


DN - 021RA-2R040 32101

**USE OF MODERN PEDAGOGIES IN TEACHING LEARNING PROCESS**

University LMS link: <https://erp.himtu.ac.in/applicantLogins.htm>

YEAR	NAME OF FACULTY	LINK
2020	Archana Chaudhary	1. Website: <a href="https://bpharm5thsemsectiona.gnomio.com/">https://bpharm5thsemsectiona.gnomio.com/</a> User id: bpharm5semsectiona Password: Laureate@2020 2. <b>B. Pharmacy Second Year (Section -B)</b> <a href="https://liphbpsecondyearb.gnomio.com">https://liphbpsecondyearb.gnomio.com</a> User Name: liphbpsecondyearb Password: 2ndyear-B 1. <a href="https://youtu.be/bYqnPTZqwr8">https://youtu.be/bYqnPTZqwr8</a> 2. <a href="https://youtu.be/oTqVFsUKp98">https://youtu.be/oTqVFsUKp98</a> 3. <a href="https://youtu.be/Q9VyoHU5PqI">https://youtu.be/Q9VyoHU5PqI</a>
2020	Anchal Guleria	1. <b>B.pharmacy Final year ( Section-B)</b> Website: <a href="https://bph07b.gnomio.com">https://bph07b.gnomio.com</a> User id: bphb Password: Pharmacy@07 2. <b>D.pharmacy 1st year</b> Website: <a href="https://dpharmacy1styearliph.gnomio.com">https://dpharmacy1styearliph.gnomio.com</a> User : dpharmacy1st Password: Ajaykumar@2020 3. <b>D.pharmacy 2nd year</b> <a href="https://dpharm2nd year.gnomio.com">https://dpharm2nd year.gnomio.com</a> User id: ajaykumar@2020 Password: Laureate@2020
2020	Prof. Amar Deep Ankalgi	<a href="https://youtu.be/7ZqMLbkPNIs">https://youtu.be/7ZqMLbkPNIs</a> <a href="https://youtu.be/QoTQCad_Ylw">https://youtu.be/QoTQCad_Ylw</a> <a href="https://youtu.be/KcsbJ5L_TVw">https://youtu.be/KcsbJ5L_TVw</a> <a href="https://youtu.be/JrvGBwMEEIQ">https://youtu.be/JrvGBwMEEIQ</a> <a href="https://youtu.be/Q68juWXeKJc">https://youtu.be/Q68juWXeKJc</a> <a href="https://youtu.be/MfZbYDA7wWw">https://youtu.be/MfZbYDA7wWw</a> <a href="https://youtu.be/xo3hh3WtB3M">https://youtu.be/xo3hh3WtB3M</a> <a href="https://youtu.be/yar_WBWvQis">https://youtu.be/yar_WBWvQis</a> <a href="https://youtu.be/V60Z8DfRq-I">https://youtu.be/V60Z8DfRq-I</a> <a href="https://youtu.be/TKEqX_ZKv5A">https://youtu.be/TKEqX_ZKv5A</a> <a href="https://youtu.be/U-PZruiKojo">https://youtu.be/U-PZruiKojo</a> <a href="https://youtu.be/7n9amhN1m3c">https://youtu.be/7n9amhN1m3c</a> <a href="https://youtu.be/yWCV4tud9HI">https://youtu.be/yWCV4tud9HI</a> <a href="https://youtu.be/a83ZAAtVTAQ">https://youtu.be/a83ZAAtVTAQ</a>

  
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2020	Upasana Thakur	<p>1. Website: <a href="https://bpharm5thsemsectiona.gnomio.com/">https://bpharm5thsemsectiona.gnomio.com/</a>  User id: bpharm5semsectiona  Password: Laureate@2020</p> <p>2. <b>B. Pharmacy Second Year (Section -B)</b>  <a href="https://liphbpsecondyearb.gnomio.com">https://liphbpsecondyearb.gnomio.com</a>  User Name: liphbpsecondyearb  Password: 2ndyear-B</p> <p>1. <a href="https://youtu.be/FXsdHlxYDqc">https://youtu.be/FXsdHlxYDqc</a>  2. <a href="https://youtu.be/rYU27Dd3s0w">https://youtu.be/rYU27Dd3s0w</a>  3. <a href="https://youtu.be/dQX77yEkZqk">https://youtu.be/dQX77yEkZqk</a></p>
2020	Shavinder kumari	<p>1. Final year section B  Website: <a href="https://bph07b.gnomio.com">https://bph07b.gnomio.com</a>  User ID: bphb  Password: Pharmacy@07</p> <p>2. D Pharmacy 1<sup>st</sup> year  Website: <a href="https://dpharmacy1styearliph.gnomio.com">https://dpharmacy1styearliph.gnomio.com</a>  User ID: dpharmacy1st  Password: ajaykumar@2020</p> <p>3. B pharmacy 2nd year(3rd sem)Section B  Website: <a href="https://liphbpsecondyearb.gnomio.com">https://liphbpsecondyearb.gnomio.com</a>  UserID: liphsecondyearb  Password: secondyear-B</p>
2020	Mr. Nishant Goutam	<p><a href="https://youtu.be/h74mRqqCURI">https://youtu.be/h74mRqqCURI</a>  <a href="https://youtu.be/ZSdNFkMG67U">https://youtu.be/ZSdNFkMG67U</a>  <a href="https://youtu.be/C9RZddFo34c">https://youtu.be/C9RZddFo34c</a>  <a href="https://youtu.be/3ibRniiXXA0">https://youtu.be/3ibRniiXXA0</a>  <a href="https://youtu.be/7_rly-LhVcg">https://youtu.be/7_rly-LhVcg</a>  <a href="https://youtu.be/w9dypNRtT3c">https://youtu.be/w9dypNRtT3c</a>  <a href="https://youtu.be/QiOHmpZutz0">https://youtu.be/QiOHmpZutz0</a>  <a href="https://youtu.be/xVAP_-q_wDA">https://youtu.be/xVAP_-q_wDA</a>  <a href="https://youtu.be/seAk8XV2Sv4">https://youtu.be/seAk8XV2Sv4</a>  <a href="https://youtu.be/w-6LoWmrAoc">https://youtu.be/w-6LoWmrAoc</a>  <a href="https://youtu.be/8j0L8qZrMQo">https://youtu.be/8j0L8qZrMQo</a>  <a href="https://youtu.be/wII_YFw-5XQ">https://youtu.be/wII_YFw-5XQ</a>  <a href="https://youtu.be/IYgTY-mMew">https://youtu.be/IYgTY-mMew</a>  <a href="https://youtu.be/M7BeWxuPlo8">https://youtu.be/M7BeWxuPlo8</a>  <a href="https://youtu.be/M_kbZP9UUUY">https://youtu.be/M_kbZP9UUUY</a>  <a href="https://youtu.be/hQcUrcXsyCs">https://youtu.be/hQcUrcXsyCs</a>  <a href="https://youtu.be/dNwMIi0IUzo">https://youtu.be/dNwMIi0IUzo</a>  <a href="https://youtu.be/xakjtTuWHSc">https://youtu.be/xakjtTuWHSc</a>  <a href="https://youtu.be/KCSHtGuB0BY">https://youtu.be/KCSHtGuB0BY</a>  <a href="https://youtu.be/aJrNpcXu2j0">https://youtu.be/aJrNpcXu2j0</a>  <a href="https://youtu.be/mfAvySoLvqc">https://youtu.be/mfAvySoLvqc</a>  <a href="https://youtu.be/sBLWQ1E72Dc">https://youtu.be/sBLWQ1E72Dc</a>  <a href="https://youtu.be/jjo7xUluqkg">https://youtu.be/jjo7xUluqkg</a>  <a href="https://youtu.be/SkflSwYfiz8">https://youtu.be/SkflSwYfiz8</a></p>

*Nishant Goutam*  
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<https://youtu.be/2KYx6liEnOc>  
<https://youtu.be/MSZTgyOoN7E>  
<https://youtu.be/zsvDUyuLDdQ>  
<https://youtu.be/YyCFHP8mLEw>  
<https://youtu.be/1DXzKpfeDVs>  
<https://youtu.be/DMAfftqtku0>  
<https://youtu.be/qKnftG0hSVU>  
<https://youtu.be/-o4ov62Wt84>  
<https://youtu.be/-8USxXGr980>  
<https://youtu.be/o6kDdz6ItPY>  
<https://youtu.be/DECiCI5-Dik>  
[https://youtu.be/dHhsrZB\\_V4](https://youtu.be/dHhsrZB_V4)

2020 Mr. Pravin Kumar

**B.Pharm First Year Section A**  
<https://liphbpfirstyear.gnomio.com/>  
 Username: liphbpfirstyear  
 Password: 1styear-A  
**Youtube Videos**  
<https://youtu.be/yU5s0vRoZtk>  
<https://youtu.be/KguYIye6mDw>  
[https://youtu.be/ShGf\\_ZVZ564](https://youtu.be/ShGf_ZVZ564)  
<https://youtu.be/3wBE2C5Gwpc>  
<https://youtu.be/Vhv94Xg5WUg>  
<https://youtu.be/5VKSKq-sg9E>  
**MCQ Test**  
[https://docs.google.com/forms/d/1ovvo9UY8DI9hXCy4yF4BNYh\\_oQ0vCrtMcaupY-8Nl6c4/edit](https://docs.google.com/forms/d/1ovvo9UY8DI9hXCy4yF4BNYh_oQ0vCrtMcaupY-8Nl6c4/edit)

2020 Mr. Ajay Kumar

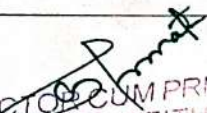
<https://dpharm2ndyear.gnomio.com/>  
<https://dpharmacy1styearliph.gnomio.com/>  
<https://bph07a.gnomio.com/>

2020 Dr. Shubham Sharma

**1. B. Pharmacy Fourth Year (Section -A)**  
 Website: <https://bph07a.gnomio.com>  
 User id: bpha  
 Password: pharmacy@07  
**2. B. Pharmacy Second Year (Section -B)**  
<https://liphbpsecondyear.gnomio.com>  
 User Name: liphbpsecondyear  
 Password: 2ndyear-A  
**3. B. Pharmacy First Year (Section A&B)**  
<https://liphbpfirstyearb.gnomio.com>  
 User Name: liphbpfirstyearb  
 Password: 1styear-B  
<https://liphbpfirstyear.gnomio.com>  
 User Name: liphbpfirstyear  
 Password: 1styear-A  
**4. D. Pharmacy First Year**  
<https://dpharmacy1styearliph.gnomio.com>

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		User Name: dpharmacy1st Password: Ajaykumar@2020 <b>5. D. Pharmacy Second Year</b> <a href="https://dpharm2ndyearliph.gnomio.com">https://dpharm2ndyearliph.gnomio.com</a> User Name: ajaykumar@2020 Password: Laureate@2020
2020	Dev Raj	<a href="https://devraj.gnomio.com/">https://devraj.gnomio.com/</a> Username: admin Password: kgvPKN7W <a href="https://youtu.be/xwsl4aT3ssl">https://youtu.be/xwsl4aT3ssl</a> <a href="https://youtu.be/tv9l0_8_dJo">https://youtu.be/tv9l0_8_dJo</a>
2020	Tarun Sharma Kumar	1. Website: <a href="https://bpharm5thsemsectionb.gnomio.com/">https://bpharm5thsemsectionb.gnomio.com/</a> 2. <b>B. Pharmacy Second Year (Section -B)</b> <a href="https://liphbpsecondyear.gnomio.com">https://liphbpsecondyear.gnomio.com</a>
2020	Arti Devi	<a href="https://youtu.be/H3H2No_2m-I">https://youtu.be/H3H2No_2m-I</a> <a href="https://youtu.be/mfxRCLvlwhU">https://youtu.be/mfxRCLvlwhU</a> <a href="https://youtu.be/2osBFK5b5_E">https://youtu.be/2osBFK5b5_E</a> <a href="https://youtu.be/GY0zwE_9j-8">https://youtu.be/GY0zwE_9j-8</a> Username: liphbpfirstyear Password: 1styear-A (No spacing) <a href="http://liphfirstyear.gnomio.com/">http://liphfirstyear.gnomio.com/</a>
2020	Kamya Jindal	<b>5 Sem (Section A)</b> Website: <a href="https://bpharm5thsemsectiona.gnomio.com/">https://bpharm5thsemsectiona.gnomio.com/</a> User id: bpharm5semsectiona Password: Laureate@2020 <b>5 Sem (Section B)</b> Website: <a href="https://bpharm5thsemsectionb.gnomio.com/">https://bpharm5thsemsectionb.gnomio.com/</a> User id: bpharm5semsectionb Password: Laureate@2020 <b>Sessional Exam (5<sup>th</sup> sem):</b> <a href="https://forms.gle/9sogxhZWoxfpeP199">https://forms.gle/9sogxhZWoxfpeP199</a>
2020	Nikhil Sharma	<b>1. D.pharmacy 1st year</b> Website: <a href="https://dpharmacy1styearliph.gnomio.com">https://dpharmacy1styearliph.gnomio.com</a> User : dpharmacy1st Password: Ajaykumar@2020 <b>2. D.pharmacy 2nd year</b> <a href="https://dpharm2ndyear.gnomio.com">https://dpharm2ndyear.gnomio.com</a> User id: ajaykumar@2020 Password: Laureate@2020
2020	Pratibha Chaudhary	<b>1. B. Pharmacy Third Year (Section -A)</b> Website: <a href="https://bpharm5thsemsectiona.gnomio.com/">https://bpharm5thsemsectiona.gnomio.com/</a> User id: bpharm5semsectiona Password: Laureate@2020 <b>2. B. Pharmacy Second Year (Section -B)</b> <a href="https://liphbpsecondyearb.gnomio.com">https://liphbpsecondyearb.gnomio.com</a> User Name: liphbpsecondyearb

