

Hemchandracharya

North Gujarat University

Patan

Syllabus

for

Mobile Communication

Under the

Community College Scheme

Enforced from June-2014

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY
SYLLABUS FOR MOBILE COMMUNICATION
(Enforced from June - 2014)

OBJECTIVES:

The main objectives of the scheme are:

- (i) To make higher education relevant to the learner and the community;
- (ii) To integrate relevant skills into the higher education system;
- (iii) To provide skill based education to **students currently pursuing higher education** but actually interested in entering the workforce at the earliest opportunity;
- (iv) To provide employable and certifiable skills with necessary general education to Senior Secondary School pass-outs not willing to join existing higher education system;
- (v) To provide for up-gradation and certification of traditional / acquired skills of the learners irrespective of their age;
- (vi) To provide opportunities for community-based life-long learning by offering courses of general interest to the community for personal development and interest;
- (vii) To provide opportunity to move to higher education in future; and
- (viii) To offer bridge courses to certificate holders of general / vocational education, so as to bring them at par with appropriate NVEQF level

CC (MB.) R. 1

Any person who has taken the 10+2 qualification from recognized as equivalent there to may be admitted to the examination for the Course of Mobile Communication, after having fulfilled the requirements as laid down by the University and UGC from time to time.

CC (MB.) R. 2

A candidate, who are the regular student any of the course from any of the university he can take admission in CC and get skill up gradation knowledge.

CC (MB.) R. 3

The CC (MB) Programme is a part time course and consists of One Entry level and many exit level like

Certificate Course	–	03 Months	(Module – I)
Advanced Certificate Course	–	06 Months	(Module –I + II)
Diploma Course	-	01 Year	(Module – I + II + III)
Advanced Diploma	-	02 Years	(Module – I + II + III + IV)

Module – I

Certificate Course – Mobile Communication (Duration – 3 Months)

Sr. No.	Subject	Credit	Hours	Internal Examination	External Examination		Total
					Theory	Practical	
1	Basic Telecomm and Earthing System	03	45	30	70	---	100
2	Basics of Electronic Components	03	45	30	70	---	100
3	Wireless & Cellular Communications-II	03	45	30	70	---	100
4	Basic Mathematics-1	03	45	30	70	---	100
5	Computer Application-I	03	45	30	50	20	100

Advanced Certificate Course – Mobile Communication (Duration – 6 Months)

Module I + Module – II

Module – II (03 Months)

Sr. No.	Subject	Credit	Hours	Internal Examination	External Examination		Total
					Theory	Practical	
1	Telephone Exchange switching Theory- I	03	45	30	70	---	100
2	Wireless & Cellular Communications-II	03	45	30	70	---	100
3	Repairing	03	45	30	70	---	100
4	Basic Mathematics-II	03	45	30	70	---	100
5	Computer Application-II	03	45	30	50	20	100

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CC-MC R1: Eligibility Criteria (EC) for Admission

1. The eligibility condition to the program will be 10+2 or equivalent.
2. If the candidate has attained the specific level 4 of NOS of Fashion Industry sector (by decision of equivalence committee of the college) can get admitted in B. Voc. for the programme
3. There is no age bar for admission to Community College
4. The student can take exit from this course at any point of time and get re-entry in this programme.

Such students will get priority in admission than to a fresher student. (multi entry & multi exit scheme)

CC- MC R2: Admission Procedure

1. For admission to the programmes offered, preference should be given to the learners living in the local community. Reservation to SC,ST, OBC and PWD categories will be available as per the extant national / State policy.
2. Admission may be done on a rolling basis depending on the duration of the programmes to facilitate a steady stream of learners joining the college and moving out as trained work force to the job market, round the year and not just once in a year.
3. The applicants seeking re-entry into the college should get preference in admission over the new applicants.
4. Candidates are selected on the basis of Merit.

CC- MC R3 : Fees and Scholarship

1. Student fee should be decided as per the prevalent practice for fee fixation for aided courses.
2. Attempt should be made to recover part of the operating expenditure from the student fees.

3. In order to motivate students to join courses under the scheme, an amount of Rs. 1,000/- per month should be provided to the students under this scheme. This should be paid based on satisfactory attendance.

CC- MC R4 : Registration / Enrollment :

1. Every student admitted to the college for the programme must get enrolled to university within a month from the date of admission.

