

**CURRICULUM OF
B.TECH. DEGREE PROGRAMME IN BIOMEDICAL
TECHNOLOGY (BMT)**

COURSE OUTLINE FOR THE PROGRAMME

YEAR ONE: HARMATTAN SEMESTER

<i>Course No</i>	<i>Title</i>	<i>L</i>	<i>T</i>	<i>P</i>	<i>Units</i>
GST 101	Use of English I	1	1	0	2
GST 103	Humanities	1	0	0	1
MTH 101	Elementary Mathematics I	3	1	0	4
PHY 101	General Physics I	2	1	1	4
CHM 101	General Chemistry I	3	0	1	4
BIO 103	Biology for Agric & Biological Science I	2	0	1	3
ENG 101	Workshop Practice I	0	0	1	1
ENG 103	Engineering Drawing I	0	0	1	1
FRN101/IGB101	Introduction to French / Igbo	1	0	0	1
	Total	13	3	5	21

YEAR ONE: RAIN SEMESTER

<i>Course No</i>	<i>Title</i>	<i>L</i>	<i>T</i>	<i>P</i>	<i>Units</i>
GST 102	Use of English II	1	1	0	2
GST 108	Social Sciences	1	0	0	1
GST 110	Science, Technology, Society	1	0	0	1
MTH 102	Elementary Mathematics II	3	1	0	4
PHY 102	General Physics II	2	1	1	4
CHM 102	General Chemistry II	3	0	1	4
BIO 104	Biology for Agric & Biological Science II	2	0	1	3
ENG 102	Workshop Practice II	0	0	1	1
ENG 104	Engineering Drawing II	0	0	1	1
FRN102/IGB102	Introduction to French / Igbo	1	0	0	1
	Total	13	3	5	21

YEAR TWO: HARMATTAN SEMESTER

<i>Course No</i>	<i>Title</i>	<i>L</i>	<i>T</i>	<i>P</i>	<i>Units</i>
GST 211	Nigerian and African Culture	1	0	0	1
CSC 201	Computer and Applications	1	1	1	3
ENG 213	Engineering Mechanics I (Statics)	1	0	1	2
ENG 221	Electrical and Electronic Engineering I	2	0	0	2
ENG 219	Bioengineering Materials I	2	0	0	2
HST 201	Human Anatomy I	1	0	1	2
BCH 201	General Biochemistry	2	0	1	3
STA 211	Introduction to Statistics and Probability	1	1	0	2
MCB 201	General Microbiology	1	0	1	2
BMT 241	Biomedical Mathematics I	1	1	0	2
BMT 203	Human Physiology I	1	0	1	2
BMT 201	Introduction to Biomedical Technology	1	0	0	1
	Total	15	3	6	24

YEAR TWO: RAIN SEMESTER

<i>Course No</i>	Title	L	T	P	Units
ENG 224	Engineering Mechanics II (Dynamics)	1	0	1	2
ENG 226	Electrical & Electronic Engineering II	1	0	1	2
ENG 228	Bioengineering Materials II	1	0	1	2
BMT 204	Human Physiology II	1	0	1	2
BCH 202	Medical Biochemistry	1	0	1	2
BMT 222	Excitable Tissues and Electrophysiology	1	1	1	3
CHM 204	Organic Chemistry for Health Professionals	2	0	1	3
BMT 212	Human Anatomy II	1	0	1	2
BMT 242	Biomedical Mathematics II	1	1	0	2
MGT 206	Health Psychology	1	1	0	2
	Total	11	3	8	22

LONG VACATION FOLLOWING YEAR TWO

<i>Course No</i>	Title	L	T	P	Units
SIWES 200	SIWES	0	0	2	2

YEAR THREE: HARMATTAN SEMESTER

<i>Course No</i>	Title	L	T	P	Units
ENS 301	Introduction to Entrepreneurship & Innovation	1	0	1	2
ENG 319	Thermo-fluids for Health Professionals	2	0	1	3
PTE 301	Polymer Chemistry	2	0	0	2
HST 301	General Pathology	2	0	0	2
HST 303	Introduction to Pharmacology	2	0	0	2
BMT 391	Biomedical Technology Practicum I	0	0	1	1
BMT 331	Biomedical Electronics I	2	0	0	2
BMT 333	Biomedical Instrumentation I	2	0	0	2
BMT 301	Professionalism, Ethics and Code of conduct	1	0	0	1
BMT 315	Medical Genetics I	1	1	0	2
BMT 311	Healthcare Technology Planning	1	0	0	1
BMT 371	Introduction To Biomedical Physics	1	0	0	1
	TOTAL	17	1	3	21

YEAR THREE: RAIN SEMESTER

<i>Course No</i>	Title	L	T	P	Units
HST 304	Statistics for Health Technology	1	1	0	2
ENS 302	Business creation growth and corporate governance	1	0	1	2
BMT 302	Biomedical System Analysis	1	1	0	2
BMT 322	Introduction to Sports Medical Technology	2	0	1	3
BMT 312	Introduction to Clinical studies	1	0	1	2
BMT 334	Biomedical Instrumentation II (Signal Processing)	1	0	1	2
BMT 332	Biomedical Electronics II	1	0	1	2
BMT 352	Introduction to Human Biotechnology	1	0	1	2
BMT 372	Biomedical Radiation Technology	1	1	0	2

BMT 310	Medical Genetics II	1	1	0	2
BMT 392	Biomedical Technology Practicum II	0	0	1	1
	Total	11	4	7	22

YEAR FOUR: HARMATTAN SEMESTER

<i>Course No</i>	Title	L	T	P	Units
ENG 407	Biomedical Devices and Mechanisms	1	0	1	2
ENG 409	Human Biomechanics	1	0	1	2
HST 401	Health Management Information Systems	2	0	0	2
BMT 493	Research Methods in Biomedical Technology	1	1	0	2
BMT 421	Ergonomics, Environmental Hazards and Laboratory Safety	3	0	1	4
BMT 461	Introduction to Clinical & Rehabilitation Engineering	2	0	0	2
BMT 491	Industrial Visits and Seminars	0	0	1	1
BMT 441	Ambulatory Technology and e-Health	1	0	1	2
BMT 495	Biomedical Technology Practicum III	0	0	1	1
	Total	11	1	6	18

YEAR FOUR: RAIN SEMESTER

<i>Course No</i>	Title	L	T	P	Units
SIW 400	Biomedical Engineering Internship/Industrial Training (Long Vacation Internship/SIWES programme in relevant industries/hospitals)	0	0	6	6
	Total	0	0	6	6

YEAR FIVE: HARMATTAN SEMESTER

<i>Course No</i>	Title	L	T	P	Units
ENG 501	Biomedical Devices Design	1	0	1	2
ENG 503	Manufacturing Processes	1	0	1	2
ENG 521	Biomedical Equipment Maintenance Management I	1	0	1	2
BMT 523	BMT Seminars	0	0	1	1
BMT 551	Genetic and Tissue Engineering	1	0	1	2
BMT 541	Biomedical Informatics	1	0	1	2
BMT 591	Project Proposal Writing and Presentation	0	0	1	1
BMT 593	Biomedical Laboratory Practicum IV	0	0	1	1
BMT 581	Disabilities and Assistive Technologies	1	0	1	2
	Electives (minimum of 2)	2	0	2	4
	Total (minimum)	8	0	11	19

Elective Courses (select a minimum of 4 units)

<i>Course No</i>	Title	L	T	P	Units
BMT 531	Biomedical Telemetry	1	0	1	2
BMT 553	Bioprocess Technology	1	0	1	2
BMT 555	Pharmaceutical Technology	1	1	0	2
BMT 561	Clinical Deformities and Management	1	0	1	2
BMT 511	Introduction to Forensic Science and Mortuary Technology	1	0	1	2

BMT 533	Intensive Care and Clinical Instrumentation	1	0	1	2
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YEAR FIVE: RAIN SEMESTER

<i>Course No</i>	Title	L	T	P	Units
BMT 522	Equipment Reliability and Safety Technology	1	1	0	2
ENG 524	Biomedical Equipment Maintenance Management II	1	0	1	2
BMT 542	Computer-Aided Design of Biomedical Equipment	1	0	1	2
BMT 572	Clinical Imaging Technology	1	0	1	2
BMT 598	Final Year Project & Oral Examination	0	0	6	6
	Electives (minimum of)	2	0	2	4
	Total (minimum)	6	1	11	18

Elective Courses (select a minimum of 4 units)

<i>Course No</i>	Title	L	T	P	Units
BMT 552	Introduction to Nanotechnology	1	1	0	2
BMT 562	Issues in Clinical Engineering Technology	1	1	0	2
BMT 584	Design of Artificial Organs & Assistive Technologies	1	0	1	2
BMT 582	Indigenous Biomedical Technologies	1	0	1	2
BMT 546	Medical Robotics and Computer Assisted Surgery	1	1	0	2

2.0 COURSE DESCRIPTION FOR THE B. TECH. PROGRAMME

GST 101 Use of English I [1, 1, 0. (2)]

Use of Library, Use of words and sentence construction. Functions of sentences, purpose structure, and correct use of Verbs (Action words), word order and punctuation. Essay/Composition Writing, Paragraphs structure, function, links and style. E.g. Letter writing, layout of a business letter, technical reports including terms of reference, drafting and editing of reports.