  
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2020	Arti Rana	Password: 2ndyear-B <a href="https://youtu.be/so-U2kJNXHQ">https://youtu.be/so-U2kJNXHQ</a> <a href="https://youtu.be/EET9D-LjOXU">https://youtu.be/EET9D-LjOXU</a> <b>B. Pharmacy Second Year (Section -A)</b> Site: liphbpsecondyear.gnomio.com User Name: liphbpsecondyear Password: 2ndyear-A <b>D Pharm 1st Year</b> Site: <a href="https://dpharmacy1styearliph.gnomio.com">https://dpharmacy1styearliph.gnomio.com</a> User ID: dpharmacy1st Password: Ajaykumar@2020 <b>D Pharm 2nd Year</b> Site: <a href="https://dpharm2ndyear.gnomio.com">https://dpharm2ndyear.gnomio.com</a> User ID: ajaykumar@2020 Password: Laureate@2020 <b>First year Section A</b> <a href="https://liphbpfirstyear.gnomio.com/">https://liphbpfirstyear.gnomio.com/</a> Username: liphbpfirstyear Password: 1styear-A (No spacing)
2020	Astha Sharma	<b>First year Section A</b> <a href="https://liphbpfirstyear.gnomio.com/">https://liphbpfirstyear.gnomio.com/</a> Username: liphbpfirstyear Password: 1styear-A (No spacing) <b>First year Section B</b> <a href="https://liphbpfirstyearb.gnomio.com/">https://liphbpfirstyearb.gnomio.com/</a> Username: liphbpfirstyear Password: 1styear-B (No spacing) <b>B. Pharmacy Second Year (Section -A)</b> Site: liphbpsecondyear.gnomio.com User Name: liphbpsecondyear Password: 2ndyear-A
2020	Pooja Kaushal	<a href="https://forms.gle/Um7ygzSemLWzJBSD8">https://forms.gle/Um7ygzSemLWzJBSD8</a>
2020	Shiv Kumar Kushawaha	<a href="https://youtu.be/mOloqu96CMA">https://youtu.be/mOloqu96CMA</a> <a href="https://youtu.be/cpYGjH62Au0">https://youtu.be/cpYGjH62Au0</a> <a href="https://youtu.be/ucACDoxhRjI">https://youtu.be/ucACDoxhRjI</a> <a href="https://youtu.be/eExYRvknTI8">https://youtu.be/eExYRvknTI8</a> <a href="https://youtu.be/TzGJ8Md-vY">https://youtu.be/TzGJ8Md-vY</a> <a href="https://forms.gle/HYSmroQ8MUrZRE7u6">https://forms.gle/HYSmroQ8MUrZRE7u6</a> <a href="https://forms.gle/k5Gt64pKNvJ4spWU8">https://forms.gle/k5Gt64pKNvJ4spWU8</a> <a href="https://youtu.be/m23GcHr3fXM">https://youtu.be/m23GcHr3fXM</a>
2020	Rinu Rana	<a href="https://liphbpfirstyearb.gnomio.com/">https://liphbpfirstyearb.gnomio.com/</a> <a href="https://liphbpfirstyear.gnomio.com/?redirect=0">https://liphbpfirstyear.gnomio.com/?redirect=0</a> <a href="https://dpharmacy1styearliph.gnomio.com">https://dpharmacy1styearliph.gnomio.com</a> <a href="https://bpharm5thsemsectionb.gnomio.com/index.php">https://bpharm5thsemsectionb.gnomio.com/index.php</a> <a href="https://bpharm5thsemsectiona.gnomio.com/index.php">https://bpharm5thsemsectiona.gnomio.com/index.php</a> <a href="https://forms.gle/J2JRzJrQZreAggmm8">https://forms.gle/J2JRzJrQZreAggmm8</a>

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2020	Dr. Shammy Jindal	<a href="https://forms.gle/GdU3J18GGffen6ep9">https://forms.gle/GdU3J18GGffen6ep9</a> <b>5 sem (Section A)</b> Website: <a href="https://bpharm5thsemsectiona.gnomio.com/">https://bpharm5thsemsectiona.gnomio.com/</a> User id: bpharm5semsectiona Password: Laureate@2020 <b>5 Sem (Section B)</b> Website: <a href="https://bpharm5thsemsectionb.gnomio.com/">https://bpharm5thsemsectionb.gnomio.com/</a> User id: bpharm5semsectionb Password: Laureate@2020 <b>First year Section B</b> <a href="https://liphbpfirstyearb.gnomio.com/">https://liphbpfirstyearb.gnomio.com/</a> Username: liphbpfirstyearb Password: 1styear-B (No spacing) <b>5<sup>th</sup> sem sessional exam:</b> <a href="https://forms.gle/6KDt3VZx1kX3yDxUA">https://forms.gle/6KDt3VZx1kX3yDxUA</a>
2021	Prof. Amar Deep Ankalgi	<a href="https://youtu.be/CeCHpRbsZvg">https://youtu.be/CeCHpRbsZvg</a>
2021	Mr. Pravin Kumar	<a href="https://youtu.be/rsWIntduD4s">https://youtu.be/rsWIntduD4s</a> <a href="https://youtu.be/G8Y4ZvensqA">https://youtu.be/G8Y4ZvensqA</a>
2021	Kamya Jindal	<b>Sessional Exam (6<sup>th</sup> sem):</b> <a href="https://forms.gle/SGbRsPojwg5Gm31r8">https://forms.gle/SGbRsPojwg5Gm31r8</a> <b>Sessional Exam (4<sup>th</sup> sem):</b> <a href="https://forms.gle/ghmMt52U4i4jjaNq5">https://forms.gle/ghmMt52U4i4jjaNq5</a>
2021	Pravin Kumar	<a href="https://docs.google.com/forms/d/1n63B3TIY8euNof9ZehmvcH759-OTD-NwUatLWUAd_Qs/edit#responses">https://docs.google.com/forms/d/1n63B3TIY8euNof9ZehmvcH759-OTD-NwUatLWUAd_Qs/edit#responses</a>  <a href="https://docs.google.com/forms/d/1iNqYER7FLNahPSVmsxKVdf5YQpVkoy2eVJp1fPOILDw/edit">https://docs.google.com/forms/d/1iNqYER7FLNahPSVmsxKVdf5YQpVkoy2eVJp1fPOILDw/edit</a>  <a href="https://docs.google.com/forms/d/1tMb8T-qX3sWGmLxlokh5Lb9zc2BD2VJ3KTIvZH4YMfk/edit">https://docs.google.com/forms/d/1tMb8T-qX3sWGmLxlokh5Lb9zc2BD2VJ3KTIvZH4YMfk/edit</a>
2021	Astha Sharma	<b>Online classes on Google meet:</b> <a href="https://meet.google.com/bfp-atnc-dcx">https://meet.google.com/bfp-atnc-dcx</a>
2021	Pooja Kaushal	<a href="https://meet.google.com/qzo-jsin-zvy">https://meet.google.com/qzo-jsin-zvy</a> <a href="https://forms.gle/q96zp7Sr8VEsvwaZA">https://forms.gle/q96zp7Sr8VEsvwaZA</a> <a href="https://forms.gle/JrdTcNPvVUSh1JJb9">https://forms.gle/JrdTcNPvVUSh1JJb9</a>
2021	Shiv Kushawaha Kumar	<a href="https://youtu.be/Ww0bR48E6KY">https://youtu.be/Ww0bR48E6KY</a>
2021	Rinu Rana	<a href="https://forms.gle/6ik9GfMpZPReSnSQ6">https://forms.gle/6ik9GfMpZPReSnSQ6</a> <a href="https://forms.gle/QyUCgZfmmhKkiV289">https://forms.gle/QyUCgZfmmhKkiV289</a> <a href="https://forms.gle/Jk8jxb8so6fCewzC6">https://forms.gle/Jk8jxb8so6fCewzC6</a> <a href="https://forms.gle/HdG8xSxHimMBR1fF8">https://forms.gle/HdG8xSxHimMBR1fF8</a> <a href="https://forms.gle/xS49mrkt5D3pLmSHA">https://forms.gle/xS49mrkt5D3pLmSHA</a> <a href="https://forms.gle/YRj1VF8WEQTR5HxA6">https://forms.gle/YRj1VF8WEQTR5HxA6</a>

  
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		<a href="https://forms.gle/SnBxpPE3wprSfnd7A">https://forms.gle/SnBxpPE3wprSfnd7A</a> <a href="https://forms.gle/k5H91c25GCWENJ1C7">https://forms.gle/k5H91c25GCWENJ1C7</a> <a href="https://forms.gle/aKtD5siW24tqdNpE7">https://forms.gle/aKtD5siW24tqdNpE7</a> <a href="https://forms.gle/HBSheo3J9eARmiSh6">https://forms.gle/HBSheo3J9eARmiSh6</a> <a href="https://forms.gle/sN2xpAfFQLogEhJD9">https://forms.gle/sN2xpAfFQLogEhJD9</a> <a href="https://forms.gle/585xEJuBKfE5t2nq9">https://forms.gle/585xEJuBKfE5t2nq9</a> <a href="https://forms.gle/fCn6kkvSRHgcdZBV9">https://forms.gle/fCn6kkvSRHgcdZBV9</a> <a href="https://forms.gle/xsMDTGSsuD9W1UpQ8">https://forms.gle/xsMDTGSsuD9W1UpQ8</a>
2021	Dr. Shammy Jindal	<b>8<sup>th</sup> sem sessional exam:</b> <a href="https://forms.gle/xvFA9gJvhDkCA5rC6">https://forms.gle/xvFA9gJvhDkCA5rC6</a> <b>B. Pharm. Practice 2<sup>nd</sup> year sessional exam:</b> <a href="https://forms.gle/U6Py7gkX4NQLx17b6">https://forms.gle/U6Py7gkX4NQLx17b6</a> <b>M. Pharm. 3<sup>rd</sup> sem sessional exam:</b> <a href="https://forms.gle/L9KgiW6HawXhU2G48">https://forms.gle/L9KgiW6HawXhU2G48</a>
2022	Kamya Jindal	<b>3<sup>rd</sup> Sessional Exam (5<sup>th</sup> sem):</b> <a href="https://forms.gle/yx5Z84qNFZw2vYrQA">https://forms.gle/yx5Z84qNFZw2vYrQA</a> <b>Online classes on Google meet:</b> <a href="https://meet.google.com/khu-oqxz-tex">https://meet.google.com/khu-oqxz-tex</a>
2022	Upasana Thakur	<a href="http://meet.google.com/roy-pgcw-xmk">http://meet.google.com/roy-pgcw-xmk</a> <b>Sessional exam</b>
2022	Astha Sharma	<b>3<sup>rd</sup> Sessional Exam (5<sup>th</sup> sem):</b> <a href="https://forms.gle/yx5Z84qNFZw2vYrQA">https://forms.gle/yx5Z84qNFZw2vYrQA</a> <b>Online classes on Google meet:</b> <a href="https://meet.google.com/yry-odwn-jbf">https://meet.google.com/yry-odwn-jbf</a>
2022	Pooja Kaushal	<a href="https://meet.google.com/qzo-jsin-zvy">https://meet.google.com/qzo-jsin-zvy</a> , <a href="https://forms.gle/bmV3eMoUAeuJhJ5u8">https://forms.gle/bmV3eMoUAeuJhJ5u8</a> <a href="https://forms.gle/gjD9Lnh91JzVSYjZ7">https://forms.gle/gjD9Lnh91JzVSYjZ7</a>

  
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# Bureau for Health and Education Status Upliftment

(Constitutionally Entitled as Health-Education, Bureau)

55/20, Rajat Path, Mansarovar, Jaipur

Rajasthan, Pin : 302020

Contact : Basic : 0141-2783681, (M) 9636348191, 7976447983

Mail : support@heb-nic.in, serviceheb@gmail.com

Website : www.heb-nic.in



Date: 30/07/2021

Ref. No: EP/1682/1/22/07R

To.

