



હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી

પો.બો.નં.૨૧, યુનિવર્સિટી રોડ, પાટણ-૩૮૪૨૬૫ (ઉ.ગુ.)
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નં. : પરીક્ષા/ખાનગી/૨૪૭/૨૦૨૪
તા. : ૨૨/૦૭/૨૦૨૪

પ્રતિ,
આચાર્યશ્રી/અધ્યક્ષશ્રી/કો-ઓર્ડીનેટરશ્રી,
હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી સંલગ્ન તમામ કોલેજો.

વિષય : સાયન્સ વિષયની પ્રેક્ટીકલ પરીક્ષાઓ અન્વયે જરૂરી અનુસુચનો અંગે...

શ્રીમાન/શ્રીમતી,

ઉપરોક્ત વિષય અન્વયે જણાવવાનું કે, માનનીય કુલપતિશ્રીના આદેશ અનુશાર નીચે મુજબના મુદ્દાઓનું દરેક કોલેજ દ્વારા **MASTER OF SCIENCE (M.Sc)**ની પ્રેક્ટીકલ પરીક્ષા દરમિયાન ફરજિયાત પણે પાલન કરવા આથી જણાવવામાં આવે છે. તથા આ સાથે સામેલ **APPENDIX (A) TO (G)** મુજબના જરૂરી સાધનો પ્રેક્ટીકલ પરીક્ષા સમયે ફરજિયાત પણે હાજર રાખવાના રહેશે. અન્યથા યુનિવર્સિટી દ્વારા નિયમો અનુસારની કાર્યવાહી કરવામાં આવશે. જેની જવાબદારી કોલેજની રહેશે.

- વિષય દીઠ દરેક કોલેજ ઓછામાં ઓછા -૨ યુનિવર્સિટી માન્યતા પ્રાપ્ત અધ્યાપકો પરીક્ષાના કાર્ય માટે ફરજિયાત આપવાના રહેશે.
- લેબ દીઠ યુનિવર્સિટીએ નક્કી કરેલ મહેકમ મુજબ યોગ્ય નોન ટીચીંગ સ્ટાફ પરીક્ષા સમયે ફરજિયાત હોવા જોઈશે.
- સ્નાતક અને અનુસ્નાતકની વિષય દીઠ અલગથી લેબોરેટરી આવશ્યક છે. કેમેસ્ટ્રીમાં ઓર્ગેનિક, ઈન-ઓર્ગેનિક, ફીઝીકલ અને એનાલીટીકલની સુવિધાયુક્ત અલગ લેબોરેટરી જરૂરી.
- યુનિવર્સિટીએ નિયત કરેલ અભ્યાસક્રમ મુજબના વિષય અનુસાર જરૂરી સંખ્યાના સાધનો તથા કેમિકલ્સ, ગ્લાસવેર-લેબવેર, મટીરીયલ્સ, નમૂના, સ્લાઈડ્સ, ચાર્ટ, મોડેલ, ઇલેક્ટ્રોનિક સાધનો, સોફ્ટવેર કોમ્પ્યુટર વિગેરે સુવિધા સાથે વસાવેલ હોવા જોઈએ તથા ડેડ સ્ટોકમાં ખરીદીની નોંધ હોવી જોઈએ.
- કેમિસ્ટ્રી-માઈક્રોબાયોલોજીની લેબોરેટરીમાં દરેક ટેબલ પર ગેસ-બર્નર-પાણીના નળની સુવિધા ફરજિયાત હોવી જરૂરી.
- ભૌતિકશાસ્ત્રમાં સ્નાતક અને અનુસ્નાતક માટે બે લેબોરેટરી અને એક ડાર્ક રૂમ ફરજિયાત જરૂરી રહેશે. ડાર્ક રૂમમાં લેમ્પ-સ્કેલ-બેટરી-મીટર ગેલ્વોનોમીટર, સ્પેક્ટ્રોમીટર વિગેરે આવશ્યક રહેશે તથા સિલેબસ મુજબ CRO (સી.આર.ઓ.) વસાવવાના રહેશે. દરેક ટેબલ પર વિજ કનેક્શન સાથે ટેબલની વ્યવસ્થા ફરજિયાત કરવાની રહેશે. દરેક સેમેસ્ટરમાં નિયત કરેલ સિલેબસના ૧૦૦% સાધનો ફરજિયાત વસાવવાના રહેશે.
- બોટની-માઈક્રોબાયોલોજીમાં વિદ્યાર્થી દીઠ એક માઈક્રોસ્કોપ ફરજિયાત હોવું જોઈએ.