GST 102 Use of English II [1, 1, 0. (2)]

Comprehension and interpretation reading efficiency of technical and non-technical material. Note taking; techniques of note taking from reading and from lectures, precise writing or summarizing methods technical vocabulary, word formation, use of classical terms and affixes, special terms, acronyms, new words, definitions by example synonym or antonym, analytic or operational definitions, basic words in fields of specialization, e.g. mechanical, electrical, civil, aeronautical, automobile engineering, metallurgy, mathematics.

GST 103 Humanities [1, 0, 0. (1)]

The nature and the scope of economics. The Nigerian political system: policy and means of production in Nigeria. The structure of the Nigerian economy aspect of economic and technological dualism; internal migration rural to urban migration and the informal sector. The role of capital growth and development; public investment criteria; choice of “appropriate” or “relevant” technology. Human resources development in Nigeria labour utilization education and manpower development and planning. Agriculture in the development process; land tenure and reform, agricultural technology and green revolution and integrated rural development. Industrialization: role and types of industries, choice of techniques import substitution, and export expansion. The economic role of the government, government expenditure and taxation; the financial system, problems of development planning and plan implementation in the federal system of government, prospects of the Nigerian economy.

GST 108 Social Science [1, 0, 0. (1)]

Introduction: The nature and scope of politics and economics. Definition of basic concept in economics and political science Nigeria's public Sector: the political set up in Nigeria. The civil service structure, public investment and economic infrastructure. The economic role of government: government expenditures and revenues, fiscal federalism and revenue allocation.

Nigeria's Private Sector: The financial system in Nigeria. The role of sector and public investment in Nigeria, National Development Planning – problems and prospects, aspects of economic and technological dualism. Political and Economic future of Nigeria. A global perspective of economics; economic system and development nations' economies. International trade and economic development; balance of payment, commercial policies of Nigeria and other developing countries. Economic integration; state and structure of economies of ECOWAS countries, the ECA and Economics Co-operation in Africa. Foreign aid and investments: the multinational corporations, technological transfer and technological economic order. World Global inter dependence and the new international economic order. World economic crisis-energy and OPEC, food storage and armament.

GST 110 Science, Technology and Society [1, 0, 0. (1)]

The scientific Evolution of man science, need for science, history of science, classifications, modern scientific methods; Science and man's environment Terrestrial and cosmic life; Harnessing science climate and vegetation. Production, processing, conservation, distribution; Energy resources solar thermal, nuclear energy fossil fuels, estimate of energy reserve in Nigeria. Key Revolution in technology; technology, electronics and computer technology, robotics and cybernetics, every day application; technology history of technology evolution/practice in Nigeria; role of technology in the national economy; Education for technology past, present and future; constraints in the use of New technology products reliability quality control, cost effectiveness, politics and environment; effects of mechanization, consumerism, Social implication of Scientifics advances science in the civilization of man, science and culture, environmental pollution; Social implications of technological research and advance e.g. displacement of man by machines, space travels, threat of nuclear and neutron war, genetic research, energy crisis; Ethics in technology_ ethics, professionalism, legal aspects.

MTH 101 Elementary Mathematic I [3, 1, 0. (4)]

Numerical systems. Indices. Surds and Logarithms. Polynomials, Remainder and factor theorems. Polynomial equations. Rational functions. Partial fractions. Fields. Ordered fields. Inequalities. Mathematical induction. Permutations and combinations. Binomial theorem. Sequences and series. The quadratic equation and function. Relation between the roots and the coefficients. Complex numbers. Addition, subtraction, multiplication and division. Arg and diagram De-Moivre's theorem, n'th roots of complex numbers. Elementary set theory. Venn diagrams and applications of de-Morgan's laws, Trigonometry. Elementary properties of basic trigonometric functions. Addition formulae. Area of Triangle. Solution of trigonometric equation. Inverse trigonometric functions. Functions, Concept and Notation. Examples. Composition. Exponential and logarithmic functions. Graph and properties limits and continuity. Techniques for finding limits. The derivatives Calculation from first principle. Techniques of differentiation. Chain rule. Higher order derivations. Extremum problems. Means value theorem. Applications. Indeterminate forms and L' Hospital's rule. Taylor's and Maclaurin's series. Curve sketching. Integration as the reverse of differentiation, as area, as limit of finite sums. Definite integrals. Properties of definite integrals. Applications.

MTH 102 Elementary Mathematics I [3, 1, 0. (4)]

Transcendental functions. Hyperbolic functions. Inverse functions. Logarithmic differentiation. Methods of integration. Integration of rational functions. Integration by substitution. Integration by parts. Improper integrals. Applications. Areas and volumes. Center of mass. Ordinary differential equations. First-order equations with variables separable. First order linear equation. Second order homogenous equations with constant coefficients. Applications. Plane analytic geometry. Rectangular Cartesian co-ordinates. Distance between two points. The straight line. Loci. The circle, parabola, ellipse and hyperbola. Second degree curves. Plane polar co-ordinates. Vectors. Vector functions and their derivatives. Velocity and acceleration. Matrix algebra. Addition and multiplications. Transpose. Determinants. Inverse of non-singular matrices. Crammer's rule and application to the solution of linear equations, (Examples should be limited to $m \times n$ matrices where $m = 1, 2, 3$, etc). Transformation of the plane. Translation, reflection, rotation, enlargement. Composition of transformations. Invariant points and lines.

PHY 101 General Physics I [2, 1, 1. (4)]

Mechanics: Space and time units and dimensions; vectors; kinematics, Newton's law; Galileo invariance, statics and dynamics of particles; universal gravitation, work and potential energy, conservation of energy and momentum; rigid bodies, fluid mechanics. Thermal properties; including elementary thermodynamics and kinetics theory.

PHY 102 General Physics II [2, 1, 1. (4)]

Electricity and Magnetism: Electrostatics; conductors and currents; dielectrics; magnetic fields and induction; Maxwell's equations; electromagnetic oscillations and waves. Geometrical Optics: Geometrical methods applied to the optics of mirrors, lenses and prisms.

CHM 101 General Chemistry I [3, 0, 1. (4)]

Atomic structure and the periodic classification of the elements; ionic and covalent bonding including the effect of dipole interacting of physical properties. Redox reactions and the concept of Oxidation numbers; introduction to gas kinetics; introduction to nuclear chemistry. Solids and lattices structure; acid-base reactions general principles of extraction of metals.

CHM 102 General Chemistry II [3, 0, 1. (4)]

Physical and chemical equilibrium, elementary electrochemistry and chemical kinetics. Survey of reactions of function group in aliphatic and aromatic compounds. Concept of hybrid bonds. Alkanes, alkenes, alkynes reactions of alcohol and alkyl; halides; addition and elimination reactions of carbon multiple bonds, elimination and substitution in benzene; hydroxyl groups and carbonyl compound, organic acid bases and derivatives.

BIO 103 Biology for Agric and Biological Science I [2, 0, 1. (3)]

Scientific methods and the characteristics of living and non-living things. Cell and Tissue biology. Elements of biological chemistry and cellular metabolism. Taxonomy of living things. Heredity and evolution. Elements of ecology and types of habitats.

BIO 104 Biology for Agric and Biological Science II [2, 0, 1. (3)]

Further scientific methods and the characteristic of living and non-living things. Cell and Tissue biology. Elements of biological chemistry and cellular metabolism. Taxonomy of living things. Heredity and evolution. Elements of ecology and types of habitats.

ENG 101 Workshop Practice I [0, 0 1. (1)]

General: Use of Engineering Measuring instruments Calipers e.g. Vernier calipers; Gauges e.g. Micrometer screw gauge and other devices. Introduction to hand tools, proficiency in the use of wood planer, Hand saw, Sanders and Pattern making.

Sheet metal work: Production of sheet metal products layouts, cutting, shaping, simple bend theory etc.

Introduction to Joining Techniques: Soldering, brazing, fusion welding, fastening and assembly. Basic wood principles and tools finishing and evaluation of finished products.

ENG 102 Workshop Practice II [0, 0, 1. (1)]

Industrial Safety: Safety Code of conduct and safety consciousness. Survey of common sources of accidents in the work place. Accident prevention and control.

Machine Shop Work: Working Component in a Lathe machine instructions in simple metal working processes e.g. shaping, milling, grinding, reaming, metal spinning, design of jigs and fixtures. Introduction of automation in manufacturing visualization fixtures and CAD, automobile works, simple automotive diagnosis and repairs.