Dept. of Pharmacology,  
Laureate Institute of Pharmacy,  
Kathog, Kangra, HP- 176031.

Subject: Confirmation of subscription

Dear Sir,

In response to subscription request & subscription amount received from you, we are here by sending you the dedicated password of Experimental Pharmacology (Ex-Pharm) Series Software and the invoice (attached with letter).

We hereby confirm your subscription for Experimental Pharmacology (Ex-Pharm) Series Software from Aug-21 to July-22 (1 Year).

To use Experimental Pharmacology (Ex-Pharm) Series Software, please enter the password in below mentioned link

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User ID: liopk

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You will be receiving further communications time to time also.

Thanking you



Enclosed:

- ❖ The Invoice
- ❖ User Manual

*[Signature]*  
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**HEALTH EDUCATION BUREAU**  
 (Bringing Innovations in Health & Learning)  
 Address: 55/20, Rajat Path, Mansarovar,  
 Jaipur, Rajasthan, Pin:302020  
 Contact:0141-2783681, 9636348191  
 Mail: serviceheb@gmail.com, support@heb-nic.in  
 Website: www.heb-nic.in

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				CLIENT LOCATION: Kangra			
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Bank Branch Name & Code:Mansarovar, Jaipur Branch . Code:002096
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Activities Firefox Web Browser


Nov 26 14:56

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Search Results: 1 - 1 of 1

1. The Importance of Medicinal Chemistry Knowledge in the Clinical Pharmacist's Education.

By: Fernandes, João Paulo S. *American Journal of Pharmaceutical Education*. 2018, Vol. 82 Issue 2, p106-114. 9p. Abstract: Objective. To show why medicinal chemistry must be a key component of the education of pharmacy students as well as in the pharmacist's practice. Findings. Five case reports were selected by their clinically relevant elements of medicinal chemistry and were explained using structure-activity relationship data of the drugs involved in the case easily obtained from primary literature and in medicinal chemistry textbooks. Summary. This paper demonstrates how critical clinical decisions can be addressed using medicinal chemistry knowledge. While such knowledge may not explain all clinical decisions, medicinal chemistry concepts are essential for the education of pharmacy students to explain drug action in general and clinical decisions. [ABSTRACT FROM AUTHOR] (AN: 128333998)

Subjects: PHARMACEUTICAL chemistry; PHARMACY education; PHARMACY students; PHARMACISTS; PHARMACODYNAMICS; DECISION making in clinical medicine

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References Available

Scholarly (Peer Reviewed) Journals

Full Text

From: 2018 Publication Date To: 2018

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# Laureate Institute of Pharmacy


(Approved by PCI & AICTE, New Delhi and H.P. Govt.)

Affiliated to Himachal Pradesh Technical University, Hamirpur

V.P.O Kathog, Tehsil Jawalamukhi, Distt. Kangra, H.P. Pin Code 176031

## International Talk Series

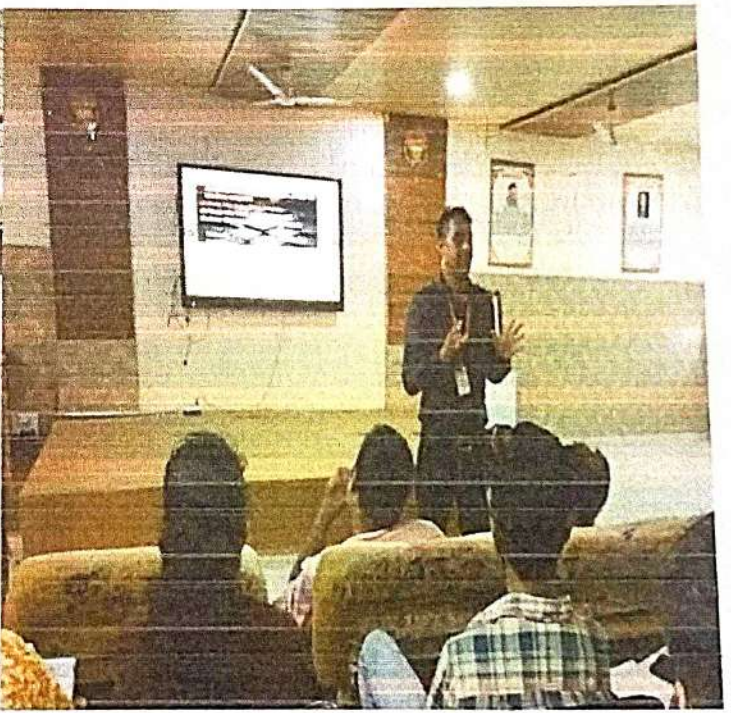
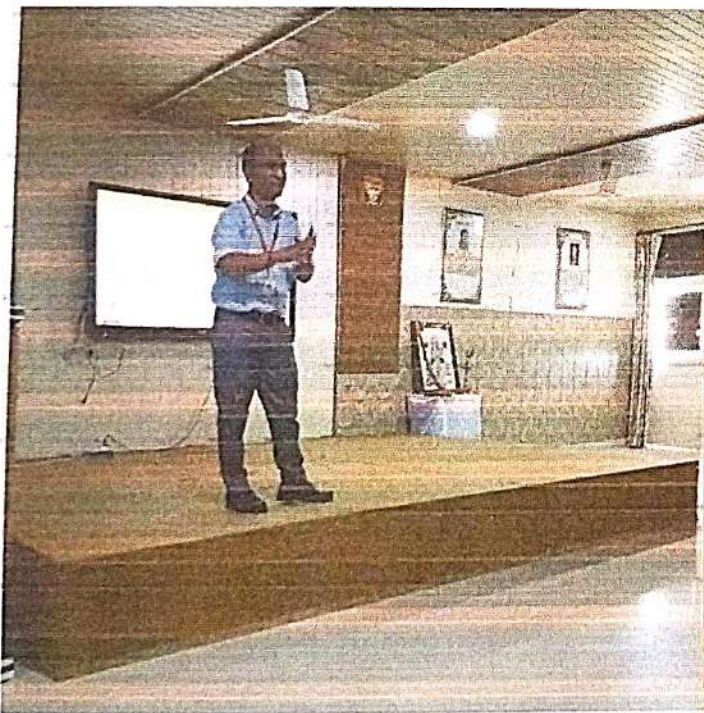
Year	Date	Title	Delivered By
2021	7/08/2021	Preclinical finding of orexin-initiated endocannabinoids sequential cascade in stress induced analgesia	Dr. Lee Ming Tatt Associate Professor, Faculty of Pharmaceutical Sciences, UCSI University, Malaysia
2021	27/09/2021	Nanoformulations for transdermal delivery: Challenges and opportunities	Dr. Rajesh Sreedharan Nair Ph.D (Pharmaceutics), School of Pharmacy, Monash University, Malaysia
2021	23/10/2021	Therapeutic outcomes of Hemodialysis	Prof. Dr. Diana Laila Ranatillah Vice Rector and Dean Pharmacy, Indonesia
2021	20/11/2021	Clinical Pharmacology in Drug Discovery	Dr. R.P Singh Head of Pharmacometrics Teva Pharmaceuticals, USA

  
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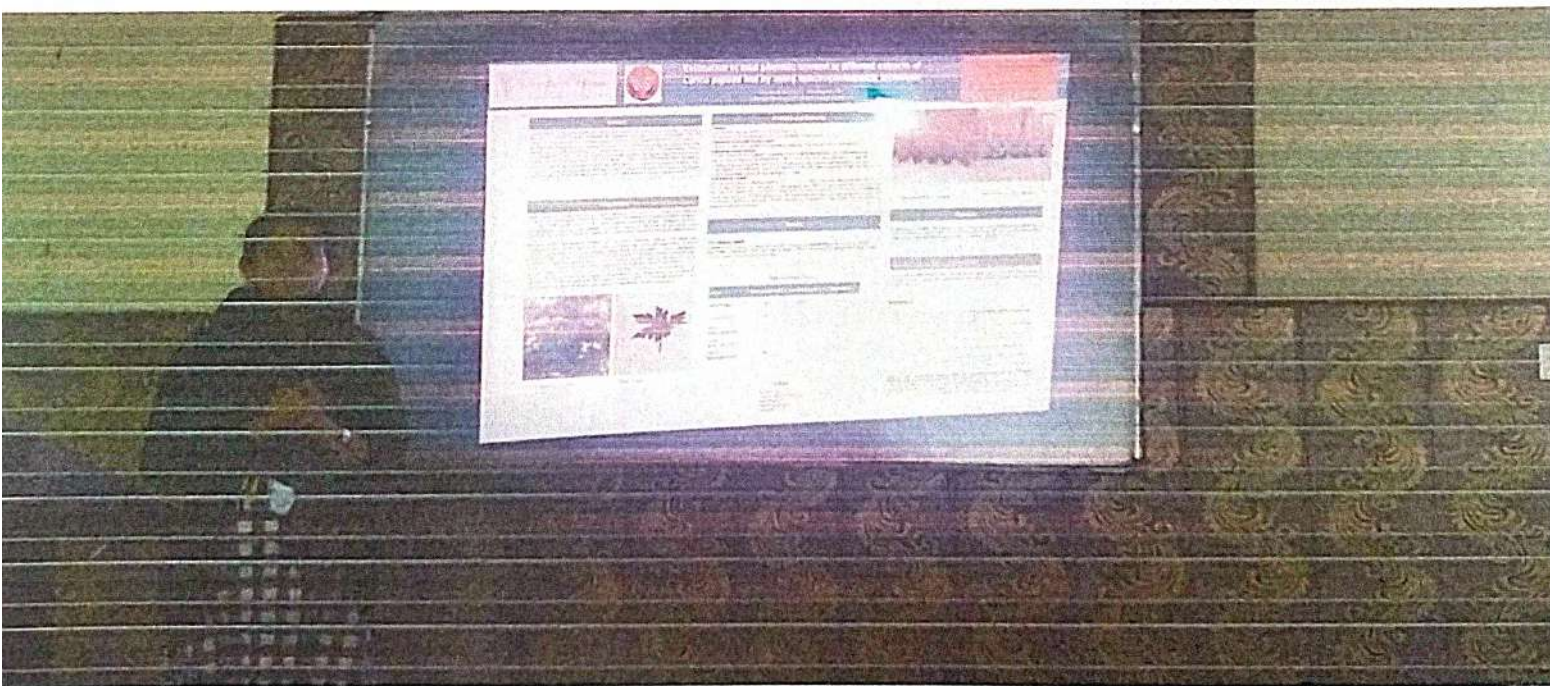
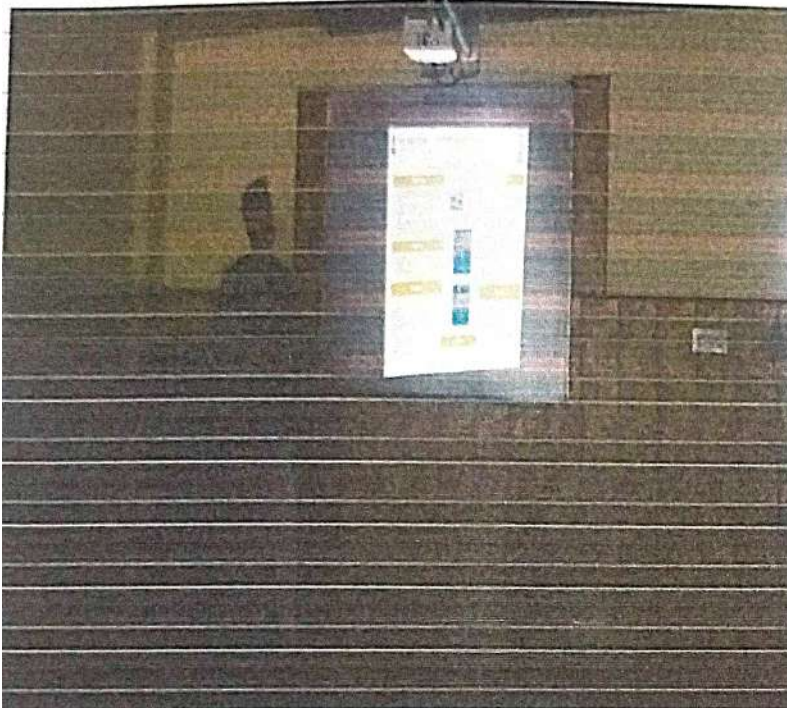
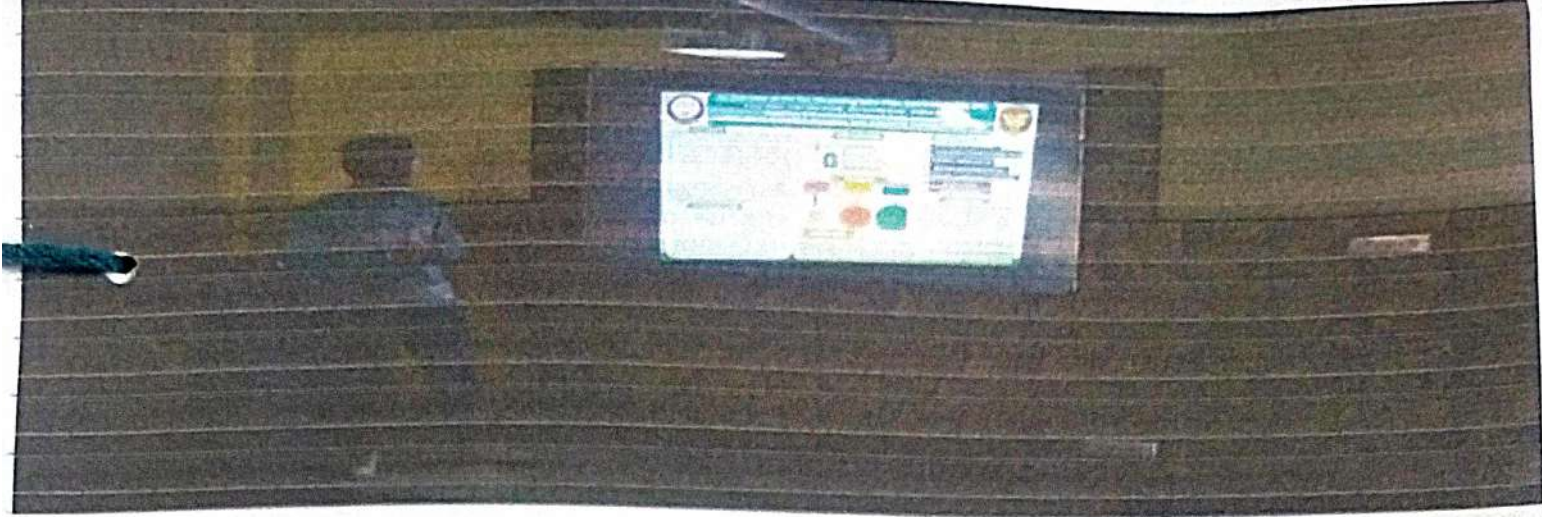
**Debate competition on "Digitalization of Pharmacy is Safe or Unsafe" (24/10/2022)**