8. દરેક લેબમાં ફાયર સેફ્ટી તથા અકસ્માત સામે રક્ષણ માટેની સુવિધા હોવી આવશ્યક રહેશે.
9. યુનિવર્સિટીએ મોકલેલ યુનિવર્સિટી પ્રતિનિધિની સમિતિ જ્યારે કોલેજની મુલાકાતે આવે ત્યારે લેબોરેટરી સાધનો બતાવવાના રહેશે
10. પ્રાયોગિક પરીક્ષામાં વિદ્યાર્થીએ જે-તે વિષયની સર્ટીફિકેટ પ્રાયોગિક જર્નલ ફરજિયાત રજુ કરવાની રહેશે. અન્યથા વિદ્યાર્થી પરીક્ષા આપી શકશે નહિ.
11. જે કોલેજ (પરીક્ષા કેન્દ્ર) જરૂરી મેન પાવર અને ભૌતિક સુવિધાઓ ઉભી કરવામાં નિષ્ફળ જશે તો સુવિધા કર્યા બાદ જ તે કેન્દ્ર ઉપર પરીક્ષા લેવામાં આવશે. વધુમાં જરૂરી સુવિધા ઉભી કરી નહિ હોય તો નવા શૈક્ષણિક વર્ષથી નવા વિદ્યાર્થી નહિ ફાળવવા સંબંધિત વિભાગને ભલામણ કરવામાં આવશે.

આપનો વિશ્વાસુ,


(મિતુલ એમ. દેલીયા)

પરીક્ષા નિયામક

APPENDIX (A)
M.Sc. PHYSICS INSTRUMENT REQUIRED

- | | |
|--------------------------------------|---|
| (1) C.R.O. → 6 (NOT Digital) | (34) R-S FLIP FLOP→1 |
| (2) Source (P.S.) → 4+2 = 6 | (35) Differentiator→1 |
| (3) AFO → 7 | (36) Square wave generator→1 |
| (4) Multimeter →10 | (37) Young's modulus →1 |
| (5) Computer → 4 | (38) Helical method →1 |
| (6) power supply → 6 | (39) Fiber Optics →1 |
| (7) G.M. Counter→1 | (40) Microwave→1 |
| (8) Micro processor→1Kit | (41) Babinet Compensator→1 |
| (9) Hall Effect set--→1 | (42) Fiberless Comm. →1 |
| (10) F.P. Interferometer→1 | (43) Frequency Modulation→1 |
| (11) Rayleigh's Method→1 | (44) Phase shift using IC-741→1 |
| (12) R. C. Phase shift→1 | (45) TRIAC →1 |
| (13) Astable multivibratore→1 | (46) Biastable Multivibrator →1 |
| (14) FET Amplifier→1 | (47) Study of integrator →1 |
| (15) Inverting OP-AMP | (48) D/A and A/D →1 |
| (16) Differential Amplifier→1 | (49) Sawtooth generator →1 |
| (17) Regulated power supply→1 | (50) Modulo n-counter 1 |
| (18) MOSFET →1 | (51) Crystal Oscillator →1 |
| (19) Scmitt trigger→1 | (52) VTVM → 2 |
| (20)Hysterisis-1 | (53) Decade Resistance box→ 3 to 6 |
| (21) Ultrasonic interferometer→1 | (54) Decade Resistance box → 3 to 6 (Dial) |
| (22) Milicon--→1 | (55) Decupe Capacitence box → 3 to 5 |
| (23) Laser kit →1 | (56) Decupe Capacitence box → 4 (Dial) |
| (24) Band gap energy→1 | (57) Vernier → 2 |
| (25) Biprism→1 | (58) Sodium source → 2 |
| (26) Fiber optics→1 | (59) Spectro Meter → 2 |
| (27) Class-B Push Pull Amp.--→1 | (60) Reading Telescope → 2 |
| (28) Amplitude Modulation→1 | (61) B.G. with lamp & scale → 2 |
| (29) Non-Inverting OP-AMP →1 | (62) Dual Power Suplly → 3 |
| (30) Voltage follower→1 | (63) Multimeter → 11 |
| (31) IC-723 Regulated Power Supply→1 | (64) જે તે પ્રયોગના બોર્ડ પણ ફરજિયાત રહેશે. |
| (32) OP-AMP parameter→1 | (65) plot area for → lab 1200 Sq. foot |
| (33) IC-555 Timer→1 | |

APPENDIX (B)
M.Sc. BIOTECHNOLOGY INSTRUMENT REQUIRED

There should a laboratory space for 30 students (one batch) with platform space of each students. Ventilation, wash basin, gas connection and fire extinguisher equipments should be adequate. A facility can be used for three batches of 30 students. For a three year course and approved batches these facility should be multiplied.

