BACHELOR OF INFORMATION AND COMMUNICATION TECHNOLOGY EDUCATION (BICTE)

Curriculum

Second Semester

प्राज्ञिक परिषद्को कार्यालय
कीर्तिपुर

Faculty of Education
Office of the Dean
Balkhu, Kathmandu

List of Subjects

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Office of the Dean
Balkhu, Kathmandu

Course title: Developmental Psychology

Course No. : Ed 422 | Nature of Course: Theoretical

Level: B.Ed. | Credit Hours: 3

Semester: Second | Teaching hours: 48

1. Introduction

This course deals with human growth and development with the aim of providing students with concept, knowledge and understanding about child growth and development. In general, the course focuses on characteristics, developmental tasks and hazards of different stages of human life with their implications in education: In particular, this course provides students with specific concept, knowledge and understanding about the puberty and adolescence. The course focuses on the characteristics, developmental tasks, spurt of growth and development, social, mental and emotional developments, happiness and unhappiness during puberty and adolescence. In addition, this course provides students with understanding about guidance and counseling as measures to deal with the problems during adolescence.

2. General Objectives

The general objectives of this course are:

- To provide students with general understanding about babyhood, early and late childhood, adulthood and their characteristics, and developmental task, as well as their educational implications.
- To familiarize with puberty and adolescence and to equip them with broader concept, knowledge, attitudes and understanding on the puberty and adolescence.
- To enable students to explore contextual problems during adolescence, and suggests measures in line with the nature of the problems.

3. Specific Objectives and Contents

Specific Objectives	**Contents**
• To develop broader understanding of human growth and development. • To grasp the major determinants of human growth and development. • To explore the reasons for studying human growth and development. • To be acquainted with major methods of studying human	**Unit I:** Human growth and development. **(10 hrs.)** 1.1.Concept of human growth and development. 1.2.Determinants of human growth and development 1.3.Need for studying human growth and development in education. 1.4.Major methods of studying human growth development. 1.4.1. Cross-sectional, longitudinal, and case study 1.5.Major issues in human development 1.5.1. Nature vs. nurture

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growth and development • To identify major issues in human development	1.5.2. Stability vs. change 1.5.3. Continuity vs. discontinuity
• To provide overview of various stages of human growth and development. • To explain developmental tasks and characteristics. • To discuss the potential hazards of all developmental stages.	**Unit II:** Developmental stages and characteristics **(8)** 1.6. Infancy and Babyhood: characteristics, developmental tasks and hazards. 1.7. Early and late childhood: characteristics, developmental tasks and hazards. 1.8.Puberty and adolescence: characteristics and developmental tasks 1.9.Adulthood (early, middle and late): characteristics and hazards.
• To broaden the knowledge and understanding on puberty. • To explain developmental tasks, skills, hobby and point out the potent hazards. • to explore the criteria, causes and effects of puberty. • To discuss the physical, mental, and emotional characteristics of puberty. • To explore educational implications for enhancing learning.	Unit III: Understanding puberty (10) 3.1 Developmental tasks, skills, hobby and possible hazards. 3.2 Causes, criteria and effects of puberty 3.3 Physical development: Spurt of growth during puberty. 3.4 Social development, entertainment and recreation. 3.5 Emotional development and its effects 3.6 Happiness and unhappiness during puberty 3.7 Ways of controlling unhappiness. 3.8 Educational Implications
• To develop wider perspectives on adolescence. • To explain developmental task, skills, hobbies, and potent hazards during adolescence. • To be familiar with physical, social, emotional, mental, moral characteristics and to explore their educational implications. • To identify the responsible factors for happiness and unhappiness during adolescence. • To be familiar with the career choice, interest and future orientation.	**Unit IV** Adolescence and developmental characteristics **(10)** 4.1 Developmental tasks, skills, hobbies and potent hazards 4.2 Physical characteristics and educational implication. 4.3 Social characteristics, leadership and educational implication. 4.4 Emotional characteristics and educational implication. 4.5 Mental characteristics and educational implication. 4.6 Morality during adolescence and educational implication. 4.7 Happiness and unhappiness during adolescence. 4.8 Career choice, interest and future orientation.
• To be aware of different problems during adolescence.	**Unit V** Adolescence and understanding problems **(10)** 5.1 Adolescence and drug abuse, alcoholism and

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• To identify measures to deal with the problems during adolescence and draw their educational implications.	effects 5.2 Adolescence and sex, HIV/AIDs, sexually transmitted disease and effects. 5.3 Adolescence and social violence and conflict 5.4 Adolescence: frustration and Suicide 5.5 Guidance and counseling, psychotherapy, rehabilitation and family adjustment. 5.6 Educational implications

4. Instructional Techniques

The instructional techniques for this course are divided into two groups. The first group consists of general instructional techniques applicable to most of the units. The second group consists of specific instructional techniques applicable to specific units.

4.1 General Instructional Techniques

- Lecture
- discussion
- Question answer

4.2 Specific Instructional Techniques

Unit	Suggested specific Instructional Techniques
III and IV	Students will be divided into groups and given different topics of III and IV units. Students will visit the schools for group work based on the topics assigned. Groups will prepare report and share in the class. Presentation will be followed by discussion and suggestions.
V	Students will be divided into different groups and assigned to collect issues and problems faced and created by the students at any school. They will prepare the report and present it in the classroom.

5. Evaluation

5.1 Internal Evaluation 40%

Internal evaluation will be conducted by subject teacher based on following activities:

1) Attendance	5
2) Class participation	5
3) First assignment	10
4) Second assignment	10
5) Third assignment	10
Total	40

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5.2 Final/Semester Evaluation 60%

Examination Division, office of the Dean, Faculty of Education will conduct final examination at the end of semester.

1)	Objective type question (Multiple choice 10 x 1ponts)	10
2)	Short answer questions (6 questions with 2 OR x 5 points)	30
3)	Long answer questions (2 questions with 1 OR x 10 points)	20
	Total	60

Recommended Books

Baron, R. (2005). *Psychology.* India: Pearson Education.

Chauhan S.S. (1992), Advance Educational Psychology Jurjact, Publication, New Delhi, Vikash Publication

Hurlock E.B. (2002). *Developmental Psychology, A life span approach.* Tata MC Graw Hill Publishing Company Pvt.

Hurlock E.B. (1972), Child development, Tata MC Graw Hill

Jersild, A. T., Telfor, C. W., & Sawrey, J.M. (1997). *Child Psychology*. Neew Delhi: Prentice Hall.

Rogers, D. (1972). *The Psychology of Adolescence.* NJ: Appleton-Century-Crofts.

Santrock, J. W. (2007). *Adolescence.* New Delhi: Tata McGraw-Hill Publishing Company LTD

References

Aryal, P. N. & Bhattarai, D.P. (2009). *Educational Psychology.* Kathmandu: Quest Publication

Battarai, H. (2073BS). *Shikshya Manobigyan.* Kathmandu: Ratna Pustak,

Bidari, B. P. (2073BS). *Shikshya Manobigyan.*Kathmandu: Pinakal

Gibson, R.L. & Mitchell, M.H. (2005). Introduction to counseling, and guidance.NY: Randow House.

Grace, J. C. (1976). *Developmental Psychology.* India: Pearson Education.

