakar, Senegal

Peace Corps, OPATS.2001, Life Skills Manual.

Robbins S.P, Hunsaker P.L, Training in Interpersonal Skills (5th eds), PHI Learning Pvt. Ltd.

National Aids Control Orgnization, 2008, Adolsecence Education Programme, Life Skills Development.

Nair. A. Radhakrishnan, (2010). Life Skills Training for Positive Behaviour , Rajiv Gandhi National Institute of Youth Development, Tamil Nadu.

Nair .V. Rajasenan, (2010). Life Skills, Personality and Leadership , Rajiv Gandhi National Institute of Youth Development, Tamil Nadu.

Url: multimedia.peacecorps.gov/.../pdf/.../M0063_lifeskillscomplete.pdf

Url: www.nacoonline.org/.../AEP%20-%20Teachers%20Workbook.pdf

B.Voc –Software Development
Management Information System

Paper Code: GEC4.1

Credit - 4 **Max Marks: 100** **Hours:3**

Objective: To provide the understanding and use of management information systems in an office and organization.

Unit I **12**

Management Information Systems - Need, Purpose and Objectives - Contemporary Approaches to MIS - Information as a strategic resource - Use of information for competitive advantage - MIS as an instrument for the organizational change

Information, Management and Decision Making - Models of Decision Making Classical, Administrative and Herbert Simon's Models - Attributes of information and its relevance to Decision Making - Types of information

Unit II **12**

Information Technology - Definition, IT Capabilities and their organizational impact - Telecommunication and Networks - Types and Topologies of Networks - IT enabled services such as Call Centers, Geographical Information Systems etc.

Data Base Management Systems - Data Warehousing and Data Mining, Systems Analysis and Design - Systems Development Life Cycle - Alternative System Building Approaches - Prototyping - Rapid Development Tools - CASE .

Unit III **12**

Tools – Object Oriented Systems (Only introduction to these tools & techniques), Decision Support Systems - Group Decision Support Systems - Executive Information Systems - Executive Support Systems - Expert Systems and Knowledge Based Expert Systems - Artificial Intelligence.

Unit IV **12**

Management Issues in MIS - Information Security and Control - Quality Assurance - Ethical and Social Dimensions - Intellectual Property Rights as related to IT Services / IT Products - Managing Global Information Systems .

Unit V **12**

Applications of MIS in functional areas as well as in the service sector should be covered with the help of minimum 5 case studies. Emphasis should be given on management oriented problems and cases as compared to technical problems expected from computer science/ computer management students.

Suggested Readings:

2. Management Information Systems, Laudon and Laudon, 7th Edition, Pearson Education Asia

3. Management Information Systems, Jawadekar, Tata McGraw Hill

4. Management Information Systems, Davis and Olson, Tata McGraw Hill

5. Analysis and Design of Information Systems, Rajaraman, Prentice Hall

6. Decision Support Systems and Intelligent Systems, Turban and Aronson, Pearson Education Asia

7. Management Information Systems, Schulthesis, Tata McGraw Hill

8. Management Information Systems - Sadagopan, Prentice Hall

Management Information Systems – JayantOke

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B.Voc –Software Development
Cyber Crimes and Laws

Paper Code: GEC4.2

Credit - 4 **Max Marks: 100 Hours:3**

B. Com.: Semester III
Paper BC3.4 (b): Cyber Crimes and Laws

Duration: 2 hrs

Objective: This paper intends to create an understanding towards the cyber crimes and to familiarize the students with the application of cyber laws in general

Contents

Unit I: Cyber Crimes
Introduction: Computer crime and cyber crimes; Distinction between cyber crime and conventional crimes; cyber forensic, Kinds of cyber crimes- cyber stalking, cyber terrorism, forgery and fraud, crimes related to IPRs, computer vandalism; Privacy of online data; Cyber harassment; Copyright issues and Domain name dispute etc.

Unit II: Definition and Terminology (Information Technology Act, 2000)
Concept of Internet, Internet Governance, E-Contract, E-Forms, Encryption, Data Security
Access, Addressee, Adjudicating Officer, Affixing Digital Signatures, Appropriate Government, Certifying Authority, Certification Practice Statement, Computer, Computer Network, Computer Resource, Computer System, Cyber Appellate Tribunal, Data, Digital Signature, Electronic Form, Electronic Record, Information, Intermediary, Key Pair, Originator, Public Key, Secure System, Verify, Subscriber as defined in the Information Technology Act, 2000.

Unit III: Electronic Records
Authentication of Electronic Records, Legal Recognition of Electronic Records, Legal Recognition of Digital Signatures; Use of Electronic Records and Digital Signatures in Government and its Agencies, Retention of Electronic Records; Attribution, Acknowledgement and Dispatch of Electronic Records; Secure Electronic Records and Digital Signatures.