CC- MC R5 : Semester Examinations

1. Candidates desirous of appearing at any semester examination shall have to submit applications in the prescribed form, through the designated authority on or before the prescribed date.
2. No candidate will be admitted to any Semester examination unless the Designated Authority i.e. the Head of the Department or Principal of the College certifies that :
 - (i) The candidate attended the course of study to the satisfaction of the designated authority.
 - (ii) The candidate maintained a good conduct and character during the studies.
 - (iii) The candidate maintained minimum 80% attendance in each semester.

CC- MC R6 : Evaluation

1. Appropriate mechanism for assessment of the learners' progress towards acquisition of knowledge and skill should be developed by the College. Partner industries should also be given a clear and well defined role in the assessment of the learners.
2. Practical or hands on skills should be given comparatively more weightage in the overall assessment plan.
3. The CC should adopt and integrate the guidelines and recommendations of the respective Sector Skill Councils (SSCs) for the assessment and evaluation of the vocational component, wherever required. They should also involve the SSCs in the assessment process, wherever required. It applies to colleges, both Autonomous and non-autonomous and university to maintain Occupational Standards and the fitness for the job.

4. Theory of each CORE paper will be evaluated for a maximum of 100 marks out of which, 30 marks shall be for Continuous evaluation (Exams) and 70 marks for the end semester examination shall be of 2 hours duration.
6. Each Elective paper is evaluated for a maximum of 70 marks which will be evaluated internally by continuous evaluation.

CC- MC R7 : Rules for grading & Semester Passing Scheme

As per UGC Guidelines and Hemchandracharya North Gujarat University Rules

CC- MC R 8: Award of degree

1. Award of Certificate, Advanced certificate, Diploma or Advanced Diploma, as the case may be, would depend on acquisition of requisite credits as prescribed by the certification body and not on the calendar time spent in pursuing the course.
2. The certificate shall mention the credits earned course duration (in hours), and the curriculum covered. If the course is aligned with NVEQF / NSQF , the corresponding NVEQF / NSQF Level should also be mentioned on the certificate.

3. Award of degree will be as follows.

NVEQF Level	Skill Component Credits	General Education Credits	Normal Calendar Duration (Post meeting the entry criterion)	Awards
6	72	48	Four Semester	Advanced Diploma
5	36	24	Two Semester	Diploma
	18	12	One Semester	Advanced Certificate
	9	6	Three Months	Certificate

Detailed Syllabus

Module – I

1 DIGITAL COMMUNICATION PRINCIPLES

Fundamental of Telecommunications: Transmission media: Guided and Unguided, Twisted pair cable (STP & UTP), Coaxial cable, fiber optic cable, radio waves, infrared, microwaves links & Satellite Communication. Propagation of signals at HF, VHF, UHF and microwave frequencies, Access- WILL/RILL, DECT, FITL, WAN-Frame Relay, ATM.

Analog and Digital Communications: Fundamentals of signals, signal transmission and media, modulation & demodulation in analogue and digital systems, Sampling and data reconstructions, Quantization & coding, Time division and frequency division multiplexing, Basic information theory, Equalisation, amplification, crosstalk, attenuation. Digital Signal Processing: Discrete time signals and systems Z- transforms. Structures for digital filters. Frequency Transformations: Linear phase design. Introduction to DFT. Errors in digital filtering.

2 Basic Electronic Components - I

Unit – I Circuit Concepts

Electrical Quantities, Lumped Circuit Elements, Kirchhoff's Laws, Meters and Measurements, Analogy between Electrical and other Non-Electrical Physical Systems

Unit – II Circuit Analysis Techniques:

Thevenin and Norton Equivalent Circuits, Node-Voltage and Mesh-Current Analysis, Superposition and Linearity, Wye-Delta Transformation, Computer Aided Circuit Analysis

Reference Books:

1. Introduction to Electrical Engineering, M S Sarma, Oxford University Press

3 Wireless & Cellular Communications-I

UNIT I Introduction To Wireless / Cellular Communications And Standards

History and Evolution of mobile radio systems. Types of mobile wireless services/systems - Paging, Cordless, WL, Cellular Systems, WL, Satellite systems. Standards overview: AMPS, GSM, CDMA (IS-95), DECT, 3G – UMTS Network Architecture.