Paudel, G. ( ). *Shikshya Manobigyan.* Kathmandu:

Pokhrel, M.M. (2073 BS), *Shikshya Monobigyan.* Ashish Book House, Bagbazar, Kathmand

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ने.शि.४२१ : साधारण नेपाली-२
पाठ्यांश सङ्केत : ने.शि.४२१
तह : बि.एड.
सेमेस्टर : दोस्रो

पाठ्यांश प्रकृति : सैद्धान्तिक
क्रेडिट आवर : ३
शिक्षण घण्टा: ४८

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१. पाठ्यांशको परिचय

यस पाठ्यांशले नेपाली भाषामा विशिष्ट बोध, अभिव्यक्ति र रचना कौशलको विकास गर्ने लक्ष्य राखेको छ । यो पाठ्यांश जम्मा पाँच एकाइमा विभाजित छ । पहिलो एकाइमा वाक्यतत्त्व, वाक्यान्तरण र संसक्ति; दोस्रो एकाइमा सूचना र तथ्यको रूपान्तर; तेस्रो एकाइमा प्रयोजनपरक बोध; चौथो एकाइमा लिखित अभिव्यक्ति र पाँचौ एकाइमा साहित्यिक कृतिको पठन, आस्वादन र प्रतिक्रियात्मक लेखन जस्ता विषयवस्तुहरू समावेश गरिएका छन् । त्यसैले यसमा वाक्यतत्त्व, वाक्यान्तरण र संसक्ति, सूचना र तथ्यको रूपान्तर, प्रयोजनपरक बोध तथा विभिन्न प्रकारका लिखित अभिव्यक्तिका साथै निर्धारित साहित्यिक कृतिहरूको पठन, आस्वादन र अभिव्यक्ति क्षमताको विकास गराउने अपेक्षा राखिएको छ ।

२. साधारण उद्देश्यहरू

यस पाठ्यांशका साधारण उद्देश्यहरू निम्नानुसार रहेका छन् :

- निर्धारित वाक्यतत्त्वका आधारमा स्वतन्त्र र निर्देशित रचना लेख्न सक्षम तुल्याउने,
- शब्दहरूका व्याकरणिक र कोशीय संसक्ति तथा अन्तर्वाक्यात्मक अन्विति पत्ता लगाउन प्रोत्साहित गराउने,
- अनुच्छेदका सूचना/तथ्यलाई तालिका र चित्राकृतिमा रूपान्तर गर्न सबल बनाउने,
- निर्धारित गद्यांशबाट प्रयोजनपरक बोध प्रश्नको उत्तर लेखनको अभ्यासमा दक्ष तुल्याउने,
- विभिन्न प्रकारका लिखित अभिव्यक्ति सिर्जनामा सक्रियता बढाउने,
- निर्दिष्ट साहित्यिक विधाको सरसरती पठन, आस्वादन र प्रतिक्रिया लेखनको अभ्यास गराउने ।

३. विशिष्ट उद्देश्य र पाठ्यवस्तु

विशिष्ट उद्देश्य	पाठ्यवस्तु
• वाक्यतत्त्व अनुरूप वर्णनात्मक प्रकृतिका स्वतन्त्र अनुच्छेद रचना गर्न, • निर्देशित वाक्यतत्त्व अनुरूप वाक्यान्तरण गर्न, • निर्देशित संरचनाअनुसार वाक्य संश्लेषण र विश्लेषण गर्न, • शब्दहरूका व्याकरणिक र कोशीय संसक्ति पहिल्याउन, • अन्तर्वाक्यात्मक अर्थान्विति पत्ता लगाउन ।	**एकाइ एक : वाक्यतत्त्व, वाक्यान्तरण र संसक्ति** (१२) १.१ काल, पक्ष, भाव, वाच्य र करणका आधारमा स्वतन्त्र रचना १.२ काल, पक्ष, भाव, वाच्य, प्रेरणार्थ, करण र उक्ति परिवर्तनका आधारमा वाक्यान्तरण १.३ वाक्य संश्लेषण र विश्लेषण १.४ व्याकरणिक संसक्ति १.५ कोशीय संसक्ति
• अनुच्छेदका सूचना र तथ्यलाई वृत्ताकार, स्तम्भ, रेखाचित्र र आरेखमा रूपान्तर गर्न ।	**एकाइ दुई : सूचना र तथ्यको रूपान्तर** (६) २.१ अनुच्छेदमा प्रस्तुत सूचना र तथ्यलाई तालिका वा चित्राकृति (वृत्ताकार, स्तम्भ) मा रूपान्तर २.२ अनुच्छेदमा प्रस्तुत सूचना र तथ्यलाई रेखाचित्र र आरेखमा रूपान्तर
• नेपाली वाङ्मयका विभिन्न विषयक्षेत्रसँग	**एकाइ तिन : प्रयोजनपरक बोध** (११)

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सम्बन्धित बोधात्मक प्रश्नको उत्तर दिन , • विभिन्न क्षेत्रसँग सम्बन्धित सामान्य तथा विशिष्ट दृष्टांश र अदृष्टांशमा आधारित तथ्यपरक, निष्कर्षपरक, अनुमानपरक, तुलनात्मक, व्याख्यात्मक, कार्यकारणात्मक, बोध प्रश्नको उत्तर लेखन गर्न ।	३.१ पठनबोध ३.१.१ नेपाली वाङ्मयका विविध क्षेत्र र विषयसँग सम्बन्धित सामान्य र विशिष्ट बोध प्रश्नहरूको उत्तर लेखन र प्रस्तुति • भाषा, • साहित्य, • शिक्षा, • भूगोल, • कृषि, • अर्थवाणिज्य, • सूचना तथा सञ्चार, • मनोविज्ञान, • समाज, • संस्कृति, • दर्शन, • विज्ञान तथा प्रविधि • स्वास्थ्य • वातावरण, • कानुन, • खेलकुद ३.१.२ सामान्य तथा विशिष्ट प्रकृतिका दृष्टांश र अदृष्टांशमा आधारित तथ्यपरक, निष्कर्षपरक, अनुमानपरक, तुलनात्मक, व्याख्यात्मक, कार्यकारणात्मक, बोध प्रश्नको उत्तर लेखन र प्रस्तुति
• निर्देशित र स्वतन्त्र अनुच्छेद रचना गर्न, • आत्मपरक र वस्तुपरक निबन्ध सिर्जना गर्न, • घटना, समारोह र निरीक्षण भ्रमणमा आधारित प्रतिवेदन लेख्न ।	**एकाइ चार : लिखित अभिव्यक्ति** (८) ४.१ निर्देशित र स्वतन्त्र अनुच्छेद रचना ४.२ आत्मपरक र वस्तुपरक निबन्ध लेखन ४.३ घटना, समारोह र निरीक्षण भ्रमणमा आधारित प्रतिवेदन लेखन
• निर्धारित साहित्यिक कृतिको सरसर्ती अध्ययन गरी प्रतिक्रियात्मक टिप्पणी लेख्न ।	**एकाइ पाँच : साहित्यिक कृतिको पठन, आस्वादन र प्रतिक्रियात्मक लेखन** (११) ५.१ कथा ५.१.१ रमेश विकल : मेरी सानी भतिजी प्रतिमा ५.१.२ इस्माली : आज शनिवार ५.२ कविता /गीत/गजल ५.२.१ भूपि शेरचन : मैनवत्तीको शिखा ५.२.२ हरिभक्त कटुवाल : रहर ५.२.३ दुर्गालाल श्रेष्ठ : फूलको आँखामा ...... ५.३ निबन्ध : ५.३.१ लक्ष्मीप्रसाद देवकोटा : शिक्षा ५.३.२ शारदा शर्मा : सुखसत्ता