Unit IV: Regulatory Framework
Regulation of Certifying Authorities; Appointment and Functions of Controller, License to issue Digital Signature Certificate, Renewal of License, Controller's Powers, Procedure to be Followed by Certifying Authority; Issue, Suspension and Revocation of Digital Signature Certificate, Duties of Subscribers; Penalties and Adjudication; Appellate Tribunal, Offences.

Suggested Readings:

1. Efraim Turban, Jae Lee, King, David, and Chung, HM. *Electronic Commerce-A managerial Perspective*. Pearson Education.
2. Joseph, P.T. *E-Commerce-An Indian Perspective*. PHI
3. Chaffey, Dave. *E-business and E-commerce Management*. Pearson Education.
4. Panethil, D. *Law of Information Technology*. New Delhi. Taxmann Publications Pvt. Ltd.
5. Dietel, Harvey M., Dietel, Paul J., and Steinbuhler, Kate. *E-business and E-commerce for managers*. Pearson Education.

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B.Voc –Software Development
Quantitative Techniques
Paper Code: GEC4.3

Credit - 4 **Max Marks: 100** **Hours:3**

Basics of project management, feasibility and technical analysis: materials and equipment, project costing & financing, financial aspects, cost benefit analysis, success criteria and success factors, risk management.

Mathematical models: project selection, project planning, cost-time trade-off, resource handling/leveling.

References /Suggested Readings:

1. Ravi Ravindran: Operations Research and Management Science Handbook, CRC Press, 2008.
2. Harold Kerzner: Applied Project Management: Best Practices on Implementation, Johr Wiley & Sons, Inc., 2000.
3. Goodpasture, J. C.: Quantitative Methods in Project Management, J Ross Publishing. Boca Raton, Florida, USA. 2003.
4. Meredith, J. R. and Mantel Jr., S. J.: Project Management: A Managerial Approach. John Wiley, New York. 2004.

B.Voc –Software Development
ORGANIZATIONAL BEHAVIOUR
Paper Code: GEC5.1

Credit - 4 **Max Marks: 100** **Hours:3**

Objectives:

1. To develop an awareness of the concepts related to organizational behavior.
2. Help the students develop connectivity between concepts and practices of organizations.

Unit 1: Introduction: Historical antecedents of Organizational Behaviour: Scientific management & Human Relations Movement; Contemporary Trends and Challenges; Organizational Behavior: Challenges in the Indian Setting

Unit 2: Individual level processes: Employee attitudes: Job satisfaction, Organizational Commitment, Organizational Citizenship Behaviour; Work Motivation; Early theories: Maslow, McClelland, Two factor; Contemporary theories and applications: Goal setting & MBO, Equity, Expectancy, Job Characteristics Model & Job Redesign

Unit 3: Dynamics of Organizational Behavior: Organizational culture; Power and Politics: Influence, sexual harassment, organizational politics; Positive Organizational Behaviour: Optimism, Emotional Intelligence

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Unit 4: **Leadership:** Basic approaches: Trait theories, Behavioral theories, Contingency theories; Contemporary Issues: Inspirational approaches to leadership, Challenges to the leadership construct; Indian perspective on leadership

Practicum: Any two practicum based on topics in C-PSY-13

Readings:

Chadha, N.K. (2007). *Organizational Behavior*. Galgotia Publishers: New Delhi.

Greenberg, J. & Baron, R.A. (2007).*Behaviour in Organizations* (9th Ed.). India: Dorling Kindersley.

Griffin, R.W. & Moorhead, G. (2009). *Organizational Behavior: Managing People & Organizations*. New Delhi :Biztantra publishers.

Landy, F.J. & Conte,J.M. (2007).*Work in the 21st Century: An Introduction to Industrial and Organizational Psychology*. New York: Wiley Blackwell.

Luthans, F. (2009).*Organizational behavior.* New Delhi: McGraw Hill.

Muchinsky, P. (2006). *Psychology applied to work: An introduction to industrial and organizational psychology*. NC: Hypergraphic Press.

Pareek, U. (2010). *Understanding organizationalbehaviour*. Oxford: Oxford University Press.

Prakash, A. (2011). Organizational behavior in India: An indigenous perspective. In G. Misra (Ed.), *Handbook of Psychology*. New Delhi: Oxford University Press.

Robbins, S. P. & Judge, T.A. (2007).*Organizational Behavior* (12th Ed). New Delhi: Prentice Hall of India.