25%

Unit II - Cellular Concept And System Design Fundamentals

Cellular Concept and Frequency Reuse, Multiple Access Schemes, Channel Assignment, Handoff, Interference and System Capacity- Improving Coverage Capacity in Cellular Systems. Trunking and Erlang Capacity - Calculations.

30%

Unit III - Mobile Radio Propagation

Large Scale Path Loss : Introduction to Radio Propagation, Basic Propagation Mechanism, Propagation models (Free Space Propagation Model, Outdoor Models, Indoor Propagation Models), Small Scale Fading : Small Scale Multipath Fading, Types of Small Scale Fading and Parameters of Mobile Multipath Channels.

45%

REFERENCES

1. Kaveh Pahlavan & Allen H. Levesque, "Wireless Information Networks", by John Wiley & Sons, 2005.
2. William Stallings, "Wireless Communication & Networking", Pearson Education Asia, 2010.
3. Gordon L. Stuber, "Principles of Mobile Communication", Springer, 2011.

4 Basic Mathematics-I

I SET THEORY 40%

Sets, types of sets, subset, power set, null set, universal set, equality of two sets, complement of a set, union and intersection of sets, difference of two sets, Venn diagram law of algebra of sets, De Morgan Laws, Cartesian product of two sets and number of elements in a finite set.

II REAL NUMBER SYSTEM 20%

Definition of Natural numbers, Integers, Rational numbers & irrational numbers, Real numbers- absolute value and its properties.

II FUNCTION : 40%

Concepts of a function, domain, co-domain and range of a function, constant functions, real functions, different functions and their graphs - linear function, quadratic function, polynomial function, rational function, exponential function and logarithmic function, function in economic theory (demand, supply, consumption, revenue and cost function) equilibrium price.

Reference Books:

1. Business Mathematics, V. K. Kapoor, Sultan chand and sons, New Delhi.
2. Business Mathematics, Allen R. G. D., Pitamber publication house.
3. Quantitative Techniques in Management, Vohra N. D., Tata MacGraw –Hill Publishing Company, New Delhi.
4. Elements of Business Mathematics by Soni, Sharma and Saxena (Pitamber Publication)
5. Mathematics for Management and Computer Applications, Sharma J. K. , Galgotia Private Limited, New Delhi.

5 Computer Applications-I

I Introduction to Computers, Operating System, Windows & its Utilities

Computer system components, Input devices, Output devices, storage, devices, computer storage elements, types of computer, Applications of computers, advantages of using computer. Operating System: Introduction to operating system, Types of User Interfaces, Functions of Operating Systems Types of Operating Systems, Booting Process, Introduction to Windows, features of Windows, various versions, Components Of Windows Internet and Outlook : Internet and intranet , Most popular internet services, Functions of Internet like email, WWW, FTP, Usenet, IRC, instant, messaging, Internet Telephony Managing emails, Using address book, Working with task list, Scheduling appointments. **50%**

II MS Word

MS Word: Creating, navigating and editing Word documents, Formatting text of a document, Formatting , viewing and printing a document, Inserting and removing page breaks, Insert Header and footers, Viewing a document, Page set up of a document, Printing a document, Working with tables and graphics, Working with objects, Mail merge and labels, Spelling and grammar tools, Autocorrect, Auto text, Auto format, Inserting endnotes and footnotes, Working with columns, Inserting comments, Creating index and tables from the content of document, Counting words, Macros, Saving document with passwords. **50%**

University Examination Scheme (70-Marks) :

Theory Examination: 35 Marks

Practical Examination: 35 Marks

Reference Books:

1. PC Software, R. K. Taxali, Tata MacGraw Hill Publishing Company.
2. Working with Personal Computer Software (2nd Ed.) – R.P.Soni, Harshal Arolkar, Sonal Jain, Wiley –India Publications.
3. O-level- Module-I, II & III, Satish Jain, Sashank Jain, Sashi Singh & Dr. Madhulika Jain, BPB Publication.
4. Office 2003 in simple steps- Dreamtech Press.
5. Jain, V.K.; *Computers and Beginners*.

Module – II

1 Telephone Exchange switching Theory - I

- a) Intelligent Network and Services: Overview of Intelligent Network architecture and functions of SSP, SCP, SMP, IP etc., Various types of IN services, Access codes for various IN services etc.
- b) Signaling Systems including CCS#7: Various signaling systems being used in the department for local and trunk network such as E/M, R2 modified, CCS#7 etc.
- c) ISDN: Overview of OSI layer, ISDN introduction and services, customer premises equipment
- d) Long Distance Switching: Overview of national transmission and signaling / synchronization plans.