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	५.३.३ युवराज नयाँघरे : भेटौंला कर्फ्युमा ५.४ उपन्यास ५.४.१ केशवराज पिँडाली : बाँच्ने एउटा जिन्दगी

४. प्रायोगिक क्रियाकलाप र शिक्षण प्रविधि

प्रायोगिक क्रियाकलाप र शिक्षण प्रविधिलाई दुई समूहमा विभाजन गरिएको छ : पहिलोमा साधारण शिक्षण प्रविधि र दोस्रोमा विशिष्ट शिक्षण प्रविधि ।

४.१ साधारण शिक्षण प्रविधि

प्रत्येक एकाइमा आवश्यकताअनुसार शिक्षकले सम्बन्धित विषयवस्तुको प्रस्तुति, व्याख्यान, छलफल, प्रश्नोत्तर गराई विद्यार्थीहरूलाई तत्सम्बन्धी अभ्यास गर्न लगाइने छ ।

४.२ विशिष्ट शिक्षण प्रविधि

एकाइ	क्रियाकलाप
एक	• व्यक्तिगत रूपमा काल, पक्ष, भाव, वाच्य, करणका आधारमा स्वतन्त्र रचना तयार गरी कक्षामा प्रस्तुत गर्न लगाउने, • जोडी समूहमा विभिन्न प्रकारका वाक्यहरू दिई संश्लेषण गर्न र संश्लेषित वाक्यहरूलाई विश्लेषण गर्न लगाउने, • समूहअनुसार पाठ्यसामग्रीमा आधारित भई व्याकरणिक संसक्ति र कोशीय संसक्तिको उदाहरण खोजी कक्षामा प्रस्तुत गर्न लगाउने ।
दुई	• जोडी समूहका रूपमा पाठ्य सामग्री हेरी विभिन्न प्रकारका सूचना र तथ्यलाई वृत्ताकार, स्तम्भ, आरेख र रेखाचित्रमा प्रस्तुत गर्न लगाउने,
तिन	• समूह अनुसार विभिन्न विषय क्षेत्रसँग सम्बन्धित सामग्रीमा आधारित भई बोध प्रश्नको उत्तर लेख्न लगाउने र कक्षामा प्रस्तुत गर्न लगाउने
चार	(क) निर्देशनअनुसार स्वतन्त्र र निर्दशित प्रकृतिका अनुच्छेद वैयक्तिक रूपमा लेखन गरी कक्षामा प्रस्तुत गर्न लगाउने (ख) दिइएको शीर्षकमा संरचनाअनुसार समूहगत प्रतिवेदन लेखन गराई कक्षामा प्रस्तुत गर्न लगाउने
पाँच	• निर्धारित साहित्यिक कृतिको पठन, आस्वादन र प्रतिक्रियात्मक लेखनका लागि व्यक्तिगत वा सामूहिक अभ्यास गर्न लगाउने ।

५. मूल्याङ्कन प्रक्रिया

मूल्याङ्कन दुई प्रकारले गरिने छ :

(१) **आन्तरिक मूल्याङ्कन** : यसका निम्ति चालिस प्रतिशत अङ्क निर्धारण गरिएको छ । आन्तरिक मूल्याङ्कन कक्षा शिक्षणसँगै गरिने छ। यसको वितरण निम्नानुसार रहेको छ :

आन्तरिक मूल्याङ्कन (४० प्रतिशत)

क्रियाकलाप	अङ्क
• उपस्थिति	५
• सिकाइ क्रियाकलापमा सहभागिता	५
• पहिलो आन्तरिक परीक्षा	१०
• दोस्रो आन्तरिक परीक्षा	१०

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• तेस्रो आन्तरिक परीक्षा	१०
जम्मा	४०

(२) **बाह्य मूल्याङ्कन**: यसका निम्ति साठी प्रतिशत अङ्क निर्धारण गरिएको छ । बाह्य मूल्याङ्कन डिन कार्यालयले निर्धारण गरेको सेमेस्टर प्रणालीअनुसार हुने छ । यसका लागि निम्नानुसारको प्रश्नका लागि निम्नानुसारको अङ्क विभाजन गरिएको छ ।

बाह्य परीक्षा (६० प्रतिशत)

प्रश्नको किसिम	**अङ्क**
• बहु बैकल्पिक प्रश्न (१०X१ =१०)	१०
• संक्षिप्त उत्तरात्मक प्रश्न (वैकल्पिक २) (६X ५ = ३०)	३०
• विवेचनात्मक प्रश्न (वैकल्पिक १) (२X१० = २०)	२०
जम्मा	६०

पाठ्यपुस्तक

गौतम, देवीप्रसाद, भण्डारी, पारसमणि र ओझा, रामनाथ (२०७०), *स्नातक नेपाली,* काठमाडौं : विद्यार्थी पुस्तक भण्डार (एकाइ १-४ का लागि) ।
शर्मा, शारदा (२०६३), *अग्निस्पर्श,* काठमाडौं : एकता प्रकाशन । (एकाइ ५ का लागि)
शेरचन, भूपि (२०६५), *घुम्ने मेचमाथि अन्धो मान्छे,* ललितपुर : साझा प्रकाशन । (एकाइ ५ का लागि)
श्रेष्ठ, दुर्गालाल (२०६७), *सन्तको छाता,* काठमाडौं : एकता प्रकाशन । (एकाइ ५ का लागि)

सन्दभ सामग्री

इस्माली (२०५८), *घाम घामजस्तो छैन,* ललितपुर : साझा प्रकाशन । (एकाइ ५ का लागि)
देवकोटा, लक्ष्मीप्रसाद (२०६८), *लक्ष्मी निबन्ध सङ्ग्रह,* ललितपुर : साझा प्रकाशन । (एकाइ ५ का लागि)
नयाँघरे, युवराज (२०६६), *एकहातको ताली,* काठमाडौं : विद्यार्थी पुस्तक भण्डार । (एकाइ ५ का लागि)
पिँडाली, केशवराज (२०६५), *बाँच्ने एउटा जिन्दगी,* ललितपुर : साझा प्रकाशन । (एकाइ ५ का लागि) विकल, रमेश (२०२५), *एउटा बूढो भ्वाइलेन आशावरीको धूनमा,* ललितपुर : साझा प्रकाशन । (एकाइ ५ का लागि)

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Course Title: General English II

Course No. : Eng. Ed. 421	Nature of the course: Theoretical
Level: B. Ed	Credit hours: 3
Semester: Second	Teaching hours: 48

1. Course Description

This course is designed to develop their proficiency in listening, speaking, reading and writing. It also intends to equip them with knowledge of vocabulary needed for academic purpose. The course includes listening, speaking, reading and writing components. The listening, speaking and reading components deal with a wide variety of carefully selected materials. They include, among other things, informative passages on contemporary and critical issues. The writing part includes materials geared to developing various writing skills required for effective communication on matters of general and academic interests.

2. General Objectives

The general objectives of this course are as follows:

- To help students listen for comprehension.
- To help students make fluent speaker.
- To familiarize students with the techniques of enriching vocabulary.
- To develop in students an ability to comprehend and interpret different kinds of written texts by exposing them to a wide variety of authentic contemporary reading materials.
- To develop in students different kinds of writing skills needed for effective communication on matters of general and academic interests.

