# IB Information Technology in Global Society Course No. 10007 Credit: 1.0

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| **Student name:**  |  | **Graduation Date:** |  |

Pathways and CIP Codes:Web & digital Communications (11.1004)

Course Description: **Application Level:** Coursework should represent objectives specific to International Baccalaureate Specifications and Portfolio Guide. Those listed below are example only.

Directions:The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.

**RATING SCALE:**

4. Exemplary Achievement: Student possesses outstanding knowledge, skills or professional attitude.

3. Proficient Achievement:Student demonstrates good knowledge, skills or professional attitude. Requires limited supervision.

2. Limited Achievement:Student demonstrates fragmented knowledge, skills or professional attitude. Requires close supervision.

1. Inadequate Achievement:Student lacks knowledge, skills or professional attitude.

0. No Instruction/Training:Student has not received instruction or training in this area.

## Benchmark 1: Working knowledge of information technology topics

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Basic electronics components (such as transistors BJT, FET IGFET, MOSFET, SCR & diodes) |  |
| 1.2 | Circuit functions (such as switching amplifiers, voltage regulations, limiters & rectification) |  |
| 1.3 | circuit breakers and fuses |  |
| 1.4 | construction of conductors and insulators (such as examples of various cables, shielding and failure mechanisms) |  |
| 1.5 | electron theory |  |
| 1.6 | inductance, capacitance, impedance, resonance and reactance |  |
| 1.7 | instrumentation schematics, control circuitry, ground detection and protective relaying (including the use of associated drawings for diagnosing circuit trouble) |  |
| 1.8 | magnetism (such as Faraday's Law of Induction, Lenz's Law, amp‐turns, volt‐turns, B&H fields) |  |
| 1.9 | relays |  |
| 1.10 | series, parallel and combination circuits applied to AC and DC circuits |  |
| 1.11 | Thevenin's and Norton's theorems |  |
| 1.12 | Theory of operation of plant electrical components: motors (such as types and classifications, generators (such as types and classifications) and transformers |  |
| 1.13 | types, functions and operation |  |
| 1.14 | fault symptoms and hazards |  |
| 1.15 | safety and environmental |  |
| 1.16 | precautions associated with cooling mediums (such as oil, air, hydrogen) |  |
| 1.17 | fire protection systems |  |
| 1.18 | voltage regulators |  |
| 1.19 | linear and switching power supplies |  |
| 1.20 | inverters (such as battery backup systems) |  |

## Benchmark 2: Diagnose problems and perform maintenance on equipment.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 2.1 | Electrical supply components: switchgear, load centers & motor control centers, transformers, inverters & uninterruptible power supplies, and circuit breakers v. batteries and chargers. |  |
| 2.2 | Electrical control components: relays, meters, control circuits, and cables. |  |
| 2.3 | Resistive electrical equipment: heaters and heat tracing. |  |
| 2.4 | Rotating equipment: motors, generators and motor‐generators. |  |
| 2.5 | Structural and auxiliary equipment: hoists & cranes, fire barriers, electric boilers, and elevators. |  |
| 2.6 | Valve actuators |  |
| 2.7 | Manual operation |  |
| 2.8 | Testing |  |
| 2.9 | Position indication |  |
| 2.10 | Environmental impact |  |

## Benchmark 3: Advanced knowledge of the construction and use of systems.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | battery systems |  |
| 3.2 | cathodic protection systems |  |
| 3.3 | electrical distribution, including alternating and direct current systems |  |
| 3.4 | emergency power systems |  |
| 3.5 | generator excitation and control systems |  |
| 3.6 | station heat tracing systems |  |
| 3.7 | transformer systems and auxiliaries |  |

## Benchmark 4: Perform specialized tasks.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 4.1 | breaker operation, setting, adjustment and repair |  |
| 4.2 | motor‐operated valve diagnostic testing |  |
| 4.3 | motor overhauls |  |
| 4.4 | high potential ("hi‐pot") tests |  |
| 4.5 | stress relief of major components |  |
| 4.6 | high voltage connection preparation |  |
| 4.7 | relay setting, adjustment, calibration and repair |  |
| 4.8 | special soldering |  |
| 4.9 | tempering and annealing |  |
| 4.10 | battery load testing |  |
| 4.11 | switchgear testing |  |

## Benchmark 5: Instrument & Control Technicians - Working knowledge of Equipment & Components

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 5.1 | advanced electronics theory, including operational amplifiers, integrated circuits and solid state circuitry |  |
| 5.2 | digital electronics, including the different type of logics used and methods for programming and controlling circuit timing |  |
| 5.3 | electrical circuit and instrument loop schematics |  |
| 5.4 | pneumatic and hydraulic valve operator fundamentals |  |
| 5.5 | principles of operation of on‐line chemistry instrumentation such as conductivity analyzers, turbidity |  |
| 5.6 | detectors and dissolved oxygen instruments |  |
| 5.7 | process measurement systems for pressure, temperature, flow, level and vibration |  |
| 5.8 | process control, loop tuning and control fundamentals |  |

## Benchmark 6: Instrument & Control Technicians - Diagnose problems and perform maintenance on components

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 6.1 | electronic equipment |  |
| 6.2 | computers/microprocessors |  |
| 6.3 | analyzers |  |
| 6.4 | signal converters |  |
| 6.5 | electrical components such as power supplies, transformers, breakers & relays |  |
| 6.6 | fire barriers |  |
| 6.7 | hoists and cranes |  |
| 6.8 | nstrumentation components, including problems associated with placing components into or out of service (such as valving transmitters being placed into service) |  |
| 6.9 | sensors and detectors: transmitters & indicators; recorders & annunciators and controllers & positioners. |  |
| 6.10 | structural and auxiliary equipment |  |
| 6.11 | valve actuators: manual operations; alignment for remote control and/or automatic operation; testing; position indication; and impact of environmental conditions. |  |

## Benchmark 7: Instrument & Control Technicians - Troubleshoot and repair systems & equipment.

### Competencies

| **#** | **Description** | **RATING** |
| --- | --- | --- |
| 7.1 | analytical equipment |  |
| 7.2 | circuit boards |  |
| 7.3 | computers |  |
| 7.4 | turbine control system |  |
| 7.5 | variable‐speed pump controls |  |

I certify that the student has received training in the areas indicated.

Instructor Signature:

For more information, contact:

CTE Pathways Help Desk

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