2 Wireless and Cellular Telecommunications

Unit I - Modulation And Signal Processing 50%

Overview of Analog and Digital Modulation Techniques, Equalization – Classification, algorithms for Adaptive Equalization, Diversity Techniques, Rake Receiver Concepts. Fundamentals of Chanel Coding.

Unit II - Intelligent Network For Wireless Communication 50%

Intelligent Cell Concept, Application for intelligent microcell Systems, In-Building Communication, MIMO, Advanced Intelligent Network(AIN) for Mobile Communication, Mesh Network / Adhoc Network – Introduction to Cooperative Communication Networks – Body Area Networks – Cognitive Radio Networks – Wireless Sensor Networks.

REFERENCES

1. Kaveh Pahlavan & Alen H. Levesque, “Wireles Information Networks”, by John Wiley & Sons, 205.
2. Wiliam Stalings, "Wireles Communication & Networking", Pearson Education Asia, 2010.
3. Gordan L. Stuber, “Principles of Mobile Communication”, Springer, 2011.

3 Repairing

The course is divided into three parts -

1. Theory
2. Practicals
3. Practice

Hardware :

50%

- * Basics of Mobile Communication.
- * Tools & instruments used in mobile phone repairing.
- * Various components used in mobile phones.
- * Basic parts of mobile phones (mic, speaker, buzzer, LCD, antenna, etc).
- * Use of Multimeter.
- * Use of Battery Booster.
- * Basic Circuit Board/ Motherboard Introduction.
- * Assembling & disassembling of different mobile phones.
- * Soldering & Desoldering Components Using Different Soldering Tools.
- * Names of Different ICs.
- * Work of Different ICs.
- * Working on SMD/ BGA ICs and the PCB.
- * Fault finding & Troubleshooting.
- * Jumpering Techniques.
- * Troubleshooting through circuit diagrams.
- * Repairing procedure for repairing different hardware faults.

Software :

50%

- * Flashing
- * Formatting
- * Unlocking
- * Use of secret codes
- * Downloading
- * Bluetooth/ infrared

4 Basic Mathematics-II

III DETERMINANT AND MATRIX

50%

Meaning of matrix and types of matrices- Null matrix, square matrix. Identity matrix, symmetric matrix and skew symmetric matrix, transpose of a matrix, orthogonal matrix, addition, subtraction and multiplication of matrices, determinants and their basic properties (without proof), singular and non singular matrices, inverse of a matrix, adjoint of a matrix, solution of simultaneous equations (for two and three variables only) using inverse of matrix.

III CO-ORDINATE GEOMETRY

50%

Co-ordinate of points, slope and intercepts of a straight line, equation of a straight line, different forms of equations of a straight line - (1) $\frac{y-y_1}{y_1-y_2} = \frac{x-x_1}{x_1-x_2}$. (2) $y-y_1 = m(x-x_1)$. (3) $y = mx + c$ (4) $\frac{x}{a} + \frac{y}{b} = 1$. General equation of a straight line, concurrent lines, angle between two straight lines, distance between two points area of a triangle and quadrilateral, collinearity of three points.

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1. Business Mathematics, V. K. Kapoor, Sultan chand and sons, New Delhi.
2. Business Mathematics, Allen R. G. D., Pitamber publication house.
3. Quantitative Techniques in Management, Vohra N. D., Tata MacGraw –Hill Publishing Company, New Delhi.
4. Elements of Business Mathematics by Soni, Sharma and Saxena (Pitamber Publication)
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5 Computer Application - II

I MS Excel

50%

Introduction To Excel, Concept of workbook, worksheet, workspace, Types of data, Formatting workbook, Sorting Data Advanced Excel , Data validation, Data filter (Auto & Advance), Charts, What if analysis, Protecting Worksheet. **25%**

Functions and formulas:

1. Mathematical: Round, ceil floor, fact, subtotal, sum , sum if
2. Logical : AND, OR, NOT, if
3. Statistical: Min, max, avg, count if
4. Text: Concatenate, Exact, find, left, right, lower, upper, trim
6. Date and Time: Date, day, days360, hours, minute, now, second, time, today, year, date
7. Financial Functions: FV, IPMT, NPER, NPV, PMT, PV, Rate Data analysis : Standard deviation, Variance correlation, z-test, Chi-square).

