1. Expand the introduction to include an introduction to the basic solid state physics. This should introduce the concept of the band theory of solids and introduce the concept of the Fermi surface. You should also introduce the phenomenon of superconductivity, and the BCS theory of conventional superconductivity before embarking on the introduction to your materials and techniques. There should also be a description of the role of spin-fluctuations in superconductivity. The additional length of this is expected to be of the order of a few pages.
2. Make your contribution to the various pieces of work much clearer. This could either be a section of your introduction or in the appropriate results sections.
3. Chapter 5 - Provide a clearer comparison to the Leboeuf paper (e.g. Describe their model in more detail and why it might be wrong).
4. Provide some more information on the characterisation of the various samples you have worked upon (e.g. RRR).
5. Include information on contact resistances.
6. Tidy up the section on the Lindhard function to emphasise that it is its singular behaviour which is important. It is not its magnitude.
7. Somewhere you should describe the various magnets/fridges you use properly rather than just calling them “yellow” or “polo”.
8. p.11 How can AFM spin-fluctuations provide a pairing mechanism.
9. p.33 Section 2.2.5. Are elemental metals free-electron like? Na, K etc. are rather free-electron like, but transition metals are not.
10. p.74 Check that there is not any band crossing happening and that this is not the cause of the sudden change in the *d* character.
11. p.77 Say why you choose not to use your own measurements of other doping levels.
12. p.78 Justify why hole surfaces are more difficult to see.
13. p.79 Tight binding fits? This is mentioned in the figure caption but I see no sign of any tight-binding fit.
14. p.78 Quite confused here (as we discussed in the exam) as to how you get out a dispersion. There is no dispersion in Eq. 4.5.1.
15. p. 94 You say that it is on the hole sheet where you see the largest nesting component? Surely this kind of interband nesting requires two sheets...
16. p.104 Justify the model used to fit the data by comparing to earlier work. Motivate why this model might apply to BSCO2201
17. Fig. 4.7.3 - faded grey lines are hard to see.
18. Include some perspectives for future work in your conclusions.
19. Address the typographical corrections listed below.

Typographical errors (Dr Dugdale)

First, some general points :

Punctuation in all figure captions and footnotes. Don’t forget the final full stop. Also, a footnote needs to be a free standing entity, starting with a captial letter and ending with a full stop.

You should make sure abbreviations such as YBCO123 and Tl2201 are fully defined.

The references not in order. Why is first reference [4]? Also, “ref” should be “Ref.” or “ref.” - and you need to be consistent throughout thesis

p.2 complement not compliment
p.9 *et al.* should consistently be italic
p. 10 phonon pairing strength - you mean electron-phonon coupling
p. 11 nesting is not just hole onto electron. And it is not about size. It is about shape.
p.12 - 1.2.4 - what do you mean by “stronger”? You mean the mass enhancements, not the masses.
p. 19 CuO lattice? - you mean layer?
p.21 Which reference is Ando et al.?
p.21 Tl2201 - why is the 2201 in subscript?
p.24 Section 2.2 - Should be De Haas-van Alphen - missing n!
p.24 Tesla is the man. The tesla is the unit. This error is multiply present.
p.25 Is “floor” a mathematical term?
p.28 K perpendicular should be lower case
p.29 a fast fourier transform, not an
p.31 It is Landé g factor, not Landau
p.32 First sentence is not a sentence.
p.32 Section on band mass needs tidying up. What is “bandstructure potential”?
p.33 2D in shape and therefore cylindrical? You mean in cross-section.
p.34 there is an i missing in expression for B
p.36 You can’t write DFT theory. The T is theory.
p.38 Missing reference to OK Andersen’s Linear Methods in Band Theory paper.
p.40 Your c.f. makes no sense.
p.41 one one - should be “on one”
p.41 Narduzzo - no reference given.
p.43 principle should be principal
p.44 Again, principle should be principal
p.44 fridge? You mean dilution refrigerator.
p.44 hysol. This is a brand - say what it is e.g. adhesive
p.45 sorb? Surely sorbtion? Again on p.46
p.45 Data are, not data is.Twice on this page.
p.47 5%?
p.47 Yellow magnet? This needs fixing.
p.48 I don’t see a curve in 2.2.13. What is this LK curve?
p.49 dependant should be dependent. Also p.51
p.50 effect should be effects
p.50 term - this should be singular. Fix verb too.
p.52 - footnote. Page referred to is blank!
p.52 equates not equate. Also, T to 2 decimal places?
p.52 amount should be number
p.55 Green “Polo” magnet. This needs fixing
p.55 LNCMI and HFML. Have these been explained before?
p.56 - whet? You mean wet.
p.56 Last paragraph - has should be have.
p.57 Polo magnet? Several times. Is this really what it is officially called?
p.59 remain should be remains
p.60 depth? You mean thickness.
p.65 Close to definitive? How can this be? Either it is or it isn’t definitive.
p.65 ...vector where investigated.... Should be were.
p.65 Good single crystals? What is good?
p.65 Has XRD been defined before?
p.68 there was no self heating - should be there were
p.68 alternatively should be alternately