3. Specific Objectives and Contents

Specific Objectives	Contents
• Use prior knowledge and personal experience to predict content • Listen for main ideas and details • Make inferences to fully understand what a speaker means • Listen for opinion to understand book review • Listen for reduced verb forms to understand everyday speech • Listen for causes and effects to understand relationships among idea	**Unit I. Listening (10)** 1.1. First impression 1.2. The psychology of first impression 1.3. Making inferences and listening for main ideas and details 1.4. Reviewing a book 1.5. Listening for causes and effects 1.6. Taking notes using a T- chart 1.7. Changing expectations 1.8. Corporate social and personal responsibility 1.9. Inferring a speakers attitude

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• Follow a summary for several ideas • Listen for opinion	1.10. Identifying fact and opinion, amounts 1.11. Advertising ethics and standards 1.12. Financing a dream 1.13. Understanding figurative meaning
• Make notes to prepare for a presentation or group discussion • Take turns to make conversation go smoothly • Imply opinions to avoid stating them too directly • Give advice and reasons • Ask for clarification • Clarify what you say • Describe a situation using details • Ask, express and use reasons • Make notes • Prepare a dialogue	**Unit II: Speaking (8)** 2.1 Taking conversation turns 2.2 Asking for and giving clarification 2.3 Asking for and giving reasons 2.4 Leading a group discussion 2.5 Giving and supporting your opinions and ideas 2.6 Giving a short presentation 2.7 Recapping a presentation 2.8Agreeing and disagreeing 2.9 Expressing emotions
• Read texts for general idea. • Find specific information in the text. • Comprehend the text for detailed understanding. • Read and make notes of the important points. • Draw inferences and implications from varieties of reading texts. • Give opinions and express attitudes.	**Unit III: Reading (15)** 3.1 Determining co-references 3.2 Matching things 3.3 Understanding instructions 3.4 Unscrambling texts and anagrams 3.5 Scanning: locating and extracting information 3.6 Skimming: finding out main point and the central idea 3.7 Drawing inferences and implications 3.8 Assessing opinions and attitudes 3.9 Solving problems and puzzles
• Write an imaginary dialogue, short sketch of a person, story • Prepare a speech and Post card • Write a report • Rewrite given texts in different forms. • Compose short and long texts in the given topics. • Write texts maintaining coherence	**Unit IV: Writing (15)** 4.1 Rewriting: Rephrasing and paraphrasing 4.2 Parallel writing 4.3 Completing a text 4.4 Organizing a text: Sequencing instructions, ordering information, connecting ideas 4.5 Writing summaries 4.6 Writing letters: Personal, business, job application

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and cohesion. • Interpret different types of texts. • Explain opinions and attitudes. • Write letters, resumes, summaries and short reports. • Write varieties of essays.	4.7 Writing curriculum vitae (resume) 4.8 Writing reports: Events and news 4.9 Writing essays: Descriptive, expository, narrative, argumentative

4. Instructional Techniques

The instructional techniques for this course are divided into two groups. First group consists of general instructional techniques applicable to most of the units. The second group consists of specific instructional techniques applicable to specific units.

4.3 General Instructional Techniques

Following general techniques are suggested for the overall delivery of the course.

- Lecture
- Discussion
- Explanation
- Illustration
- Demonstration
- Quizzes
- Guided study

It is expected that students are fully engaged in the lesson and sessions are interactive while presenting the lesson.

4.4 Specific Instructional Techniques

Some specific techniques are suggested to ensure the active engagement of the students.

Unit I	Small group discussion for the various grammar points, pair work to find out the rules of language, mini-projects to research the various grammar points in the texts.
Unit II	Individual practice and small group discussion and pair work.
Unit III	Individual study, pair works for reading tasks and presentation.
Unit IV	Individual assignment on various writing tasks, small group discussion and presentation.

In addition to the techniques mentioned above, observation of an English language class where children with different abilities are studying followed by presentation is also encouraged in all the units.

5. Evaluationand Time Allotment

The time and weighting allocated for the entire course is as follows:

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Unit weighting		Time
I Grammar	20%	20%
II Vocabulary	15%	15%
II Reading	30%	30%
III Writing	35%	35%

5.1 Internal Evaluation 40%

Internal evaluation will be conducted by course teacher based on following activities:

• Attendance	5 Points
• Participation in learning activities	5 points
• First assignment/midterm exam	10 points
• Second assignment/assessment (1 or two)	10 points
• Third assignment/assessment	10 points
Total	**40 points**

5.2 External Evaluation (Final Examination) 60%

Examination Division, Office of the Dean, Faculty of Education will conduct final examination at the end of the semester. Type of questions and the points allocated for them are as follows:

• Objective type question (Multiple choice 10 × 1 point	= 10 points
• Short answer questions (6 questions with 2 OR × 5 points)	= 30 points
• Long answer questions (2 questions with 1 Or × 10)	= 20 points
Total	**60 points**

6. Recommended Books and Reference Materials

Recommended Books

Awasthi, J. R. , Bhattarai, G. R. & Rai, V. S. (eds.) (2008). *English for the New Millennium.* Kathmandu: EKTA Books. **(For units III to IV) (Selected Lessons)**

Craven, M. and Sherman, K.D. (2011). Q: Skills for Success: 3: Listening and Speaking. Oxford: Oxford University Press. **(For units I and II)**

Following lessons have been selected from the book **English for the New Millennium:**

Unit I : Legend, Lore and Education

a. Whole Child Education

b. The Five Dimensions of Education

c. The Essentials of Education

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Unit II: Short Stories

a. The Gateman's Gift
b. The Martyr
c. The Joys of Motherhood
e. Grief

Unit III: Non Fictional/ Factual Writings

a. I Once Was Lost
b. Albert Einstein
C. Music and Science

Unit IV: Essays

a. Victory on Everest
b. Laughter is the Best Medicine
c. Liberty and Democracy

Unit V: Interviews

a. ImreKertesz

Unit VI: One Act Plays

a. A Horseman in the Sky

Unit VII: Memoir and Travel

a. The Boatman's Gift

Unit VII: Journals

a. Journal Writing II

Unit IX: Novel Extract and Motion Picture

a. My Love Story with the City of Joys

Unit X: Contemporary Topics

a. Inclusive Education
b. English as a World Language
c. Diasporas and Language
d. The New Electronic Media

Unit XI: Poems

a. Composed upon Westminster Bridge
b.Mid- Summer Noon in the Australian Forest
c. Baby's World
d. Butcher Shop
e. If
f. Before the Battle
g. Letter from Foreign Grave
h. Sonnet

Reference

Hornby. A.S. (2010). Oxford Advanced Learner's Dictionary (8th Edition). Oxford: Oxford University Press.

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Course Title: Digital Logics | **Program: BICTE**

Course No. : ICT Ed. 425
Level: Bachelor
Semester: Second

Nature of course: Theoretical + Practical
Credit Hour: 3 (2T+1P)
Teaching Hour: 64 (32+32)

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1. Course Description

This course provides students with the basic concepts of digital logic, organization and architecture of digital computers as foundation for more advanced computer related studies. It also intends to provides the skill on able to design simple digital devices and implement them. It covers the knowledge area of digital system, logic gates and Boolean algebra, combinational and sequential circuit design, registers, counters, memories and programmable logic devices and VHDL. Laboratory work is essential in this course.

2. Course Objectives

Following are the general objective of this course:

- To make the student knowledgeable about fundamental digital logics and switching networks as well as to exposure of Boolean Algebra and its application for circuit analysis.
- To enable the student to identify the design concept of multilevel gates networks, flip-flops, counters and logic devices.