Electrical Workshop Practice: Convention and application of colours, codes for cables, resistors etc and signs. Use of simple electrical tools, machines etc.

ENG 103 Engineering drawing I [0, 0, 1. (1)]

Introduction to Engineering Tools. Planning and Layout of Engineering Drawing. Engineering Drawing Concept. Introduction to Dimensioning of circles, holes, radii, tolerancing. Descriptive Geometry, Freehand sketching. Introduction to Drawing/Drafting software and CAD basic tools. Orthographic multi view projection. Construction of plane shapes using CAD Construction techniques. Presentation of Data and results. Using charts, graphs etc by appropriate Computer Software. Further dimensioning, addition of dimension to drawing using CAD.

ENG 104 Engineering Drawing II [0, 0, 1. (1)]

Connections in Engineering Drawing. Introduction to IS Code of Drawing. Conics and Engineering Curves ellipse, parabola, hyperbola, cycloid,

trochoid, involutes. Projection of planes and solids (cube, prism, pyramid, cylinder, cone and sphere). Projection on auxiliary planes. Isometric Projection. Introduction to section drawing and use of CAD Construction techniques. Development and intersection of surfaces. Detail drawing with the addition of machine and surface symbols. Detail drawing with the addition of machine and surface texture symbols. Simple assembly drawing with suitable fits and a part list. Introduction to limits, tolerances. Screw threads, fasteners and springs including keys and key ways.

IGBO 101: Introduction to Igbo Grammar, Composition and Comprehension (1 Credit Unit)

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|---|--|
| <ul style="list-style-type: none"> i. Nkenke nkowa banyere ndi Igbo ii. Nkowa Asusu iii. Njirimara Asusu iv. Uru asusu bara v. Mmalite edemede asusu Igbo vi. Mkparita uka banyere ndi malitere odide na ogugu asusu Igbodika, schon, ida ward, Olauda Equiano, Oldendorp, n’oge ochichi ndi bekee. vii. Ihe mere o jiri dimkpa na aga-akuzi asusu Igbo n’ulo akwukwo anyi ha. | <ul style="list-style-type: none"> iv. Udaume Igbo: Ha di ole? v. Kedu ndi bu udaaru? vi. Kedu ndi bu udamfe? vii. Mgbochiume Igbo; Ha di ole? viii. Mgbochiumenge ix. Mgbochiume Mkpi x. Myiriudaume M na N. |
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| <p>2. MKPURUEDEMEDE IGBO (Otografi Onwu)</p> <ul style="list-style-type: none"> i. Ndeputa na Nguputa mkpuru edemede Igbo na usoro odideya. ii. Mkpuru edemede Igbo ndi obere iii. Mkpuru edemede Igbondi ukwu | <p>3. NKEJIASUSU IGBO</p> <ul style="list-style-type: none"> i. Mkpo aha na omuma atu ya ii. Nju ajuju iii. Nnochicha iv. Onuogugu v. Ngwaa vi. Njiko vii. Mbuuzo viii. Nkowa aha ix. Ntimkpu |
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| <p>4. AKARA EDEMEDE</p> <ul style="list-style-type: none"> i. Nkowa ihe bu akara edemede na kwauru ha bara n’edemede Igbo ii. Kpom-(.) na ebendi a na-etinye ha iii. Rikom - (.) | |
|--|--|

- iv. Rikomelu - (‘)
- v. Kpom Kpom- (:)
- vi. Kpomrikom- (;)
- vii. Akara ajuju - (?)
- viii. Akara mkpu - (!)
- ix. Akara mkpuchi/Akara ngudo- ()
- x Akara uhie -(-)
- xi Akara ngwu - (“ “)

5. NKEBIOKWU IGBO

- i. Gini bu nke biokwu?
- ii. Nkebiokwu di icheiche
- iii. Omuma atu nkebiokwu di icheiche

6. NKEBIAHIRI IGBO

- i. Nkowa ihe bu nkebi ahiri okwu
- ii. Nkebi ahiriokwu di icheiche
- iii. Omuma –atu nkebi ahiriokwu di icheiche

7. AHIRIOKWU IGBO

- i. Nkowa ihe bu ahiri okwu na odidi ha
- ii. Ahiri mfe
- iii. Ahirinha
- iv. Ahiriokwu
- v. Ahirimgbagwo

8. UDI AHIRIOKWU DI ICHE ICHE

- i. Ahirincho
- ii. Ahirinkwusa
- iii. Ahiri nti-miwu

9. ASUSU IGBO DIKA, ASUSU SVO

- i. Omuma atu ahiriokwu ndina-egosiputa aha, ngwa anannara.

10. NKEJIOKWU IGBO

- i. Gini bu nke jiokwu?
- ii. Kedu uzo esi emebe nke jiokwu?
- iii. Udi nke jiokwu ole e nwere

11. NDAKORITA UDAUME

- i. Ginibu nda korita udaume?
- ii. Ndakoritau damfe
- iii. Ndakorita udaaru

12. UDAOLU

- i. Nkowa ihe uda olu putara
- ii. Akaranda elu
- iii. Akaranda ala
- iv. Akaranda nsuda
- v. Omuma atu ha di icheiche
- vi. Itinye akara udaolu n’okwu

13. NTUGHARI

- i. Ihe ntughari putara
- ii. Ihe ejieme ntughari
- iii. Ihe ndi aga-agbado ukwu n’ime ntughari
- iv. Ntughari ihe ogugundi a hoputara

14. EDEMEDE (KOMPOZISHON)

- i. Ginibu edemede?
- ii. Ihendi di mpka maka edemede
- iii. Udi edemede di icheiche
- iv. Ide edemeden’onweya

15. EDEMLETA

- i. Nkowa ihebu ide leta
- ii. Udi leta di icheiche
- iii. Nhazi edemede
- iv. Asusu edemede

16. ATUMATU OKWU

- i. Nkowa ihe bu atumatu okwu
- ii. Mburu
- iii. Myiri
- iv. Mmemmadu
- v. Nsinuuda
- vi. Ahauda
- vii. Nzaraonwe

17. AGHOTA AZAA (AGUOAZAA)

- i. Nkowa ihu bu aghota azaa
- ii. Ihendi ana-elekwasi anya n'ime aghota azaa
- iii. Uru aghota azaa bara
- iv. Iweputa agumagu maka aghota azaa

18. NCHIKOTA

- i. Gini bu nchikota?
- ii. Kedu ihe ndi ana-agbado ukwu n'ime nchikota
- iii. Uru nchikota bara
- iv. Ichikota agumagu eweputara

19. EKWUMEKWU N'ASUSU IGBO

- i. Ihe bu ekwumekwu n'igbo
- ii. Ihe ndi ana-elekwasi anya n'ikwu ekwumekwu
- iii. Uru ekwumekwu bara
- iv. Mkparita uka na klaasi

20. IKWU OKWU N'OHA

- i. Uzo enwere ike isi were asusu igbo gwa oha mmadu okwu
- ii. Uoro ndi ekwesiri igbaso maka okwuoha
- iii. Ekele, Isiokwu, ihe ndi mejuputara okwu, nchikota na mmechi

21. NSUPE N' IGBO

- i. Nsupe okwu n'igbo
- ii. Iwu nsupe di icheiche
- iii. Oru ndi "Na", "Ga" na "Ka" na – aru n'asusu Igbo.

22. JEM NLEGHARI ANYA/IGBA NKIRI

- i. Ndi nkuzi ga-akporo umuaka gaa ebendi a hooro, buebe ha ga-ejianya ha hu ihe ndi metutara asusu na ome na ala Igbo, iji nyere ha aka ighota nke oma, ma chekwa akwa ihe ndi a kuziiri ha n'ime klassi.