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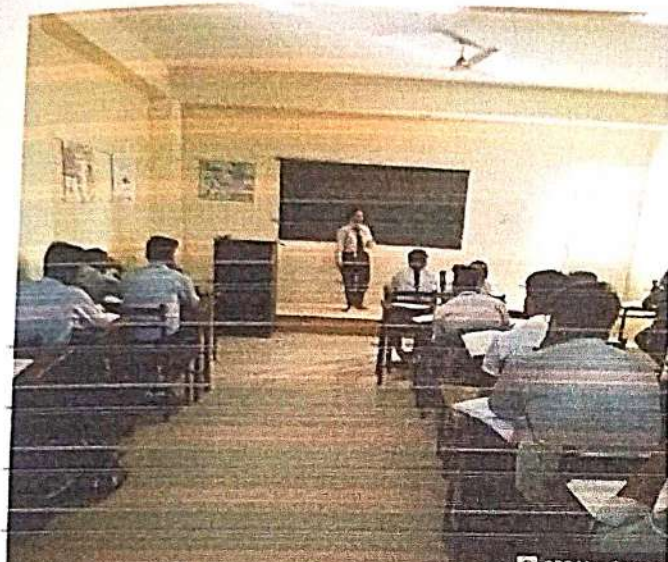


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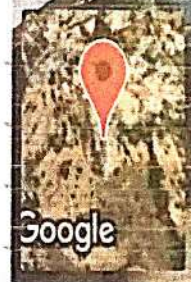
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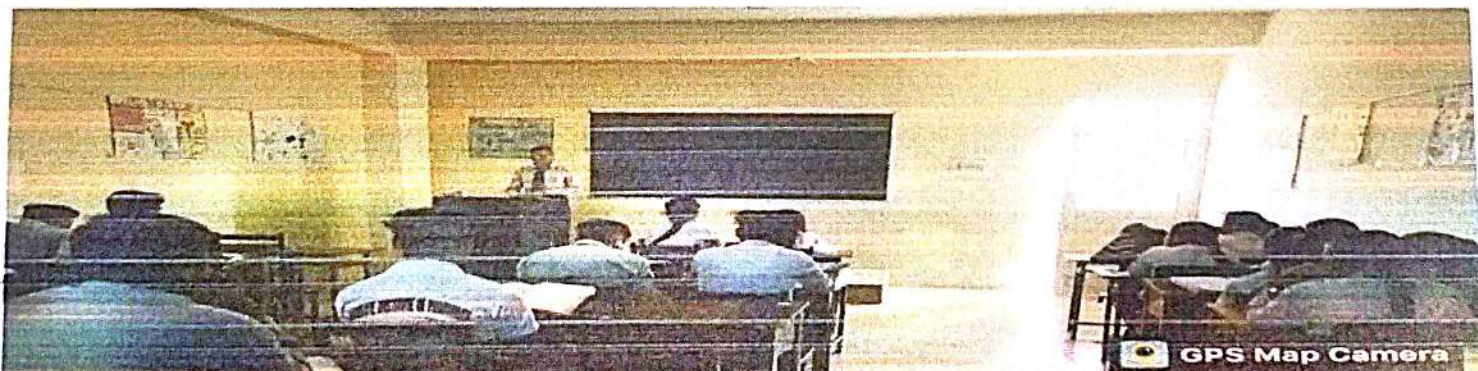
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**Conduction of class Seminars**

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## Experiential learning

Teaching-learning methods adopted by the faculty members include Lecture Method, Interactive Method, Project-based Learning, Computer-assisted Learning, Experiential Learning, etc. The Teaching-learning activities are made effective through illustration and special lectures. Lessons are taught through PowerPoint presentations to make learning interesting besides oral presenting methods. Lecture method: This conventional method is commonly adopted by all teachers. This method facilitates the teacher to interpret, explain and revise the content of a text-only for better understanding of the subject by the learners. Interactive method: The faculty members make learning interactive with students by motivating student participation in group discussion, role-play, subject quiz, news analysis, discussion, and questions and answers on current affairs.

Faculty members make efforts in making the learning activity more interactive by adopting student-centric methods.

1. **Experiential Learning:** Department conducts add-on programs to support students in their experiential learning. The department communicates the following experiential learning practices to improve creativity and cognitive levels of the students

- Laboratory Sessions are conducted with content of syllabus experiments.
- Project development on latest technologies by students where they platform their working model

in the different Domain classes.

- Practical Viva and hands on Practice is regular feature

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## **BP107P. HUMAN ANATOMY AND PHYSIOLOGY (Practical)**

**4 Hours/week**

Practical physiology is complimentary to the theoretical discussions in physiology. Practicals allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject.

1. Study of compound microscope.
2. Microscopic study of epithelial and connective tissue
3. Microscopic study of muscular and nervous tissue
4. Identification of axial bones
5. Identification of appendicular bones
  
6. Introduction to hemocytometry.
7. Enumeration of white blood cell (WBC) count
8. Enumeration of total red blood corpuscles (RBC) count
9. Determination of bleeding time
10. Determination of clotting time
11. Estimation of hemoglobin content
12. Determination of blood group.
13. Determination of erythrocyte sedimentation rate (ESR).
14. Determination of heart rate and pulse rate.
15. Recording of blood pressure.


### **Recommended Books (Latest Editions)**

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
4. Text book of Medical Physiology- Arthur C, Guyton and John.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.

6. Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

**Reference Books (Latest Editions)**

1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje ,Academic Publishers Kolkata

  
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**BP108P. PHARMACEUTICAL ANALYSIS (Practical)**

**4 Hours / Week**

**I Limit Test of the following**

- (1) Chloride
- (2) Sulphate
- (3) Iron
- (4) Arsenic

**II Preparation and standardization of**

- (1) Sodium hydroxide
- (2) Sulphuric acid
- (3) Sodium thiosulfate
- (4) Potassium permanganate
- (5) Ceric ammonium sulphate

**III Assay of the following compounds along with Standardization of Titrant**

- (1) Ammonium chloride by acid base titration
- (2) Ferrous sulphate by Cerimetry
- (3) Copper sulphate by Iodometry
- (4) Calcium gluconate by complexometry
- (5) Hydrogen peroxide by Permanganometry
- (6) Sodium benzoate by non-aqueous titration
- (7) Sodium Chloride by precipitation titration

**IV Determination of Normality by electro-analytical methods**

- (1) Conductometric titration of strong acid against strong base
- (2) Conductometric titration of strong acid and weak acid against strong base
- (3) Potentiometric titration of strong acid against strong base

**Recommended Books: (Latest Editions)**

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry
4. Bentley and Driver's Textbook of Pharmaceutical Chemistry
5. John H. Kennedy, Analytical chemistry principles
6. Indian Pharmacopoeia.

- 1. Syrups**
  - a) Syrup IP'66
  - b) Compound syrup of Ferrous Phosphate BPC'68
- 2. Elixirs**
  - a) Piperazine citrate elixir
  - b) Paracetamol pediatric elixir
- 3. Linctus**
  - a) Terpin Hydrate Linctus IP'66
  - b) Iodine Throat Paint (Mandles Paint)
- 4. Solutions**
  - a) Strong solution of ammonium acetate
  - b) Cresol with soap solution
  - c) Lugol's solution
- 5. Suspensions**
  - a) Calamine lotion
  - b) Magnesium Hydroxide mixture
  - c) Aluminium Hydroxide gel
- 6. Emulsions**
  - a) Turpentine Liniment
  - b) Liquid paraffin emulsion
- 7. Powders and Granules**
  - a) ORS powder (WHO)
  - b) Effervescent granules
  - c) Dusting powder
  - d) Divided powders
- 8. Suppositories**
  - a) Glycero gelatin suppository
  - b) Cocoa butter suppository
  - c) Zinc Oxide suppository
- 8. Semisolids**
  - a) Sulphur ointment
  - b) Non staining-iodine ointment with methyl salicylate
  - c) Carbopal gel
- 9. Gargles and Mouthwashes**
  - a) Iodine gargle
  - b) Chlorhexidine mouthwash

**Recommended Books: (Latest Editions)**

1. H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.
2. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
3. M.E. Aulton, Pharmaceutics, The Science & Dosage Form Design, Churchill Livingstone, Edinburgh.
4. Indian pharmacopoeia.
5. British pharmacopoeia.
6. Lachmann. Theory and Practice of Industrial Pharmacy, Lea & Febiger Publisher, The University of Michigan.
7. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi.
8. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBS Publications, New Delhi.
9. E.A. Rawlins, Bentley's Text Book of Pharmaceutics, English Language Book Society, Elsevier Health Sciences, USA.
10. Isaac Ghebre Sellassie: Pharmaceutical Pelletization Technology, Marcel Dekker, INC, New York.
11. Dilip M. Parikh: Handbook of Pharmaceutical Granulation Technology, Marcel Dekker, INC, New York.
12. Françoise Nieloud and Gilberte Marti-Mestres: Pharmaceutical Emulsions and Suspensions, Marcel Dekker, INC, New York.