3. Specific Objectives and Contents

Specific Objectives	Contents
• Differentiate between digital and analog system. • Calculate and convert the number system digital, binary, octal and hexadecimal. • Create complement numbers and use it to perform addition. • Define codes such as ASCII, Gray, BCD, XS-3	**Unit 1: Introduction to Digital System (5T+5P)** 1.1 Introduction to Analog and digital system 1.2 Number Systems- Decimal, Binary, Octal, Hexadecimal and conversion among them 1.3 Binary Addition and Subtraction 1.4 Complement of Binary Numbers: 1's and 2's 1.5 Adding signed 2's complement data 1.6 Digital Codes: BCD, XS-3, Gray code, alphanumeric codes (ASCII) ***Practical Work:*** • Practices on Number conversion between Decimal, Binary, Octal, Hexadecimal. • Binary Arithmetic 1's, 2's
• Explain Boolean Logic and Boolean Algebra • Generate the logic gates with diagram, truth table and Boolean expression.	**Unit 2: Logic Gates and Boolean Algebra (10T+8P)** 2.1 Logic Gates 2.1.1 Basic gates (AND, OR, NOT)

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• Explain Boolean Algebra and laws of Boolean Algebra • Identify universal gate and draw circuit using only universal gates • Simplification of Boolean algebra with Boolean rules • Simplification of Boolean algebra with Karnaugh Map	2.1.2 Derived Gates (NAND, NOR, X-OR, X-NOR) 2.1.3 Universal Gates (NAND, NOR) 2.1.4 Designing circuits with basic gates, derived gates and universal gates 2.2 Introduction to Boolean Algebra 2.3 Boolean Expression and Boolean Rules 2.4 Types of Boolean Expression 2.4.1 Sum of Product Terms (SOP) 2.4.2 Product of Sum Terms (POS) 2.5 Standard form of SOP and POS Expression 2.6 Conversion between SOP and POS Expression 2.7 Canonical Form of Boolean Expression (min term, max term) 2.8 Representation of Boolean Expression in Truth Table 2.9 Applying Boolean Rules to Simplify Expressions 2.10 Introducing Karnaugh Map (K-Map) to minimize Boolean expression 2.11 Don't care condition in K-Map ***Lab Work:*** • Verification of AND, OR, NOT, NAND, NOR, XOR, and XNOR gate. • Apply Boolean rules to simplify Boolean expression. • Apply K-Map to simplify Boolean expression
• Explain combinational circuits • Implement the adder, multiplexers and de-multiplexers • Implement the encoders and decoders • Apply combinational circuit design procedure • Design 7 segment display decoder circuit	**Unit 3: Combinational Circuit (8T+4P)** **3.1** Introduction to Combinational Circuit and its design procedure **3.2** Arithmetic Circuit: Adder (Half and Full), Subtractor (Half and Full) **3.3** Code Converter (Gray to Binary and Binary to Gray) **3.4** Multiplexers and Demultiplexers **3.5** Encoders and Decoders **3.6** 7 Segment Display Decoder ***Lab Work:*** • Design the adder and subtractor • Design Mux/Demux and Encoder/Decoder(upto 4 bit) • Design the digital code converter circuit

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	• Design Display Decoder circuit
• Explain Sequential Logic Circuits • Design Flip-flop circuits • Create flip-flop excitation table, characteristics table and timing diagrams	**Unit 4: Sequential Circuit Fundamentals (3T+3P)** 4.1 Introduction to sequential circuit 4.2 Latch and flip flop Introduction 4.3 Types of flip flop : SR, JK, D, and T 4.4 Characteristics table, characteristics equation, excitation table, circuit diagram and operating characteristics of flip flops 4.5 Drawing Timing Diagram for Sequential Circuit ***Lab Work:*** • Design the different types of flip-flops. • Draw timing diagrams
• Explain counters • Implement different synchronous and asynchronous counter.	**Unit 5: Counter (5T+3P)** 5.1 Introduction to Counter 5.2 Synchronous and Asynchronous Counter 5.3 Modulus 2^n and Modulus other than 2^n Asynchronous Counters 5.4 Cascaded Counter ***Lab Work:*** • Design the different synchronous and asynchronous counters. • Design higher modulus asynchronous counter using cascaded counter • Realize truncated counters
• Explain Shift Registers. • Implement different types of shift registers	**Unit 6: Shift Register (5T+3P)** 6.1 Introduction to Shift Register 6.2 Serial In Serial Out Register (SISO) 6.3 Serial In Parallel Out Register (SIPO) 6.4 Parallel In Parallel Out Register (PIPO) 6.5 Parallel In Serial Out Register (PISO) 6.6 Bidirectional Register 6.7 Shift Register Counters (Ring and Johnson) ***Lab Work:*** • Design different types shift registers

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	• Design higher modulus asynchronous counter using cascaded counter Realize truncated counters
• Analyze and design synchronous sequential circuits • Analyze asynchronous sequential circuits	**Unit 7: Sequential Circuit Design (3T+3P)** 7.1 Sequential Circuit Design Procedure 7.2 Synchronous Counter Design 7.3 Analysis of Synchronous Sequential Circuit ***Lab Work:*** • Design different types shift registers • Design higher modulus asynchronous counter using cascaded counter
• Define IC and level of integration • Describe digital logic families • Implement PLA and PAL	**Unit 8: IC and Programmable Logic Devices (4T)** 8.1 Integrated Circuit and level of integration 8.2 Operating characteristics of IC 8.3 IC Packages 8.4 PLDs: PAL and PLA 8.5 Logic Families: TTL, ECL, and CMOS
• Define concept of VHDL • Design simple circuits by using VHDL	**Unit 9: VHDL (5T+3P)** 7.1 Introduction to VHDL 7.2 Representation of Boolean expression in VHDL **LAB Work:** • Demonstrate the different circuit in VHDL

4. Instructional Techniques

The instructional techniques for this course are divided into two groups. First group consists of general instructional techniques applicable to most of the units. The second group consists of specific instructional techniques applicable to particular units.

4.1 General Instructional Techniques

Reading materials will be provided to students in each unit. Lecture, Discussion, use of multi-media projector, brain storming are used in all units.

4.2 Specific Instructional Techniques

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Demonstration is an essential instructional technique for all units in this course during teaching learning process. Unit one and three are theoretical and numerical chapters so, they require more exercise and demonstration of principles. Use more pictures, flowchart of method, and assignment. Specifically, demonstration with practical works will be specific instructional technique in this course. The details of suggested instructional techniques are presented below:

Units	Activities
Unit 2: Logic Gates and Boolean Algebra	• Verify AND, OR, NOT, NAND, NOR, XOR, and XNOR gate using physical real bread board and two input TTL ICs. • Demonstration by the teacher on physical real device and circuitry design to demonstrate the working principle, objective and their use. • Individual lab work of real bread board by each student • Monitoring of students' work by reaching each student and providing feedback for improvement • Presentation by students followed by peers' comments and teacher's feedback
Unit 3: Combinational Circuit	• Design the adder and subtracter, Implement logic of Mux/Demux and Encoder/Decoder, and Design the number system converter circuit, Design Various Decision making circuits. • Lab work in pairs in different tasks assigned by the teacher • Monitoring of students' work by reaching each pair and providing feedback for improvement • Presentation by students followed by peers' comments and teacher's feedback
Unit 4: Sequential Circuit Fundamentals	• Design SR, JK, D and T flip-flops with their excitation table and design procedure. • Demonstrate the objective, use and practically implement the master slave flip-flop. • Demonstrate the state diagram of any simple sequential circuit. • Monitoring of students' work by reaching each student and providing feedback for improvement • Presentation by students followed by peers' comments and teacher's feedback
Unit 5, 6, 7, 8: Registers, Counters, and Programmable Logic Devices	• Demonstrate the implement the concept, objective and real use of registers, counters, memories and PLDs. • Design any clock driven sequential circuit, verify the principle of conversion of parallel data into serial. Design circuits like: digital clock, voting system, counting machine, storage device, traffic control system, frequency division circuits, and analyze circuits. • Demonstrate the interfacing method with various types of logic families and integrated circuits. • Monitoring of students' work by reaching each student and

