|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **AREA** | **DURATION** | **TITLE** | **TASKS** | **TOOLS** | **UNDERSTANDING** |
| 1 | ELECTRONICS | 30 mins. | Automatic Dependent Surveillance Broadcast | * Analyze different blocks in GNU Radio
* Install Dump1090 and RTL Sdr
* Apply ADSB flow graph
 | * GNU radio ,
* RTLSdr
* Dump1090
 | * Basic concepts of GNU Radio .
* Flow graphs in GNU Radio.
* Implementation of flow graphs
 |
| 2 |  | 30 mins. | AM, FM and Music-LED | * Generate AM and FM signal
* Make LEDs blink in sync with music
 | * Function generators
* Power supplies
* CRO
* Components assembled general purpose PCB
 | * AM and FM used in Radio broadcasting.
* Nature of waveforms of AM and FM.
* Convert sound vibration to audio signal
* Signal processing action.
 |
| 3 |  | 30 mins. | TV trainer module  | * Check TV transmission
* Implement basic operations.
* Simulate faults and detect at various stages of TV receiver
 | * Multi-meter
* CRO
 | * Tuners,
* IF subsystems
* Amplifiers
* Deflection circuits
* Power supplies and other circuits
 |
| 4 |  | 30 mins. | Orthogonal Frequency Division Multiplexing (OFDM) | * Implement OFDM modulation and demodulation
* Observe the waveforms
 | * GRC software.
 | * General terminology of OFDM
* OFDM techniques for practical applications
* Modulation and demodulation techniques of QPSK or QAM
 |
| 5 |  | 15 mins. | FM Reception | * Install RTL Sdr packages.
* Apply FM reception flow graph in practical applications.
* Tuning FM channels automatically
 | * GNU radio
* RTL Sdr
* Ddump1090.
 | * Basic concepts of GNU Radio .
* Basic flow graphs in GNU Radio.
* Implementation of flow graphs using RTL Sdr(R820T).
 |
| 6 |  | 15 mins. | MicrocontrollerTraffic Light Interface | * Simulate the control and operation of traffic lights
 | * Keil microvision
 | * Concept and working of Microcontroller
 |
| 7 |  | 15 mins. | Music tone generator | * Synthesizing SaReGaMa
 | * 8051 microcontroller
 | * Concept behind generating sound from the 8051 microcontroller
* Generating specific sounds or alarms.
 |
| 8 |  | 2 hours | Image Processing in common applications | * Face Recognition
* Eye Detection
* Ear Detection
* Smile/expression Detection
* Object Tracking
 | * Anaconda Python
* Open CV and Tensor Flow
* Web Cameras and Microphones
 | * Principles of Computer Vision principles and Machine Learning
* Softwares and techniques to implement Computer Vision applications
 |
| 9 | ELECTRICAL | 3 hours | House Wiring Practice | * Two-way control of lamps
* Three-way control of lamps
* MCB operation with load
* Using contactors in motors in pumps and flour mills
* Types of wiring
 |  | * The need for 2-way switches, MCB, contactor
* Connections and advantages for different types of wiring
 |
| 10 |  | 3 hours | Troubleshooting home appliances | * Practical connection of tube light
* Troubleshooting a ceiling Fan
* Troubleshooting a mixer-grinder
* Troubleshooting an iron box
* Tesla Coil
 |  | * Practical connection with switch, checking continuity and troubleshooting
* Windings, capacitor, regulator, bushes and coil. electronic switches
 |
| 11 | MECH | 3 hours | 4 wheeler servicing | * Check, replenish, top up lubricating oil, brake, fluid, engine coolant, power steering hydraulic oil, wind screen wiper water, battery electrolyte and transmission oil
* Clean, replace – air cleaner, oil filter, fuel filter
* Apply grease to parts through greasing points
* Remove and refit vehicle body parts head lamp assembly
* Clean, check and adjust: spark plug, hand brake, clutch, propeller shaft, wheel hub bearings, battery, tyres
 |  | * Nomenclature of different parts of vehicle and their locations
* General health and Safety precautions to be

observed in the workshop / garage* Working principle of 4 stroke petrol &amp; diesel engines , differences between petrol and diesel engines
 |
| 12 |  | 3 hours | 2 wheeler servicing | * Clean and replace air cleaner, fuel strainers and oil filters
* Drain and replenish lubricants, brake fluid
* Remove, clean, check, adjust and refit – fuel tank, pipes, tap, spark plug, brakes, clutch, drive chain
* Replace control cables – clutch, brake, accelerator cables
* Adjust clutch brake plays
* 13Check and replace bulbs
 |  | * Working principle of 2 and 4 stroke engines
* Procedure for dismantling, cleaning assembling of major assemblies of vehicle
* Functions and types of lubrication and cooling, fuel and ignition systems
* General defects and adjustments in clutch, gearbox, brake, carburetor
 |
| 13 | COMPUTER SCIENCE | 40 mins. | DesignThinking | * Empathize
* Define
* Ideate
* Prototype
* Test
* Iteration and making the process your own
 | * Scissors, Colored Sketch Pens, glue stick,paper cups, spin of yarn, roll of Cello Tape, Balloons, Clip on Pins, Straws, Rubber Bands, Colored sticky note pads, books, KG Cardboard Sheets, Carton Box, Cloth Bag
 | * Systematic approach to problem solving
* Develop practical innovative solutions for difficult and ambiguous real world problems.
* Action and creation, start-up ideas
* Special focus on Computer Science, will change the way you think forever
 |
| 14 | SOCIAL AWARENESS | 8 hours | Social Awareness | * Volunteering for charity organizations.
* Painting of walls and blackboard
* Cleaning up and preparing the play area, installing sports equipment
* Planting saplings
* Creating awareness about health and hygiene through interactions, songs and cultural activities
* Repairs and civil works
 | * Tools and equipment for civil work
 | * Empathy
* Helping the under privileged
* Sense of gratitude
 |