- (1). Laminar Air Flow Cabinet
- (2). UV-Vis Spectrophotometer
- (3). Bacteriological Incubator
- (4). BOD Incubator
- (5). Hot Air Oven
- (6). Microwave oven
- (7). Water bath
- (8). Shaking Incubator
- (9). Autoclave
- (10). Light Microscope
- (11). Magnetic Stirrer
- (12). Vortex
- (13). Hot Plate
- (14). Agarose gel electrophoresis Unit
- (15). Polyacrylamide gel electrophoresis Unit
- (16). Refrigerator
- (17). Deep freeze
- (18). Ultra-centrifuge
- (19). pH Meter
- (20). Environmental shaker
- (21). UV trans illuminator
- (22). Benchtop centrifuge
- (23). Weighing Balance

APPENDIX (C)
M.Sc. ZOOLOGY INSTRUMENT REQUIRED

Products (Instruments)

Semester 1

- (1) Centrifuge → 01
- (2) Compound light Microscope → 01(per student)
- (3) Spectrophotometer → 02
- (4) Hot air oven → 01
- (5) Weight balance → 02
- (6) Sieve set → 01(per student)
- (7) Burette stands → 01(per student)
- (8) Vortex → 02
- (9) Rotary Shaker → 01
- (10) Magnetic stirrer with hot plate → 02
- (11) Cuvette → 04

Semester 2

- (12) Refrigerator → 01

- (13) Water bath → 02
- (14) Burner → 01(per student)

Semester 3

- (15) Sahli's Haemometer with Pipette → 01(per student)
- (16) Neubauer counting chamber → 05
- (17) RBC pipette → 01(per student)
- (18) WBC pipette → 01(per student)
- (19) Computer Lab with PQGIS software → Atleast 10 PC

Semester 4

- (20) Dissecting microscope → 01(per student)
- (21) Table top microtome → 01

Products (Apparatus)

Semester 1

- (1) Spirit lamp
- (2) Crucible (Pores at bottom)
- (3) Conical flask (100, 250, 500, 1000 ml)
- (4) Conical flask (100ml) (Brown colour)
- (5) Pipettes (0.1, 1, 2, 5, 10, 25 ml)
- (6) Burettes (Brown Colour)
- (7) Glass Funnel (Every size)
- (8) Glass Measuring cylinders (10, 50, 100, 250, 500 ml)
- (9) Plastic Measuring cylinders (10, 50, 100, 250, 500 ml)
- (10) Beakers (50, 100, 250, 500, 1000 ml)
- (11) Wash Bottle (250, 500, 1000 ml)
- (12) Glass Bottle (250, 500, 1000 ml)
- (13) Indicator Bottles
- (14) Glass rod
- (15) Spatula (Small and Large)
- (16) Forceps
- (17) Droppers
- (18) Aluminium foil
- (19) Eppendorf
- (20) Petri dish
- (21) Whatman filter paper no. 1
- (22) Test-tubes

- (23) Test-tube holder
- (24) Test-tube stands
- (25) Pipette Pumps (According to Pipette size)
- (26) Volumetric Flask (250, 500 ml)
- (27) Lamp brush

Semester 2

- (28) Whatman filter paper no. 1 (Chromatography)
- (29) Chromatography chamber
- (30) Capillary
- (31) Sprayer
- (32) Motor pestle
- (33) Vial with cap
- (34) Pipette Bulb (According to Pipette size)
- (35) Magnetic stir bar
- (36) Wire Gauze
- (37) Burner stand

Semester 3

- (38) Slides
- (39) Coverslip

Semester 4

- (40) S.S. Tray

Products (Specimens)

Semester 1

1. Phylum: Protozoa

Leishmania; Trypanosoma; Giardia; Trichomonas; Trichonympha; Ceratium; Noctiluca; Euglena; Volvox; Opalina; Amoeba; Arcella; Elphidium; Globigerina; Monocystis; Gregarina; Plasmodium; Balantidium; Vorticella; Stentor

2 Phylum: Porifera

Leucosolenia; Clathrina; Sycon; Grantia; Euplectella; Hylonema; Cliona; Tethya; Chalina; Spongilla; Euspongia