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	providing feedback for improvement • Presentation by students followed by peers' comments and teacher's feedback
Unit 7: VHDL	• Explain the fundamental of VHDL programming language using class lecture method. • VHDL language should be taught to specify the logic circuits. Instructor should illustrate how VHDL can be used to specify the desired functionality and how CAD tools provide a mechanism for developing the required circuits. Instructor should assign design projects like Adder/Subtracter, Multiplexer/Demultiplexer, Encoder/Decoder, Flip-flops, resister and counters to each individual using both methodologies: manual design and CAD tools to design logic circuits.

5. Evaluation

Evaluation of students' performance is divided into parts: Internal assessment (theory and practical and internal external examinations (theory and practical). The distribution of points is given below:

Internal Assessment Theory	Internal Assessment Practical	Semester Examination (Theoretical exam)	External Practical Exam/Viva	Total Points
25 Points	15 Points	40 Points	20 Points	100 Points

***Note**: Students must pass separately in internal assessment, external practical exam and semester examination.*

5.1 Internal Assessment (25 Points) of Theoretical Part

Internal assessment will be conducted by subject teacher based on following criteria:

Attendance and learning Activities	5 points
First assignment (Written assignment)	5 points
Second assignment (Project work with presentation)	10 points
Third assignment/written examination	5 point
Total	25 points

5.2 Internal Assessment (15 Points) of practical part

Internal practical assessment will be conducted by subject teacher based on following criteria:

Attendance and learning Activities	5 points
Practical work/project work/lab work	10 points
Total	15 points

5.3 Semester Final Examination (40 Points) theoretical part

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Examination Division, Dean office will conduct final examination at the end of semester.

Objective question (Multiple choice questions 10 x 1 point)	10 Points
Subjective questions (6 questions x 5 marks with 'OR" two questions)	30 Points
Total	40 points

5.4 **Practical Exam/Viva (20 Points)**

Examination Division, Office of the Dean will appoint an external examiner (ICT teachers working another campus) for conducting practical examination

Items	Points
Evaluation of Record Book	4
Project work/practical work presentation/skill test	10
Viva	6
Total	20

6. Recommended Books and References materials

Recommended Books:

Floyd, T. L. (2009). *Digital fundamentals* (10th ed). Upper Saddle River, N.J: Pearson/Prentice Hall.

Mano, M. M., & Kime, C. R. (2008). *Logic and computer design fundamentals* (4. ed). Upper Saddle River, NJ: Pearson Prentice Hall.

References materials:

Brown, S. D., & Vranesic, Z. G. (2014). *Fundamentals of digital logic with Verilog design* (Third edition). New York: McGraw-Hill Higher Education.

Rafiquzzaman, M. (2005). *Fundamentals of digital logic and microcomputer design* (5th ed). Hoboken, N.J: J. Wiley & Sons.

Mano, M. M. (2002). *Digital design* (3rd ed). Upper Saddle River, NJ: Prentice-Hall.

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Course Title: Object Oriented Programming with C++ Program: **BICTE**

Course No. : ICT. Ed. 426 Nature of course: Theoretical + Practical

Level: Bachelor Credit Hour: 3 hours (2T+1P)

Semester: Second Teaching Hour: 80hours (32+48)

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1. Course Description

The aim of the course is to develop the skill on thinking about computation and problem solving in Object Oriented Paradigms. The course helps the students to discover the basic concepts of object-oriented programming concept such as object, class, inheritance, polymorphism, abstraction and encapsulation and apply in C++. Students are more engaged in laboratory work to exaction of programing experiments rather than theoretical concept.

2. General Objectives

Following are the general objective of this course:

- To acquaint the student with fundamentals object oriented paradigms and programming style in C++ programming language.
- To develop the skill on apply object oriented programming concept in programming.
- To enable a student in explore the new software development paradigms.

3. Course Outlines:

Specific Objectives	Contents
• Compare procedure and object oriented programming concept • Describe the feature of object oriented programming. • Compare C and C++. • Demonstrate the C++ programming styles.	**Unit 1: Concept of C++ with Object Oriented Programming (6T+4P)** 1.1 Structured vs Object Oriented Programming Paradigm 1.2 Features of Object Oriented Programming 1.3 Comparison on C and C++ 1.4 C++ Program Structure 1.5 Data types, variables and constants 1.6 Insertion and Extraction Operators 1.7 Type conversion 1.8 Dynamic memory allocation : new and delete operator **Practical Works:** • Install the compiler of C++. • Use Insertion and Extraction Operator. • Use structure in C++ to bundle data
• Demonstrate inline function, function overloading, default arguments, reference arguments and returning by reference concept	**Unit 2: Function in C++ (3Th+3Pr)** 2.1 Inline function 2.2 Overloaded function 2.3 Default arguments 2.4 Reference arguments 2.5 Returning by reference **Practical Works:** • Write program to implement inline function, overloaded function, default arguments, reference arguments and returning by reference

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• Explain the Object and Class • Define Data member and Member function. • Define inline member function. • Use array in member function and objects. • Define static and friend function. • Explain constructor and destructors.	**Unit 3: Object and Class** **(5T+10P)** 3.1 Concept of Object and Class 3.2 Access controls: private, protected and public 3.3 Data Member and Member Function of class 3.4 Constructor and Destructor 3.5 Default, Parameterized and Copy constructor 3.6 Constructor Overloading 3.7 Array in Class and Array of Objects 3.8 Static data member and Static member function 3.9 Friend function and friend class **Practical Works:** • Create class and objects with data member and member function. • Declare and define member function and data member with visibility. • Create static function • Create friend functions. • Create different types of constructors
• Explore the concept of inheritance • Describe the derived class and access specifier • Apply single, multiple, multilevel inheritance. • Identify function overriding and ambiguity in inheritance with possible solution • Demonstrate execution sequence of constructor and destructor in inheritance • Implement containership	**Unit 4: Inheritance** **(3T+9P)** 4.1 Concept of Inheritance 4.2 Deriving class using access specifiers: private, public and protected 4.3 Types of Inheritance 4.4 Function overriding 4.5 Ambiguity due to multiple inheritance 4.6 Execution sequence of constructor and destructor in inheritance 4.7 Containership **Practical Works:** • Create different types of inheritance. • Write program to illustrate execution sequence of constructor and destructor in inheritance • Create containership • Identify and solve the ambiguity due to multiple inheritance
• Describe Virtual	**Unit 5: Polymorphism, Abstraction and Encapsulation** **(3T+3P)**