IGBO 102: Introduction to Igbo History, Culture and Literature

AKUKO BANYERE NDIGHBO NA MMALITE NDU HA

- i. Udiekele di icheiche
- ii. Oge eji ekwe ekele ndi ana kwaihe a na-ekele
- iii. Aziza one/ndi e kwere ekele na-aza

2. EKELE NA NSOPURU N’ALA IGBO

- i. Udiekele di icheiche
 - ii. Oge eji ekwe ekele ndi ana kwaihe a na-ekele
 - iii. Aziza onye ndi ekwere ekele na-aza
- b. Uzo di iche iche esi enye nsopuru
- i. Nsopuru nwata na-enye okenye
 - ii. Nsopuru nwayin a-enye di ya
 - iii. Nsopuru ndi okenye kwesiri inye onwe ha

3. NDI IGBO NA NNABATA NDI OBIA

- i. Ndi Igbo dika agburu na-anabata ma na elektakwa ndi obia
- ii. Uzo di iche iche ndi igbo si elektota ndi obia
- iii. Oji n’ala Igbo
- iv. Uru oji bara
- v. Emume di n’oji, (iche, icho na igooji)

- vi. Nsodon’oji

4. EWUMEWU NDI IGBO

- i. Usoro alum di nanwunye n’ala Igbo
- ii. Ezina ulo
- iii. Ewumewu mmekorita mmadu na ibeya
- iv. Emume di iche iche na uru ndi ha bara
- v. Emume iriji ohuu
- vi. Igba mmonwu
- vii. Iwa akwa
- viii. Iru mgbede

5. EWUMEWU NKWALITE AKU NA UBA

- i. Ndi Igbo dika ndi oru ugbo
- ii. Ndina-azu ahia
- iii. Aka oru di iche iche enweren’ala Igbo
- iv. Ufodu ihe ndi ama ama a na-akoputa n’ugbon’ala Igbo

6. EWUMEWU OKPUKPERECHI

- i. Usoro okpu kperechi ndi Igbo tupu mmalite okpu kperechi oloro ohuu
- ii. Okwu kwendi Igbo nwere na Chukwu, dika Chi kacha chi niile

- iii. Chi ndi nkenta na-agalite ozi n'agbata mmadu na chukwu
 - iv. Ihe ndi jikoro okpu kperechi odi na'la na nke ndi otu Kraist.
- 7. EWUMEWU AHIUKE**
- i. Iji mgborogwu na mkpa akwukwo agwo oria
 - ii. Igbo nwa n'uzo odina ala
 - iii. Ufodu mgborogwu na mkpa akwukwo na kwa oru ndi ha na-aruru
- 8. EWUMEWU OKWU OCHICHO**
- i. Ndi Igbo dika ndi kwenyere n'oha karasi
 - ii. Onodu di'okpara dika onye isi, onyen du, na oji ofo nke ezi n'aulo
 - iii. Oru ofo na-aruru dika ihe eji aku n'alamgbe e nwere nkwekorita
 - iv. Mmalite ochichi eze (ka aluchara agha)
 - v. Ufodu obodo na-amueze amu, ebe ufodu na-echieze echi
- 9. MMEKORITA NDI IGBO NA NDI AGBATAOBI HA**
- i. Mmekorita site n'oke oru
 - ii. Mmekorita site n'azumahia
 - iii. Mmekorita site mgbapu osondu (enyemaka) dgz.
- 10. AKUKO OKIKE**
- (i) Mkparita uka banyere otu ufodu ihe sirimalite n'uwa, dika oku, ihe mere ufodu mmiri ji ata ata, ihe mere onwa ji adimpekele (oge ufodu), ihe mere anyanwu ji achasimmadu anya, ihe egbe ji eburu okuko, dgz.
- 11. ARU**
- i. Ezi ndu na ndu ojoo
 - ii. Onwu oma na onwu ojoo
 - iii. Ilo uwa maka ezigbo mmadu (onye ojoo na alo-uwa n'okwute, ma obun'osisi).
- 12. ONWU NA NDU**
- i. Ezi ndu na ndu ojoo
 - ii. Onwu oma na onwu ojoo
 - iii. Ilo uwa maka ezigbo mmadu, (onye ojoo na alo uwa n'okwute, ma obu n'osisi)
- 13. AKWAMOZU**
- i. Usoro di icheiche esi akwa ozu
 - ii. Oke di icheiche ndi ha naakwamozu so.
- 14. OKWUKWE DI ICHE ICHE NDI IGBO NWERE**
- i. Okwukwe na Chukwu (Chiukwu)
 - ii. Ilouwa

- iii. Osisi
 - iv. Osimiri
 - v. Anumanu
 - vi. Ndi ichie (ancestors)
- 15. AGUMAGU IGBO**
- i. Agumagu onu (odina ala)
 - ii. Agumagu ederede (ugbua)
- 16. NGALABA AGUMAGU IGBO NA EJIRIMARA HA**
- i. Iduazi
 - ii. Ejije
 - iii. Abu
- 17. AKPARAMAGWA NA URU AGUMAGU ONU**
- NA AGUMAGU EDEREDE**
- i. Ejirimara, agumagu onu
 - ii. Uru ndi agumagu onu bara
 - iii. Ejirimara agumagu ederede
 - iv. Uru agumagu ederede bara
 - v. Ntule korita ejirimara agumagu onu na nke ederede
- 18. NKOWA NGALABA AGUMAGU DI ICHE ICHE**
- i. Nnyocha na igu akwukwo agumagu ufodu ndi ebi putara n' asusu Igbo
 - ii. Ejije
 - iii. Iduazi
 - iv. Abu

GST 211 Nigerian And African Culture [1, 0, 0. (1)]

Introduction: The nature and scope of politics and economics. Definition of basic concept in economics and political science.

Nigeria's Public Sector: The political set up in Nigeria. The civil service structure, Public investment and economic infrastructure. The economic role of government; government expenditures and revenues, fiscal federalism and revenue allocation.

Nigeria's private sector: the financial system in Nigeria. The role of the agriculture sector in the development process. The industrial sector and public investment in Nigeria. National development planning problems and prospect, aspects of economic and technology dualism. Political and economic future of Nigeria. A global perspective of economics; system and developing nations' economies. International trade and economic development; balance of payments, commercial policies of Nigeria and other developing countries. Economic integration; state and structure of economics of ECOWAS countries. ECA and economics co-operative in Africa. Foreign aid and investment: the multinational corporations, technology transfer and technology.

CSC 201 Computer and Applications [1, 1, 1. (3)]

Introduction to digital computer, their uses and modern programming techniques. Brief history of computers, generation of computers, structure of a general purpose computer general problem solving, systematic development of algorithm, flow diagrams. Practical experience operating computers, and peripheral equipment. Extensive practice with one or more higher level language. Emphasis on technical. Elementary numerical algorithms.

MGT 206 Health Psychology [1, 0, 0. (1)]

Meaning of development psychology; Conception: concept of human growth and development, concept of childhood and adolescence, history and theories of child development, determinants of development; mechanisms of heredity; Cognitive language and personality development in Infancy: Early childhood and later childhood, physical and psychological change at puberty, meaning of identity in adolescence and adolescence behaviour problems.

ENG 213 Engineering Mechanics (Statics) [1, 0, 1. (2)]

Basic concepts in statics, statics of particles and rigid bodies in a plane. Analysis of forces; distributed forces, vectors, flexible cable, fraction static and dynamic. Equilibrium of a particle and equilibrium of rigid body, areas, centroids, masses, centers of gravity, analysis of structure; internal forces.

Newton's third law, shearing forces, moments, trusses and frames. The basic of free body diagrams. General mathematical principles. Moments of inertial of an area. Computers application and simulations in statics.

ENG 219 Bioengineering Materials I [2, 0, 0. (2)]

Atomic structure; solid state; biomolecular structure; structures of selection materials used in biology and medicine; physical, chemical, mechanical, electrical, magnetic, optical and thermal properties of material's, introduction to natural and artificial biomaterials transplants, implants, prostheses and artificial organs; mechanics of biomaterials.

ENG 221 Electrical and Electronic Engineering I [1, 0, 0. (1)]

Review of electrostatics and electromagnetism. Transient and steady-state analysis of circuit's network theorem and techniques. Passive and active circuits and building blocks. Sinusoidal circuits. Introduction to electronic circuits and diodes. Transistors. Introduction to integrated circuits and design.

ENG 224 Engineering Mechanics II (Dynamics) [1, 0, 1. (2)]

Newtonian principle of dynamics of particles and rigid bodies applied to one dimensional and two-dimensional motions. Force system resultants. Structural analysis, kinematics and kinetics of particles and rigid body motions, methods of impulses and momentum, linear and angular momentums, work and energy, relative motion concept. Computer applications and simulation of engineering mechanic and dynamic.

ENG 228 Bioengineering Materials II [1, 0, 1. (2)]

Engineering properties of biomaterials: fatigue of biomaterials applications of materials in medicine; cardiovascular, Surgical, dental ophthalmic, orthopedic applications; Bioelectrodes and bio(medical) sensors; compatibility of biomaterials; tissue materials interactions; host response to biomaterials; biomaterials failure.

ENG 226 Electrical and Electronic Engineering II [1, 0, 1. (2)]

Transformers and their principle of operation. Electric motors, generators; single and poly-phase system. Introduction to instrumentation. Introduction to bionics.

HST 201 Human Anatomy I [1, 0, 1. (2)]

Overview of cell biology; tissue structures and human histology; basic structure of the human body; body planes and position. The skeleton; regional anatomy of the upper limb, lower limb, thorax and abdomen.

BMT 203 Human Physiology [1, 0, 1. (2)]

Basic concepts in physiology; Overview of Cellular physiology; Homeostasis; functional mechanisms of human organ-systems as: Cardiovascular System; Respiratory System; Urinary System; Gastrointestinal system; integumentary system; immune system; endocrine system; reproduction system, nervous system and musculoskeletal System.