p.69 intermediary? You mean intermediate range.
p.69 What do you mean APW method + lo method - you mean LAPW + lo method
p.71 extremum not extrema when singular
p.71 the bands are not overestimating anything. The calculation might be...
p.71 100 and 110 need to be [100] and [110] (or < > if generic).
p.73 basal not basel
p.73 (100) plane, not [100] plane.
p.73 sub-orbit level. You mean decomposed by orbital character.
p.73 [110] slice should be (110) slice. Also in caption on p.74
p.73 basal not basel
p.74 Don't understand this figure.
p.75 different from, not different to.
p.75 These refer to BZ not unit cells.
p.78 repeat of to - "to to"
p.79 Fig. caption - what do you mean tight-binding fits?
p.79 dependent, not dependant.
p.81 Use of word granularity. Technical term is k-point mesh or density.
p.84 unit cell should be BZ.
p.85 zero not zeros.
p.85 eighth not eight.
p.85 You need to remind the reader where to look for the theory of the A_s curves.
p.86 "as is transitions" should be "as are transitions"
p.86 "DFT does not follow" should be "DFT calculation does not follow"
p.88 Standard deviation "as calculated" should be "was calculated"
p.89 Dependant should be dependent. Also, say what are you fitting.
p.90 Missing full stop just before "Filtering".
p.91 Dependant again!
p.93 Missing Analytis reference.
p.93 Is this first reference to Yamaji?
p.94 posit not posits
p.97 Polo magnet. Fix this.
p.98 Fit parameters, not Fits parameters
p.104 too associated? What do you mean? As well?
p.108 begin should be being.
p.109 repeated in in
p.109 modelled not modeled
p.109 Last paragraph - fix the English!
p.109/10 and possibly elsewhere - fix spelling of LeBoeuf.

Typographical errors (Dr Dugdale)

Pg. 2 ln 4, $_{0.8}$
Pg.8 ln 13 interpolate THE femiology
Pg. 12 ln 14 'they' → 'it is'?
Pg. 24 title: 'van Alphen' same on page headers for the next few pages.
Pg.27 define 'A_(delta_B)' in equation 2.2.9.
Pg.30 and elsewhere – 'Shoenberg' not 'Schoenberg'
Pg. 30 3rd line from bottom – double 'is'
Pg. 34 section 2.3.1 ln 4 – double 'to'
Pg. 41 ln 3 double 'one'

Pg. 43 last line – ‘corps.’ Should be ‘corporation’
Pg. 46 caption ‘th esample’
Pg. 72 ln 4 ‘however is proves’
Pg. 77 page header and number run into each other
Pg. 85 ‘zeros’ → ‘zero’
Pg.90 paragraph 2 ln 2 ‘at a time Filtering’ --. Not sure what you mean?
Pg. 104 Equation has typo
Pg .105 equation has typo
Pg. 105 ‘Kondo Fermi surface?’