3 Phylum: Cnidaria

Hydra; Obelia, Sertularia; Physalia, Porpita; Velella; Aurelia; Cassiopea; Tubipora; Alcyonium; Gorgonia; Pennatula; Metridium; Fungia; Madrepora; Favia; Zoanthus, cerianthus

4 Phylum: Platyhelminthes

Dugesia; Fasciola hepatica; Taeniasolium

5 Phylum: Mollusca

Chaetoderma; Neomenia; Neopilina; Chiton; Dentalium; Patella; Turbo; Pila; Cypraea; Murex; Conus; Onchidium; Aplysia; Doris, Helix; Mytilus; Nucula; Pecten; Unio; Teredo; Sepia; Loligo; Octopus; Nautilus

6 Phylum: Urochordata

Salpa; Ascidia; Oikopleura; Doliolum

7 Phylum: Cephalochordata

Amphioxus

Semester 2

8 Phylum: Annelida

Aphrodite; Polynoe; Nereis; Heteronereis; Eunice; Arenicola; Chaetopterus; Terabella; Sabella; Tubifex; Pherethima; Hirudinaria

9 Phylum: Nematoda

Trichinellaspinalis, Trichuris, Enterobiusvermicularis, Ascarislumbricoides, Ancylostomaduodenale, Dracunculusmedinensis, Wuchereriabancrofti

10 Phylum: Arthropoda

Spiders; Scorpions, Ticks and Mites; Julus; Scolopendra; Scutigera; Pauropus; Apus; Daphnia; Cypris; Cyclops; Balanus; Lepas; Prawns; Lobsters; Hippa; Hermit crab; True crab; Squilla; Oniscus; Amphipoda; Gammarus; Silverfish; Diplurans; Proturans; Springtails; Mayflies; Dragonflies; Damselflies; Stoneflies; Grylloblatta; Grasshopper; Stick insect; Leaf insect; Earwigs; Cockroach; Praying mantis; Termites; Book Lice; Bird Lice; Head louse; Bugs; Thrips; Antlions; Lacewings; Snakeflies; Alderflies; Beetles; fireflies; Weevils; Stylopids; Scorpionflies; Fleas; True flies; Houseflies; Mosquitoes; Butterflies; Moths; Caddisflies; Ants; Bees; Wasps

11 Phylum: Echinodermata

Antedon; Astropecten; Pteraster, Ophioderma; Arbacia; Strongylocentrotus; Echinus; Echinarachinus; Cucumaria.

12 Phylum: Hemichordata

Balanoglossus

13 Phylum: Agnatha

Myxine; Petromyzon

14 Phylum: Osteichthyes

Latimeria; Neoceratodus; Protopterus; Lepidosiren; Acipenser; Lepidosteus; Harpodon; Cyprinus; Labeorohitaa; Arius; Clarias; Anguilla; Belone; Exocoetus; Hippocampus; Fistularia; Channa; Hilsa; Anabas; Antennarius; Synaptura; Tetraodon; Diodon

15 Phylum: Chondrichthyes

Torpedo; Tiger shark; Hammer Head shark; Dog fish; Sting ray, Saw fish; Chimaera

Semester 3**16 Slides: Histology**

Pituitary Gland; Pineal Gland; Thyroid Gland; Parathyroid Gland; Pancreas, Adrenal Gland; Testes; Ovar, Thymus; Bone marrow; Lymph node; Spleen; Mucosal-associated lymphoid tissue;

Semester 4**17 Slides/Chart: Developmental Biology**

Spermatogenesis; oogenesis; meiosis; mitosis; Frog metamorphosis; Chick embryo slide (24, 36, 48, 60, 72, 96 hrs)

18 Models/Chart: Evolution

Comparative Hearts, Brain, aortic arches of vertebrate; Human evolution (Homo habilis, Homo erectus, Homo neanderthalensis, Homo sapiens)

Separate Laboratory for Zoology Practical.

APPENDIX (D)
M.Sc. CHEMISTRY INSTRUMENT REQUIRED

સાધનનું નામ

(1) pH મીટર	(9) થર્મોસ્ટેટ	(17) વેક્યુમ પંપ
(2) પોટેશીઓમીટર	(10) ડાયર	(18) સેપરેટિંગ ફનેલ
(3) કંડક્ટોમીટર	(11) ગ્રેવીટી બોટલ	(19) બી-14 ફ્લાસ્ક
(4) કલરીમીટર	(12) બકનર ફનેલ	(20) ડિસીકેટર
(5) પોલારીમીટર	(13) ઓઇલબાથ	(21) સેટરીફ્યુજ મશીન
(6) સ્પેક્ટ્રોફોટોમીટર	(14) હોટપ્લેટ	(22) થર્મોમીટર
(7) રીફ્રેક્ટોમીટર	(15) ટી.એલ.સી. પ્લેટ	(23) પેરાફિન બાથ
(8) વિસ્કોમીટર	(16) ઓવન	