BMT 204 Human Physiology II [1, 0, 1. (2)]

Body fluid Physiology and Basic Immunology; Detailed Physiology of the vital systems including: Cardiovascular and Respiratory systems; Renal and Reproductive Systems; Endocrine and Central Nervous Systems.

BMT 222: Excitable Tissues and Electrophysiology [1, 0, 1. (2)]

The structure and classification of nerves; Myelinated and Non-Myelinated fibers; Membrane Potential; Resting membrane potential; Nernst potential, Action potentials; Synapses and types; Synaptic transmission; Neuromuscular transmission; Neuromuscular junction; effect of Ca^{2+} and Mg^{2+} on transmitter release; Structures and classification of muscles; Mechanisms of muscle contraction; Skeletal, Smooth, and Cardiac Muscles; Excitation-contraction coupling.

BCH 201 General Biochemistry [1, 0, 1. (2)]

Review of general chemistry; chemical elements and the periodic table. Electronic configuration, electronic orbital, valence of atoms, and types of chemical bonds' metals and non-metals; Acids and base, highlighting Lewis concept on; carbon, sp^3 hybridization, the tetrahedron and covalent bond; functional groups; water and its special properties. Introduction of the cells, and hierarchy of organization of living things: macromolecules, organelle, cells tissues, organs and organism. Amino acids, proteins; the peptide bond and polypeptides; glycosidic bond; relationship of photosynthesis and tissue respiration; carbohydrate as strong molecule of easily accessible metabolic energy. Fatty acids and lipids; the ester bond of lipids and triglycerides; fat as efficient energy storage molecule. Nucleic acid and nucleotides: DNA and RNA as polymers of nucleotides; the phosphodiester bond; gene and genetic information transcription and translation.

BMT 201 Introduction to Biomedical Technology [1, 0, 0. (1)]

Bio- and Medical technology: Impact of technology on biology and medicine. Biomedical engineering: definition, history and components. Engineering communication. Biomedical Science, Biomedical Engineering and Biotechnology Health care. Health (care) technology and Human System: Man as a Research, Development, Education, Training, Certification

and Practice of biomedical engineering and health technology. Problems and prospects of biomedical engineering and health technology in Nigeria and Africa. Future perspectives in biomedical engineering. Introduction to cybernetics- biological, and medical web systems. Introduction to synergetics- structure, inductive, immunological, reparative and productivity. Introduction to medical physics and imaging – radiation technology, biological effects, exposure control, safety concept; imaging instrumentation, design principles and use.

BCH 202 Medical Biochemistry [1, 0, 1. (2)]

Carbohydrate metabolism; Glycolysis and intermediary metabolism. Electron transport and oxidative phosphorylation. Disorders of carbohydrate metabolism (e.g diabetes etc). Body lipids and lipid metabolism; disorders of lipid metabolism. Amino acid and protein metabolism; disorders of protein metabolism. Gene expression and molecular disease (e.g. sickle cell etc). Liver function and tests. Renal function and test. Blood chemistry (including haemopoiesis). Hormones and metabolism; endocrinal diseases (e.g goiter, etc)

MCB 201 General Microbiology [1, 0, 1. (2)]

History and scope of microbiology; the general characteristics of microorganisms. Prokaryotic and eukaryotic microorganisms. Bacteria morphology and cell structure. Growth and reproduction of microorganisms. Biochemical reactions of microorganisms. Antimicrobial agents. Systematic classification of bacteria, fungi, viruses, algae and protozoa.

CHM 204 Organic Chemistry for Health Professionals [1, 0, 1. (2)]

Organic Chemical bonds: formation, types and bond energy, organic chemical reaction types/mechanic: addition, substitution (Nucleophilic and Electrophilic); Thermodynamic and kinetic control of products: Functional group and functional group analysis. Aromatic compounds: Benzene ring, etc, stereochemistry and Stereoisomerism, Steroids, structure and function. Organometallic compounds; hemoglobin, chlorophyll etc.

BMT 212 Human Anatomy II [1, 0, 1. (2)]

Embryology and human Development: Regional anatomy of the pelvis, perineum, head, neck, brain, vertebral canal and spinal cord.

STA 211: Introduction to Statistics and Probability [1, 1, 0. (2)]

Frequency distributions, measure of location and dispersion in simple and grouped data. Laws of probability. The binomial, Poisson and normal distributions. Estimation and tests of hypothesis. Analysis of variance and

co-variance, simple regression and correlation, contingency tables and χ^2 . Descriptive methods-stem and leaf charts. Graphical displays-box and whisker plots, applications. **Pre-requisites: MTH 101 and MTH 102**

BMT 241 Biomedical Mathematics I [1, 1, 0. (2)]

Functions of two or more variables. Limits and continuity, partial derivatives, directional derivatives, tangent plane and normal line. Gradient, chain rule, Total differential, implicit functions, Jacobians, Inverse functions, maxima and minima. Exact differentials, Derivatives of integrals, Taylor's theorem. Multiple integrals. Calculations of areas, volumes, centre of mass, moments of inertia and Etc. Infinite sequence and series. Absolute and conditional convergence.

Prerequisites: MTH 101 & MTH 102

BMT 242 Biomedical Mathematics II [1, 1, 0. (2)]

Solution of algebraic and transcendental equations. Curve fitting, Lagrange and Aithens Interpolating polynomials. Errors, Difference calculus. Newton forward and backward difference formulae. Approximation of functions, Numerical differentiation and intergration. Numerical solution of systems of linear equations. Numerical methods for differential equations.

Prerequisite: BMT 241

BMT 301 Ethics in Biomedical Technology [1, 0, 0. (1)]

Bioethics fundamentals; Metaethics. Ethics as a discipline. Study of the basic concepts of right and wrong, good and bad; Descriptive Ethics. Analysis of morality within different cultures; Normative Ethics. The morality of an action. Nature, motives or consequences of an action. Divine command. Value theory. Utilitarianism Professional ethics: Engineering ethics. Public health and public safety. Conflicts of interests. Ethical issues in design and manufacture. Risk analysis. Cost benefit analysis. Resources allocation, Negligence. Professional restrictions and professional responsibility. Rights of engineers. The ethics of engineering organizations. Codes of ethics; Medical ethics. The patient physician relationship. Autonomy and privacy of patients. Informed consent. Professional conduct and confidentiality. Truth telling. Biotechnologies. Reproductive techniques. Genetic engineering clinical trials. Resources allocation. Euthanasia. Conflict of interests.

Research ethics: Human subjects and animals for experimentation. Control of science and technology. Conflicts of interests in research. Scientific misconduct. Ethics committees. Data management.

Social Ethics: Social morality and personal ethics. Public policies. Ethical criteria for resources allocation. Governmental, inter and intra-institutional allocation policies.

Legal ethics: Scientific advances and legal changes. Health and welfare. Environmental ethics. World population and natural resources. Rural development. Biomedical forensics.

ENG 319 Thermofluids for Health Professionals [2, 0, 1. (3)]

Fundamental concepts of thermofluids (pneumatics and hydraulics); first law of thermodynamics, conservation of mass in a closed system. Second law of thermodynamics: relationships of enthalpy y and free energy. Concept of thermodynamics efficiency. Pressure, volume and temperature (PVT) relationships; general gas law and equation. Third law condition for absolute order in crystalline system. Definition of fluid. Monometry; forces on plane and curved surface; buoyancy and floatation. Kinetics of fluid motion. Types of flows; continuity equation; energy equations momentum equation. Fluid resistance; laminar flow and turbulent flow. Modes of heat transfer. Systems with heat sources; heat transfer in extended surfaces; conduction, radiation and convection; combined modes of heat transfer. Mass diffusion. Condensation. Radiation of heat between black grey bodies, thermal condensation principles.

ENS 301 Introduction to Entrepreneurship & Innovation [1, 0, 1. (2)]

Technology development and entrepreneurship; evolution of industrial, domestic, and commercial products; identification of society's need, market surveys, invention, diffusion, patents, trademarks, and copyrights. Maintenance culture.

Concepts of repair and maintenances of equipment and units. Maintenance scheduling. Business planning; financial accounting and marketing; consultancies; small business startups and management. Internet connectivity methods using internet browsing. Practice; innovation solutions to inventions needs chosen by students; development of new product or processes development of business plans and proposals.

ENS 302 Business creation growth & corporate governance [1, 0, 1. (2)]

Creativity and starting off a business enterprise. Methods of generating ideas: brainstorming, synergetic, checkbook method, Gordon method of generating ideas, reverse brainstorming; free association. Collective notebook; heuristic, scientific method; value analysis; legal issues in entrepreneurship marketing; financial and organizational plans. Financing the new business enterprise. Going public. Managing, growing and ending enterprise.