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function. • Describe the Pure virtual function. • Describe the Abstract class • Demonstrate early binding (Compile time polymorphism) and late binding (runtime polymorphism)	5.1 Introduction to Virtual Function 5.2 Pure Virtual function 5.3 Abstract Class 5.4 Runtime Polymorphism and Compile time Polymorphism 5.5 Implementation of encapsulation **Practical Works:** • Create virtual function. • Create pure virtual function. • Create Abstract class • Write program to compare different types of polymorphism
• Apply Binary operator and unary operator overloading. • Describe data conversion methods.	**Unit 6: Operator Overloading (4T+6P)** 6.1 Introduction to Operator Overloading 6.2 Unary Operator Overloading: prefix/ postfix ++, -- 6.3 Relational Operator Overloading: >, >=. <, <=, ==, != 6.4 Arithmetic Operator Overloading: +, -, *, /, % 6.5 Type Conversion i. Basic to user-defined types ii. User-defined to basic types iii. User-defined to user-defined types **Practical Works:** • Overload unary operator, relational operator and arithmetic operators • Apply data conversion techniques to convert different types of data
• Explain concept of template. • Demonstrate namespace creation and use of it in programs • Define function template and class template. • Apply the different exception handling methods.	**Unit 7: Namespace, Template and Exception Handling (4T+6P)** 7.1 Namespace Concept, creation and usage in programs 7.2 Concept of Template 7.3 Function Template 7.4 Class Template 7.5 Basic of exception handling 7.6 Exception handling mechanism: throw, catch and try 7.7 Exception handling of basic types and user-defined types **Practical Works:** • Create and apply namespace • Create and apply function template. • Create and apply template class.

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	• Apply try, catch and throw methods in program to handle exception for user-defined and basic types.
• Explain concept of files • Demonstrate stream classes • Demonstrate sequential and random access to file	**Unit 8: File Handling** **(3T+3P)** 8.1 Introduction to file stream 8.2 fstream, ofstream and ifstream classes 8.3 Using constructor to open file 8.4 File opening modes in C++ 8.5 Using open function to open file 8.6 Sequential and Random access to file **Practical Works:** • Apply fstream, ifstream and ofstream classes to manipulate files • Access files sequentially and randomly
• Create console application using C++ .	**Unit 9: Project** **(5P)** Develop simple Application using C++.

4. Instructional Techniques

The instructional techniques for this course are divided into two groups. First group consists of general instructional techniques applicable to most of the units. The second group consists of specific instructional techniques applicable to particular units.

4.1 General Techniques

Reading materials will be provided to students in each unit. Lecture, Discussion, use of multi-media projector, brain storming are used in all units.

4.2 Specific Instructional Techniques

Demonstration is an essential instructional technique for all units in this course during teaching learning process. Specifically, demonstration with practical works will be specific instructional technique in this course. The details of suggested instructional techniques are presented below:

Units	Activities
Unit 1: Concept of Object Oriented Programming	• Select and Install the different compiler of C++ such as Code Block, Dev C++ etc. • Demonstrate the programming structure of C++. • Compare the other program provide the assignment for understanding of object oriented paradigms. • Monitoring of students' work by reaching each student and providing feedback for improvement • Presentation by students followed by peers' comments and teacher's feedback
Unit 2, 3:Function,	• Demonstrate inline function, function overloading, default arguments, reference arguments and returning by reference.

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Object and Class	• Demonstrate class and object creation methods in C++. • Demonstrate the methods and attributes in Class and access from objects. • Demonstrate the different types of methods such as inline, static and friends. • Lab work in pairs in different tasks assigned by the teacher • Monitoring of students' work by reaching each pair and providing feedback for improvement • Presentation by students followed by peers' comments and teacher's feedback
Unit 4: Inheritance	• Demonstrate the single, multiple and multilevel inheritance and applied into C++. • Lab work in pairs in different tasks assigned by the teacher. • Monitoring of students' work by reaching each student and providing feedback for improvement • Presentation by students followed by peers' comments and teacher's feedback
Unit 5: Virtual Function and Polymorphism	• Demonstrate the virtual and pure virtual functions and application. • Demonstrate the abstract and container class. • Lab work in pairs in different tasks assigned by the teacher. • Monitoring of students' work by reaching each student and providing feedback for improvement • Presentation by students followed by peers' comments and teacher's feedback
Unit 6: Operator Overloading	• Demonstrate the unary and binary operator overloading methods. • Lab work in pairs in different tasks assigned by the teacher • Monitoring of students' work by reaching each student and providing feedback for improvement • Presentation by students followed by peers' comments and teacher's feedback
Unit 7: Namespace, Template and Exception Handling	• Demonstrate Namespace creation and usage • Demonstrate the template function and class. • Demonstrate the exception handling concept in OOPs with reference C++. • Monitoring of students' work by reaching each student and providing feedback for improvement • Presentation by students followed by peers' comments and teacher's feedback
Unit 8: File Handling	• Demonstrate stream classes • Demonstrate file opening and closing • Demonstrate random access and sequential access to file
Unit 9: Project	• Develop console application applied with OOPs Concepts including file handling.

5. Evaluation :

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Evaluation of students' performance is divided into parts: Internal assessment (theory and practical and internal external examinations (theory and practical). The distribution of points is given below:

Internal Assessment Theory	Internal Assessment Practical	Semester Examination (Theoretical exam)	External Practical Exam/Viva	Total Points
25 Points	15 Points	40 Points	20 Points	100 Points

***Note**: Students must pass separately in internal assessment, external practical exam and semester examination.*

5.1 Internal Assessment (25 Points) of theoretical part

Internal assessment will be conducted by subject teacher based on following criteria:

Attendance and learning Activities	5 points
First assignment (Written assignment)	5 points
Second assignment (Project work with presentation)	10 points
Third assignment/written examination	5 point
Total	25 points

5.2 Internal Assessment (15 Points) of practical part

Internal practical assessment will be conducted by subject teacher based on following criteria:

Attendance and learning Activities	5 points
Practical work/project work/lab work	10 points
Total	15 points

5.3 Semester Examination (60 Points)

Examination Division, Dean office will conduct final examination at the end of semester.

Objective question (Multiple choice questions 10 x 1 point)	10 Points
Subjective Questions (6 questions x 5 marks With "OR" two questions)	30 Points
Total	40 points

5.4 **Practical Exam/Viva (20 Points)**

Examination Division, Office of the Dean will appoint an external examiner (ICT teachers working another campus) for conducting practical examination

Items	Points
Evaluation of Record Book	4
Project work/practical work presentation/skill test	10
Viva	6

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Total	20

6. Recommended books and References materials (including relevant published articles in national and international journals)

Recommended books:

Balagurusamy, E. (2013). *Object oriented programming with C++*. New Delhi: Tata McGraw-Hill (Unit 1-8).

BaralDayasar&BaralDiwakar(2010), Secrete of Object Orientd Programming in C++, Kathmandu, BhundipuranPrakashan (Unit 1-8).

References materials:

Robert Lafore(2003), Object Oriented Programming in Turbo C++, Galgotia Publications Ltd. India, 2003 (Unit 1-8).

Schildt, H. (2003). *C++: the complete reference* (4th ed). New York: McGraw-Hill.

Lippman, S.B., Lajoie. J., C++ Primer, 3rd Ed., Addison Wesley, 1998

कीर्तिपुर

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Course Title: Mathematics II

Nature of Course: Theory

Level: BICTE

Teaching Hours: 48

Code Number: Math Ed. 426

Full Marks: 100

Semester: Second

Credit Hours: 3

1. Course Introduction

The course Math II is an integrated course of different branches of mathematics for the students at bachelor's degree students of Information and Communication Technology (BICTE). This course deals the different concepts of mathematics which are applicable in the study of information and communication technology. The course comprised six units from different areas of mathematics. Complex numbers, calculus, basics of number theory, analytic geometry, fundamental concepts of graph theory and algebra are six chapters. These chapters are primarily designed to provide the foundational concepts of mathematics which are crucial in the field of study.