CHEMICALS

(1) BENZOIC ACID	(39) CHLOROBENZENE
(2) OXALIC ACID	(40) BROMOBENZENE
(3) SALICYLIC ACID	(41) SODIUM HYDROXIDE (500gm)
(4) CINNAMIC ACID	(42) PHOSPHORUS PENTACHLORIDE
(5) SUCCINIC ACID	(43) METHYL ACETATE
(6) PHTHALIC ACID	(44) CUPRIC SULPHATE
(7) HIPPURIC ACID	(45) SODIUM SULPHITE
(8) ANTHRANILIC ACID	(46) SODIUM THIOSULPHATE
(9) 1-NAPHTHOL	(47) STARCH
(10) 2-NAPHTHOL	(48) SODIUM SULPHIDE
(11) RESORCINOL	(49) EDTA
(12) PHENOL	(50) THIO UREA
(13) O-CRESOL	(51) BARIUM CHLORIDE
(14) M-CRESOL	(52) POTASSIUM CHLORIDE
(15) P-CRESOL	(53) POTASSIUM PERSULPHATE
(16) O-NITRO PHENOL	(54) TUNGSTIC ACID
(17) M-NITRO PHENOL	(55) COBALT NITRATE
(18) P-NITRO PHENOL	(56) ZIRCONYL NITRATE
(19) DIPHENYL AMINE	(57) VANADIUM PENTOXIDE
(20) P-TOLIDINE	(58) POTASSIUM PYROANTIMONATE
(21) O-NITRO ANILINE	(59) HCl
(22) M-NITRO ANILINE	(60) ACETOPHENONE
(23) P-NITRO ANILINE	(61) BROMINE
(24) ANILINE	(62) H ₂ SO ₄
(25) N,N-DIMETHYL ANILINE	(63) FERROUS SULPHIDE
(26) ACETANILIDE	(64) BENZENE
(27) MDNB	(65) NITROBENZENE
(28) BENZAMIDE	(66) HNO ₃
(29) ACETAMIDE	(67) BENZALDEHYDE
(30) NAPHTHALENE	(68) CYCLOHEXANOL
(31) ANTHRACENE	(69) DIETHYL ETHER
(32) IODINE	(70) LEAD NITRATE
(33) POTASSIUM IODIDE	(71) ACETIC ACID
(34) KMnO ₄	(72) MAGNESIUM CHLORIDE
(35) K ₂ Cr ₂ O ₇	(73) HEXAMINE
(36) SnCl ₂	(74) PER CHLORIC ACID
(37) Boric Acid	(75) ACETONE
(38) FeCl ₃	

(76) DIAMONIUM HYDROGEN ORTHO
PHOSPHATE
(77) DISODIUM HYDROGEN ORTHO
PHOSPHATE
(78) AMMONIUM MOLYBDATE
(79) CARBON TETRA CHLORIDE
(80) ACETYL CHLORIDE
(81) BENZOIN
(82) WHATTMAN FILTER
(83) PARAFIN OIL
(84) PHENOLPHTHALEIN
(85) METHYL ORANGE
(86) POTASSIUM BROMATE
(87) PHTHALIC ANHYDRIDE
(88) EBT
(89) P ANISIDINE
(90) POTASSIUM ARSENITE
(91) POTASSIUM ARSANATE
(92) ZINC CHLORIDE
(93) SODIUM TUNGSTATE
(94) THORIUM NITRATE
(95) BENZIDINE
(96) SILVER NITRATE
(97) HYDROGEN PEROXIDE
(98) ETHYL ACETOACETATE
(99) 150 AMYL ALCOHOL
(100) ACETOPHENONE
(101) TRI ETHANOLAMINE
(102) O ANISIDINE
(103) HEXAMINE
(104) M-NITRO ANILINE
(105) SODIUM ARSENITE
(106) POTASSIUM THIOCYNATE
(107) METHANOL
(108) NITROBENZENE
(109) CHLOROFORM
(110) FILTER PAPER
(111) TRIANGLE
(112) RBF