  
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**BP110P. PHARMACEUTICAL INORGANIC CHEMISTRY (Practical)**

**4 Hours / Week**

- I Limit tests for following ions**  
Limit test for Chlorides and Sulphates  
Modified limit test for Chlorides and Sulphates  
Limit test for Iron  
Limit test for Heavy metals  
Limit test for Lead  
Limit test for Arsenic
- II Identification test**  
Magnesium hydroxide  
Ferrous sulphate  
Sodium bicarbonate  
Calcium gluconate  
Copper sulphate
- III Test for purity**  
Swelling power of Bentonite  
Neutralizing capacity of aluminum hydroxide gel  
Determination of potassium iodate and iodine in potassium Iodide
- IV Preparation of inorganic pharmaceuticals**  
Boric acid  
Potash alum  
Ferrous sulphate

**Recommended Books (Latest Editions)**

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4<sup>th</sup> edition.
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3<sup>rd</sup> Edition
4. M.L Schroff, Inorganic Pharmaceutical Chemistry
5. Bentley and Driver's Textbook of Pharmaceutical Chemistry
6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7. Indian Pharmacopoeia

  
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## BP111P.COMMUNICATION SKILLS (Practical)

2 Hours / week

The following learning modules are to be conducted using wordsworth® English language lab software

### Basic communication covering the following topics

Meeting People

Asking Questions

Making Friends

What did you do?

Do's and Dont's

### Pronunciations covering the following topics

Pronunciation (Consonant Sounds)

Pronunciation and Nouns

Pronunciation (Vowel Sounds)

### Advanced Learning

Listening Comprehension / Direct and Indirect Speech

Figures of Speech

Effective Communication

Writing Skills

Effective Writing

Interview Handling Skills

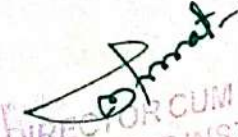
E-Mail etiquette

Presentation Skills

  
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17th Floor, 17th Avenue,  
Mumbai (M.R.)

**Recommended Books: (Latest Edition)**

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2<sup>nd</sup> Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1<sup>st</sup> Edition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1<sup>st</sup> Edition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1<sup>st</sup> Edition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5<sup>th</sup> Edition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2<sup>nd</sup> Edition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1<sup>st</sup> Edition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
10. Soft skills and professional communication, Francis Peters SJ, 1<sup>st</sup> Edition, Mc Graw Hill Education, 2011
11. Effective communication, John Adair, 4<sup>th</sup> Edition, Pan Mac Millan, 2009
12. Bringing out the best in people, Aubrey Daniels, 2<sup>nd</sup> Edition, Mc Graw Hill, 1999

  
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**BP112RBP.REMEDIAL BIOLOGY (Practical)**

**30 Hours**

1. Introduction to experiments in biology
  - a) Study of Microscope
  - b) Section cutting techniques
  - c) Mounting and staining
  - d) Permanent slide preparation
2. Study of cell and its inclusions
3. Study of Stem, Root, Leaf, seed, fruit, flower and their modifications
4. Detailed study of frog by using computer models
5. Microscopic study and identification of tissues pertinent to Stem, Root  
Leaf, seed, fruit and flower
6. Identification of bones
7. Determination of blood group
8. Determination of blood pressure
9. Determination of tidal volume

**Reference Books**

1. Practical human anatomy and physiology. by S.R.Kale and R.R.Kale.
2. A Manual of pharmaceutical biology practical by S.B.Gokhale, C.K.Kokate and S.P.Shriwastava.
3. Biology practical manual according to National core curriculum .Biology forum of Karnataka. Prof .M.J.H.Shafi

  
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**BP 207 P. HUMAN ANATOMY AND PHYSIOLOGY (Practical)**

**4 Hours/week**

Practical physiology is complimentary to the theoretical discussions in physiology. Practicals allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject.

1. To study the integumentary and special senses using specimen, models, etc.,
2. To study the nervous system using specimen, models, etc.,
3. To study the endocrine system using specimen, models, etc
4. To demonstrate the general neurological examination
5. To demonstrate the function of olfactory nerve
6. To examine the different types of taste.
7. To demonstrate the visual acuity
8. To demonstrate the reflex activity
9. Recording of body temperature
10. To demonstrate positive and negative feedback mechanism.
  
11. Determination of tidal volume and vital capacity.
12. Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.
13. Recording of basal mass index
14. Study of family planning devices and pregnancy diagnosis test.
15. Demonstration of total blood count by cell analyser
16. Permanent slides of vital organs and gonads.

**Recommended Books (Latest Editions)**

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA

4. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

**Reference Books:**

1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterje, Academic Publishers Kolkata

**BP208P. PHARMACEUTICAL ORGANIC CHEMISTRY -I (Practical)**

**4 Hours / week**

1. Systematic qualitative analysis of unknown organic compounds like
  1. Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc.
  2. Detection of elements like Nitrogen, Sulphur and Halogen by Lassaigne's test
  3. Solubility test
  4. Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides.
  5. Melting point/Boiling point of organic compounds
  6. Identification of the unknown compound from the literature using melting point/ boiling point.
  7. Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.
  8. Minimum 5 unknown organic compounds to be analysed systematically.
2. Preparation of suitable solid derivatives from organic compounds
3. Construction of molecular models

**Recommended Books (Latest Editions)**

1. Organic Chemistry by Morrison and Boyd
2. Organic Chemistry by I.L. Finar , Volume-I
3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
4. Organic Chemistry by P.L.Soni
5. Practical Organic Chemistry by Mann and Saunders.
6. Vogel's text book of Practical Organic Chemistry
7. Advanced Practical organic chemistry by N.K.Vishnoi.
8. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.
9. Reaction and reaction mechanism by Ahluwalia/Chatwal.

## UNIT V

07 Hours

- **Enzymes**

Introduction, properties, nomenclature and IUB classification of enzymes

Enzyme kinetics (Michaelis plot, Line Weaver Burke plot)

Enzyme inhibitors with examples

Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation

Therapeutic and diagnostic applications of enzymes and isoenzymes

Coenzymes –Structure and biochemical functions

### BP 209 P. BIOCHEMISTRY (Practical)

4 Hours / Week

1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch)
2. Identification tests for Proteins (albumin and Casein)
3. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method)
4. Qualitative analysis of urine for abnormal constituents
5. Determination of blood creatinine
6. Determination of blood sugar
7. Determination of serum total cholesterol
8. Preparation of buffer solution and measurement of pH
9. Study of enzymatic hydrolysis of starch
10. Determination of Salivary amylase activity
11. Study the effect of Temperature on Salivary amylase activity.
12. Study the effect of substrate concentration on salivary amylase activity.

### Recommended Books (Latest Editions)

1. Principles of Biochemistry by Lehninger.
2. Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell.
3. Biochemistry by Stryer.
4. Biochemistry by D. Satyanarayan and U.Chakrapani
5. Textbook of Biochemistry by Rama Rao.
6. Textbook of Biochemistry by Deb.
7. Outlines of Biochemistry by Conn and Stumpf
8. Practical Biochemistry by R.C. Gupta and S. Bhargavan.
9. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition)
10. Practical Biochemistry for Medical students by Rajagopal and Ramakrishna.
11. Practical Biochemistry by Harold Varley.

### BP 204T.PATHOPHYSIOLOGY (THEORY)

45Hours

**Scope:** Pathophysiology is the study of causes of diseases and reactions of the body to such disease producing causes. This course is designed to impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms. Hence it will not only help to study the syllabus of pathology, but also to get baseline knowledge required to practice medicine safely, confidently, rationally and effectively.

**Objectives:** Upon completion of the subject student shall be able to –

1. Describe the etiology and pathogenesis of the selected disease states;
2. Name the signs and symptoms of the diseases; and
3. Mention the complications of the diseases.

### Course content:

#### Unit I

10Hours

- **Basic principles of Cell injury and Adaptation:**

Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury, Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage), Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia), Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis & Alkalosis, Electrolyte imbalance

### **BP210P. COMPUTER APPLICATIONS IN PHARMACY (Practical)**

1. Design a questionnaire using a word processing package to gather information about a particular disease.
2. Create a HTML web page to show personal information.
3. Retrieve the information of a drug and its adverse effects using online tools
4. Creating mailing labels Using Label Wizard , generating label in MS WORD
5. Create a database in MS Access to store the patient information with the required fields Using access
6. Design a form in MS Access to view, add, delete and modify the patient record in the database
7. Generating report and printing the report from patient database
8. Creating invoice table using – MS Access
9. Drug information storage and retrieval using MS Access
10. Creating and working with queries in MS Access
11. Exporting Tables, Queries, Forms and Reports to web pages
12. Exporting Tables, Queries, Forms and Reports to XML pages

#### **Recommended books (Latest edition):**

1. Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.
2. Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
3. Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
4. Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi - 110002

  
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**BP305P. PHARMACEUTICAL ORGANIC CHEMISTRY -II (Practical)**

**4 Hrs/week**

**I Experiments involving laboratory techniques**

- Recrystallization
- Steam distillation

**II Determination of following oil values (including standardization of reagents)**

- Acid value
- Saponification value
- Iodine value

**III Preparation of compounds**

- Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation reaction.
- 2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/
- Acetanilide by halogenation (Bromination) reaction.
- 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction.
- Benzoic acid from Benzyl chloride by oxidation reaction.
- Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction.
- 1-Phenyl azo-2-naphthol from Aniline by diazotization and coupling reactions.
- Benzil from Benzoin by oxidation reaction.
- Dibenzal acetone from Benzaldehyde by Claisen Schmidt reaction
- Cinnamic acid from Benzaldehyde by Perkin reaction
- *P*-Iodo benzoic acid from *P*-amino benzoic acid

**Recommended Books (Latest Editions)**

1. Organic Chemistry by Morrison and Boyd
2. Organic Chemistry by I.L. Finar , Volume-I
3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
4. Organic Chemistry by P.L.Soni
5. Practical Organic Chemistry by Mann and Saunders.
6. Vogel's text book of Practical Organic Chemistry
7. Advanced Practical organic chemistry by N.K. Vishnoi.

  
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**BP306P. PHYSICAL PHARMACEUTICS – I (Practical)**

**4 Hrs/week**

1. Determination the solubility of drug at room temperature
2. Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.
3. Determination of Partition co- efficient of benzoic acid in benzene and water
4. Determination of Partition co- efficient of Iodine in  $CCl_4$  and water
5. Determination of % composition of NaCl in a solution using phenol-water system by CST method
6. Determination of surface tension of given liquids by drop count and drop weight method
7. Determination of HLB number of a surfactant by saponification method
8. Determination of Freundlich and Langmuir constants using activated char coal
9. Determination of critical micellar concentration of surfactants
10. Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method
11. Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method

**Recommended Books: (Latest Editions)**

1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parott.
3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C and ManavalanR.
8. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanyam, J. Thimma settee
9. Physical Pharmaceutics by C.V.S. Subramanyam
10. Test book of Physical Phramacy, by Gaurav Jain & Roop K. Khar

## BP 307P.PHARMACEUTICAL MICROBIOLOGY (Practical)

4 Hrs/week

1. Introduction and study of different equipments and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology.
2. Sterilization of glassware, preparation and sterilization of media.
3. Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.
4. Staining methods- Simple, Grams staining and acid fast staining (Demonstration with practical).
5. Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.
6. Microbiological assay of antibiotics by cup plate method and other methods
7. Motility determination by Hanging drop method.
8. Sterility testing of pharmaceuticals.
9. Bacteriological analysis of water
10. Biochemical test.


### Recommended Books (Latest edition)

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4<sup>th</sup> edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Pepler: Microbial Technology.
9. I.P., B.P., U.S.P.- latest editions.
10. Ananthnarayan : Text Book of Microbiology, Orient-Longman, Chennai
11. Edward: Fundamentals of Microbiology.
12. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
13. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company

**BP308P - PHARMACEUTICAL ENGINEERING (Practical)**

**4 Hours/week**

- I. Determination of radiation constant of brass, iron, unpainted and painted glass.
- II. Steam distillation – To calculate the efficiency of steam distillation.
- III. To determine the overall heat transfer coefficient by heat exchanger.
- IV. Construction of drying curves (for calcium carbonate and starch).
- V. Determination of moisture content and loss on drying.
- VI. Determination of humidity of air – i) From wet and dry bulb temperatures –use of Dew point method.
- VII. Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier.
- VIII. Size analysis by sieving – To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic and logarithmic probability plots.
- IX. Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill.
- X. Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment.
- XI. Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity
- XII. To study the effect of time on the Rate of Crystallization.
- XIII. To calculate the uniformity Index for given sample by using Double Cone Blender.