Schermerhorn, J.R. , Hunt,J.G. & Osborn,R.N. (2008). *Organizational Behavior* (10th Ed.) New Delhi: Wiley India Pvt. Ltd.

Singh, K. (2010). *Organizational Behavior: Texts & Cases*. India: Dorling Kindersley Sinha, J.B.P. (2008). *Culture and Organizational Behavior*. New Delhi: Sage.

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B.Voc –Software Development
Geographical Information System (Practical)

Paper Code: GEC5.2

Credit - 4 **Max Marks: 100 Hours:3**

Geographical Information System (GIS): Definition and Components.
Global Positioning System (GPS) – Principles and Uses; DGPS.
GIS Data Structures: Types (spatial and Non-spatial), Raster and Vector Data Structure.
GIS Data Analysis: Input; Geo-Referencing; Editing, Output and Query; Overlays.
Application of GIS: Land Use Mapping; Urban Sprawl Analysis; Forests Monitoring.

Practical Record: A project file consisting of 5 exercises on using any GIS Software on above mentioned themes.

Reading List

1. Bhatta, B. (2010) Analysis of Urban Growth and Sprawl from Remote Sensing,Springer, Berlin Heidelberg.41
2. Burrough, P.A., and McDonnell, R.A. (2000) Principles of Geographical Information System-Spatial
Information System and Geo-statistics. Oxford University Press
3. Chauniyal, D.D. (2010) Sudur Samvedan evam Bhogolik Suchana Pranali, Sharda Pustak Bhawan, Allahabad
4. Heywoods, I., Cornelius, S and Carver, S. (2006) An Introduction to Geographical Infromation system. Prentice Hall.
5. Jha, M.M. and Singh, R.B. (2008) Land Use: Reflection on Spatial Informatics Agriculture and Development, New Delhi: Concept.
6. Nag, P. (2008) Introduction to GIS, Concept India, New Delhi.
7. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
8. Singh, R.B. and Murai, S. (1998) Space Informatics for Sustainable Development, Oxford and IBH, New Delhi.

B.Voc –Software Development
Robotics

Paper Code: GEC5.3

Credit - 4 **Max Marks: 100 Hours:3**

Programming Environments: Integrated Development Environment (IDE) for AVR microcontrollers, free IDEs like AVR Studio, WIN AVR. Installing and configuring for Robot programming, In System Programmer (ISP), loading programmes on Robot

Actuators: DC Motors, Gearing and Efficiency, Servo Motors, Stepper motors, Motor Control and its implementations

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Sensors: White line sensors , IR range sensor of different range, Analog IR proximity sensors , Analog directional light intensity sensors , Position encoders , Servo mounted sensor pod/ Camera Pod, Wireless colour camera , Ultrasound scanner , Gyroscope and Accelerometer , Magnetometer, GPS receiver, Battery voltage sensing, Current Sensing

LCD interfacing with the robot (2 x 16 Characters LCD)

Other indicators: Indicator LEDs, Buzzer

Timer / Counter operations: PWM generation, Motor velocity control, Servo control, velocity calculation and motor position Control, event scheduling

Communication: Wired RS232 (serial) Communication, Wireless ZigBee Communication, USB Communication, Simplex infrared Communication (IR remote to robot)

Suggested Books:

1. Saha, S.K., Introduction to Robotics, 2nd Edition, McGraw-Hill Education, New Delhi, 2014
2. R.K. Mittal, I.J. Nagrath, —Robotics & Controll, Tata McGraw & Hills, 2005.

B.Voc –Software Development
EFFECTIVE DECISION MAKING

Paper Code: GEC6.1

Credit - 4 **Max Marks: 100** **Hours:3**

Objective: Students will learn various strategies which will enable them to make good decisions in life.

Unit 1: Introduction: What is decision making? Importance of making good decisions.

Unit 2: Decisions regarding career: Discovering self and creating a healthy acceptance of self; Learning to connect with self with vocational choices/career.

Unit 3: Decision making in interpersonal context: Learning about conflict management in interpersonal relations; negotiation in interpersonal conflict, handling difficult people and finding solutions

Unit 4: Decision making at the workplace: developing competencies and skills required for effective decision making

Readings:

Adler, R.B & Proctor, R.F (2009).Communication Goals and Approaches. Wadsworth cengage Learning, India

Chadha, N.K. & Bhatia, H. (2014).Career Development-different voices, different choices. The Readers Paradise: New Delhi.

Sherfield, R.M., Montgomery, R.J., & Moody, P.G. (2009).Developing soft skills. Pearson Education, India.

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B.Voc –Software Development
E-Commerce & Marketing

Paper Code: GEC6.2

Credit - 4 **Max Marks: 100** **Hours:3**

Objective: To enable the students to become competent to understand the mechanism for excelling in e-commerce based employments and self-employment opportunities.

