

# Access to H.E. National Programme Unit



|                   |                                   |                     |                            |
|-------------------|-----------------------------------|---------------------|----------------------------|
| Unit Title:       | Chemical and Acid-Base Equilibria |                     |                            |
| Graded Unit Code: | GA33CHE11                         | Ungraded Unit Code: | UA33CHE11                  |
| Pathway(s):       | Science and Engineering           |                     |                            |
| Module(s):        | Chemistry                         |                     |                            |
| Level:            | 3                                 | Credit Value:       | 3                          |
| Valid from:       | 1 <sup>st</sup> August 2019       | Valid to:           | 31 <sup>st</sup> July 2028 |

**The following QAA grade descriptors must be applied if you are delivering the graded version of this unit:**

|   |                              |
|---|------------------------------|
| 1 | Understanding of the subject |
| 3 | Application of skills        |
| 7 | Quality                      |

| LEARNING OUTCOMES                                                                                        | ASSESSMENT CRITERIA                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>The learner will:</b>                                                                                 | <b>The learner can:</b>                                                                                                                                              |
| 1. Know that many reactions are reversible and recognise that the equilibrium constant can be calculated | 1.1 Use Le Chatelier's principle to predict the effects on position of equilibrium due to changes in temperature, pressure, concentration and addition of a catalyst |
|                                                                                                          | 1.2 Predict the effect of temperature on the position of equilibrium and explain why a compromise temperature and pressure may be used in industrial processes       |
|                                                                                                          | 1.3 Construct an expression for $K_c$ and perform calculations for a homogeneous system at constant temperature                                                      |
|                                                                                                          | 1.4 Predict and explain the effects of changes in temperature, concentration or the addition of a catalyst on the value of the $K_c$ of a range of given reactions   |
| 2. Know that acids and bases react in different ways                                                     | 2.1 Define acids and base in terms of proton transfer                                                                                                                |

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| LEARNING OUTCOMES                                                                    | ASSESSMENT CRITERIA                                                                                                        |
|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>The learner will:</b>                                                             | <b>The learner can:</b>                                                                                                    |
|                                                                                      | 2.2 Define pH and calculate the pH of strong acids from its concentration or vice versa                                    |
|                                                                                      | 2.3 Describe the dissociation of weak acids and bases in aqueous solution                                                  |
|                                                                                      | 2.4 Define $K_a$ and $pK_a$                                                                                                |
|                                                                                      | 2.5 Calculate the pH of weak acids, and explain the assumptions made in such calculations                                  |
| 3. Recognise that the dissociation of water is an example of homogeneous equilibrium | 3.1 Define $K_w$ and calculate the pH of a strong base                                                                     |
|                                                                                      | 3.2 Explain the variation of $K_w$ with temperature                                                                        |
| 4. Understand the nature and action of buffer solutions                              | 4.1 Describe the components of an acidic buffer and of a basic buffer                                                      |
|                                                                                      | 4.2 Qualitatively explain the action of acidic and basic buffers using specific examples from living or non-living systems |