  
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**BP406P. MEDICINAL CHEMISTRY – I (Practical)**

**4 Hours/Week**

**I Preparation of drugs/ intermediates**

- 1 1,3-pyrazole
- 2 1,3-oxazole
- 3 Benzimidazole
- 4 Benztriazole
- 5 2,3- diphenyl quinoxaline
- 6 Benzocaine
- 7 Phenytoin
- 8 Phenothiazine
- 9 Barbiturate

**II Assay of drugs**

- 1 Chlorpromazine
- 2 Phenobarbitone
- 3 Atropine
- 4 Ibuprofen
- 5 Aspirin
- 6 Furosemide

**III Determination of Partition coefficient for any two drugs**

**Recommended Books (Latest Editions)**

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.

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**BP 407P. PHYSICAL PHARMACEUTICS- II (Practical)**

**3 Hrs/week**

1. Determination of particle size, particle size distribution using sieving method
2. Determination of particle size, particle size distribution using Microscopic method
3. Determination of bulk density, true density and porosity
4. Determine the angle of repose and influence of lubricant on angle of repose
5. Determination of viscosity of liquid using Ostwald's viscometer
6. Determination sedimentation volume with effect of different suspending agent
7. Determination sedimentation volume with effect of different concentration of single suspending agent
8. Determination of viscosity of semisolid by using Brookfield viscometer
9. Determination of reaction rate constant first order.
10. Determination of reaction rate constant second order
11. Accelerated stability studies

**Recommended Books: (Latest Editions)**

1. Physical Pharmacy by Alfred Martin, Sixth edition
2. Experimental pharmaceuticals by Eugene, Parott.
3. Tutorial pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical calculations, Lea & Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, Marcel Dekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C, and Manavalan R.

**BP 408 P.PHARMACOLOGY-I (Practical)**

**4Hrs/Week**

1. Introduction to experimental pharmacology.
2. Commonly used instruments in experimental pharmacology.
3. Study of common laboratory animals.
4. Maintenance of laboratory animals as per CPCSEA guidelines.
5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.
6. Study of different routes of drugs administration in mice/rats.
7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
8. Effect of drugs on ciliary motility of frog oesophagus
9. Effect of drugs on rabbit eye.
10. Effects of skeletal muscle relaxants using rota-rod apparatus.
11. Effect of drugs on locomotor activity using actophotometer.
12. Anticonvulsant effect of drugs by MES and PTZ method.
13. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
14. Study of anxiolytic activity of drugs using rats/mice.
15. Study of local anesthetics by different methods

*Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos*

**Recommended Books (Latest Editions)**

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology

**BP408 P. PHARMACOGNOSY AND PHYTOCHEMISTRY I (Practical)**

**4 Hours/Week**

1. Analysis of crude drugs by chemical tests: (i) Tragacanth (ii) Acacia (iii) Agar (iv) Gelatin (v) starch (vi) Honey (vii) Castor oil
2. Determination of stomatal number and index
3. Determination of vein islet number, vein islet termination and palisade ratio.
4. Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer
5. Determination of Fiber length and width
6. Determination of number of starch grains by Lycopodium spore method
7. Determination of Ash value
8. Determination of Extractive values of crude drugs
9. Determination of moisture content of crude drugs
10. Determination of swelling index and foaming

**Recommended Books: (Latest Editions)**

1. W.C. Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Saunders & Co., London, 2009.
2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988.
3. Text Book of Pharmacognosy by T.E. Wallis
4. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
5. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
6. Herbal drug industry by R.D. Choudhary (1996), 1st Edn, Eastern Publisher, New Delhi.
7. Essentials of Pharmacognosy, Dr. SH. Ansari, IInd edition, Birla publications, New Delhi, 2007
8. Practical Pharmacognosy: C.K. Kokate, Purohit, Gokhlae
9. Anatomy of Crude Drugs by M.A. Iyengar


**BP 506 P. Industrial Pharmacy I (Practical)**

**4 Hours/week**

1. Preformulation studies on paracetamol/asparin/or any other drug
2. Preparation and evaluation of Paracetamol tablets
3. Preparation and evaluation of Aspirin tablets
4. Coating of tablets- film coating of tables/granules
5. Preparation and evaluation of Tetracycline capsules
6. Preparation of Calcium Gluconate injection
7. Preparation of Ascorbic Acid injection
8. Qulaity control test of (as per IP) marketed tablets and capsules
9. Preparation of Eye drops/ and Eye ointments
10. Preparation of Creams (cold / vanishing cream)
11. Evaluation of Glass containers (as per IP)

**Recommended Books: (Latest Editions)**

1. Pharmaceutical dosage forms - Tablets, volume 1 -3 by H.A. Liberman, Leon Lachman &J.B.Schwartz
2. Pharmaceutical dosage form - Parenteral medication vol- 1&2 by Liberman & Lachman
3. Pharmaceutical dosage form disperse system VOL-1 by Liberman & Lachman
4. Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition
5. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS)
6. Theory and Practice of Industrial Pharmacy by Liberman & Lachman
7. Pharmaceutics- The science of dosage form design by M.E.Aulton, Churchill livingstone, Latest edition
8. Introduction to Pharmaceutical Dosage Forms by H. C.Ansel, Lea &Febiger, Philadelphia, 5<sup>th</sup>edition, 2005
9. Drug stability - Principles and practice by Cartensen & C.J. Rhodes, 3rd Edition, Marcel Dekker Series, Vol 107.

  
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**BP 507 P. PHARMACOLOGY-II (Practical)**

**4Hrs/Week**

1. Introduction to *in-vitro* pharmacology and physiological salt solutions.
2. Effect of drugs on isolated frog heart.
3. Effect of drugs on blood pressure and heart rate of dog.
4. Study of diuretic activity of drugs using rats/mice.
5. DRC of acetylcholine using frog rectus abdominis muscle.
6. Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively.
7. Bioassay of histamine using guinea pig ileum by matching method.
8. Bioassay of oxytocin using rat uterine horn by interpolation method.
9. Bioassay of serotonin using rat fundus strip by three point bioassay.
10. Bioassay of acetylcholine using rat ileum/colon by four point bioassay.
11. Determination of  $PA_2$  value of prazosin using rat anococcygeus muscle (by Schild's plot method).
12. Determination of  $PD_2$  value using guinea pig ileum.
13. Effect of spasmogens and spasmolytics using rabbit jejunum.
14. Anti-inflammatory activity of drugs using carrageenan induced paw-edema model.
15. Analgesic activity of drug using central and peripheral methods

*Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos*

**Recommended Books (Latest Editions)**


1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill.
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins.
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology.
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
8. Modern Pharmacology with clinical Applications, by Charles R.Craig & Robert.
9. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
10. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan.

**BP 508 P. PHARMACOGNOSY AND PHYTOCHEMISTRY II (Practical)**  
**4 Hours/Week**

1. Morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander
2. Exercise involving isolation & detection of active principles
  - a. Caffeine - from tea dust.
  - b. Diosgenin from Dioscorea
  - c. Atropine from Belladonna
  - d. Sennosides from Senna
3. Separation of sugars by Paper chromatography
4. TLC of herbal extract
5. Distillation of volatile oils and detection of phytoconstituents by TLC
6. Analysis of crude drugs by chemical tests: (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh

**Recommended Books: (Latest Editions)**

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Saunders & Co., London, 2009.
2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
4. Herbal drug industry by R.D. Choudhary (1996), 1st Edn, Eastern Publisher, New Delhi.
5. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007
6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi.
7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.
8. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin, 1994.
9. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.
10. The formulation and preparation of cosmetic, fragrances and flavours.
11. Remington's Pharmaceutical sciences.
12. Text Book of Biotechnology by Vyas and Dixit.
13. Text Book of Biotechnology by R.C. Dubey.

  
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**BP607P. MEDICINAL CHEMISTRY- III (Practical)**

**4 Hours / week**

**I Preparation of drugs and intermediates**

- 1 Sulphanilamide
- 2 7-Hydroxy, 4-methyl coumarin
- 3 Chlorobutanol
- 4 Triphenyl imidazole
- 5 Tolbutamide

**6 Hexamine**

**II Assay of drugs**

- 1 Isonicotinic acid hydrazide
- 2 Chloroquine
- 3 Metronidazole
- 4 Dapsone
- 5 Chlorpheniramine maleate
- 6 Benzyl penicillin

**III Preparation of medicinally important compounds or intermediates by Microwave irradiation technique**

**IV Drawing structures and reactions using chem draw®**

**V Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies RO5)**

**Recommended Books (Latest Editions)**

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.

**BP 608 P. PHARMACOLOGY-III (Practical)**

**4Hrs/Week**

1. Dose calculation in pharmacological experiments
2. Antiallergic activity by mast cell stabilization assay
3. Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model.
4. Study of effect of drugs on gastrointestinal motility
5. Effect of agonist and antagonists on guinea pig ileum
6. Estimation of serum biochemical parameters by using semi- autoanalyser
7. Effect of saline purgative on frog intestine
8. Insulin hypoglycemic effect in rabbit
9. Test for pyrogens ( rabbit method)
10. Determination of acute oral toxicity (LD50) of a drug from a given data
11. Determination of acute skin irritation / corrosion of a test substance
12. Determination of acute eye irritation / corrosion of a test substance
13. Calculation of pharmacokinetic parameters from a given data
14. Biostatistics methods in experimental pharmacology( student's t test, ANOVA)
15. Biostatistics methods in experimental pharmacology (Chi square test, Wilcoxon Signed Rank test)

*\*Experiments are demonstrated by simulated experiments/videos*

**Recommended Books (Latest Editions)**

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs. The Point Lippincott Williams & Wilkins
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher Modern Pharmacology with clinical Applications, by Charles R.Craig & Robert,
8. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata,
9. Kulkarni SK. Handbook of experimental pharmacology. VallabhPrakashan,
10. N.Udupa and P.D. Gupta, Concepts in Chronopharmacology.


**BP 609 P. HERBAL DRUG TECHNOLOGY (Practical)**

**4 hours/ week**

1. To perform preliminary phytochemical screening of crude drugs.
2. Determination of the alcohol content of Asava and Arista
3. Evaluation of excipients of natural origin
4. Incorporation of prepared and standardized extract in cosmetic formulations like creams, lotions and shampoos and their evaluation.
5. Incorporation of prepared and standardized extract in formulations like syrups, mixtures and tablets and their evaluation as per Pharmacopoeial requirements.
6. Monograph analysis of herbal drugs from recent Pharmacopoeias
7. Determination of Aldehyde content
8. Determination of Phenol content
9. Determination of total alkaloids

**Recommended Books: (Latest Editions)**

1. Textbook of Pharmacognosy by Trease & Evans.
2. Textbook of Pharmacognosy by Tyler, Brady & Robber.
3. Pharmacognosy by Kokate, Purohit and Gokhale
4. Essential of Pharmacognosy by Dr.S.H.Ansari
5. Pharmacognosy & Phytochemistry by V.D.Rangari
6. Pharmacopoeal standards for Ayurvedic Formulation (Council of Research in Indian Medicine & Homeopathy)
7. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.