(113) FUNNEL
(114) XYLENOL ORANGE
(115) MUREXIDE
(116) ZINC URENYL ACETATE
(117) LITHIUM CHLORIDE
(118) TITANIUM DIOXIDE
(119) SODIUM FLOURIDE
(120) COBALT CARBONATE
(121) COBALT CHLORIDE
(122) NICKEL CHLORIDE
(123) NICKEL CARBONATE
(124) FERROUS AMMONIUM SULPHATE
(125) CHROMIC SULPHATE
(126) CHROMIC CHLORIDE
(127) CADMIUM CARBONATE
(128) CADMIUM SULPHIDE
(129) ANTIMONY SULPHIDE
(130) BISMUTH CHLORIDE
(131) COPPER CARBONATE
(132) ALUMINIUM CHLORIDE
(133) SODIUM NITRITE
(134) POTASSIUM NITRITE
(135) SODIUM NITRATE
(136) ZINC PHOSPHATE
(137) ZINC SULPHIDE
(138) NICKEL PHOSPHATE
(139) ETHYL ACETATE
(140) POTASSIUM OXALATE
(141) ETHANOL
(142) KBr
(143) SrBr₂
(144) NaI
(145) MgCl₂
(146) MgSO₄
(147) MgCO₃
(148) MnCl₂
(149) MnO₂
(150) MnCO₃

APPENDIX (E)
M.Sc. MATHEMATICS INSTRUMENT REQUIRED

કોમ્પ્યુટર હાર્ડવેર

- Computer Systems Nos.30 with i5-Processor and 4-GB Ram

કોમ્પ્યુટર સોફ્ટવેર

- Matlab-2016 or Later Version
- Miktex Software
- Texmaker or Other Tex editor
- Turbo C/C+

APPENDIX (F)
M.Sc. MICROBIOLOGY INSTRUMENT REQUIRED

- (1) Laminar Air Flow / Gas burners points → 1 / 10 points (minimum)
- (2) Autoclave → 1
- (3) Microscopes → 01 (between 2 students)
- (4) UV- Trans illuminator → 1
- (5) UV-Visible spectrophotometer → 1
- (6) Electrophoresis Unit for SDS and Native PAGE → 1 unit
- (7) Hot Air Oven → 1
- (8) BOD Incubator → 1
- (9) Environmental Shaker → 1
- (10) Digital Weight Balance (milligram sensitivity) → 1
- (11) pH meter (digital) → 2
- (12) Conductivity meter (digital) → 2
- (13) Magnetic stirrer → 2
- (14) Vortex mixture → 1
- (15) Centrifuge Machine → 1
- (16) Refrigerated centrifuge (10000 RPM) → 1
- (17) Refrigerator → 1
- (18) Deep freezer (-20°C) → 1
- (19) Hot plate → 2
- (20) Distillation Unit → 1
- (21) PCR machine (96 well palte) → 1
- (22) Computer facility for Bioinformatics → 01 (between 2 students)
- (23) Water bath → 1

APPENDIX (G)
M.Sc. BOTANY INSTRUMENT REQUIRED

	BOP-101 & 102 (BOC-101,102,103 & 104)					
Sem I	Gram staining.		Gentian violet Iodine, Alcohol,			
	Algae	Microscope-20 Simple/Component,		Petridish Glass Permanent Slides		Chlorella,Ulva SpirogyraChara Padina,Sargassum Polysiphonia and Permanent slides of various stages above materials
	Fungi	do				Mucor,Sclerospora Peziza,Aspergillus Agaricus,Polyporus Colletotrichum and Permanent slides of various stages above materials
	Pathology	do				Bacteria Paddy late blight of Potato Tikka- Groundnut Powdery mildew-Cucurbita and Permanent slides of various stages above materials
	Cell biology			Wie loop,Cavity Side		Cell Organelles charts as per syllabus
				And all glassware require as per Sem-III		
				Spirit lamp, Pointer		
	Isolation of Chloroplast by centrifugation.	Centrifuge-02	Sucrose	Tube		
	Isolation of mitochondria by ultracentrifugation.	Refrigerated Centrifuge-02				
	Induction of polyploidy		Colchicine.			
	Cell biology & Genetic practical					Mitosis (P.S of Every stage
						Meiosis (P.S of Every Stage)
						Genetics- Chart as per syllabus
					Chironomous larva	Lamp brush Chromosome Slide
					Chironomous larva	Polytene Chromosome Slide
						Chart-SEM,TEM Karyotype