II MS PowerPoint

50%

Creating , browsing & saving Presentation, Editing & formatting slides, Linking multiple slides using hyperlinks and advance buttons, Using slide layouts, Adding notes to the slides, Editing and formatting slides, Working with slide masters, Inserting objects on the slide, Animating objects, Slide transitions, Choosing preset animations, Triggering animations, Applying sound effects to animation effects, Playing videos, Slide show, Custom Show **25%**

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Level should also be mentioned on the certificate.

Module-III (Six Months)

Sr. No.	Subject	Credit	Hours	Internal	External		Total
					Theory	Practical	
1	Wireless Communication	6	90	30	35	35	100
2	Wireless Networks	6	90	30	35	35	100
3	Mobile communication System	6	90	30	35	35	100
4	Mobile Network and Transport Layers	6	90	30	35	35	100
5	Business Mathematics-I	4	60	30	70	---	100
6	Communication Skill-II	4	60	30	35	35	100
7 ₄	MS Access	4	60	30	35	35	100
8	Survey Based Project	4	60	---	---	100	100

Module - III

1 WIRELESS COMMUNICATION

Cellular systems- Frequency Management and Channel Assignment- types of handoff and their characteristics, dropped call rates & their evaluation -MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks

2 WIRELESS NETWORKS

Wireless LAN – IEEE 802.11 Standards – Architecture – Services – Mobile Ad hoc Networks- WiFi and WiMAX - Wireless Local Loop

3 MOBILE COMMUNICATION SYSTEMS

GSM-architecture-Location tracking and call setup- Mobility management- Handover- Security-GSM SMS –International roaming for GSM- call recording functions-subscriber and service data mgt –Mobile Number portability -VoIP service for Mobile Networks – GPRS –Architecture-GPRS procedures-attach and detach procedures-PDP context procedure-combined RA/LA update procedures-Billing

4 MOBILE NETWORK AND TRANSPORT LAYERS

Mobile IP – Dynamic Host Configuration Protocol-Mobile Ad Hoc Routing Protocols– Multicast routing-TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing-Selective Retransmission – Transaction Oriented TCP- TCP over 2.5 / 3G wireless Networks

5 Business Mathematics-I

SET THEORY

Sets, types of sets, subset, power set, null set, universal set, equality of two sets, complement of a set, union and intersection of sets, different of two sets, Venn diagram law of algebra of sets, De Morgan Laws, Cartesian product of two sets and number of elements in a finite set.

FUNCTION :

Concepts of a function, domain, co-domain and range of a function, constant functions, real functions, different functions and their graphs - linear function, quadratic function, polynomial function, rational function, exponential function and logarithmic function, function in economic theory (demand, supply, consumption, revenue and cost function) equilibrium price.

DETERMINANT AND MATRIX

Meaning of matrix and types of matrices - Null matrix, square matrix. Identity matrix, symmetric matrix and skew symmetric matrix, transpose of a matrix, orthogonal matrix, addition, subtraction and multiplication of matrices, determinants and their basic properties (without proof), singular and non singular matrices, inverse of a matrix, ad joint of a matrix, solution of simultaneous equations (for two and three variables only) using inverse of matrix.

LIMIT

Limit as a function, limit of sum, product and quotient of two functions and their uses in evaluating limits, use of the standard forms (without proof)

6 Business Communication – I

Grammar : Tense, Voice and Modals

Vocabulary : Phrasal Verbs, Synonyms, Antonyms, Idioms, Commercial Terms (Business jargons).

Communication Theory :

Process of Communication

Characteristics of Business Communication

Importance of Business Communication

Business Communications :

- a. Format and Layouts of business letters
- b. Letter writings for followings; Enquiries and Replies, Placing of orders, Execution of orders, denying of orders/ offers.

Practical Examination:

- Listening Comprehension
- Group discussion and individual speaking
- Listening
- Journal Writing (Review of at least one short story/Biography of business leaders and two Articles form the leading business news papers).

7 MS Access

Access Basics

Design a Database

Build a Database

Work with Forms

Sort, Retrieve, Analyze Data

Work With Reports

Access with Other Applications

Manage an Access Database