  
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**BP705P. INSTRUMENTAL METHODS OF ANALYSIS (Practical)**

**4 Hours/Week**

- 1 Determination of absorption maxima and effect of solvents on absorption maxima of organic compounds
- 2 Estimation of dextrose by colorimetry
- 3 Estimation of sulfanilamide by colorimetry
- 4 Simultaneous estimation of ibuprofen and paracetamol by UV spectroscopy
- 5 Assay of paracetamol by UV- Spectrophotometry
- 6 Estimation of quinine sulfate by fluorimetry
- 7 Study of quenching of fluorescence
- 8 Determination of sodium by flame photometry
- 9 Determination of potassium by flame photometry
- 10 Determination of chlorides and sulphates by nephelo turbidometry
- 11 Separation of amino acids by paper chromatography
- 12 Separation of sugars by thin layer chromatography
- 13 Separation of plant pigments by column chromatography
- 14 Demonstration experiment on HPLC
- 15 Demonstration experiment on Gas Chromatography


**Recommended Books (Latest Editions)**

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
6. Organic Chemistry by I. L. Finar
7. Organic spectroscopy by William Kemp
8. Quantitative Analysis of Drugs by D. C. Garrett
9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
10. Spectrophotometric identification of Organic Compounds by Silverstein

  
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PHARMACEUTICS PRACTICALS - I  
(MPH 105P)

1. Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer
2. Simultaneous estimation of multi component containing formulations by UV spectrophotometry
3. Experiments based on HPLC
4. Experiments based on Gas Chromatography
5. Estimation of riboflavin/quinine sulphate by fluorimetry
6. Estimation of sodium/potassium by flame photometry
7. To perform In-vitro dissolution profile of CR/ SR marketed formulation
8. Formulation and evaluation of sustained release matrix tablets
9. Formulation and evaluation osmotically controlled DDS
10. Preparation and evaluation of Floating DDS- hydro dynamically balanced DDS
11. Formulation and evaluation of Muco adhesive tablets.
12. Formulation and evaluation of trans dermal patches.
13. To carry out preformulation studies of tablets.
14. To study the effect of compressional force on tablets disintegration time.
15. To study Micromeritic properties of powders and granulation.
16. To study the effect of particle size on dissolution of a tablet.
17. To study the effect of binders on dissolution of a tablet.
18. To plot Heckal plot, Higuchi and peppas plot and determine similarity factors.

  
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INDUSTRIAL PHARMACY PRACTICAL - I  
(MIP 105P)

1. Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer
2. Simultaneous estimation of multi component containing formulations by UV spectrophotometry
3. Experiments based on HPLC / GC
4. Estimation of riboflavin/quinine sulphate by fluorimetry
5. Estimation of sodium/potassium by flame photometry
6. Effect of surfactants on the solubility of drugs.
7. Effect of pH on the solubility of drugs.
8. Stability testing of solution and solid dosage forms for photo degradation..
9. Stability studies of drugs in dosage forms at 25 °C, 60% RH and 40 °C, 75% RH.
10. Compatibility evaluation of drugs and excipients (DSC & FTIR).
11. Preparation and evaluation of different polymeric membranes.
12. Formulation and evaluation of sustained release oral matrix tablet/ oral reservoir system.
13. Formulation and evaluation of microspheres / microcapsules.
14. Formulation and evaluation of transdermal drug delivery systems.
15. Design and evaluation of face wash, body-wash, creams, lotions, shampoo, toothpaste, lipstick.
16. Electrophoresis of protein solution.
17. Preparation and evaluation of Liposome delivery system.

  
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INDUSTRIAL PHARMACY PRACTICAL - II  
(MIP 205P)

1. Improvement of dissolution characteristics of slightly soluble drug by Solid dispersion technique.
2. Comparison of dissolution of two different marketed products / brands
3. Protein binding studies of a highly protein bound drug & poorly protein bound drug
4. Bioavailability studies of Paracetamol (Animal).
5. Pharmacokinetic and IVIVC data analysis by WinnolineR software
6. In vitro cell studies for permeability and metabolism
7. Formulation and evaluation of tablets
8. Formulation and evaluation of capsules
9. Formulation and evaluation of injections
10. Formulation and evaluation of emulsion
11. Formulation and evaluation of suspension.
12. Formulation and evaluation of enteric coating tablets.
13. Preparation and evaluation of a freeze dried formulation.
14. Preparation and evaluation of a spray dried formulation.

  
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PHARMACEUTICAL CHEMISTRY PRACTICAL - I  
(MPC 105P)

1. Analysis of Pharmacopoeial compounds and their formulations by UV Vis spectrophotometer, RNA & DNA estimation
2. Simultaneous estimation of multi component containing formulations by UV spectrophotometry
3. Experiments based on Column chromatography
4. Experiments based on HPLC
5. Experiments based on Gas Chromatography
6. Estimation of riboflavin/quinine sulphate by fluorimetry
7. Estimation of sodium/potassium by flame photometry

To perform the following reactions of synthetic importance


1. Purification of organic solvents, column chromatography
2. Claisen-schimidt reaction.
3. Benzylic acid rearrangement.
4. Beckmann rearrangement.
5. Hoffmann rearrangement
6. Mannich reaction
7. Synthesis of medicinally important compounds involving more than one step along with purification and Characterization using TLC, melting point and IR spectroscopy (4 experiments)
8. Estimation of elements and functional groups in organic natural compounds
9. Isolation, characterization like melting point, mixed melting point, molecular weight determination, functional group analysis, co-chromatographic technique for identification of isolated compounds and interpretation of UV and IR data.
10. Some typical degradation reactions to be carried on selected plant constituents



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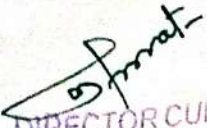
PHARMACEUTICAL CHEMISTRY PRACTICALS – II  
(MPC 205P)

1. Synthesis of organic compounds by adapting different approaches involving (3 experiments)
  - a) Oxidation
  - b) Reduction/hydrogenation
  - c) Nitration
2. Comparative study of synthesis of APIs/intermediates by different synthetic routes (2 experiments)
3. Assignments on regulatory requirements in API (2 experiments)
4. Comparison of absorption spectra by UV and Wood ward – Fieser rule
5. Interpretation of organic compounds by FT-IR
6. Interpretation of organic compounds by NMR
7. Interpretation of organic compounds by MS
8. Determination of purity by DSC in pharmaceuticals
9. Identification of organic compounds using FT-IR, NMR, CNMR and Mass spectra
10. To carry out the preparation of following organic compounds
11. Preparation of 4-chlorobenzhydrylpiperazine. (an intermediate for cetirizine HCl).
12. Preparation of 4-iodotoluene from p-toluidine.
13.  $\text{NaBH}_4$  reduction of vanillin to vanillyl alcohol
14. Preparation of umbelliferone by Pechhman reaction
15. Preparation of triphenyl imidazole
16. To perform the Microwave irradiated reactions of synthetic importance (Any two)
17. Determination of  $\log P$ , MR, hydrogen bond donors and acceptors of selected drugs using softwares
18. Calculation of ADMET properties of drug molecules and its analysis using softwares  
Pharmacophore modeling
19. 2D-QSAR based experiments
20. 3D-QSAR based experiments
21. Docking study based experiment
22. Virtual screening based experiment

  
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PHARMACEUTICAL ANALYSIS PRACTICALS - II  
(MPA 105P)

1. Analysis of Pharmacopoeial compounds and their formulations by UV Vis spectrophotometer
2. Simultaneous estimation of multi component containing formulations by UV spectrophotometry
3. Experiments based on HPLC
4. Experiments based on Gas Chromatography
5. Estimation of riboflavin/quinine sulphate by fluorimetry
6. Estimation of sodium/potassium by flame photometry
7. Assay of official compounds by different titrations
8. Assay of official compounds by instrumental techniques.
9. Quantitative determination of hydroxyl group.
10. Quantitative determination of amino group
11. Colorimetric determination of drugs by using different reagents
12. Impurity profiling of drugs
13. Calibration of glasswares
14. Calibration of pH meter
15. Calibration of UV-Visible spectrophotometer
16. Calibration of FTIR spectrophotometer
17. Calibration of GC instrument
18. Calibration of HPLC instrument
19. Cleaning validation of any one equipment
20. Determination of total reducing sugar
21. Determination of proteins
22. Determination of saponification value, Iodine value, Peroxide value, Acid value in food products
23. Determination of fat content and rancidity in food products
24. Analysis of natural and synthetic colors in food
25. Determination of preservatives in food
26. Determination of pesticide residue in food products
27. Analysis of vitamin content in food products
28. Determination of density and specific gravity of foods
29. Determination of food additives

  
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PHARMACEUTICAL ANALYSIS PRACTICALS - I  
(MPA 205P)

1. Comparison of absorption spectra by UV and Wood ward - Fiesure rule
2. Interpretation of organic compounds by FT-IR
3. Interpretation of organic compounds by NMR
4. Interpretation of organic compounds by MS
5. Determination of purity by DSC in pharmaceuticals
6. Identification of organic compounds using FT-IR, NMR, CNMR and Mass spectra
7. Bio molecules separation utilizing various sample preparation techniques and Quantitative analysis of components by gel electrophoresis.
8. Bio molecules separation utilizing various sample preparation techniques and Quantitative analysis of components by HPLC techniques.
9. Isolation of analgesics from biological fluids (Blood serum and urine).
10. Protocol preparation and performance of analytical/Bioanalytical method validation.
11. Protocol preparation for the conduct of BA/BE studies according to guidelines.
12. In process and finished product quality control tests for tablets, capsules, parenterals and creams
13. Quality control tests for Primary and secondary packing materials
14. Assay of raw materials as per official monographs
15. Testing of related and foreign substances in drugs and raw materials
16. Preparation of Master Formula Record.
17. Preparation of Batch Manufacturing Record.
18. Quantitative analysis of rancidity in lipsticks and hair oil
19. Determination of aryl amine content and Developer in hair dye
20. Determination of foam height and SLS content of Shampoo.
21. Determination of total fatty matter in creams (Soap, skin and hair creams)
22. Determination of acid value and saponification value.
23. Determination of calcium thioglycolate in depilatories

  
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QUALITY ASSURANCE PRACTICAL - I  
(MQA 105P)


PRACTICALS

1. Analysis of Pharmacopoeial compounds in bulk and in their formulations (tablet/ capsules/ semisolids) by UV Vis spectrophotometer
2. Simultaneous estimation of multi-drug component containing formulations by UV spectrophotometry
3. Experiments based on HPLC
4. Experiments based on Gas Chromatography
5. Estimation of riboflavin/quinine sulphate by fluorimetry
6. Estimation of sodium/potassium by flame photometry or AAS
7. Case studies on
  - Total Quality Management
  - Six Sigma
  - Change Management/ Change control. Deviations,
  - Out of Specifications (OOS)
  - Out of Trend (OOT)
  - Corrective & Preventive Actions (CAPA)
  - Deviations
8. Development of Stability study protocol
9. Estimation of process capability
10. In process and finished product quality control tests for tablets, capsules, parenterals and semisolid dosage forms.
11. Assay of raw materials as per official monographs
12. Testing of related and foreign substances in drugs and raw materials
13. To carry out pre formulation study for tablets, parenterals (2 experiment).
14. To study the effect of pH on the solubility of drugs, (1 experiment)
15. Quality control tests for Primary and secondary packaging materials
16. Accelerated stability studies (1 experiment)
17. Improved solubility of drugs using surfactant systems (1 experiment)
18. Improved solubility of drugs using co-solvency method (1 experiment)
19. Determination of  $P_{ka}$  and  $\log p$  of drugs.

  
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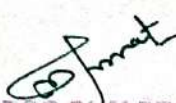
QUALITY ASSURANCE PRACTICAL – II PRACTICALS  
(MQA 205P)

1. Organic contaminants residue analysis by HPLC
2. Estimation of Metallic contaminants by Flame photometer
3. Identification of antibiotic residue by TLC
4. Estimation of Hydrogen Sulphide in Air.
5. Estimation of Chlorine in Work Environment.
6. Sampling and analysis of SO<sub>2</sub> using Colorimetric method
7. Qualification of following Pharma equipment
  - a. Autoclave
  - b. Hot air oven
  - c. Powder Mixer (Dry)
  - d. Tablet Compression Machine
8. Validation of an analytical method for a drug
9. Validation of a processing area
10. Qualification of at least two analytical instruments
11. Cleaning validation of one equipment
12. Qualification of Pharmaceutical Testing Equipment (Dissolution testing apparatus, Friability Apparatus, Disintegration Tester)
13. Check list for Bulk Pharmaceutical Chemicals vendors
14. Check list for tableting production.
15. Check list for sterile production area
16. Check list for Water for injection.
17. Design of plant layout: Sterile and non-sterile
18. Case study on application of QbD
19. Case study on application of PAT

  
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**REGULATORY AFFAIRS PRACTICAL - I**  
**(MRA 105P)**