	BOP-201 & 202 (BOC-201,202,203 & 204)					
SemII	Bryophytes	Disection box-05 Disecting-Microscope-20	Formaldihyde Water	Petridish, Glass Permanent Slides		Riccia, Plagiochasma Anthoceros, Sphagnum Polytrichum and Permanent slides of various stages above materials
	Pteridophytes	do	do	do		Psilotum, Lycopodium Isoetes, Osmunda Marsilea and Permanent slides of various stages above materials
	Shoot apices	do	do	do	Hydrilla, Grass Ceratophyllum	
	Root Apices	do	do	do	Eichornia Lemna, Allium	
	Study to plant Tissues	do	Water	do		
	Parenchyma				Sunflower stem	Permanent slide of
	Aerenchyma				Eichhornia	All types of trichome
	Chlorenchyma				Any plant leaf	Stomata
	Collenchyma				Sunflower stem	leaf Anatomy
	Sclerenchyma				Sunflower stem	Nodal Anatomy
	Xylum				Cucurbita stem	Cellular Contents
	Phloem				Cucurbita stem	
	Transfusion tissue				Cycas leaflet	
	Secretory ducts	do			Ocimum leaf	
	Laticifers tissue	do			Argemone	
	Wood Anatomy	do				Accacia, Tectona Azadirachta - Mature Wood Sample

	Structural variability in Leaves	do	Water		Plant twig with Flower Helianthus, Aloe- Flowerbud, Ipomoea- Flowerbud Typha, Nymphaea Maize, Leffy plants	Permanent slide of all materials
	Instruments	Colorimeter-02, pH Meter-02, Spectrophotometer-02, Ectophoresis-02				
	Anther T.S.	do			Dhatura mettal Flower	Permanent slide of Anther T.S.
	Pollen viability	do	Boric Acid powder	Cavity slide & Cover glass	Dhatura mettal Flower	
	Endosperm haustoria with embryo				Cucumber seeds	
	Embryo with suspensor and basal cell				Brassica seeds	
	Polyembryony				Citrus seeds	
	Microsporogenesis				Ipomea flower buds	Permanent slide of Microsporogenesis

Sem II & Sem III	Biochemistry (Sem- II) and Plant Physiology Practica (Sem III)				
	Standard Curve of Starch	Photoelectric Colrimeter-02, Water bath-02, Centrifuge-02, Balance-02, Spectrophotometer-02, Electrophoresis-02, pH meter-02, chrometography chamber-06	KOH,Starch, Citric acid, sodium citrate, Ethanol,	Pestle mortar, sterilized sand, Distilled water, Pipettes, measuring cylinders, Glass rod	
	Extration & Estimation Starch				Wheat seeds
	Standard Curve of Glucose		Glucose, Sodium potassium, tartarate, Copur sulfate,Arsanomolybdate, H2SO4, Disodium hydrogen arsenate, Ethanol		
	Extration & Estimation Glucose				Acrus fruit
	Standard Curve of Protein		Ethanol, Ether, , Casein TCA solution,NaOH, CuSO4, Sodium potassium tararate,		
	Extration & Estimation of Protein				Agg albumine
	Standard Curve of Amino acids		Ninhydrin, Ethanol, Glycine, HCL, Sodiun acetate, Acitic acid,		
	Extration & Estimation of Amino acids				Green gram
	Deyermiation of amylase activities		KOH, Starch, Citric acid, sodium citrate, Acetone, HgCl2		Wheat seeds
	Separation and identification of Sugar by paper chromatography.		Phenylldiamine, Stannous chloride, Acetic acid, Ethanol, Butanol,	Pestle mortar, sterilized sand, Distilled water, Pipettes, measuring cylinders, Glass rod, Chrometography paper	Gucose, Fructose Matose Lactose Sucrose
	Separation and identification of Amino acids by paper chromatography.				Different amino acids
	Separation and identification of Plant pigments by paper chromatography.				Leafy vegetable
	Determiation of Isoelectric point of Casein.		Acetic acid, NaOH, Casein,	Test tube, Testtube stand	
	Estimation of free fatty acids by titration.		Ethar, Ehanol, NaOH, butter		

	Determination of pH from fruits/plant sample.	pH Meter-02	HCl, KCl		
	Preparation of Buffers and buffering actions.				
	Standard curve of IAA	Photoelectric Colrimeter-02	HClO ₄ FeC ₃ IAA	Pestle mortar, sterilized sand, Distilled water, Pipettes, measuring cylinders, Glass rod,	
	Determination of peroxidase aivity		Sodium phosphate, Dibasic sodium phosphate, Guiacol, Hydrogen peroxide		
	Detemination of isoelectric point off proteins		Aceic acid, NaOH, Casein		
	Seperation and Identification of Sugars by paper chrometography		Guucose,fructose, Malose, lactose, sucose, Phenylldiamine, sannous chloide, Acetic acid, Ethanol, Butanol		
	DNA and RNA Isolation		NaCl, Sodium Citrate, Yeast tablets, Ethanol, EtherPhenol,Potassium acetate		Coconut