2. General Objectives

The general objectives of this course are as follows:

- To visualize the concept of complex numbers and their properties.
- To familiarize the concept of limit, continuity, derivative and integration.
- To introduce the concept of numbers and number theory.
- To explain the concept of coordinates in plane and space.
- To visualize the concept and graph theory and connect this concept with technology.
- To familiarize the basic concept of group and ring theories.

3. Specific Objectives and Contents

Specific objectives to each unit and corresponding contents are described below:

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• Define complex number and visualize the complex number in Argand diagram. • Find the conjugate and absolute value of complex number • Find the square roots of complex number • Explain the relation of sets and subsets • Convert the complex number from cartesian form to polar and exponential form and vice-versa. • Find the nth roots of given complex numbers using DeMoivre's Theorem.	**Unit I Complex Number [6]** 1.1 Definition of complex number and Geometrical representation. 1.2 Conjugate and absolute value of complex number 1.3 Square roots of complex number 1.4 Polar and Exponential forms of complex numbers 1.5 n^{th} roots of complex numbers using DeMoivre's Theorem
• Define limit of the function using the $\varepsilon - \delta$. • Discuss the existence of limit of function. • Test the continuity of the function. • Discuss the types of discontinuity of the function • Define derivative with example • Derive the formula to find the derivatives of the function using definition • Find the derivatives of functions • Define extreme values of a function • Find the maxima and minima of function • Differentiate the definite and indefinite integrals • Evaluate standard indefinite integrals • Define the fundamental theorem of calculus. • Evaluate the area of plane regions using definite integrals.	**Unit II: Fundamentals of Calculus [12]** **2.1 Limits and continuity of a function** 2.1.1 $\varepsilon - \delta$ definition of limit and continuity. 2.1.2 Evaluate the limit of the function 2.1.3 Continuity of the function **2.2 Derivatives of function** 2.2.1 Definition and Geometrical interpretation 2.2.2 Derivatives of the functions (Algebraic only) 2.2.3 Maxima and minima of functions **2.3 Indefinite and Definite Integral** 2.3.1 Meanings of Integrals 2.3.2 Some Standard Integrals 2.3.3 Meaning of $\int_a^b f(x)dx$ 2.3.4 Problems on finding definite integral 2.3.5 Area of plane regions

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3. Discuss the odd, even and divisibility relationship of number 4. Derive the divisibility rule for positive integers 5. Define division algorithm 6. Solve the problems related to division algorithm 7. Discuss the properties of GCD and solve the problems related to GCD 8. Discuss the different forms of Euclidean Algorithm 9. Execute the operations on different base number system. 10. Discuss the concept of modular arithmetic.	**Unit III Basics of Number Theory [6]** 3.1 Odd, Even and Divisibility Relationships 3.2 The Divisibility Rules 3.3 The Division Algorithm 3.4 The Greatest Common Divisor (GCD) and Euclidean Algorithm 3.5 Different Base Number System 3.6 Modular Arithmetic
• Derive the equation of straight line in different form • Find the length of perpendicular distance from any point to a straight line • Derive the angle between two lines • Define a concept of coordinate of a point in a space • Solve the problems involving dcs., drs., and projection • Derive the equation of planes • Find the angle between two points • Derive the equation of plane passing through any three points	**Unit IV Analytic Geometry [8]** **4.1 Straight Lines** 4.1.1 Equation of straight lines 4.1.2 Perpendicular distance of a line 4.1.3 Angle between lines **4.2 Conic Section [Definitions and equations on Standard forms with examples]** 4.2.1 Circle 4.2.2 Parabola 4.2.3 Ellipse 4.2.4 Hyperbola **4.3 Coordinate in space** 4.3.1 Coordinates of a point in space 4.3.2 Distance between two points 4.3.3 Directions Cosines and Ratios 4.3.4 Projection

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• Discuss the concept of graph and different types of graphs • Define walks, paths and cycles of graphs with example • Find the vertex and edge of graphs • Define and solve the problems related to Eulerian and Hamiltonian graphs • Discuss the concepts of trees and forest with illustrative example.	**Unit V: Fundamental Concepts of Graph Theory [6]** 5.1 Introduction of graph 5.2 Different types of Graphs 5.3 Vertex and edges of graphs 5.4 Walks, paths and cycles of Graphs 5.5 Eulerian and Hamiltonian graphs concept and examples only 5.6 Trees and Forest concept with examples.
• Define binary operation with examples • Discuss the properties of algebraic structure with examples • Define group with example and non-example • Discuss the properties of group • Define sub-group, cyclic group and permutation group with examples. • Define ring with examples. • Explain the concept of subring, ideal and quotient rings with examples • Derive the relation between integral domain and field	**Unit VI: Algebra [10]** **6.1 Group Theory** 6.1.1 Binary operation 6.1.2 Algebraic Structure and its properties 6.1.3 Group and its properties 6.1.4 Sub-groups, Cyclic groups and Permutation groups **6.2 Ring and Field** 6.2.1 Definition of rings and its properties 6.2.2 Subring definition with examples. 6.2.3 Field definition and examples.

4. Instructional Techniques

4.1 General Instructional Techniques: There are various techniques of teaching and learning so as to grasp the knowledge of mathematics. Although the methods of teaching and learning may differ, the techniques to be used are lecture, discussion, problem solving, inquiry, question answer, demonstration, collaborative teaching approach and problem-solving method.

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4.2 Specific Instructional Techniques

The specific teaching and learning techniques (unit - wise) are listed below:

Units	Activities and Instructional Techniques	Teaching Hours (48)
I	Discussion and presentation	6
II	Problems solving and Project work in group and group presentation.	5
III	Problem solving and discussion	7
IV	Question answer and discussion in group	6
V	Assignment and Group discussion	10
VI	Project work in group and individual and problem solving	9
VII	Discussion and Questions answer	5

5. Evaluation

5.1 Internal Evaluation: (40%)

Internal evaluation will be conducted by subject teacher based on the following aspects:

- Attendance 5 marks
- Participation in learning activities 5 marks
- First assignment 10 marks
- Second assignment 10 marks
- Third assignment 10 marks

Total 40 marks

5.2 External Evaluation (60%)

The examination section of Dean Office , Faculty of Education will conduct final examination at the end of the first semester .The type of questions and marks allocated for each question will be as follows :

- Objective questions (multiple choice) 10 x 1 mark = 10 marks
- Short answer questions (with two or) 6 x 5 marks = 30 marks
- Long answer questions (with 1 or) 2 x 10 marks = 20 marks

Total = 60 marks

6. Reference Books

Burton, D.M. (2011). *Elementary number theory.* The McGraw-Hill Companies, Inc. (Chapter III)

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Goyal, J. K & Gupta, K. P. (2006). *'Advance course in modern algebra (11th ed.).* Meerut: Pragati Prakashan Educational Publisher.

Mittal P. K. (2007). *Analytical geometry,* Delhi: Vrinda Publication (P)LTD.

Maskey, S. M. (2002). *First Course in Graph Theory*. Kathmandu: Ratna Pustak Bhandar.

Bell, H.F. (1978). *Teaching and learning mathematics*. WMC Brown Company.

Das, B. C. & Mukharjee, B. (1984). *Differential Calculus*. Calcutta: U N Dhur and Sons Pvt Ltd.

Sharma, J. N. (1991). *Functions of a complex variable*. Krishna Prakashan Media.

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