Contents

Unit I: Introduction **7 Lec**

Introduction to E Commerce and Definition, E-Commerce based activities, Goals of E-Commerce,

Technical Components of E-Commerce, Functions, Advantages and disadvantages of E-Commerce, Scope

of E-Commerce, Electronic Commerce Applications, Framework of E-Commerce, Supply Management, Electronic Commerce and Electronic Business.

Unit II: Planning Online-Business **7 Lec**

Nature and dynamics of the internet. Electronic business models: B2B, B2C, C2C, C2B. Web-site Design: Web sites as market place. E –commerce, pure online vs. brick and click business; assessing requirement for an online business designing, developing and deploying the system.

Unit III: Technology for Online-Business **5 Le**

Internet and its Evolution, IT Infrastructure, Middleware, Domain names, Contents: Text and Integrating E-business applications. Component of Internet Information technology structure, Development of Intranet, Extranet and their Difference.

Unit IV: Operations of E Commerce **4 Le**

Online-payment mechanism; Electronic Payment systems; payment Gateways; Visitors to website; Tools for promoting websites; Risk management options for e - payment systems.

Unit VI: Security and Legal Aspects of E-Commerce **7 Le**

Threats in E-Commerce, Security of Clients and Service-Provider; Cyber Laws – Relevant provisions of Information Technology Act 2000, offences, secure electronic records and digital signatures penalties and adjudication.

Suggested Readings:

1. Agarwala, Kamlesh N., Amit Lal and Deeksha Agarwala, Business on the Net: An Introduction to the Whats and Hows of E -Commerce, Macmillan India Ltd.
2. Bajaj, Deobyani Nag, E-Commerce, Tata McGraw Hill Company, New Delhi.
3. Turban, E., et. al., Electronic commerce: A Managerial Perspective, Pearson Education Asia.
4. Diwan, Prag and Sunil Sharma, Electronic Commerce -A Manager's Guide to E-Business, Vanity Books International, Delhi.

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5. Dietel, Harvey M., Dietel, Paul J., and Kate Steinbuhler., E-business and E-commerce for managers, Pearson Education.
6. Greenstein, M. and T.M. Feinman, Electronic Commerce: Security, Risk Management and Control, Tata McGraw hill.
7. Kosiur, David, Understanding Electronic Commerce, Prentice Hall of India Private Ltd., New Delhi.
8. Whiteley, David, E-commerce, McGraw Hill, New York.

Note: Latest edition of text books may be used.

B.Voc –Software Development
ENTREPRENEURSHIP

Paper Code: GEC6.3

Credit - 4 **Max Marks: 100 Hours:3**

Unit I: The Entrepreneurial Mindset

Concept of an entrepreneur, Concept and Evolution of entrepreneurship, Distinction between entrepreneur and manger, Distinction between entrepreneur and intrapreneur, Attributes of entrepreneurs, Core elements of entrepreneurship, Entrepreneurship in a Developing economy, Factors affecting Entrepreneurship development, Entrepreneurship as a Process, Role of entrepreneurship in the developing economy.

Unit II: Launching Entrepreneurial Ventures

Generation of ideas: Methods and process of generating ideas, sources of ideas and screening process
Assessing opportunities: Challenges, pitfalls and critical factors of new venture; Business and Entrepreneurial development organizations
Determining and acquiring required resources (Financial, Physical and Human): Search for entrepreneurial capital- Debt vs. Equity; Venture Capital Market; Angel Financing and Alternative sources of finance for Entrepreneurs
Business Plan Preparation for new Ventures: Meaning of a business plan, benefits, elements and presentation

Unit III:Role of Innovation & Creativity

Creativity: Concept and process of creativity; role and importance of creativity and mental blocks to creativity
Innovation: Meaning and importance of innovation; Types of innovation; Sources of innovation; Conditions for effective innovation at Organization level and Methods of protecting innovation and creativity: branding, trademarks, patents, copyrights and registered design protection

Unit IV: Case Study of selected Indian Business Houses

Note: Case Studies and examples of successful entrepreneurs and entrepreneurial ventures should be discussed at relevant places.

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Suggested Readings:

3. Entrepreneurship: A South Asian Perspective, Donald. F Kuratko& T.V Rao, Cengage Learning Publications, 2012
4. Family Business, Ernesto J. Poza, 3rd ed., 2010
5. Entrepreneurship and Small Business Management, C.B Gupta and S.S Khanka, Sultan Chand Publications, 2014

Entrepreneur Development, Taneja& Gupta, Galgotia Publishing Company, 2nd ed., 2012

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