	BOP-301 & 302 (BOC-301,302,303 & 304)				
Sem III	Gymnosperms				Cycas, Zamia, Pinus, Thuja Gnetum, Ephedra and Permanent slides of various stages above materials
	Fossil				Permanent slides of Psilophytaes Lepidodendrales Calamitales, Calamitales, Pteridospermales, Cycadales, Coniferales, Bennettitales, Pentoxylales, Cordiales.
	To prepare standard curve of DNA.	Photoelectric Colorimeter-02	Diphenylamine DNA Solution Acetic acidH ₂ SO ₄	Pestle mortar, sterilized sand, Distilled water, Pipettes, Glass rod, measuring cylinders,	
	To prepare standard curve of DNA.	do	Diphenylamine DNA Solution Acetic acidH ₂ SO ₄	do	
	To prepare standard curve of RNA.	do	Orcinol reagent Feric chloride RNA Soution	do	
	Extraction and quantitative analysis of RNA by spectrophotometric method.	do	Orcinol reagent Feric chloride RNA Soution	do	
	Soil thermometers	Soil thermometers-01	Auxin	Burate	
	Spectrophotometers	Spectrophotometers-01	EDTA	Pipette	
	Centrifuge	Centrifuge-01	NaOH	Test tube	
	Sling Pycnometer	Sling Pycnometer-01	Ammonium- Buffer	Conical Flask	
	Abney meter	Abney meter-01	EBT	Beaker	
	Min-Max Thermometers	Min-Max Thermometers-01	Ca-Hardness Tablet	Funnels	
	Cup-Anemometer	Cup-Anemometer-01	Total Hardness Tablet	Tripod	
	Flame Photometer	Flame Photometer-02	AgNO ₃	Burate Stand	
	Microwave Oven	Microwave Oven-01	K ₂ CrO ₄	Test tube Stand	
	Weeing Machine	Weeing Machine-01	Chromatography Paper	Net/Mash	
	Spectrophotometer	Spectrophotometer-02	Universal Indicator	Measuring Cylinder	
	EC meter	EC meter-02	HClO ₄	Filter Paper	

Quadrats 50 X50 cm	Quadrats 50 X50 cm and 100x100 cm -05	MnCl ₂ , IAA	Petri dish	
100x100 cm		FeCl ₃ , H ₂ SO ₄	Graph paper	
		Sodium sulphate	Meter scale	
Different Size of Sieve Clinostat	Different Size of Sieve Clinostat- 02 set	Acetone	Polythene bag	
		Aluminum Foil	Nail String	
		Na ₂ CO ₃		
		CuSO ₄	Pitted Tiles	
		Na-K_Tartarate	Capillary tube	
		Follin reagent	Wattmam filter	
		Nin hydrine	Paper No.1	
		Acetic acid	Rubber Bands	
		Ethanol	Glass rod	
		Glutaic Acid	Burate Stand	
		KOH, Ether		
		Hgcl ₂ , TT2		
		Cacl ₂ , ZnSo ₄		
		KI, KNO ₃ , MgSo ₄		
		BOD,COD-Bottle		
		Clenostate		
		Sprayer(સ્પ્રેયર)		

	BOP-401 & 402 (BOC- 401,402,403 &404)				
Sm IV	Biotechnology Practical (Embryo & Pollen culture)	MS Media gel Agar Ager		Fowerbud & Seed embryo	
			Scissor	Atropa	Models/Charts as per theory Syllabus
	Ethnobotany , Resource utilization & Conservation		Blade	Catharanthus	Groundnut Oil
			String	Adhatoda	Sunflower Oil & Seeds
			Emasculation Bag	Allium	Pepper
				Phyllanthus	Fennel,
				Papaver, Aloe	Cardeones
				Azadirecta	Saffron
				Osimum, Vitex	Clove
				Tribulus, Gloriosa	Bajra
				Pongamia	Agaricus
				Cassia, Cotton	Rice
				auriculata	Tur, Gram
				Indigofera tinctoria	Acacia
				Withnia, Artemisia	Tectona
				Ravoulfia, Wheat	Dalbegeria
				Becopa, Lawsonia	Terminalia
				Centtella, Butea	Mangifera