PTE 301 Polymer Chemistry [2, 0, 0. (2)]

Initiation mechanism (free radical, cationic, stereo-specific) in the polymerization reactions through functional groups and multiple bonds (vinyl and diene). Ring opening, polymer modification, living polymers; distribution between chain and step growth, kinetics of vinyl polymerization and poly-condensation. Methods of determination, Auto-acceleration, chain transfer, inhibitors, retarders. Raw material, polymerization. Techniques and properties of polyethylene, polypropylene, polystyrene, methyl acrylate, polyamides, polyether, polyurethane and inorganic polymers. Polymer characterization; essential of fiber forming polymers.

HST 301 General Pathology [2, 0, 0. (2)]

Definition of pathology, disease and relevant terms use in pathology. The causes and classification of diseases. Cell damage and its sequel. Inflammation, its function and types. Cardinal signs and mechanism of inflammation. Infection and body's defense against it, cross infection and its control. Some important bacterial fungal and viral infection including Tuberculosis, hypertrophy, dysplasia and dystrophy, Malignant, tumors and their etiology, types classification and characteristics. Cysts, their formation and classification developmental anomalies or disturbance. Effects of ionizing classification of human tissues. Trauma – wounds. Fractures dislocations and bleeding. Systems pathology, disorders of blood disorders of red blood cells. WBCs and thrombocytes. Disorders of circulation. Disorders of the heart, disorders of the respiratory system. Diseases of the gastro-intestinal tract, disorders of bones and joints.

HST 303 Introduction to Pharmacology [2, 0, 0. (2)]

Historical Development of Pharmacology; Divisions of pharmacology and their applications: Definitions of terms and abbreviations: concept and nature of drugs; Pharmacodynamics; pharmacokinetics; classification of essential drugs and their importance; classification of drugs of abuse; significance and control of drug abuse or misuse; introduction to toxicology and its importance; classification of poisons; general principles of drug safety and poisoning management.

HST 304 Statistics for Healthcare Profession [1, 1, 0. (2)]

Applications of descriptive, inferential, parametric and non parametric statistic to health theory of probability, sampling technique, hypothesis testing. Dealing with errors; construction and interpretation of graphs and data tables. Biostatistics; population sampling, structural measurements. Statistical applications to health and medicine. Drug counting. Statistics of health delivery.

BMT 302 Biomedical Systems Analysis [1, 0, 0. (1)]

Advanced Mathematical Concepts: Linear relations and Functions; Systems of equations and Inequalities; Polar coordinates and complex numbers; Exponential and Logarithmic functions; Iteration; Statistics and Data Analysis; Limits, Derivatives and Integrals. Application of Differentiation and Integration (Fourier series Laplace transforms etc). Introduction to biomedical Modeling and control.

Mathematical methods and models: Numerical methods; Finite differences; Solutions of Differential equations; Role and Application of models in biology and medicine.

Biomedical Systems Analysis: Development of Computers simulation techniques to study physiological systems.

Further Physiology of Cardiovascular System: Respiratory System; Urinary System; Musculoskeletal System; Fetal and Neonatal Physiology; Endocrine System; Nervous System and Introduction to Electrophysiology.

BMT 315 Introduction to medical Genetics I [2, 1, 0. (3)]

Medical genetics – History, molecular basis of gene, basic cytologic aspect of cell division, constitution of DNA, RNA structure and their behaviour, gene culture, transcription, transmission, mapping, coding and cloning. Methods and technology in gene study, medicolegal aspect of gene study application.

BMT 310 Medical Genetics [2, 1, 0. (3)]

Genetic mutation – mendelian disorders, transmission patterns of single-gene disorder, biochemical and molecular basis of single-gene disorder, disorders associated with structural proteins, disorder associated with receptor proteins, disorders associated with enzymes, disorders associated with growth proteins, disorders with multifactorial inheritance. Normal human karyotype. Cytogenetic disorders, instrumentation and techniques, New advances in technology for the diagnosis of human genetic disorders.

BMT 311 Healthcare Technology Planning [1, 1, 0. (2)]

Planning principles; Components of technology planning; Equipment planning for new facilities; Project management; Facility components; Business cases; Priorities and funding; outsourcing; Co-operate relationships.

BMT 312 Introduction to Clinical Studies [1, 0, 1. (2)]

Introduction to biological, medical and clinical sciences; the different clinical specialties, pharmacology and therapeutics, pathology, medicine, surgery, obstetrics and gynecology. Pediatrics, radiology, orthopedics, ophthalmology, anesthesiology, physiotherapy, etc; the study of biological, medical and clinical sciences as bases of biomedical engineering; general applications of biomedical engineering to clinical research. Review of biomedical technologies used in diagnosis and treatment in the various specialties.

BMT 331 Biomedical Electronics I [2, 0, 0. (2)]

Nature of Electronics, Introduction to Biomedical Electronics, Fundamental Electronic Concepts and Components, Elementary Circuit Theorem, Semiconductor Electronics, Feedback and Operational Amplifiers, Application of Operational Amplifiers, Filters, Oscillators, Sinusoidal Oscillators.

BMT 332 Biomedical Electronics II [2, 0, 0. (2)]

Transistors voltage regulators power supply circuits, digital electronics, microprocessors and computer systems. Common biomedical circuits, analog to digital converter, thermometry, telemetry, ambulatory (remote control) circuits, safety circuits.

Study of medical equipments used in health care, especially critical care, electrical hazards and patients/User safety.

BMT 333 Biomedical Instrumentation I [2, 0, 0. (2)]

Introduction to Biomedical Instrumentation, Basic Biomedical Instrumentation System, General Considerations in the Design of Biomedical Instrumentation Systems, Biomedical Measurement, Errors in Measurement, Biology signals, bioelectric signals, biomedical sensors and transducers types and forms.

BMT 334 Biomedical Instrumentation II [1, 0, 1. (2)]

Blood pressure measurement; Blood flow measurements; Measurement of the respiratory system; Clinical laboratory instrumentation; Electrical safety instrumentation.

Introduction to Measurement and Instrumentation: errors in measurement, types of measurement errors, principles of biomedical instrumentation.

Instrumentation system processors:

Biomedical signal processing, amplification, modulation, transmission, demodulation, frequency selection, wave shaping, isolation, analog to digital signal conversion and data processing. Instrumentation display and storage data acquisition and recorders. Principles of signal storage and display,

requirements of good signal storage and display devices, recording and display devices, data acquisition and storage system.

BMT 352 Introduction to Human Biotechnology [1, 0, 1. (2)]

Biotechnology and Human Health: pharmaceuticals, diagnosis, vaccines, gene therapy, organ replacement therapy, nutrition, environmental health prevention etc.

Introduction to Genetic engineering: The human genome project: Genetic disorders; Gene therapy; Cloning; Stem cells.

BMT 371 Introduction to Biomedical Physics [1, 0, 1. (2)]

Basic and applied physical concepts used in biology, human anatomy, and physiology, as well as in medical diagnosis and treatment. Biological Physics: Introduction to application of Physics to molecular Biology. Medical Physics: Physics of medical technology from imaging to radiation oncology. Research in Biomedical Physics: Introduction to laboratory experience in biomedical physics research.

BMT 372 Biomedical Radiation Technology [1, 1, 0. (2)]

Review of physical concepts of radiation atomic and nuclear structures, electromagnetic spectrum, x-ray production, radioactive decay; Ionizing and non-ionizing radiation; X-ray interaction, basic radiobiology radiation dosimetry and protection; Legislation and regulations for radiations for protection.

BMT 391 Biomedical Laboratory Practicum I [0, 0, 1. (1)]

Experiments and demonstration dealing with basic medical electronics and signal analysis, Experiments and demonstration on biotechnology, biofluids and thermofluids. Related to BMT 333, 313, and ENG 319.

BMT 392 Biomedical Laboratory Practicum II [0, 0, 1. (1)]

Experiments and demonstration on the measurement and analysis of various physiological quantities or parameters of cardiovascular and respiration systems and cellular viability, metabolism, morphogenesis, kinetics, and protein and nucleic acid composition. Experiments and demonstration on biomechanics and rehabilitation. BMT,334, 352, 371.

ENG 407 Biomedical Devices and Mechanisms [1, 0, 1. (2)]

Introduction to hospital equipment: radiology, spirometry and intensive care equipment; physiotherapy. Theater, orthopaedic, anesthetic, ophthalmic equipment. Laboratory equipment: spectrophotometer, computerized tissue

processor, chemical pathology, haematology, microbiology equipment. Concept of mechanism; links kinematic pairs, kinematic chains and inversion. Types of mechanism; slider-crank mechanism, muscle as sliding mechanical system; simple, compound and epicyclic gear trains. Dynamics of rotating and reciprocating devices. Friction, wear, lubricating; application in kinematics and selection of power screws; belts; rope drives, clutches and hydrostatic lubrication.