1. Case studies (4 Nos.) of each of Good Pharmaceutical Practices.
2. Documentation for in process and finished products Quality control tests for Solid, liquid, Semisolid and Sterile preparations.
3. Preparation of SOPs, Analytical reports (Stability and validation)
4. Protocol preparation for documentation of various types of records (BMR, MFR, DR)
5. Labeling comparison between brand & generics.
6. Preparation of clinical trial protocol for registering trial in India
7. Registration for conducting BA/ BE studies in India
8. Import of drugs for research and developmental activities
9. Preparation of regulatory dossier as per Indian CTD format and submission in SUGAM
10. Registering for different Intellectual Property Rights in India
11. GMP Audit Requirements as per CDSCO
12. Preparation and documentation for Indian Patent application.
13. Preparation of checklist for registration of IND as per ICH CTD format.
14. Preparation of checklist for registration of NDA as per ICH CTD format.
15. Preparation of checklist for registration of ANDA as per ICH CTD format.
16. Case studies on response with scientific rationale to USFDA Warning Letter
17. Preparation of submission checklist of IMPD for EU submission.
18. Comparison study of marketing authorization procedures in EU.
19. Comparative study of DMF system in US, EU and Japan
20. Preparation of regulatory submission using eCTD software
21. Preparation of Clinical Trial Application (CTA) for US submission
22. Preparation of Clinical Trial Application (CTA) for EU submission
23. Comparison of Clinical Trial Application requirements of US, EU and Japan of a dosage form.
24. Regulatory requirements checklist for conducting clinical trials in India.
25. Regulatory requirements checklist for conducting clinical trials in Europe.
26. Regulatory requirements checklist for conducting clinical trials in USA

  
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REGULATORY AFFAIRS PRACTICAL - II  
(MRA 205P)

1. Case studies on
2. Change Management/ Change control. Deviations
3. Corrective & Preventive Actions (CAPA)
4. Documentation of raw materials analysis as per official monographs
5. Preparation of audit checklist for various agencies
6. Preparation of submission to FDA using eCTD software
7. Preparation of submission to EMA using eCTD software
8. Preparation of submission to MHRA using eCTD software
9. Preparation of Biologics License Applications (BLA)
10. Preparation of documents required for Vaccine Product Approval
11. Comparison of clinical trial application requirements of US, EU and India of Biologics
12. Preparation of Checklist for Registration of Blood and Blood Products
13. Registration requirement comparison study in 5 emerging markets (WHO) and preparing check list for market authorization
14. Registration requirement comparison study in emerging markets (BRICS) and preparing check list for market authorization
15. Registration requirement comparison study in emerging markets (China and South Korea) and preparing check list for market authorization
16. Registration requirement comparison study in emerging markets (ASEAN) and preparing check list for market authorization
17. Registration requirement comparison study in emerging markets (GCC) and preparing check list for market authorization
18. Checklists for 510k and PMA for US market
19. Checklist for CE marking for various classes of devices for EU
20. STED Application for Class III Devices
21. Audit Checklist for Medical Device Facility
22. Clinical Investigation Plan for Medical Devices

  
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PHARMACEUTICAL BIOTECHNOLOGY PRACTICAL - I  
(MPB 105P)

1. Analysis of Pharmacopoeial compounds and their formulations by UV Vis spectrophotometer
2. Simultaneous estimation of multi component containing formulations by UV spectrophotometry
3. Experiments based on HPLC
4. Experiments based on Gas Chromatography
5. Estimation of riboflavin/quinine sulphate by fluorimetry
6. Estimation of sodium/potassium by flame photometry
7. Isolation and Purification of microorganism from the soil
8. Microbial contamination of Water and biochemical parameters.
9. Determination of Minimum Inhibitory concentration by gradient plate technique and serial dilution method.
10. UV- survival curve and Dark repair
11. Sterility test for pharmaceutical preparations
12. Sub culturing of cells and cytotoxicity assays.
13. Construction of growth curve and determination of specific growth rate and doubling time
14. Fermentation process of alcohol and wine production
15. Fermentation of vitamins and antibiotics
16. Whole cell immobilization engineering
17. Thermal death kinetics of bacteria
18. Replica plating
19. Bio-autography.
20. Isolation and estimation of DNA
21. Isolation and estimation of RNA
22. Isolation of plasmids
23. Agarose gel electrophoresis.
24. Transformation techniques
25. SDS - polyacrylamide gel electrophoresis for proteins
26. Polymerase chain reaction technique.

  
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PHARMACEUTICAL BIOTECHNOLOGY PRACTICAL - II  
(MPB 205P)

1. Protein identification
2. Protein characterization
3. Protein biochemistry
4. Recombinant DNA Technology
5. Protein expression
6. Protein formulations
7. Database searching
8. Sequence analysis methods
9. Protein structure prediction
10. Gene annotation methods
11. Phylogenetic analysis
12. Protein, DNA binding studies
13. Preparation of DNA for PCR applications - Isolation, Purity and Quantification
14. Introduction to PCR - working of PCR, Programming.
15. Introduction to RT-PCR - working, programming.
16. Primer design using softwares.
17. Gene DNA amplification by random / specific primers.
18. Southern Hybridization
19. Western Blotting
20. Gene transformation


  
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PHARMACY PRACTICE PRACTICAL – I  
(MPP 105P)

Pharmacy Practice practical component includes experiments covering important topics of the courses Clinical Pharmacy Practice, Pharmacotherapeutics-I, Hospital & Community Pharmacy and Clinical Research.

List of Experiments (24)

1. Treatment Chart Review (one)
2. Medication History Interview (one)
3. Patient Medication Counseling (two)
4. Drug Information Query (two)
5. Poison Information Query (one)
6. Lab Data Interpretation (two)
7. Presentation of clinical cases of various disease conditions adopting Pharmaceutical Care Plan Model (eight)
8. ABC Analysis of a given list of medications (one)
9. Preparation of content of a medicine, with proper justification, for the inclusion in the hospital formulary (one)
10. Formulation and dispensing of a given IV admixtures (one)
11. Preparation of a patient information leaflet (two)
12. Preparation of Study Protocol (one)
13. Preparation of Informed Consent Form (one)


  
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PHARMACY PRACTICE PRACTICAL - II  
(MPP 205P)

Pharmacy Practice practical component includes experiments covering important topics of the courses Principles of Quality Use of Medicines, Pharmacotherapeutics-II, Clinical Pharmacokinetics & Therapeutic Drug Monitoring and Pharmacoepidemiology and Pharmacoeconomics.

List of Experiments (24)

1. Causality assessment of adverse drug reactions (three)
2. Detection and management of medication errors (three)
3. Rational use of medicines in special population (three)
4. Presentation of clinical cases of various disease conditions adopting Pharmaceutical Care Plan Model (eight)
5. Calculation of Bioavailability and Bioequivalence from the given data (two)
6. Interpretation of Therapeutic Drug Monitoring reports of a given patient (three)
7. Calculation of various Pharmacoeconomic outcome analysis for the given data (two)

  
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PHARMACOLOGICAL PRACTICAL - I  
(MPL 105P)

1. Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer
2. Simultaneous estimation of multi component containing formulations by UV spectrophotometry
3. Experiments based on HPLC
4. Experiments based on Gas Chromatography
5. Estimation of riboflavin/quinine sulphate by fluorimetry
6. Estimation of sodium potassium by flame photometry

Handling of laboratory animals.

1. Various routes of drug administration.
2. Techniques of blood sampling, anesthesia and euthanasia of experimental animals.
3. Functional observation battery tests (modified Irwin test)
4. Evaluation of CNS stimulant, depressant, anxiogenics and anxiolytic, anticonvulsant activity.
5. Evaluation of analgesic, anti-inflammatory, local anesthetic, mydriatic and miotic activity.
6. Evaluation of diuretic activity.
7. Evaluation of antiulcer activity by pylorus ligation method.
8. Oral glucose tolerance test.
9. Isolation and identification of DNA from various sources (Bacteria, Cauliflower, onion, Goat liver).
10. Isolation of RNA from yeast
11. Estimation of proteins by Bradford/Lowry's in biological samples.
12. Estimation of RNA/DNA by UV Spectroscopy
13. Gene amplification by PCR.
14. Protein quantification Western Blotting.
15. Enzyme based in-vitro assays (MPO, AChEs,  $\alpha$  amylase,  $\alpha$  glucosidase).
16. Cell viability assays (MTT/Trypan blue/SRB).
17. DNA fragmentation assay by agarose gel electrophoresis.
18. DNA damage study by Comet assay.
19. Apoptosis determination by fluorescent imaging studies.
20. Pharmacokinetic studies and data analysis of drugs given by different routes of administration using softwares
21. Enzyme inhibition and induction activity
22. Extraction of drug from various biological samples and estimation of drugs in biological fluids using different analytical techniques (UV)
23. Extraction of drug from various biological samples and estimation of drugs in biological fluids using different analytical techniques (HPLC)

PHARMACOLOGICAL PRACTICAL - II  
(MPL 205P)


1. To record the DRC of agonist using suitable isolated tissues preparation.
2. To study the effects of antagonist/potentiating agents on DRC of agonist using suitable isolated tissue preparation.
3. To determine to the strength of unknown sample by matching bioassay by using suitable tissue preparation.
4. To determine to the strength of unknown sample by interpolation bioassay by using suitable tissue preparation
5. To determine to the strength of unknown sample by bracketing bioassay by using suitable tissue preparation
6. To determine to the strength of unknown sample by multiple point bioassay by using suitable tissue preparation.
7. Estimation of  $PA_2$  values of various antagonists using suitable isolated tissue preparations.
8. To study the effects of various drugs on isolated heart preparations
9. Recording of rat BP, heart rate and ECG.
10. Recording of rat ECG
11. Drug absorption studies by averted rat ileum preparation.
12. Acute oral toxicity studies as per OECD guidelines.
13. Acute dermal toxicity studies as per OECD guidelines.
14. Repeated dose toxicity studies- Serum biochemical, haematological, urine analysis, functional observation tests and histological studies.
15. Drug mutagenicity study using mice bone-marrow chromosomal aberration test.
16. Protocol design for clinical trial.(3 Nos.)
17. Design of ADR monitoring protocol.
18. In-silico docking studies. (2 Nos.)
19. In-silico pharmacophore based screening.
20. In-silico QSAR studies.
21. ADR reporting

REFERENCES

1. Fundamentals of experimental Pharmacology-by M.N.Ghosh
2. Hand book of Experimental Pharmacology-S.K.Kulakarni
3. Text book of in-vitro practical Pharmacology by Ian Kitchen
4. Bioassay Techniques for Drug Development by Atta-ur-Rahman, Iqbal choudhary and William Thomsen
5. Applied biopharmaceutics and Pharmacokinetics by Leon Shargel and Andrew B.C.Yu.
6. Handbook of Essential Pharmacokinetics, Pharmacodynamics and Drug Metabolism for Industrial Scientists.


PHARMACOGNOSY PRACTICAL - I  
(MPG 105P)

1. Analysis of Pharmacopoeial compounds of natural origin and their formulations by UV Vis spectrophotometer
2. Analysis of recorded spectra of simple phytoconstituents
3. Experiments based on Gas Chromatography
4. Estimation of sodium/potassium by flame photometry
5. Development of fingerprint of selected medicinal plant extracts commonly used in herbal drug industry viz. Ashwagandha, Tulsi, Bael, Amla, Ginger, Aloe, Vidang, Senna, Lawsonia by TLC/HPTLC method.
6. Methods of extraction
7. Phytochemical screening
8. Demonstration of HPLC- estimation of glycerrhizin
9. Monograph analysis of clove oil
10. Monograph analysis of castor oil.
11. Identification of bioactive constituents from plant extracts
12. Formulation of different dosage forms and their standardisation.

  
DIRECTOR CUM PRINCIPAL  
LAUREATE INSTITUTE OF  
PHARMACY KATHOG  
TEH. JAWALAMUKHI  
DISTT. KANGRA (H.P.)

# HERBAL COSMETICS PRACTICALS (MPG 205P)

1. Isolation of nucleic acid from cauliflower heads
2. Isolation of RNA from yeast
3. Quantitative estimation of DNA
4. Immobilization technique
5. Establishment of callus culture
6. Establishment of suspension culture
7. Estimation of aldehyde contents of volatile oils
8. Estimation of total phenolic content in herbal raw materials
9. Estimation of total alkaloid content in herbal raw materials
10. Estimation of total flavonoid content in herbal raw materials
11. Preparation and standardization of various simple dosage forms from Ayurvedic, Siddha, Homoeopathy and Unani formulary
12. Preparation of certain Aromatherapy formulations
13. Preparation of herbal cosmetic formulation such as lip balm, lipstick, facial cream, herbal hair and nail care products
14. Evaluation of herbal tablets and capsules
15. Preparation of sunscreen, UV protection cream, skin care formulations.
16. Formulation & standardization of herbal cough syrup.

  
DIRECTOR CUM PRINCIPAL  
LAUREATE INSTITUTE OF  
PHARMACY KATHOG  
TEH. JAWALAMUKHI  
DISTT. KANGRA (H.P.)