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| **Own time** | **Video lectures** | Le1 Introduction | Le5 Metabolic networks and flux analysis | Le9 Energetics and enzymes | Le13 Measuring metabolites | Le17 Experimental considerations |
| | | Le2 Material and energy budget | Le6 Isotope tracing | Le10 Respiration and oxygen | Le14 Fatty acids and sterols | Le18 Compartmentalization and Transport |
| | | Le3 Oxidation and reduction | Le7 The TCA cycle | Le 11 Enzyme classes | Le15 Nucleotides | Le19 Genomic aspects |
| | | Le4 Carbohydrates | Le8 Cofactors and vitamins | Le12 Amino acids and nutrient starvation | Le16 One-carbon units and methylation | |
| | **Literature** | Stryer ch. 15,16 | Stryer ch 17<br>Buescher et al. 2015 | Stryer ch 8, 18, 23 | Stryer ch 22, 25, 26 (cholesterol) | Thiele et al 2013 |

| | **Mon 20/3 Room 221** | **Tue 21/3 Room 221** | **Fri 24/3 Room 221** | **Mon 27/3 Room 311** | **Wed 29/3 Room 311** | **Fri 31/3 Room 311** |
|---|---|---|---|---|---|---|
| **13--14** | Introduction to course, practical issues | Q & A<br>Biomedical context | Q & A<br>Biomedical context | Q & A<br>Biomedical context | Q & A<br>Biomedical context | Q & A<br>Biomedical context |
| **14--15** | Databases and tools for navigating metabolism | Material and energy | TCA cycle<br>Isotope tracing 1 | Energetics and respiration | Fatty acids | Measuring metabolism |
| | | Coffee break | Coffee break | Coffee break | Coffee break | |
| **15--16** | | Redox metabolism | Flux balance analysis | Enzyme classes | Mass spectrometry and NMR | Compartments and transport |
| **16--17** | | Carbohydrates | | Amino acids<br>Isotope tracing 2 | Nucleotides and one-carbon units | Genomics |

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| Seminar / Problem solving | Own time | Computer lab / exercise |