ENG 409 Human Biomechanics [1, 0, 1. (2)]

Fundamental principles of mechanics applied to study the anatomy and physiology of biological systems; Interlocution to the basic concepts of continuum mechanics – tensors, finite deformation kinematics, stress, conservation laws of mass, momentum and energy applied to deformable continua; Rigid body kinematics in the context of applications in biomechanics. Application of biomechanics in tissues such as bones, ligaments, skeletal muscle structure and mechanisms of movement; Biomechanical implications of the sliding filament theory; velocity-force curves; lever mechanism; Types of muscle fibers’.

HST 401 Health Information Management System [2, 0, 0. (2)]

Study of contemporary medical and information systems, especially as used in morbidity surveys, diseases surveillance system, disease registers, etc. also includes introduction to computers simulation techniques and life-table techniques. Medical and health data based management. Internet and extranet applications. E-library information, globalization and teleconferencing.

BMT 493 Research Methods in Biomedical Technology [1, 1, 0. (2)]

Rudiments of research methodology and its application to the health field. Course covers a basic learning of the following aspects: research problems definition, research questions, research null hypothesis, theoretical – conceptual formulation of research designs, method of research observations, and measurements of variables, modeling and simulation of biomedical systems, data analysis techniques, interpretation of research findings, randomization techniques, research on equipment design principles, biomedical equipment tracking and clinical trial control.

BMT 421 Ergonomics, Environmental Hazards and Laboratory Safety [3, 0, 1. (4)]

Ergonomics: definition, classification, multi-disciplinary nature; physiology of work; work design and strategies for prevention of ergonomic injuries. Occupational health standards; Occupational exposure to hazardous chemicals and blood-borne pathogens; Stress, fatigue and the words

environment; Precautions in equipment handling in the industries; Workman compensation act.

Environmental pollution: air, fresh water, ocean and land pollution others environmental degradation, ionizing radiation, oil spillage, pesticides, noise, weather/climate pollution.

Biohazards: Laboratory/hospital acquired infections, infectious aerosols, occupational exposure to blood borne pathogens (hepatitis V virus, HIV etc) and hazardous chemicals in laboratories, tuberculosis, laboratory spills, and medical wastes.

Laboratory Safety: Standards, safety signs/codes, standard procedures, hazardous awareness (Right to Know); preventive equipment; ventilation; precautions/prevention against fire, chemical, toxic, radiation, electrical, mechanical, biology hazards.

BMT 441 Ambulatory Technologies and E-Health [1, 0, 1. (2)]

Ambulatory Technology: Ambulatory medical practice; Ambulatory care devices in Medical institution-based settings (including ambulatory care clinics, ambulatory surgery centers and emergency medical services) and in Non-medical institution-based settings (including school and prison health, vision, dental and pharmaceutical care).

Ambulatory information systems e-Health: Use of ICT in health and health – related fields (including health-care services, health surveillance, health literature, and health education, knowledge and research): Clinical e-Health; Specialist referral services; Tele radiology; Primary Remote Diagnostic Visit's; Remote patient monitoring; e-Prescription; e-Medical Records (EMR); Evidence Based Medicine; Virtual healthcare teams.

BMT 461 Introduction to Clinical Engineering and Rehabilitation Engineering [2, 0, 0. (2)]

Evolution of clinical engineering; The health care environment; Equipment planning; Clinical education; Quality Assurance; Equipment replacement project; The role of clinical engineer in hospital organization and enhancing patients' safety; Healthcare facilities planning; A model clinical engineering department; careers, roles and responsibilities of a clinical engineers.

Introduction to rehabilitations engineering: Technology and disability; Standards for assistive technology; The use of implants, prostheses and artificial organs in rehabilitation; Wheelchair and other orthopaedic devices; Rehabilitation robotics; Aids for physically handicapped people; Rehabilitation in sports. Physiotherapeutic technologies.

BMT 491 Industrial Visits and Seminars [0, 0, 1. (1)]

Each student will be required to present a seminar on an approved topic in biomedical technology. Industrial visits to hospitals and other industries engaged in biomedical engineering and allied fields will be organized. Reports of these will be assessed accordingly.

BMT 511 Introduction to Forensic science, Mortuary and Museum Technologies [1, 0, 1. (2)]

Forensic Science – Introduction, forensic pathology, clinical forensic, the environment for sample collection, methods, sample analysis, technologies in forensic, reliability, photography, Various storage protocols and procedures of reporting. Instrumentation in forensic science and medical litigation. Mortuary – Introduction, what is death, causes of death, anatomical posture of the dead, Embalment of bodies- techniques and technologies, cosmetology, presentation of bodies, physical structure of morgue, environment control, safety. Museum – Introduction, Basic museum technology, Presentation of museum specimen, Photomicrography- colour photomicrography, black and white photomicrography, Principles of Fluorescence and phase contrast photomicrography, Embedding of photographs, Organization of museum specimens. Electron Microscope – types, electron beam generation, electromagnetic lenses, instrumentation of all types, operation modes, laboratory applications of types, safety and handling of specimens and fixation, storage and processing.

BMT 521 Biomedical Equipment Maintenance Management I [1, 0, 1. (2)]

Maintenance related definitions, Maintenance programme planning, Inventory. **Methodology Resources:** Financial resources, Physical resources, Human resources.

Management: Financial management and Personnel management, including Service vendors and Training.

Operational management: Developing or changing IPM procedures, Setting IPM frequency, Scheduling maintenance, Prioritization of work, Keeping records, Computerized maintenance management systems, Tags and labels, Communication, Managing use and user error, Travel

Performance monitoring: Completion rate of assigned IPM, Equipment location rate, IPM yield IPM productivity, CM performance measures, Performance improvement, Medical equipment maintenance programme overview

BMT 524 Biomedical Equipment Maintenance Management II [1, 0, 1. (2)]

Implementation: Inspection and preventive maintenance, IPM procedures, Problem identification. Corrective maintenance: Troubleshooting and repair, Factors affecting equipment failures, Inspection and return to service. Reporting. Safety.

ENG 501 Biomedical Devices Design [1, 0, 1. (2)]

Generalized Biomedical System; Types and Categories of Biomedical equipment; Design criteria, general Requirements, design process, mathematical modeling and simulation techniques. Introduction to Biomedical Devices, Design Methodologies in Biomedical Engineering. Overview Biomedical devices design, Design tools, Design team management, the design process, project definition, project design specification, materials selection and intellectual property management, regulation of biomedical devices. Prototyping in biomedical devices design; testing and optimization of biomedical design.

ENG 503 Manufacturing Processes [1, 0, 1. (2)]

Product Documentation; Product Presentation. Manufacturing and Quality Control; Product Reliability; Equipment Reliability; Equipment Maintainability and Availability; Safety in Design.

BMT 522 Equipment Reliability And Safety Technology [1, 1, 0. (2)]

Safety consideration in equipment design reliable equipment earthing, reduction of leakage current, operation at low voltage; Safe instrumentation, physiological effects of electricity, shock hazards, electrical safety codes and standards, power distribution protection, electric system testing; Quality assurance in equipment design.

BMT 531 Biomedical Telemetry [1, 0, 1. (2)]

Introduction to telemetry systems; Transmitters and modulation; Receivers and demodulation; Monitoring with telemetry systems inpatient, outpatient, stationary and ambulatory patients. Transmission of physiologic data; Telemetered parameters: bio potentials (ECG, EMG, EEG), temperature, mechanical events (muscle force, limb motion), pH, pressure (ICP, blood pressure), and others; System developments in biomedical telemetry; Implanted and external biotelemetry (e.g. Employing a radio link) in the research laboratory, the intensive care unit, portable patient care units, etc. Advantages and disadvantages of biomedical telemetry.

BMT 532 Medical Electronics and Bionics [1, 9, 1. (2)]

Industrial Medical Electronics: Circuit and network analysis; Design systems in medical electronics; Communication systems in medical electronics' Analog and Digital computers in medical electronics.

Bionics: Definition of bionics; basic and operational; biomimetics and interphase of biology and electronics. Review of the basic principles of electronic. Interphase of biology and electrons to mimic living system electronically. Operated mechanical system that function as prostheses. Different kinds of bionic appliance. Bionic (biocompatible materials). Design and manufacture of bionic devices for the Nigeria health systems. Ethical concerns in bionics.

BMT 533 Intensive Care and Clinical Instrumentation [1, 0, 1. (2)]

Intensive Care Instrumentation: introduction; levels of organization of Intensive Care Units; Design of Intensive Care Units (Type, Size Site, Equipment, Supporting services areas) Clinical Instrumentation: Monitoring and Ambulatory Instruments; Radiology instruments: Respiratory Instruments; Hospital operating systems; Cardiovascular Equipment of the renal unit; Hospital laboratory instrumentation; hardware and software; clinical laboratory instrumentation. Safe Instrumentation.

BMT 541 Biomedical Informatics I [1, 0, 1. (2)]

Management Information Systems in biology and medicine Data Acquisition, Data Storage and Retrieval, Data Processing' Computer Networking in the Hospitals – Concept of Computer networking, Telemedicine; Software Development in biology and medicine – Computer in Medical diagnosis and Therapy, - Computer-Aided Simulation and Experimentation.

BMT 542 Computer-Aided Design Biomed Equipment [1, 0, 1. (2)]

Computer Aided Design (CAD): Introduction; CAD Hardware and Software; The Drawing Tools; Design management; Introduction to 3-Dimensional (3-D) design; 3D Modeling; The Printing and Plotting Process.

Design of Biomedical Equipment: Use of CAD in the design of medical equipment; Practical applications. Introduction to medical robotics.

BMT 546 Medical Robotics and Computer Assisted Surgery [1, 1, 0. (2)]

Integrated Multimedia Patient Record Systems; Computers-Aided Diagnosis; Clinical Decision Support Systems; Medical Robotics and Computer-Integrated Interventional Medicine; the Evolution of E-Health Systems; Multimedia for Future Health the Smart Medical Home. Artificial Intelligence, Knowledge Based Systems and Medicine; examples of Expert

Reasoning; Development of Clinical Expertise in the Computer; Modeling Knowledge of the Patient.

BMT 551 Genetic and Tissue Engineering [1, 0, 1. (2)]

Genetic Engineering: Introduction; History of Genetic Engineering cloning; DNA fingerprinting polymerase Chain Reaction; Summary of DNA Fingerprinting; Applications of Gene in fighting Disease. Tissue Engineering; basic biological concept of cells, Organelles; Tissue Organization; Tissue Dynamic, Regenerative Tissue; Case Studies on Barriers to Tissue Engineering Adoptions. New technology and techniques in Tissue Engineering and Tissue therapy.

BMT 553 Bioprocess Technology [1, 0, 1. (2)]

Introduction – Bioprocessing versus chemical processing; Bioconversion process – substrates, design of media, cell culture techniques, inoculums development and aseptic transfer; Process technology for the production of primary metabolites e.g. Baker's yeast, ethanol, acetone-butanol. Citric acid, amino acids, polysaccharides and plastics; Microbial production of industrial enzymes- glucose isomerase, penicillin acylase, cellulose, Penicilline, Cephalosporins, Streptomycin etc; metabolites from plants and animal cell culture; Biomass (Mushroom) production from agro-residues, Biofertilizers and Biopesticides.

BMT 552 Introduction to Biomedical Nanotechnology [1, 1, 0. (2)]

Introduction to Nanoscience – Quantum Mechanics, Quantum Chromodynamics, Quantum Electrodynamics, Elementary Particles, Atoms Molecular Biology and Medicine. Nanotechnology, Biomedicine; Trends in Drug Delivery Systems with Self-Assembled Carriers; Implants and Prostheses; Diagnostics and High Throughput Screening; Nano-Enabled Components and Systems for Biodefense; Social and Economic Contexts: Making Choices in the Development of Biomedical Nanotechnology; Potential Risks and Remedies in biomedical technology.

BMT 554 Advances in Biomedical Engineering [1, 1, 0. (2)]

Advances in Physiological Modeling; Emerging trends in Hospital Information Systems; Evolution of the Clinical Engineering Discipline; Current trends in Rehabilitation Engineering Technologies; Artificial Intelligence in Medical Decision Making Problems and Prospects; Professional Issues in biomedical engineering.

BMT 555 Pharmaceutical Technology [1, 1, 0. (2)]

Pharmaceutical chemistry: The drug discovery and development processes; review of organic functional groups in drug molecules; drug-target interactions; physicochemical properties related to drug action such as acid-base properties, equilibrium, and stereochemistry; chemistry of OTC inorganic drugs; effects of chemical structure on the metabolism of drug molecules; fundamentals of neurochemistry; chromatographic analysis of pharmaceutical against, metabolites and clinical samples; methods for identification of pharmaceutical agents and metabolites spectral technique used in quantitative analysis of clinical samples.

Biomedical Toxicology: Effect and mechanism of actions of toxic substances from a variety of perspectives: from whole body systems and organs to the molecular and biochemical levels. Mammalian toxicology. Toxicological substances of interest: therapeutic agents, metals, industrial chemicals, and natural toxins found in foodstuffs.

Toxicology Testing: to assure the safety of new drugs, consumer products, pesticides and industrial chemicals before release to market.

BMT 561. Introduction to clinical Deformities and Assistive Technology

[1, 0, 1. (2)]

Definition of deformities; Classification of deformity; Causes of Deformities; Amputation; Definition, Indications for amputation, causes of amputation especially in the lower limbs; Review of lower limb muscles (origin, insertion and action). Causes, Feature and Management of Coxa Vara, Genu Valgum and Varum; Spinal deformity such as scoliosis; Osteogenesis imperfect, Pesplanus and Talipes Equinovarus (Causes, features and management).

BMT 572 Clinical Imaging Technology [1, 0, 1. (2)]

X-rays: characteristics and applications; Computerized tomography: technology and applications; Gamma camera; Nuclear magnetic resonance imaging: systems and applications; Ultrasound imaging; forms and comparative safe applications. Positron-Emission Tomography (PET); Electrical Impedance Tomopography; Medical Applications of Virtual Reality Technology.

BMT 581 Disabilities and Assistive Technology [1, 0, 1. (2)]

Disabilities. Forms of disabilities (physical, emotional or mental handicap). Causes of disabilities. Developmental Disabilities Mental Disabilities. Physical Disabilities. Substance Abuse/Addictions. Other Disabilities. Assistive Technology: Definition; History; Assistive technology devices; Computers and the disabled.

BMT 593 Biomedical Laboratory Practicum IV [0, 0, 1. (1)]

Modeling of Digital Bio-signal processing (DBP) and analysis. Simulation of Digital Bio-signal processing data and model. Optimization and statistical relevance using DOE (Design of Experiment) software, MATLAB using ANFIS and FUZZY, Solid works and Biopack. As related to BMT511.

BMT 562 Issues in Clinical Engineering and Rehabilitation Technology [1, 1, 0. (2)]

Who is a Clinical Engineer? Clinical Engineering Programs; Clinical engineering internships. Risk Factors and safety of Medical Equipments; Clinical Engineering Programs; Ethical issues and standards in clinical engineering; Clinical engineering certificate, accreditation and regulatory bodies; Professional bodies in clinical engineering; Virtual Instruments in Health Care; Future of clinical engineering. Rehabilitation as a Team work. Various Licensing and Regulatory bodies in Nigeria and overseers. Various professions and professionals in Rehabilitation Sciences and Engineering Physical and Rehabilitation medicine, Physical therapy, Occupational safety/therapy, Speech therapy, Rehabilitation nursing, Prosthesis and Orthosis, Nutritionist and Psychologist, Rehabilitation technologist and engineers. Techniques and Modalities in rehabilitation. Medical and Surgical conditions in Rehabilitation; Rehabilitation in Sports; Rehabilitation Fitness. Recent trends in Rehabilitation Engineering. General and Anatomical Design consideration in the design of artificial organs.

BMT 584: Design of Artificial Organs & Assistive Technologies [1, 0, 1(2)]

Definition of prosthesis; Definition of Orthosis; Amputation Introduction, causes, classification; Casting: modification, rectification, fabrication of sockets; prosthetic feet; Prosthetic knee units; Lower-Limb orthotics; Alignment and amputee gait abnormalities; Upper-extremity prostheses, body-powered; Externally-powered prostheses, Myoelectric control; Upper-limb and Spinal Orthotics.

Introduction to Artificial Organs. Specific examples: artificial heart; artificial lung; artificial kidney; artificial blood; artificial limb; artificial teeth; artificial lens.

BMT 582: Indigenous Biomedical Technologies [1, 0, 1. (2)]

Introduction to indigenous medical and physiotherapeutic methods and devices employed in African traditional medicine; scientific basis of outlined methods and devices. Illustrative examples, e.g. the application of heat in the

treatment of malaria, etc. Identification of Traditional practitioners of these indigenous methods.

Comparative study of the different health/medical systems and technologies of the world's nations: The African traditional, Asian and European models: Identification of areas of weakness and strength of each system, possible technology transfer or improvement.

BMT 598: Final Year Project and Oral Examination [(0, 0, 3)3(0, 0, 3) 3. (6)]

Independent individual or group student product probably nominated and sponsored by a biomedical corporation under the direction of a staff or team of staff, involving biomedical engineering design, construction, laboratory experimentation and testing involving biomedical systems. Project is to be completed and a written technical report submitted at the end.

A viva-voce (oral) examination will be conducted in order to assess the student(s) performance. The Department and the External Examiner (s) contribute in assessing each candidate 50:50.